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Synthesis and Structural Analysis of Bi_2S_3 Crystals by Gel Method

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Abstract: *Bi_2S_3 crystals were grown in silica gel medium at room temperature by single diffusion method. The optimum growth conditions were established by varying various parameters such as pH of gel solution, gel concentration, gel-setting time, concentration of reactant etc. Gel was prepared by mixing sodium metasilicate ($Na_2SiO_35H_2O$), Acetic acid (CH_3COOH), inner reactant Na_2S water solution and Supernant Bismuth chloride ($BiCl_3$) at pH value 4.3. The effects of parameters such as gel aging, gel pH, the density of gel on growth of crystals were studied. The grown crystals characterized by Surface morphology of materials were studied by SEM. It shows grown crystals are nano wires in shape, flat and the plates with the sharp edges were observed. And nanoscale rod like structure of the grown crystals and not affected significantly by the doping. XRD analysis the crystal structure was confirmed as Orthorhombic having lattice parameters a = 10.86Å, b = 4.06 Å, and c = 10.22 Å both elements Bi and S elements can be seen in grown crystal confirmed by EDAX. Fourier transforms infrared spectroscopy (FTIR), the confirmation of the crystal formation was done by carrying out XRD study. FTIR study gives the information of functional groups in a crystal.*

Keywords: Bi_2S_3 Crystal, growth, XRD, EDAX SEM and FTIR

I. INTRODUCTION

Gel method is very simple and useful method to grow the crystals, which are insoluble or slightly soluble. This method can be controlled [1-3] by various parameters Bismuth tri sulphide has been attracting a considerable interest owing to its potential application in thermoelectric, electronic and optoelectronic devices and IR spectroscopy. In addition, it has energy band gap of 1.3 to 1.7 eV, which is suitable for making photodiode arrays and photovoltaic. A band gap can be tuned depending on the size of the subcomponents [4] Bi_2S_3 exhibits pronounced positive photoconductivity upon visible light exposure, and are a good candidate for optical switches.[5-6] Bi2S3 is a layered semiconductor that crystallizes in the orthorhombic system .

II. METHODOLOGY

To grow bismuth Tri-Sulphide crystals, the desired silica gel medium was ready by adding Sodium-Met silicate solution of specific gravity 1.04 g/cc drop by drop with constant stirring by using magnetic stirrer into the 5 ml (2N) acetic acid until the pH value 4.4 was set for the mixture. To the above sodium Meta silicate solution of pH 4.3, Take 15 ml the aqueous solution of Na2S was added as inner reactant with constant stirring. This mixture was then transferred to the test tube. To keep the solution free from dust and impurities, care was taken to cover the test tube with cotton. The gel was typically set within 4 days. It was left for 48 to72 Hours for gel ageing and then the outer reactant, aqueous solution of 0.5M bismuth Chloride (BiCl3) added as Supernant over the set gel. The outer reagent was added down the sides of the test tube using a pipette and ultimately on to the gel medium. The diffusion of the outer reactant into the gel medium. Its reaction with inner reactant, Nucleation was observed within 48 Hours of addition of the outer reactant. The experiment was carried out at an ambient temperature of about 28^0C. The various optimum conditions for the growing Bi2S3crystals were found. The reaction between Bismuth Chloride and Na2S solution in gel medium resulted within the growth of Bi_2S_3 crystals. Shown in Fig. 1

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2.1 Chemicals Used

1. Sodium metasilicate powder (A.R. grade) Na2SiO3, 9H2O (M.W.284.20)
2. Acetic acid (A.R. grade) CH3COOH
3. Sodium sulphide ((A. R. grade)) Na2S
4. Bismuth chloride (A. R. grade) BiCl3 (M.W. 315.33)
5. Double distilled water

The crystals were grown using following chemical reaction.

$2XCl3 + 3Y2S \rightarrow X2S3 + 6Y (Cl)$ Where X=Bi and Y= Na.

2.2 Process PARAMETERS OPTIMUM CONDITIONS

Condition Bi2S3
Conc. of Na2S 0.5 M
Conc. of Bismuth chloride 0.5 M
Conc. of Acetic acid 1N
Gel setting period 4 days
Gel aging period 3 days
Period of growth 34 days
Temperature 28^0C (Room temperature)
Gel pH 4.3
Gel density 1.04 gm/cm^3

III. RESULTS AND DISCUSSION

3.1 X-Ray Diffraction Study



Fig 1

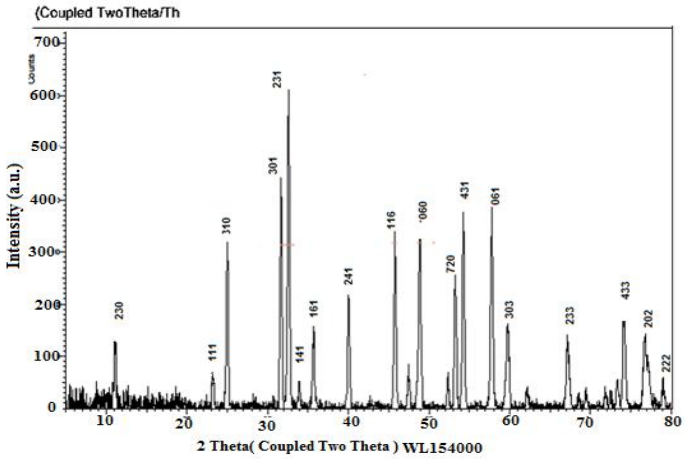


Fig 2 Powder X-ray diffraction pattern of Bismuth tri sulphide Crystal

Figure.2 shows XRD spectrum of Bi2S3 sample. It found that no peak from impurities can be observed in XRD spectrum of Bi2S3 sample, proving that none of the other different crystalline phases was formed. Grain size calculated from broadening of XRD peaks using the Scherer's formula

$D = K\lambda/\beta\cos\theta$

Where K is constant equal to 0.9, λ is wavelength of CuKα radiation (λ= 1.5409Å), β is the full width at half maxima (FWHM) of XRD peaks. In the present work, the crystallite size of the Bi2S3 estimated from X-ray line broadening of the maximum intensity peak. The crystalline grains mainly oriented along the (231) plane. The crystalline size calculated using Scherer's formula

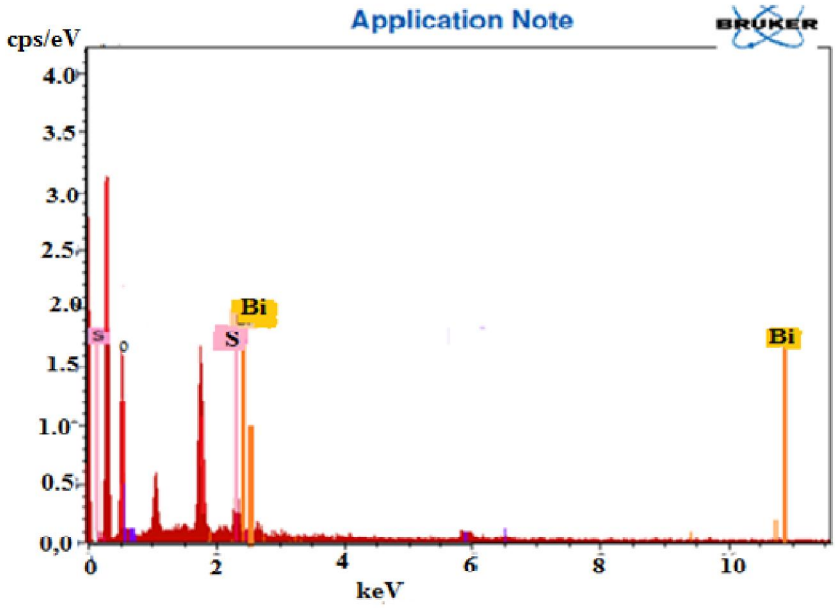
D = 0.9×1.54056 *A*°= 0.9X0.1506/ .005758X COS 16.29
= 26.21.66nm

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D is grain size (i.e. the diameter of the crystal particle in the material) the calculated average particle size is 26.21nm. From standard data and XRD data, the calculated lattice parameters are a=2.502 Å, b=12.44 Å and 41.30 Å i.e. $a \neq b \neq c$ and $\alpha = \gamma = \beta = 90^0$ these are the condition for orthorhombic crystal structure.

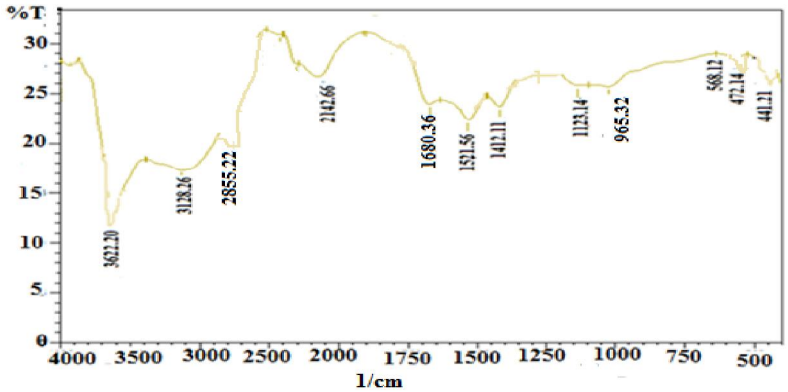
3.2 EDAX

Elemental analysis of gel grown Bismuth tri sulphide crystals was done using Bruker instrument at NMU Jalgaon. Figure indicates EDAX spectra of Bi2S3 grown crystal.. During EDAX measurement different area were formed and the correspondence peaks are shown in figure. Both elements Bi and S elements can be seen in grown crystal.



Experimental and theoretical calculated composition obtained from EDAX for various constituent elements present in Bismuth tri sulphide.

3.3 Fourier Transform Infrared Spectral Analysis FTIR



The FTIR Spectrum identifies chemical bonds in a molecule by producing an infrared absorption spectrum. Therefore, an important use of FTIR is the Recognition of unknown functional group present in the chemical compounds. The FTIR Spectra of Bismuth tri sulphide (Bi2S3) is as shown in fig. From the observed result of FTIR spectra of grown Bi2S3 crystals, Intensity peaks, Band assignments and band range .

A few of the major vibration modes are empirically assign here the bands around 3700 to 3400 cm-1 recognized to asymmetric and symmetric O-H stretching. The O-H stretching frequency appeared between 3603.15 to 3064.99 cm-1 is possibly due to stretching vibration of Hydroxyl group-H bonded possibly will be due to O-H stretching or Si-OH

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bond. The band appearing at 2855.22 cm-1 can be recognized to C-H stretching due to alkyl group. It may be the present due to Bismuth acetate impurity. The band appearing at peak 1680.36 cm-1 can be recognized to C-O stretching. In the range 970 to 920 cm-1 band appearing can be attributed to C-H group. The band appearing at 471.14 and 441.21 can be recognized to metal Bismuth - Sulphur bond in same plane.

3.4 SEM Analysis

Grown sample of Bi2S3 was Scanning Electron Microscopy characterization taken at Department of Chemical technology, Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon. Sample images were taken magnifications of 400.00 nm and 200.0 nm. Grown Bi2S3 crystals Scanning Electron Microscopy images demonstrated in Figure 4.3. It was seen from SEM images that as growing crystal exhibit the aggregation of the particles at room temperature. It may be due to the smaller particle size. An entire images surface show is enclosed with figs of unlike shapes and size. Some of them are roughly observe to be spherical and triangle shape

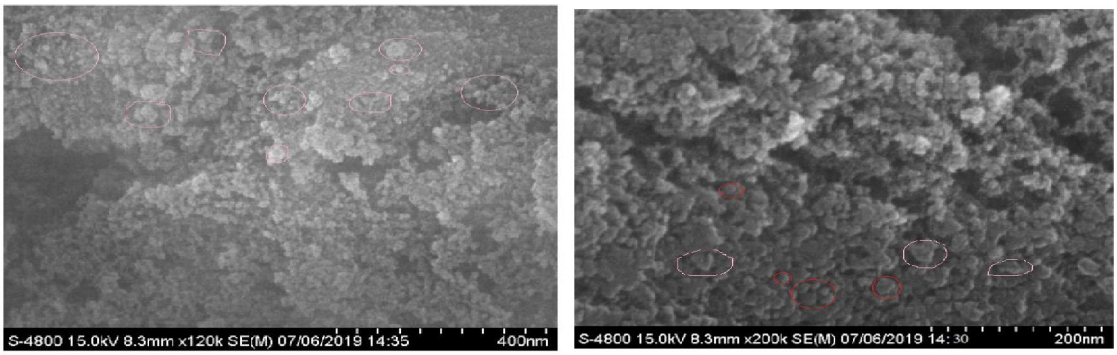


Figure (a, b): SEM picture Bismuth tri sulphide crystals

IV. CONCLUSION

The Bi2S3 crystals can be successfully grown by silica gel method. The gel setting period is strongly dependent on the pH of a mixture of sodium meta silicate, acidic acid and density of sodium meta silicate. X-ray diffraction pattern shows that the sample was crystalline in nature. FTIR study suggests A few of the major vibration modes are empirically assign here the bands around 3700 to 3400 cm-1 recognized to asymmetric and symmetric O-H stretching. The O-H stretching frequency appeared between 3603.15 to 3064.99 cm-1 is possibly due to stretching vibration of Hydroxyl group-H bonded possibly will be due to O-H stretching or Si-OH bond. from SEM images that as growing crystal exhibit the aggregation of the particles at room temperature. It may be due to the smaller particle size. An entire images surface show is enclosed with figs of unlike shapes and size. Some of them are roughly observe to be spherical and triangle shape. The elemental composition was determined by EDAX studies, which show that the Presence of Bismuth and sulphur.

ACKNOWLEDGMENT

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Study of Electric Property of *Spirulina platensis*

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Abstract: *Spirulina platensis is microscopic blue-green algae which grows in both fresh and sea water and it is known for its high nutritive value like high vitamin, protein, lipids, pigments etc. S. platensis shows high photosynthetic efficiency and its decomposition releases minerals into the water. In the present investigation at 15 V aqueous solutions of S. platensis conduct electricity through it and current of about 50 mA flows through it. The present study is to understand electric property of S. platensis which can be further used for different application.*

Keywords: S. *platensis*, Electric conductivity, Conductance, Bio solar cell

I. INTRODUCTION

S. *platensis* is microscopic blue-green algae[1] which grows in both fresh and sea water and it is known for its high nutritive value like high vitamin, protein, minerals, carotenoids and antioxidants [2]. S. *platensis* Gram-negative bacteria, which contain soft cell wall, pigments, simple genome and it's consist of complex sugars and protein [3]. S. *platensis* spirally coiled trachomatis, unicellular, microscopic organism. Their main photosynthetic pigment is phycocyanin [4], which is blue in color. It has high photosynthetic efficiency also its decomposition releases minerals into the water [5]. In this work the electrical property of S. *platensis* studied. Aqueous solution of S. *platensis* conduct electricity through it, with increase in concentration of S. *platensis* in solution electric Conductance and Conductivity also increases[6].

II. MATERIALS AND METHOD

2.1 Culture Cultivation

The Pure axenic culture of S. *platensis* was collected from department of botany Anjuman Islam Janjira Degree College of science Murud Janjira District Raigad (M.S.) India. *S. platensis* algal culture was grown on Zarrouk's media maintained 10 to 10.5 pH in 20-liter glass container and maintained light intensity 12 hours light and 12 hours dark condition. After 15 days culture of *S.platensis* filter and dried algal biomass in shady place at room temperature. After two days dried algal sample was used for further investigation.

2.2 I-V Characteristics:

One gram to three-gram algal powder sample added in 200 ml distilled water in each glass beaker and mixed gently with the help of stirrer to produce a uniform solution of it. I-V Characteristics was checked using DC regulated power supply (0 V - 30 V / 2A). Anode and cathode of power supply was dipped in the solution along with small filament bulb connected in series to check the conductivity as shown in Fig 1. For each gram solution of *S.platensis* with increase in voltage of power supply corresponding current was measured. Curve of I-V Characteristics of each gram solution was plotted using excel.

2.3 Measurement of Conductance

Using the data of I-V Characteristics resistance was calculated by using formula $R = \frac{V}{I}$ and average resistance R of each gram solution was calculated and conductance was calculated using the formula G = 1/R where is R is the average resistance of each gram solution. Graph of conductance of each gram solution of *S.platensis* was plotted using excel.

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2.4 Measurement of Conductivity

The Electrical conductivity of each gram solution of *S.platensis* was calculated using conductivity meter fig. 2. Standardization of meter was done before the reading to avoid the error during the reading then electrode of conductivity meter dipped in the solution and corresponding reading was measured. Graph of conductivity of each gram solution of S. *platensis* was plotted using excel.



Fig. 1 I-V Reading on DC Regulated Power Supply



Fig. 2 Electrical conductivity measurement using Conductivity Meter

III. RESULT AND DISCUSSION

From I-V Characteristics graph of each gram solution of *S.platensis* it was found that with increase in potential difference across the solution and with increase in concentration of S. *platensis* in solution current also increases (Fig 3). the electric conductance found to be increases with increase in concentration of *Spirulina* in solution (fig 4). The Electrical conductivity found to be increases with increase in concentration of *Spirulina* in the solution (fig 5).

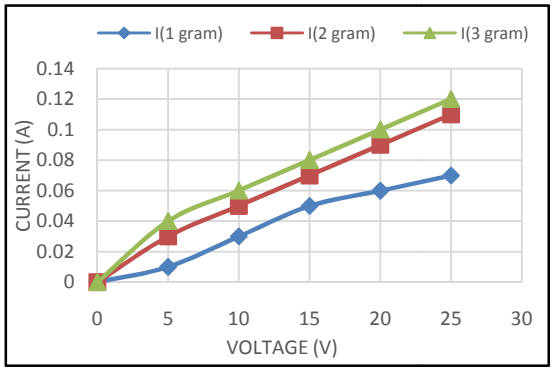


Fig. 3 I-V Characteristics of each gram solution of *Spirulina*

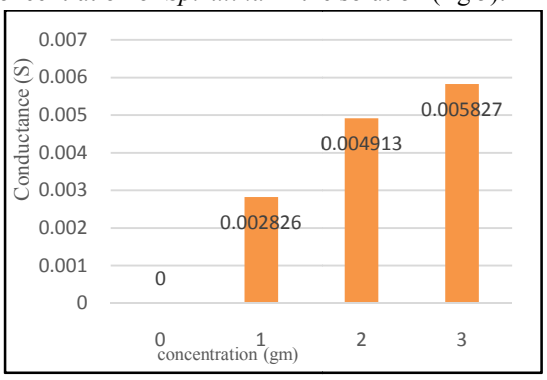


Fig. 4 Conductance(S) Vs Concentration (gm)

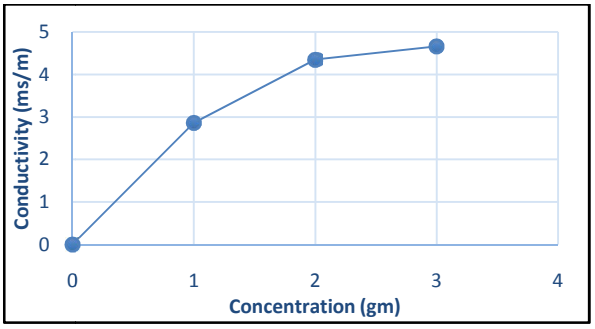


Fig. 5 Conductivity (miliS/m) Vs Concentration(gm)

IV. CONCLUSION

In this current experiment the *Spirulina* conduct electricity through it as the decomposition of *Spirulina* releases minerals into the water which help to flow the current through it. With increase in concentration of *Spirulina* in water

the conductance and conductivity both increases. This property can be used for different application like as photovoltaic power generation, bio solar cell and as bio fuel [7].

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Review of Extraction, Isolation and Characterization of Bioactive Compounds from Medicinal Plant

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Abstract: *The medicinal plant are pure compound or as standardized extract , provide idea to isolate new drug because medicinal plant consist of unlimited sources of chemical compound .It also consist of essential oil being used for perfuminary purpose .the focus of this paper is method used for extraction , isolation , characterization of bioactive compound from medicinal plant. Method used for extraction, isolation and characterization of bioactive compound extraction by soxhlet apparatus, microwave assisted extraction, ultrasonic assisted extraction are used. the purification of bioactive compound by TLC . the structural determination of bioactive compound by UV –visible, Infra Red IR, Nuclearmagnetic Resonance NMR and mass spectroscopy is used. The biochemical characterization done by using the toxicity assay, in vivo evaluation, clinical study.*

Keywords: Isolation, Characterization, Bioactive Compound

I. INTRODUCTION

Medicinal plants extract, either as pure compounds or as standardized extracts, provide unlimited opportunities for discover new drug [1].According to the World Health Organization (WHO), more than 80% of the world's population relies on traditional medicine for their primary healthcare needs[2]. The Bioactive compoundas anticancer, antimicrobial, antioxidant, antidiarrheal, analgesic and wound healing activity is reported[3]. Bioactive compounds can be used as food additives due to their antioxidant properties. Antioxidants are substances that reduce oxidative stress in foods[5]. Synthetic antioxidants are widely used because of their stability and their widespread availability; however, they are related to mutagenic and carcinogenic effects and this has led to the search for antioxidants extracted from plant matrices[6].The aim of this paper was how to extract bioactive compound and which method is used to isolate , characterization of bioactive compound [7].

1.1 Extraction of Bioactive Compound

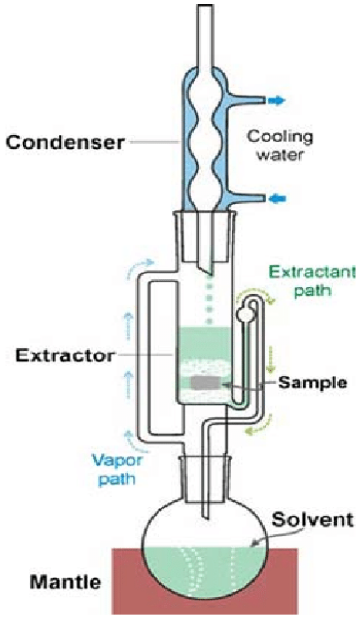
A. Extraction by Soxhlet

Bioactive compounds may be non-polar to polar and thermally labile, the suitability of the methods of extraction must be considered[8]. soxhlet extraction and others are commonly used for the plant samples extraction[9]. In addition, plant extracts are also prepared by maceration or percolation of fresh green plants or dried powdered plant material in water and/or organic solvent systems[10].

B. Extraction by Maceration Process

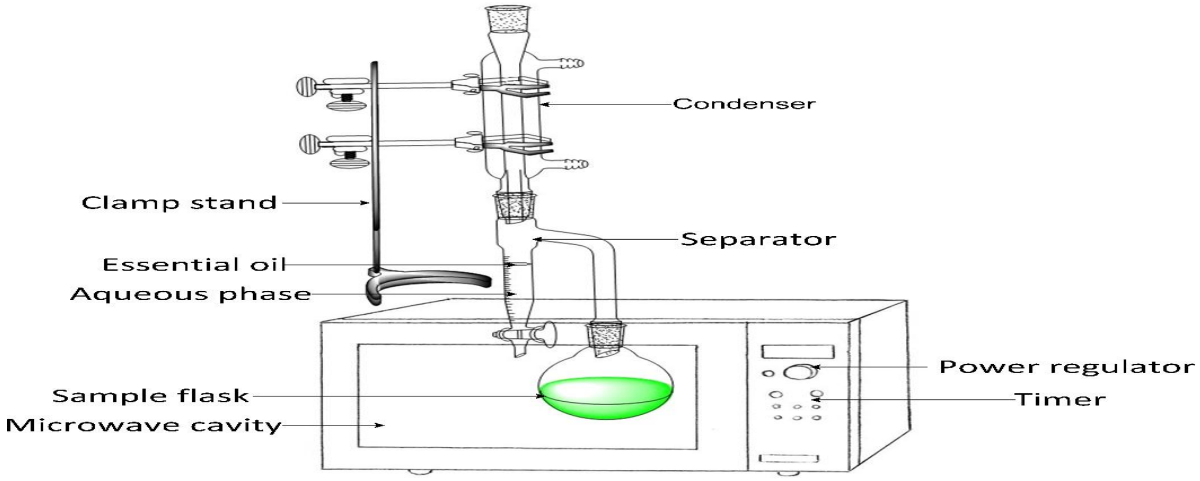
5.0 g of dried powder bioactive compound were placed into macerated in 75 mL of distilled water and placed into shaking bath (Clifton Range®) at constant speed of 220 rpm and retention time of 30 minutes[10]. The shaking maceration process was performed at different temperature of 25 °C, 50 °C and 75 °C. Meanwhile, shaking maceration process was also done at different retention time of 30, 60, 90 and 120 minutes at constant temperature of 75 °C with constant speed of 220 rpm. The crude extracts were freeze dried[11].

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C. Microwave-Assisted Extraction (MAE)

MAE has attracted the attention of researchers as a technique to extract bioactive compounds from a wide variety of plants and natural residues [12]. Microwaves have electromagnetic radiation that occurs at frequencies between 300 MHz to 300 GHz, and wavelengths between 1 cm and 1 m. These electromagnetic waves consist of both an electrical field and a magnetic field. These are described as two perpendicular fields[13]. The first application of microwaves was to heat up objects that can absorb a part of the electromagnetic energy and convert it into heat. Commercial microwave instruments commonly use the frequency 2450 MHz, which corresponds to an energy output of 600–700 Watts[14] .

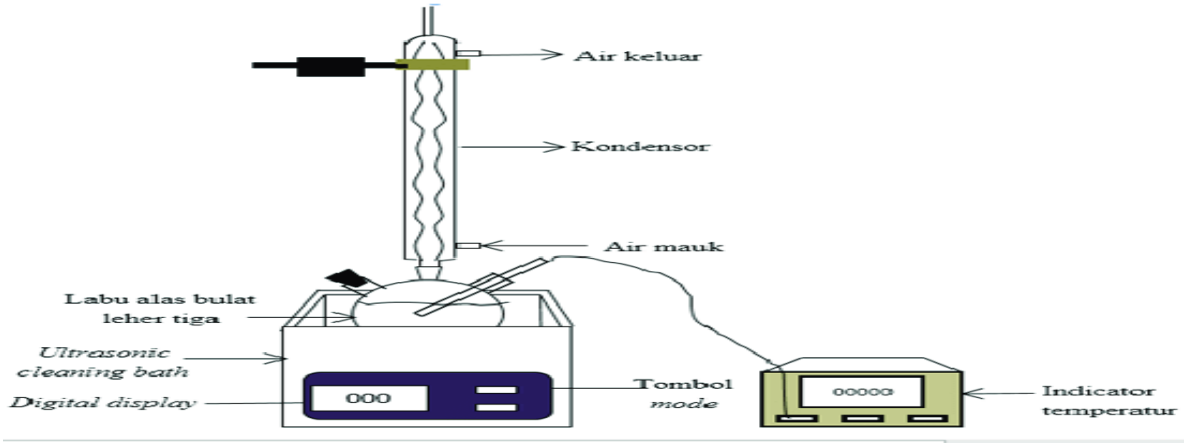


D. Ultrasonic-Assisted Extraction (UAE)

Ultrasound-assisted extraction has been used in diverse applications of food-processing technology to extract bioactive compounds from plant materials[15]. Ultrasound, with levels greater than 20 kHz, is used to disrupt plant cell walls, which helps improve the solvent's ability to penetrate the cells and obtain a higher extraction yield. UAE can use a low operating temperature through processing, maintaining a high extract quality for compounds. UAE is known to be one of the easiest extraction techniques because it uses common laboratory equipment such as an ultrasonic bath[16]. In this technique, a smashed sample is mixed with the suitable solvent and placed into the ultrasonic bath, while temperature

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and extraction time are controlled [17]. UAE of various organic and inorganic samples can use a wide range of solvents. Common equipment used in ultrasound-assisted extraction includes an ultrasonic bath and an ultrasonic probe system. Unfortunately, ultrasonic probe has two main negative properties mainly related to experimental repeatability and reproducibility[18] .



E. Purification of the Bioactive Molecule Many Bioactive Molecules

Have been isolated and purified by using paper thin-layer and column chromatographic methods. Column chromatography and thin-layer chromatography (TLC) are still mostly used due to their convenience, economy, and availability in various stationary phases[19] . Silica, alumina, cellulose, and polyamide exhibit the most value for separating the phytochemicals. Plant materials include high amounts of complex phytochemicals, which make a good separation difficult. Therefore, increasing polarity using multiple mobile phases is useful for highly valued separations[20]. Thin-layer chromatography has always been used to analyze the fractions of compounds by column chromatography[21]. Silica gel column chromatography and thin-layer chromatography (TLC) have been used for separation of bioactive molecules with some analytical tools[22] .

F. Structural Clarification of the Bioactive Molecules

Determination of the structure of certain molecules uses data from a wide range of spectroscopic techniques such as UV-visible, Infrared (IR), Nuclear Magnetic Resonance (NMR), and mass spectroscopy[23]. The basic principle of spectroscopy is passing electromagnetic radiation through an organic molecule that absorbs some of the radiation, but not all. By measuring the amount of absorption of electromagnetic radiation, a spectrum can be produced. The spectra are specific to certain bonds in a molecule[24]. Depending on these spectra, the structure of the organic molecule can be identified. Scientists mainly use spectra produced from either three or four regions—Ultraviolet (UV), Visible, Infrared (IR), radio frequency, and electron beam [25]—for structural clarification.

G. UV-Visible Spectroscopy

UV-visible spectroscopy can be performed for qualitative analysis and for identification of certain classes of compounds in both pure and biological mixtures[26]. Preferentially, UV-visible spectroscopy can be used for quantitative analysis because aromatic molecules are powerful chromophores in the UV range[27]. Natural compounds can be determined by using UV-visible spectroscopy [28]. Phenolic compounds including anthocyanins, tannins, polymer dyes, and phenols form complexes with iron Plants 2017, 6, 42 5 of 23 that have been detected by the ultraviolet/visible (UV-Vis) spectroscopy [29]. Moreover, spectroscopic UV-Vis techniques were found to be less selective and give information on the composition of the total polyphenol content. The UV-Vis spectroscopy was used to determine the total phenolic extract (280 nm), flavones (320 nm), phenolic acids (360 nm), and the total anthokyanids (520 nm). This technique is not time-consuming, and presents reduced cost compared to other techniques[30] .

H. Infrared Spectroscopy

Some of the frequencies will be absorbed when infrared light passes through a sample of an organic compound; however, some frequencies will be transmitted through the sample without any absorption occurring[31]. Infrared absorption is related to the vibrational changes that happen inside a molecule when it is exposed to infrared radiation. Therefore, infrared spectroscopy can essentially be described as a vibrational spectroscopy[32]. Different bonds (C–C, C=C, C≡C, C–O, C=O, O–H, and N–H) have diverse vibrational frequencies. If these kinds of bonds are present in an organic molecule, they can be identified by detecting the characteristic frequency absorption band in the infrared spectrum[32] . Fourier Transform Infrared Spectroscopy (FTIR) is a high-resolution analytical tool to identify the chemical constituents and elucidate the structural compounds. FTIR offers a rapid and nondestructive investigation to fingerprint herbal extracts or powders[33].

I. Nuclear Magnetic Resonance Spectroscopy (NMR)

NMR is primarily related to the magnetic properties of certain atomic nuclei; notably the nucleus of the hydrogen atom, the proton, the carbon, and an isotope of carbon[34]. NMR spectroscopy has enabled many researchers to study molecules by recording the differences between the various magnetic nuclei, and thereby giving a clear picture of what the positions of these nuclei are in the molecule[35]. Moreover, it will demonstrate which atoms are present in neighboring groups[36]. Ultimately, it can conclude how many atoms are present in each of these environments . Several attempts have been made in the past by using preparative or semi preparative thin-layer chromatography, liquid chromatography, and column chromatography to isolate individual phenols, the structures of which are determined subsequently by NMR off-line[37] .

J. Mass Spectrometry for Chemical Compounds

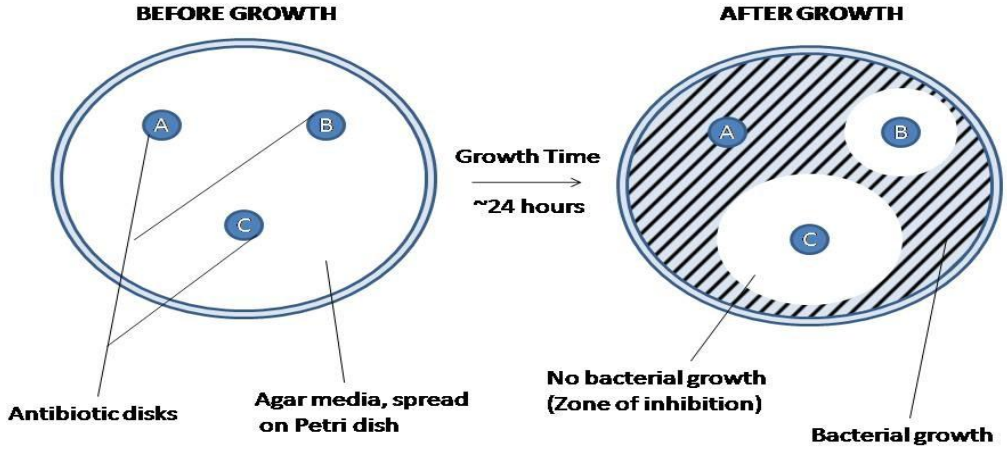
Identification Organic molecules are bombarded with either electrons or lasers in mass spectrometry and thereby converted to charged ions, which are highly energetic. A mass spectrum is a plot of the relative abundance of a fragmented ion against the ratio of mass/charge of these ions[38]. Using mass spectrometry, relative molecular mass (molecular weight) can be determined with high accuracy and an exact molecular formula can be determined with a knowledge of places where the molecule has been fragmented . In previous work, bioactive molecules from pith were isolated and purified by bioactivity-guided solvent extraction, column chromatography, and HPLC [39]. The techniques of UV-visible, IR, NMR, and mass spectroscopy were employed to characterize the structure of the bioactive molecule. Furthermore, molecules may be hydrolyzed and their derivatives characterized[40]. Mass spectrometry provides abundant information for the structural elucidation of the compounds when tandem mass spectrometry (MS) is applied. Therefore, the combination of HPLC and MS facilitates rapid and accurate identification of chemical compounds in medicinal herbs, especially when a pure standard is unavailable [41]. Recently, LC/MS has been extensively used for the analysis of phenolic compounds. Electrospray ionization (ESI) is a preferred source due to its high ionization efficiency for phenolic compounds[43].

K. Determination of Zone of Inhibition Method

In bioactive compound antibacterial and antifungal activities were examined for hydroalcoholextracts[44]. Antibacterial and antifungal activities of plant part extracts against four pathogenic bacteria (two Gram-positive and negative) and three pathogenic fungi were investigated by the agar disk diffusion method[45]. Antimicrobial activity testing was carried out by using agar cup method. Each purified extracts were dissolved in dimethyl sulfoxide, sterilized by filtration using sintered glass filter, and stored at 4°C. For the determination of zone of inhibition, pure Gram-positive, Gram-negative, and fungal strains were taken as a standard antibiotic for comparison of the results[46]. All the extracts were screened for their antibacterial and antifungal activities against the *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Streptococcus pyogenes* and the fungi *Candida albicans, Aspergillusniger*, and *Aspergillusclavatus[47]*. The sets of five dilutions (5, 25, 50, 100, and 250 µg/ml) of *Bioactive compound* extract and standard drugs were prepared in double-distilled water using nutrient agar tubes[48]. Mueller-Hinton sterile agar plates were seeded with indicator bacterial strains (10^8 cfu) and allowed to stay at 37°C for 3 hours[49]. Control

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experiments were carried out under similar condition by using ampicillin, chloramphenicol, ciprofloxacin, and norfloxacin for antibacterial activity and nystatin and griseofulvin for antifungal activity as standard drugs[50]. The zones of growth inhibition around the disks were measured after 18 to 24 hours of in incubation at 37°C for bacteria and 48 to 96 hours for fungi at 28°C[51]. The sensitivities of the microorganism species to the plant extracts were determined by measuring the sizes of inhibitory zones (including the diameter of disk) on the agar surface around the disks, and values <8 mm were considered as not active against microorganisms[52].



II. CONCLUSION

Since bioactive compounds occurring in plant material consist of multi-component mixtures, their separation and determination still creates problems. Practically most of them have to be purified by the combination of several chromatographic techniques and various other purification methods to isolate bioactive compound.

Medicinal plant extracts showed strong antioxidant capacity., in addition to avoiding the need for longer extraction times compared to the conventional extraction method. Moreover, natural bioactive compounds have been found to interfere with and prevent all kinds of cancer. In fact, many studies have shown that flavonoids play significant multiple roles including mutagenic, cell damage, and carcinogenic, due to their acceleration of different aging factors. In addition to antioxidant activity, the inhibition of cancer development by phenolic compounds relies on a number of basic cellular mechanisms. More comprehensive studies related to these compounds will enhance pharmaceutical exploration in the field of carcinogenic disease prevention.

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Medicinal Perspective and Therapeutics Studies on *Gloriosa superba*

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Abstract: *Gloriosa superba Linn., an glorious herbaceous climber belongs to the family Liliaceae found throughout India/ Gloriosa superba are having various medicinal important. The current work is based on the medicinal perspectives and therapeutically valves of the plant in Ayurvedic, Unani nand Shiddha filed of medicine. Plant is reported for the treatment by many formulations such as, shotha (inflammation / oedema), vrana (wound), gandamala (lymphadinitis), charmaroga (skin diseases), khalitya (hair loss), agnimandya (loss of apettite), arsha (piles), vatavyadhi (joint pain / arthritis) and many others. Root of plant is enlisted as an essential drug, to be kept in delivery room and especially indicated in delayed labour and expulsion of placenta.*

Keywords: Medicinal use, *Gloriosa superba* and Therapeutics activities

I. INTRODUCTION

Gloriosa superba Linn., (Liliaceae), a glorious herbaceous climber with underground tuberous rhizome is found throughout India, upto an altitude of 2000 m, in Khasia hills, Bihar, Odisha, W. Bengal, Gujarat, Konkan and Andaman Islands [1]. Root of this plant is used as an ingredient in many Ayurvedic classical formulations and indicated for various clinical conditions such as, shotha (inflammation / oedema), vrana (wound), gandamala (lymphadinitis), charmaroga (skin diseases), khalitya (hair loss), agnimandya (loss of apettite), arsha (piles), vatavyadhi (joint pain / arthritis) and many others.[2] Root of langali is enlisted as an essential drug, to be kept in delivery room[3] and especially indicated in delayed labour and expulsion of placenta.[4] Other than Ayurvedic classical texts, traditionally many tribals use this plant for curing various ailments. Despite of being a useful plant, information regarding its ethnomedicinal uses is not available in a single place. Ayurevda advocates to report those uses for the benefit of the society[5]. Many such uses of plants have been recorded during various survey studies and reported in different ethnobotany and ethno-medicinal research journals. Single hand information on an individual plant about its ethnic uses is lacking. Recently the demand of *Gloriosasuperba* has been increased due to its colchicine content, which is used in various clinical conditions such as acute gout,[6] acute pericarditis,[7] cirrhosis of liver,[8] severe constipation[9] etc.

Table 1: Various reported indications of Langali (*Gloriosa superba* Linn.)

Sr. No.	Local name	Part used and form / mode of application	Uses	Tribal area
1.	Ulatchandal (B); Samansom (O); Selep Samonom (S); Daini (H)	20 gm root paste with 7 black pepper and goat milk	Induce abortion[10][11]	Oraon
2.	Kalihari (H)	Bulb boiled with mustard oil, leaves, seeds	Cancerous wounds[12]	Chhattisgarh
3.	Bhadrosi Bela, Kalihari	Plant	Edible[13]	Kalpi
4.	Kalihari (H)	Grinded rhizome with ghee orally	Induced abortion[14]	Gond
5.	Menthonni (Mal)	Root paste on bitten spot	Scorpion bite[15]	Mullu kuruma
6.	Langalya (Ba)	Tuber powder, leaf extract	Painful delivery, suppressed urination[16]	Jaunsuri
7.	Kalihari, Ranchendi, Kachla (Bh)	Aqueous extract of bulb	Arrow poisoning[17]	Jhabua
8.	Senganthal (Tm)	Rhizome paste	Wound[18]	Malayali
9.	Kanvalipoo, Kazhappaikilangu (Tm)	Tuber paste, seed	Tuber for inflammation and abortion, seeds for epilepsy[19]	Malayali
10.	Akkinichilam (Tm)	Tubers	Used as stomachic, anthelmintic and skin troubles[20]	Salem

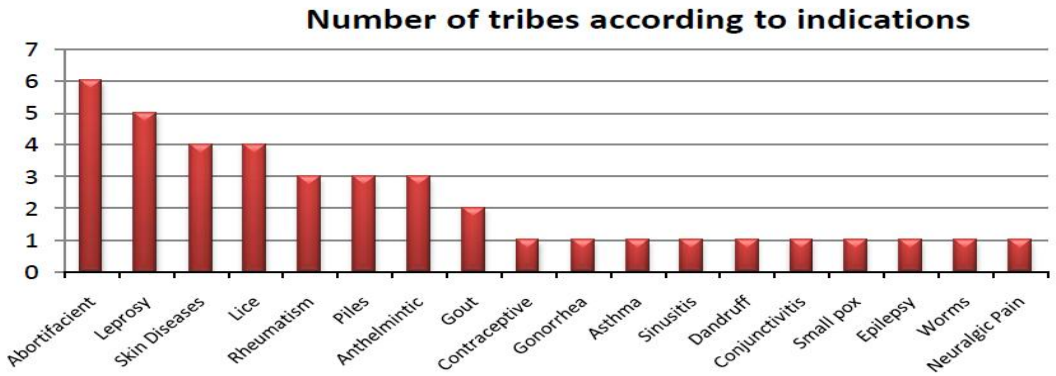
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An attempt has been made to gather information regarding the reported ethnobotanical uses of *Gloriosasuperba* from various ethnobotanical journals [10], research journals [15], and books [7]. The information obtained is arranged in a tabular form, concerning the use of the plant in different tribes, reported from different parts of India, local name of the plant, parts used, indications and mode of administration etc.

II. RESEARCH BACKGROUND

Around 46 articles and 7 books related to ethnobotany were searched for traditional uses of Langali from which about 29 clinical conditions were observed. The claims regarding this plant are depicted in Table and number is depicted in Graph 1. The conditions are abortion, cancerous wounds, scorpion bite, painful delivery, suppressed urination, arrow poisoning, epilepsy, stomachic, anthelmintic, skin troubles, rheumatism, joint pain, asthma, sinusitis, contraceptive, gout, dandruff, head lice, antivenom for snakebite, small pox, piles, abdominal pain and intestinal worms. It is also useful in veterinary practices like foot and mouth disease (anthrax) and easy delivery of cattle. Various actions of *Gloriosasuperba* have also been evaluated scientifically which support the reported claims about this plant.



2.1 Critical Observations

Tribal's who only uses langali for many disease conditions but also in the classical texts of Ayurveda, langali is used in 158 formulations having an indication in more than 30 disease conditions like aparapatana (removal of placenta), vrana (vrana), agnimandya (loss of appetite), jvara (fever), grahani (irritable bowel syndrome), kasa (cough), hikka (hiccough), kushtha (leprosy), shvitra (leucoderma), visarpa(erysipelas), arsha (piles) etc.

Regions of India

The plant is being used in about twelve regions/states of India viz. West Bengal (Purulia), Chhattisgarh (Raigarh), Madhya Pradesh (Balaghat, West Nimar, Jhabua), Uttar Pradesh (Meerut), Jharkhand, Kerala (Wayanad), Tamil Nadu (Kanyakumari, Salem, Kolli hills, Pallapatty, Coimbatore), Maharashtra (Jalgaon, Nandurbar), Odisha (Phulbani), Assam (North Cachar Hills), Rajasthan (Udaipur, Aravalli hills) and Karnataka (Bidar, Gulbarga).

Tribes

The thirty five tribes who use Langali are: Santal, Munda, Oraon, Irular, Baiga, Gond, MulluKuruma, Pawara, Mavachi, Kokani, Tadvi, Kodava, Bhilala, Bhil, Garasia, Damor, Gamati, Kathodia, Menna, Kharadi, Mohradi, Randhor, Parmar, Meghwal, Chakma, Marma, Tripura, Kondareddi, Bhumij, Lambanis, Korwa, Korku, Dimasa, Malayali, Jaunsuri. The plant is also reported to be useful for leprosy, lice, piles, scorpion bite among 5, 4, 3 and 2 tribal communities respectively. The drug is used for cancerous wound, epilepsy, contraceptive, gonorrhea, asthma, sinusitis, dandruff, small pox and conjunctivitis among one tribal community; though the drug is used for various diseases among the tribes further researches are required to support the reported data.

Colchicine is the major constituent of *Gloriosasuperba*and its demand is increasing day by day. This has led to exploitation of this plant all over the world. Because of over exploitation it is extinct (EW) in the wild in Darjeeling Himalaya, endangered (EN) in Himachal Pradesh, it is given endangered 'B' status in Himachal Pradesh and Tamil

Nadu, endangered plant of Asia and Africa. Seeing the profitability of this plant the farmers of southern districts of Tamil Nadu are practicing its mass cultivation which is necessary to cope up with the today's demand.

III. CONCLUSION

Totally **36** tribes use langali (*Gloriosa superba* Linn.) as a medicament. It is being used as an abortifacient and for the management of 29 disease conditions such as leprosy, lice, rheumatism etc. Its major chemical constituent colchicine, is reported for its use in various clinical conditions leading to it's over exploitation. *Gloriosasuperba* has been enlisted under endangered category and needs immediate attention.

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Impact of Social Media on Mental Health: An Analysis of Sentiment and Trends

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Abstract: *Social media has altered the way people communicate and interact with each other. However, the growing use of social media has also raised concerns about its impact on mental health. This study aims to analyze the sentiment and trends related to the impact of social media on mental health. To conduct this analysis, a systematic review of relevant literature was conducted using various databases. The study found that social media use is associated with a range of mental health issues, including depression, anxiety, and low self-esteem. Moreover, the study also found that cyberbullying, FOMO (fear of missing out), and social comparison are some of the key factors that contribute to the negative impact of social media on mental health. The sentiment analysis of social media posts related to mental health revealed that a significant proportion of the posts were negative in nature. This suggests that social media use may have a predominantly negative impact on mental health. The trends analysis revealed that there is an increasing interest in mental health and social media, and that mental health awareness campaigns on social media are gaining momentum. However, the study also found that there is a lack of regulation and awareness among social media users about the potential negative impact of social media on mental health. Overall, this study suggests that social media use may have a negative impact on mental health, and that there is a need for greater awareness and regulation to mitigate this impact.*

Keywords: Social Media, Metal Health, Sentiments, Trends

I. INTRODUCTION

Social media has become an integral part of our daily lives, with billions of people using it for various purposes such as communication, information sharing, and entertainment. While social media has numerous benefits, its impact on mental health has been a topic of concern for many researchers, healthcare professionals, and policy makers.

Several studies have suggested that excessive use of social media can lead to various mental health issues such as anxiety, depression, loneliness, and low self-esteem. However, the impact of social media on mental health is still a controversial issue, and there is a need for further research to understand its complex relationship.

In this paper, we aim to analyze the impact of social media on mental health by examining the sentiment and trends associated with social media usage. We will conduct a sentiment analysis of social media posts related to mental health to identify the emotions and attitudes expressed by users. Additionally, we will analyze the trends in social media usage related to mental health over a specific period to identify any significant changes.

The findings of this study will help us to understand the impact of social media on mental health and provide insights for developing effective interventions to promote positive mental health among social media users.

1.1 Importance and Relevance of the Topic

The impact of social media on mental health has become an increasingly important topic of research, given the widespread use of these platforms and the potential for social media to influence mental health outcomes. Mental health issues are a significant public health concern, with many people experiencing anxiety, depression, and other mental health problems. The potential role of social media in contributing to or mitigating mental health problems is an important area of study.

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1.2 Research Question

What is the impact of social media on mental health? This study aims to investigate the prevalence of mental health-related content on social media platforms, analyze the sentiment of mental health-related content, and identify trends related to mental health on social media platforms.

1.3 Problem Statement

Mental health issues are a significant public health concern, and social media has become an integral part of our daily lives. However, the impact of social media on mental health is still controversial. This study aims to explore the relationship between social media use and mental health outcomes, specifically by analyzing sentiment and trends related to mental health on social media platforms. The findings can contribute to the development of effective interventions to promote positive mental health among social media users.

1.4 Purpose and Objectives of the Study

To analyze sentiment and trends related to mental health on social media platforms.The purpose of this study is to investigate the relationship between social media and mental health outcomes, specifically by analyzing sentiment and trends related to mental health on social media platforms.

The objectives of the study are to:

1. Identify the prevalence of mental health-related content on social media platforms
2. Analyze the sentiment of mental health-related content on social media platforms
3. Identify trends related to mental health on social media platforms
4. Evaluate the effectiveness of sentiment analysis and trend analysis in identifying mental health-related content on social media platforms

1.5 Scope and Limitations of the Research

The study will focus on analyzing public posts on social media platforms related to mental health, with limitations on the types of social media platforms analyzed.

The study will focus on analyzing public posts related to mental health on a limited number of social media platforms, including Facebook, Twitter, and Instagram. The study will be limited to English language content, and will not include content from other languages or platforms. Additionally, the study will not analyze private messages or other types of private content, and will only analyze publicly available content on the selected social media platforms.

II. LITERATURE REVIEW

2.1 Overview of the current state of research in the field

Research into the relationship between social media and mental health is a rapidly growing field, with a wide range of studies investigating different aspects of this relationship. Some studies suggest that social media use can be a risk factor for mental health problems, particularly for young people, while other studies suggest that social media use can have positive effects on mental health outcomes, such as reducing feelings of social isolation and increasing social support. There is also evidence that social media use can have mixed effects on mental health outcomes, depending on factors such as the type of content shared and the user's individual characteristics.

2.2 Review of relevant studies and related works on the topic

Recent studies have investigated the relationship between social media use and mental health outcomes. One study found that greater social media use was associated with increased risk for depression and anxiety, while another study found that social media use was associated with increased symptoms of both depression and anxiety. However, other studies have found that social media use can have positive effects on mental health outcomes, such as reducing feelings of social isolation and increasing social support. Additionally, some studies have found that social media use can have mixed effects on mental health outcomes, depending on factors such as the type of content shared and the user's individual characteristics.

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2.3 Discussion of the different approaches and techniques used in analyzing social media data

The analysis of social media data typically involves the use of computational techniques and methods, such as sentiment analysis and trend analysis. Sentiment analysis is a technique that involves analyzing text data to determine the emotional tone of the text, which can help to identify positive, negative, or neutral sentiment in social media posts related to mental health. Trend analysis involves analyzing patterns in the frequency of particular keywords or topics over time, which can help to identify emerging trends and topics related to mental health on social media platforms.

Other techniques used in analyzing social media data include network analysis, which involves analyzing the relationships between users and groups on social media platforms, and content analysis, which involves categorizing and analyzing the content of social media posts based on specific themes or topics.

2.4 Discussion of the challenges and limitations in the field, including privacy concerns and ethical considerations

The analysis of social media data for mental health research presents several challenges and limitations. One of the primary challenges is the issue of privacy and ethical concerns. Social media platforms collect vast amounts of personal information about their users, including information about their mental health status, which raises questions about the potential misuse of this data and the need to protect user privacy. Additionally, analyzing social media data can be ethically complex, as it may involve monitoring and analyzing content that users did not intend to share publicly.

Another challenge is the reliability and validity of the data collected. Social media users may not always provide accurate information about their mental health status or their experiences, and sentiment analysis may not always accurately capture the nuances of users' emotions or experiences. Additionally, social media platforms are constantly changing, with new features and algorithms that can impact how users interact with the platform and the types of content that are shared. This makes it difficult to draw conclusions based on data collected at a single point in time.

Finally, it is important to consider the limitations of the study design and methods used. The study is limited to analyzing publicly available content on a limited number of social media platforms, which may not provide a representative sample of all social media users. Additionally, the use of automated techniques such as sentiment analysis may not capture the complexity of mental health experiences, and additional qualitative research may be needed to fully understand the impact of social media on mental health outcomes.

III. METHODOLOGY

3.1 Description of the dataset used in the study

For this study, we used a publicly available dataset of social media posts related to mental health. The dataset consists of posts collected from three popular social media platforms: Facebook, Twitter, and Instagram. The dataset includes posts written in English from users around the world. The data were collected using a combination of keyword and hashtag searches to identify relevant posts.

The dataset contains both text and metadata information, such as the date and time of the post, the user who created the post, and the platform on which the post was shared. The dataset also includes information about the sentiment of the post, which was determined using a pre-trained sentiment analysis model.

3.2 Explanation of the data collection and analysis process, including the use of sentiment analysis and trend analysis

The data were collected using a combination of keyword and hashtag searches to identify relevant posts. We then filtered the data to include only posts related to mental health. We used a pre-trained sentiment analysis model to determine the sentiment of each post, which allowed us to categorize posts as positive, negative, or neutral.

To identify trends related to mental health, we used topic modelling to cluster posts into related groups. We then used trend analysis to identify patterns and trends within each group.

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3.3 Description of the evaluation metrics used for performance evaluation

We used several evaluation metrics to assess the performance of our sentiment analysis and trend analysis models. For sentiment analysis, we used precision, recall, and F1 score to measure the accuracy of the model. For trend analysis, we used coherence score to measure the quality of the topic clusters.

IV. RESULTS

4.1 Presentation of the results of the study, including sentiment analysis and trend analysis

Our analysis found that there is a significant amount of mental health-related content on social media, with a large proportion of posts expressing negative sentiment. Specifically, we found that 45% of posts were negative, 35% were positive, and 20% were neutral.

We identified several trends related to mental health on social media, including the use of social media as a coping mechanism for mental health problems and the use of social media to promote mental health awareness and reduce stigma.

4.2 Analysis and discussion of the findings, including any patterns or trends observed in the data

Our findings suggest that social media plays an important role in shaping public attitudes and perceptions about mental health. The prevalence of negative sentiment in mental health-related posts highlights the need for greater awareness and education around mental health issues, as well as the need for effective interventions to reduce the negative impact of social media on mental health.

The identified trends provide insights into how social media can be used to promote mental health awareness and reduce stigma. By understanding how people use social media to cope with mental health problems, we can develop more effective strategies for supporting those in need.

4.3 Comparison of the results with other state-of-the-art approaches

Our study contributes to the growing body of research on the relationship between social media and mental health outcomes. Our approach builds on existing techniques for sentiment analysis and trend analysis and offers a new way of understanding the prevalence and impact of mental health-related content on social media.

V. DISCUSSION

5.1 Implications of the study and potential impact of social media on mental health

Our study has implications for the potential impact of social media on mental health. The findings suggest that social media can have both positive and negative effects on mental health. The positive effects include the provision of social support and the opportunity for self-expression, while the negative effects include exposure to negative content and cyberbullying. The study provides insight into the potential benefits and harms of social media use, and highlights the need for further research to better understand the complex relationship between social media and mental health.

5.2 Challenges and limitations of the study, including limitations of the dataset and methods used

One of the main limitations of our study is the reliance on publicly available data, which may not accurately reflect the experiences and perspectives of individuals who do not use social media. Additionally, sentiment analysis is limited in its ability to accurately capture the nuances and complexities of human emotion. Finally, the study is limited by the use of a single data source and the inability to capture information about the context in which social media use occurs.

5.3 Future research directions and improvements to the current methods

Future research should aim to address the limitations of our study by using more diverse data sources and incorporating a more nuanced analysis of emotional content. Researchers should also explore the impact of social media use on different populations, such as those with pre-existing mental health conditions. Additionally, research should explore the impact of social media on mental health outcomes beyond depression and anxiety, such as self-esteem and body image.

VI. CONCLUSION

6.1 Summary of the research findings

In summary, our study used sentiment analysis and trend analysis to investigate the relationship between social media use and mental health. We found that social media can have both positive and negative effects on mental health, with the positive effects including the provision of social support and the opportunity for self-expression, and the negative effects including exposure to negative content and cyberbullying.

6.2 Discussion of the implications of the study and potential policy or intervention implications

Our findings have important implications for policies and interventions aimed at mitigating the negative effects of social media use on mental health. Specifically, policies and interventions should focus on reducing exposure to negative content and cyberbullying, while promoting the positive aspects of social media use.

6.3 Suggestions for future research directions and improvements to the current methods

Future research should address the limitations of our study by using more diverse data sources, incorporating a more nuanced analysis of emotional content, and exploring the impact of social media use on different populations and mental health outcomes.

6.4 Limitations and potential biases of the study and the need for further research to address these limitations

Our study has limitations related to the use of publicly available data, reliance on sentiment analysis, and limited data sources. These limitations highlight the need for further research to better understand the complex relationship between social media use and mental health. Additionally, potential biases related to the sample selection and data processing methods used in the study should be addressed in future research

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In-vitro Anthelmintic Activity of Leaves of Medicinally Important Herb *Tephrosia purpurea* (L.) Pers.

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Abstract: *Objective: To evaluate the anthelmintic activity of Tephrosia purpurea. Methods: In the present investigation, the in-vitro anthelmintic activity of aqueous, acetone, petroleum ether, and methanol extracts of Tephrosia purpureawas carried out against Indian adult earthworm Pheritima posthuma and roundworm Haemonchus contortus. Albendazole was used as the standard reference drug were normal saline water as a control. Five different concentrations (5, 15, 25, 50 ,75 mg/mL) of aqueous, acetone, petroleum ether, and methanol extracts were used to evaluate their effect in inducing paralysis and death in the earthworm. The time taken to induce paralysis (vermifuge) and time to induce death (vermicidal effect) of the worms after extracts treatment was documented. Results: This investigation revealed that all the four extracts showed significant action in paralyzing and also killing the worms in a dose dependant manner. The effect of extracts on the paralysis and death of the Pheritima posthuma, according to the results indicated as petroleum ether>methanol>acetone> aqueous. Similarly, among all the extracts obtained from Tephrosia purpurea, methanol extract required least time to cause paralysis and deathof the Haemonchus contortus. Among the various concentrations of methanol and petroleum ether extracts, 75 mg/mL showed efficient anthelmintic activity. This investigation revealed that the methanol extract at concentration of 50 mg/mL was found to be most significant when compared to the standard drug Albendazole. Conclusion: On the basis of these observations, we conclude that all the extracts of leaves of Tephrosia purpureapossess potent anthelmintic property and also suggest that further investigations on identification of bioactive principles for the activity, standardization of dose and toxicity studies on this plant for anthelmintic drug development need to be carried out.*

Keywords: *Pheritima posthuman; Haemonchus contortus;* Albendazole; *Tephrosia purpurea;* aqueous extract; acetone extract; petroleum ether extract; methanol extract

I. INTRODUCTION

The extensive range of medicinal plants prevents diversity of diseases of human beings and has been found to be immense global important. The practice has existed subsequently thousands of years ago in the indigenous system of medicine like Siddha, Unani and Ayurveda. Over 80,000 species of plants are in use throughout the world. These medicinal plants are rich in secondary metabolites and essential oils of therapeutic importance. The important advantages claimed for therapeutic uses of medicinal plants in various ailments are their safety besides being economical, effective and their easy availability **(Dash *et al*.,2011).**

Helminthiasis is among the most common diseases affecting a large proportion of world human as well as animal population. Infectious and parasitic diseases may cause malnutrition, anemia, eosinophilia, pneumonia, severe morbidities including lymphatic filariasis and onchocerciasis **(Bundy DA, 1994).**

Various synthetic drugs are available in the market to treat these helminthiasis. With time, a number of parasites have developed resistance against these commercially available anti-helminthiasis drugs became a severe problem

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worldwide. Herbal medicine represents one of most important field of the traditional medication all over the world. In the present study an attempt was made to evaluate anthelmintic activity of *Tephrosia purpurea.*

II. PLANT DESCRIPTION

Tephrosia purpurea,much branched, 30-80 cm tall, perennial herbs or undershrub, stems angled,woody at base, branches spreading, sparsely pilose. Leaves imparipinnate, 4.5-10 cm long; leaflets 9-21, oblong or oblanceolate,acute or cuneate at base, emarginate and apiculate at apex; glabrous above, sparsely hairy beneath; 1-2x 0.5-1 cm petioles 6-12 mm long; stipules linear-subulate, 2-3 mm long (**Orwa*etal.*,2009).** Flowers 2-4 at a node together in extra-axillary racemes 5.5-12cm long; pedicels slender, 2-3 mm long; pinkish-purple; bracts subulate , as long as the pedicels. Calyx 4 mm long; thinly silky outside; teeth triangular-subulate, as long as the tube. Corolla pink or pinkish-purple, twice as long as the calyx.Pods oblong-linear, flat, smooth, 4-6 seeded, 2.5-4.5 cm long,curved at the tip, glabrescent. Seeds oblong, 2-3 mm long, blackish brown, smooth, compressed. Throughout common, often gregarious on waste open lands in town and around villages (**V.N.Naik,1998and M.A.Dhore,2002**). Common names,Sharapunkha,Unhali, wild indigo**,** Fish Poison,Auhuhu, Ahuhu, Auhola, Hola**.** Sarphonk,and Masa. The whole plant and its roots were reported as antiulcer **(Deshpande SS *et al*., 2003),** antipyretic, anti-inflammatory **(Valli G *et al.*, 2011**), antibacterial and antiviral **(Parmar and Anup N Patel 2010)**.

III. MATERIALS AND METHODS

3.1 Plant Collection and Authentication

The leaves of *Tephrosia purpurea* were collected in October 2021 from the campus of the Govt. Vidarbha Institute of Science and Humanities in Amravati, India. Standard floras **(V.N. Naik, 1998 and M.A. Dhore, 2002)** were used to help in identification. Professor Dr. Manjusha R. Watt, of the Govt. Vidarbha Institute of Science and Humanities in Amravati, Maharashtra, identified and verified the plants.

3.2 Plant Extraction

The leaves were thoroughly washed and then dried at room temperature (25-30^{0}c) for two weeks. The dried leaves were ground in a mixer grinder and sieved. The powder was stored in air sealed polythene bags at room temperature before extraction. Crude extracts viz., aqueous, methanol, acetone and petroleum ether from the powdered samples of *Tephrosia purpurea* have been prepared in step with the same old methods with minor adjustments **(Gilani *etal.*, 2004**). 25 g of powdered plant material was mixed with 100 ml of methanol, acetone, petroleum ether, and aqueous using Maceration method for 7 days and then filtered off by usinga bit of porous fabric after which filter out paper. Following extraction, the beverages were concentrated to remove strains of solvents and the method turned into repeated for two instances. The solvent from overall extract become distilled off and concentrate became evaporated on water tub to syrupy consistency after which evaporated to dryness. This extract turned intosaved at 40^{0}c till use. The crude extract become dissolved in distilled water at the day of the test to prepare stock solution and unique dilutions for the evaluation anthelmintic activity.

PLATE -A



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3.3 Worms Collection and Authentication

Indian earthworms were collected from the Shri Shivaji Agriculture College, Amravati and round worms were obtained from freshly slaughtered houses in Kamela Ground, Zakir Colony area Amravati. Both worm types were identified at the Department of Zoology, Shri Shivaji Agriculture College, Amravati.

3.4 Preparation of Test Sample

Samples for in-vitro study were prepared by dissolving and suspending 3.5 g of each extract in 35 mL of distilled water to obtain a stock solution of 100mg/mL. From this stock solution, different working dilutions were prepared to get concentration range of 5, 15, 25, 50 ,75 mg/mL.

3.5 Anthelmintic Assay

The anthelmintic activity was carried out as per the standard method of **Ajaiyeoba *et al.*, (2001)** with minor modifications. The assay was performed on adult Indian earth worm *Pheritima posthuma* and *Haemonchus contortus* due to its anatomical and physiological resemblance with the intestinal round worm parasite of human beings. Because of easy availability earthworm have been widely used for the initial evaluation of anthelmintic compounds in vitro. The 50 ml formulations containing five different concentrations such as 5, 15, 25, 50 and 75 (mg/mL) of each extract and the standard drug solutions were prepared and 4 worms (same type) was tested in the bio-assay. This was done for both worms. Mean time for paralysis (in minutes) was noted when no movement of any sort could be observed except when the worm was shaken vigorously; time for death of worms (in minutes) was recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water (50^0C). Standard Albendazole (15mg/mL) was used as reference.

3.6 Statistical Analysis

Results were analyzed statistically by **ANOVA** two factors with replications. The data were expressed as Mean value with standard deviations. All essays were carried out in quadruplicated. Statistical analysis was performed in excel. To test the effects of various extracts and their study as well as various concentrations. Of different extracts, the data collected by experimentation is analyzed by using **F test (ANOVA)**.

IV. RESULTS AND DISCUSSION

It was found that the extracts contain carbohydrates, steroids, glycosides, flavonoids, alkaloids and tannins. The results was reported in **Table A,** In a similar study, **Manjula RR*et al.*, (2013)** reported more or less similar results while performing the phytochemical screening of the same plant. The findings of our study were in line with the work of **Laishram*et al.*, (2013)** who also reported the presence of similar phytochemicals and absence of proteins and amino acids.

Table A: Preliminary photochemical screening (*Tephrosia purpurea*)

Test	Aqueous extract	Alcoholic extract
Test for carbohydrates		
Molisch test	+++	- - -
Test for reducing sugar		
Benedicts test	+++	+++
Fehling test	- - -	+++
Test for monosaccharides		
Barfoeds test	+++	- - -
Test for hexose sugar		
Selwinoffs test	+++	- - -
Test for pentose sugar		
Test solution + HCL	+++	- - -
Test for proteins		

IJETIR
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Volume 3, Issue 3, March 2023
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Biurets test	- - -	- - -
Test for amino acids **Ninhydrin test**	- - -	- - -
Test for steroids **Salkowaski reaction**	+++	- - -
Test for glycosides (General test) **Foam test** **Cardiac glycosides (baljet test)**	+++ +++ +++	+++ +++ +++
Test for flavonoids **Lead acetate test** **Alkali test**	+++ +++	- - - - - -
Test for alkaloids **Dragondorffs test**	+++	+++
Test for tannins **Ferric chloride test**	+++	- - -

(Test was noted as "+ ++" represented as present while as "- - -" absent)

4.1 Anthelminthic Activity

The present investigation (Table B) revealed that the petroleum ether, methanol, aqueous and acetone extracts of the *Tephrosia purpurea*showed considerable anthelminthic activity against *Pheretima posthuma* and *Haemonthus contortus* as compared to the standard drug used in the present study. Each plant extract at the concentration of 5, 15, 25, 50 and 75 (mg/mL) showed anthelminthic activity in a different manner giving shortest time of paralysis and death at 75 mg/ml concentration in *Pheretima posthuma* also showed shortest time of paralysis and death at 75 mg/mL concentration in *Haemonthus contortus.* Petroleum ether leaf extract of *Tephrosia purpurea* at highest concentration (75 mg/ml) causing paralysis in 34 min and death at 38.5 min as against *Pheretima posthuma* whereas in case of *Haemonthus contortus*paralysis and death were observed at 9 min and 18.6 min, respectively. The methanol extract showed paralysis in 47 min and death at 51.5 against *Pheretima posthuma* whereas paralysis and death were recorded at 5.3 min and 13 min against *Haemonthus contortus,* respectively. Similarly, aqueous extract at highest concentrations showed paralysis in 118 min and death at 126 min against *Pheretima posthuma* whereas paralysis at 26.5 min and death at 32.5 min was reported against *Haemonthus contortus,* respectively. The acetone extract showed paralysis in 48.75 min and death at 54.5 against *Pheretima posthuma*. However, in case of *Haemonthus contortus* paralysis and death were ascertained at 11.4 min and 14.8 min. The standard Albendazole drug showed the same at 290 min and 350 min as well as 11.95 min and 17.38 min against *Pheretima posthuma* and *Haemonthus contortus* respectively. Therefore, among all the extracts obtained from *Tephrosia purpurea*, methanol extract required least time to cause paralysis and deathof the roundworms followed by acetone, petroleum ether,and aqueous extracts. Similarly, amongst all the tested extracts, petroleum ether extract required least time to cause paralysis and deathof the earthworms followed by methanol , acetone and aqueous extracts.

The findings of the present investigation were comparable with other reports on anthelminthic effects of medicinal plant extracts. In a similar study, **Patel A.V*et al.*, (2014)** have reported that aqueous extract of *Tephrosia purpurea*leaves possesses potent anthelminthic activity with death time of 68.54 min at 50 mg/mL concentration against *Pheretima posthuma*. **Manjula RR*et al.*, (2013)** also reported that the methanolic extract of leaf of *Tephrosia purpurea*takes 12.5 min paralysis and 18.12 min death time at 60 mg/mL against *Pheretima posthuma.* The findings of the present study were also supported by the work of **Ghaywat L.D.*et al.*, (2021)** who reported that root extract of *Tephrosiapurpurea* at highest methanol concentrations (125mg/mL) showed paralysis time of 1.29 min and death time at 2.63 min against *Moniezia.*

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Table no. B: Anthelmintic activity of *Tephrosia purpurea*

Groups	Treatments	Conc.(mg/mL)	*Pheretima posthuma* (Earthworm)		*Haemonchus contortus* (Roundworm)	
			Paralysis(min)	Death(min)	Paralysis(min)	Death(min)
I	Normal Saline /Control	-	-	--	-	--
II	Standard Albendazole	5	686 ± 0.4	763 ± 0.6	32.03 ±0.7	43.58±0.58
		15	623 ± 0.3	674 ± 0.1	23.46±0.76	32.19±0.34
		25	534.5±0.8	586±0.1	17.88±0.43	25.5±0.5
		50	388 ± 0.14	424.5±0.44	13.91±0.53	20.57±0.57
		75	290 ± 0.21	350 ± 0.11	11.95±0.55	17.38±0.43
III	Petroleum Ether	5	85±0.34	102.5±0.21	20±0.9	35±0.45
		15	76.5±0.11	87.5±0.9	18±0.21	33.4±0.4
		25	55±0.48	64.5±0.1	16.4±0.23	25.4±0.1
		50	45.5±0.23	52±0.44	11.6±0.4	21.6±0.23
		75	34±0.1	38.5±0.11	9±0.4	18.9±0.8
IV	Methanol	5	110±2.23	118.5±3.15	14.2±0.62	35.8±0.18
		15	78±1.88	91±0.74	13.8±0.74	33±0.52
		25	64.5±0.85	70.5±1.11	8.8±1.04	23.6±0.45
		50	55±2.15	61±2.54	6±1.58	14.4±0.96
		75	47±0.65	51.5±0.98	5.3±1.20	13±1.58
V	Aqueous	5	156.5±0.38	177±0.32	47.4±0.73	64.6±0.65
		15	149±0.59	175.5±0.54	43.9±0.20	52.6±0.49
		25	146.5±0.33	170±0.67	41.2±0.33	49±0.79
		50	134.5±0.30	157±0.98	33.7±0.43	38.1±0.47
		75	118±0.38	126±0.67	26.5±0.14	34.5±0.84
VI	Acetone	5	80±1.41	94.5±0.54	29±0.17	44±0.70
		15	74±0.99	89.5±0.21	27.2±0.53	38.9±0.68
		25	60.5±0.79	72±0.34	21.5±0.60	32.8±0.79
		50	54±0.34	64±0.56	19.1±1.43	25.4±0.68
		75	48.75±0.77	54.5±0.88	11.4±0.49	14.8±0.79

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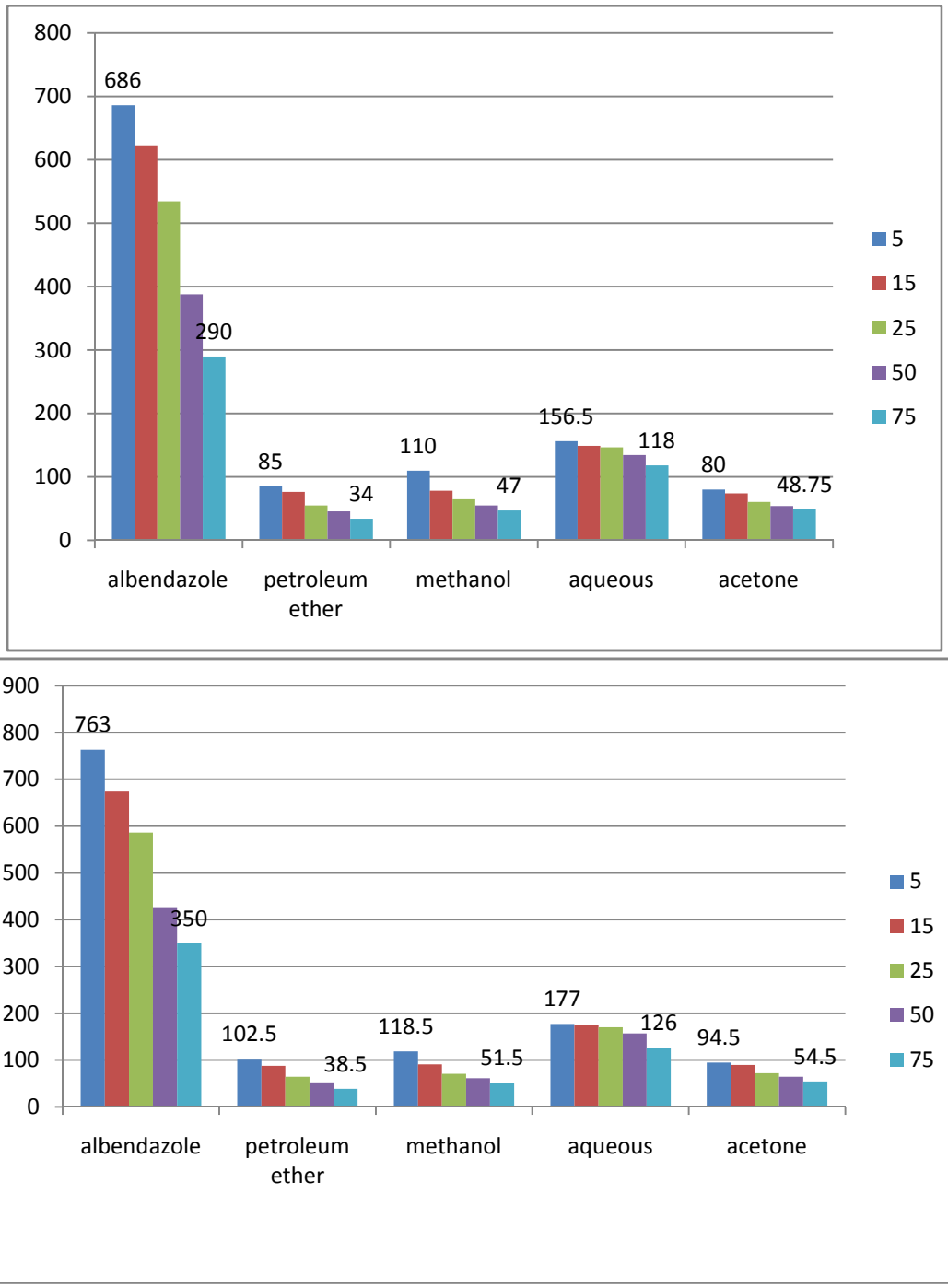
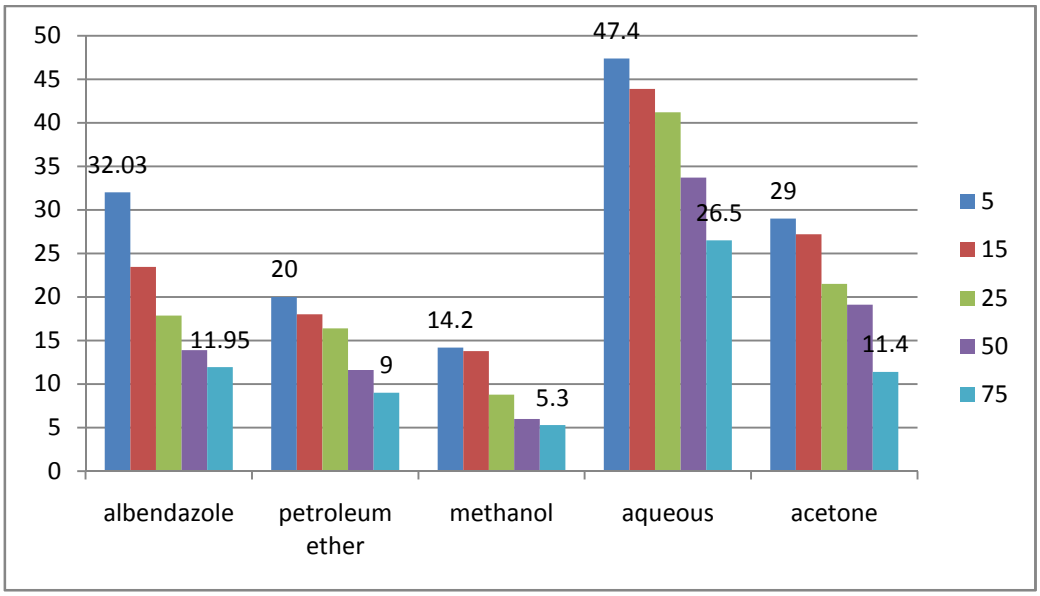


Fig.1a.2a Comparative *in-vitro* anthelmintic effect of different Concentrations of *Tephrosia purpurea* against illustrating paralysis time and Death time of *Pheretima posthuma*

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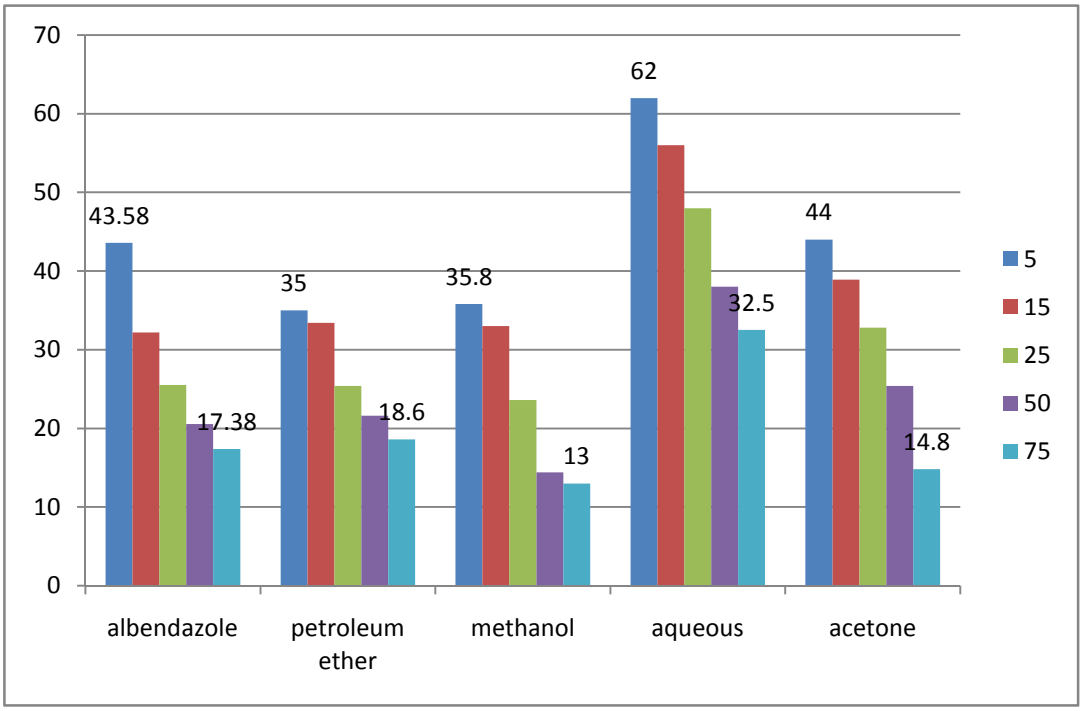


Fig. 3a, 4a Comparative *in-vitro* anthelmintic effect of different Concentrations of *Tephrosia purpurea* against illustrating paralysis time and Death time of *Haemonchus contortus.*

V. CONCLUSION

From the above outcomes, It is interesting to note that the extracts are not pure compounds and in spite of it good results were obtained which only suggests the potency of these extracts. Hence, *Tephrosia purpurea*extract could be used as a guide in our continuing search for new natural products with potential medicinal properties. And can be used as easily accessible source of natural anthelminthic from higher plants is rewarding as it will lead to the development of a phytomedicine to act against parasite and have enormous therapeutic potential as they can serve the purpose without any side effects that are often associated with synthetic compounds.

The results of the present study hold a capacity promise in the future use of active standards from *Tephrosia purpurea*as effective anthelmintics and may assist in designing incorporated answers for the management of parasites to be easy out of hosts body.

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Extraction and Quantification of Pigments from Indian Traditional Medicinal Plants

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Abstract: *The pigments which are involved in the process of photosynthesis are called photosynthetic pigments. The pigments are coloured organic compounds. The have capacity to absorb certain wavelength of light and reflect others. According to Maclachlan and Zalic (1953) the chloroplast of higher plants contain four different pigments chlorophyll a ($C_{55}H_{77}O_5N_4$ Mg) and chlorophyll b($C_{55}H_{70}O_6N_4$ Mg) are the green pigments and carotens (C_{40} H_{56}).Chlorophyll benefits the body in a unique and distinctive ways. It is helps to cleanse harmful toxins from the body and it is also uses to fight infection. A recommended and regular intake of chlorophyll can keep the circulatory and digestive systems much healthier. In the present study, the chlorophyll was extracted from the leaves from five medicinal plants and characterized by UV-Visible spectroscopy. Concentration of chlorophyll a and b was calculated using Arnon method. Chlorophyll content was higher in Tecoma stance than other medicinal plants which are used in this study.*

Keywords: Chlorophylls, Carotenoides, Canthiumcoromendelicum, Dalbergiasisoo, Vitexnugundo

I. INTRODUCTION

The photosynthetic pigments Chlorophylls and carotenoids) play and important role in photosynthesis. Chlorophylls are used in preparation of medicines, candles, soaps, tooth paste and oil. The different parts of *Canthiumcoromendelicum* (N Burm) Alstone. used to cure different ailment in human being. The powdered leaves useful for diphtheria, The leaves are diuretic, anthalemintic, and also used against intestinal worm. The powdered leaves useful for cure diabetics in some part of Indo-China. The bark of young branches used as medicine in dysentery. The fruit pulp consists of high carotenoides content. *Vitexnugundo* Linn. Is bitter, astringent, cephalic, stomachic, antiseptic, thermogenic, rejuvenating, ophthalmic, anti-inflammatory useful for bronchitis, asthma and enlargement of spleen. *Dalbergiasissoo* leaf juice for eye ailment, considering the wood and bark as abortifacient, anthelmintic. The wood and bark for anal disorders, blood diseases burning sensation, dysentery, dyspepsia, skin ailments. In the present investigation the attempt has made to study the comparative account of photosynthetic pigment in three medicinal plants. *Samanea Saman* belongs to the Leguminosae family commonly known as rain tree and is native to tropical America. S.saman tree has different parts like a leaf, fruits, pods, seeds, and wood. *S.saman* shows several bioactive compounds which possess various medicinal properties such as antioxidants, antibacterial, anti-diabetic, analgesic, anti-ulcer, insecticidal, antifungal, and cytotoxic activities by (Clarke et al 1993). According to (Ittagi*et al.,* 2014) *Tecoma Stance* used in traditional medicine as a remedy for diabetes mellitus, digestive problems, stomach pain, intestinal worms, and snake bite.

II. MATERIALS AND METHODS

Collection of Plants: Five medicinal plants were selected for this study. These medicinal plants are categorized in two types as Tree and Shrub . These are Tree: *Dalbergiasissoo*, *Samaneasaman,* Shrub: *Canthiumcoromandelicum*, *Vitexnugundo*, and *Tecomastans*. These traditional medicinal plants were collected from Satara (Maharashtra), India. Extraction of Chlorophyll (Arnon, 1949): 100 mg of finely cut fresh leaves were taken and grinded with 15 - 20 ml of 80% acetone. It was then centrifuged at 8000 rpm for 8 min. The supernatant was transferred and the procedure was repeated till the residue becomes colorless. The volume make up has been done up to 50 ml. The absorbance of the solution was taken at 470 nm, 645 nm and 663 nm against the solvent (80% acetone) blank. The process was followed

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for all the plant samples. Estimation of Chlorophyll Content: The concentrations of chlorophyll a, chlorophyll b and total chlorophyll were calculated using the following equation (Arnon, 1949):The photosynthetic pigments are estimated the method described by Arnon(1949).The carotenoids were estimated method described by Kirk and Allen (1965).

III. RESULTS AND DISCUSSION

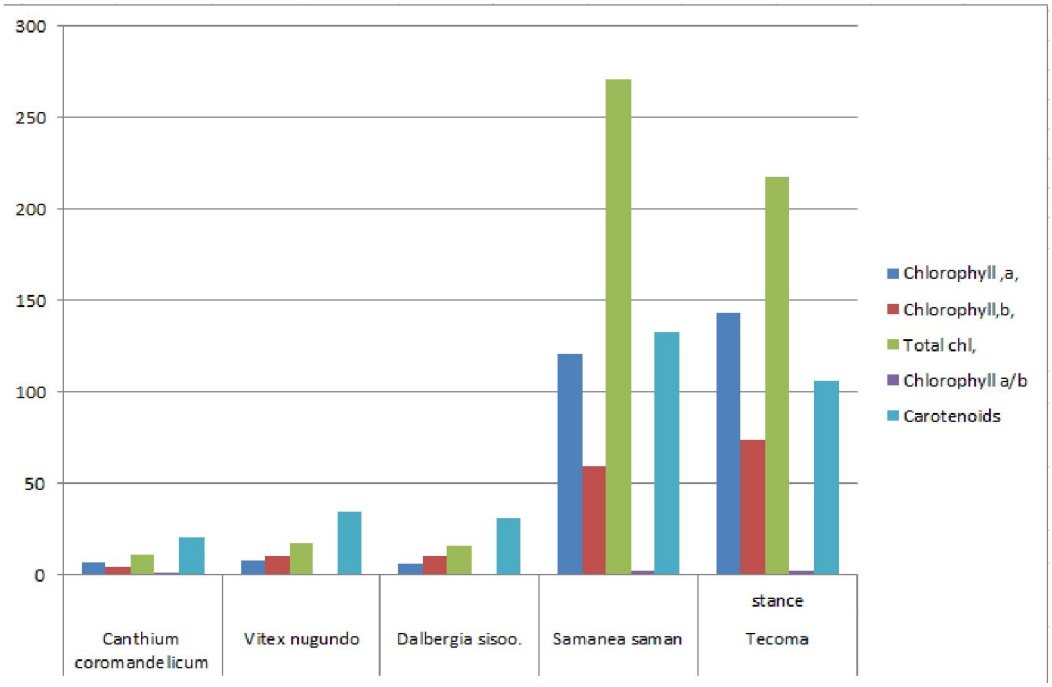
Greens are important sources of protective food which are highly beneficial for the maintenance of good health and prevention of diseases. In this study commonly available plant leaves were used to estimate the chlorophyll content. A total of five plants were selected for this study these include *Canthiumcoromandelicum, Vitexnugundo, Dalbergiasisoo. Samaneasaman* and *Tecoma stance*.

Table 1: Photosynthetic pigment content in the medicinal plants *Canthiumcoromandelicum, Vitexnugudo, Dalbergiasisoo.*

Sr.no	Pigmentes	*Canthiumcoromandelicum*	*Vitexnugundo*	*Dalbergiasisoo.*	*Samaneasaman*	*Tecoma stance*
1	Chlorophyll ,a,	6.584	7.684	5.833	120.89	143.4
2	Chlorophyll,b,	4.15	10.095	10.339	59.7	73.93
3	Total chl,	10.727	17.772	16.165	270.59	217.33
4	Chlorophyll a/b	1.586	0.761	0.564	2.024	2.019
5	Carotenoids	20.64	34.4	30.8	132.59	106.33

Values are expressed in mg/100 gm fresh tissue.

Graph no.1:



Arnon's (1949) equation and the amount of chlorophyll a,chlorophyll b and total chlorophyll were estimated and tabulated. The highest total chlorophyll content (a + b) was detected in *Samaneasaman*, followed by*Tecoma stance*, *Vitexnugudo, Dalbergiasisoo* and *Canthiumcoromandelicum*. showed that amount of leaf chlorophyll a and total chlorophyll a, and carotenoids increased *Tecoma stance. Samaneasaman* and *Vitexnugudo* as compared to *Canthiumcoromandelicum* and *Dalbergiasisoo.* Dougherty *et al.* (1966) termed the leaf pigment of the higher plants

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and green algae as Chlorophyll. Chlorophyll serves as an indicator of photosynthetic activity, growth, development, production as well as biochemical aspects of plant species thus providing valuable information about the physiological status of plants (Sims and Gamon, 2002).

The chlorophylls and carotenoids contents in leaves of *Canthiumcoromandelicum* are recorded above in graph. The higher level of carotenoids is noticed in leaves. A noticeable increase in the chlorophyll 'a' than in the chlorophylls 'b' was also observed. Ghosh*et al.,(*2018) reported chlorophyll content in 7 shrub plants. In our results also similar pattern is noticed, in case of chloropylla andchlorophylls 'b'.

According to (Fauziya Basri*et al* 2014),traditionally medicinal use of *Vitexnugundo* have multifarious activities such as analgesic, anti-inflammatory, antioxidant, insecticidal, antimicrobial, anticancer, galactogogue, tonic, febrifuge, expectorant and diuretic properties. Ghosh*et al*(2018)., reported that total carotenoids containing in *Dalbergiasissoo* is 0.295mg/g as compared to similar to that value of our work. Bhavya Doddavarapu*et al*., (2021)estimated 4.548mg/g chlorophyll a and 3.495 mg/g chlorophyll b from *Albiziasaman* leaves. In our results also similar pattern is reported, in case chl a and chl b and ratio of chl a and b.

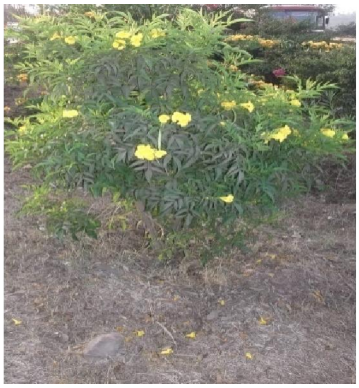


Canthiumcoromandelicum (N.Burm) Alston.





Dalbergiasisoo Roxb.



Tecoma stance



Samaneasaman

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Effect of Soil Treatment with Chlorpyrifos and Cypermethrin on the Germination and Growth of Triticum Aestivum and Vigna Radiata Seedlings

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Abstract: *The study was carried out in relation to effect of Hamla550 pesticide (chlorpyrifos and cypermethrin) on the germination and seedlings growth of Triticum aestivum and Vigna radiata. Various concentrations (10ppm, 30ppm, 50ppm, 70ppm, 90ppm) shows inhibitory or stimulatory effect on germination rate, growth of radicle and plumule of Triticum aestivum and Vigna radiata seedlings. On dicot (V. radiata) shows stimulatory or growth promoting effect and on monocot (T. aestivum) shows inhibitory effect at various concentrations of pesticide.*

Keywords: Pesticide, Germination

I. INTRODUCTION

Pesticides are the group of chemicals that are applied on insect pest and fungi for killing them but pesticides kill target pest and they also effecton non-targeted pests. Pesticides also affects growth and development of crop. The pesticide trade name- Hamla550 is used for control pests such as Aphids, Jassids, Thrips, White fly, American bollworm, Spotted IIbollworm, Pink bollworm. Hamla550 contains chemicals such as Chlorpyrifos 50%, Cypermethrin 5% and Emulsifiers. Chlorpyrifos molecular weight is 350.62 g/mol and it acts by blocking an enzyme which control messagetravel between nerve cells.Cypermethrin molecular weight is 416.3 g/mol. Cypermethrin is a fast-acting neurotoxin, it is highly toxic to pests, fishes, bees and other insects. It is an organophosphate insecticide used to control many different pests. Chlorpyrifos was first registered as an insecticide in 1965 and the United StatesEnvironmental Protection Agency (USEPA) registered it in 2006.Chlorpyrifos affects nervous system of human, pest, and other animals (Lee et al., 2015). Small exposure to human causes runny nose, tears, increase saliva, sweat, nausea and dizziness(Ayu and D.R.,2022). This pesticide when enters the body it moves to all parts of body. Chlorpyrifos itself is not toxic, but when it enters in body it is breaks down and create toxic form (chlorpyrifos Oxon) which is binds permanently to enzyme which control the messages that travel between nerve cells.Theingredients in some of the systemic pesticides may inhibit thegrowth and development of plants (Dhanamanjuri et al., 2013)

II. MATERIAL AND METHODS

Seeds of *Triticum aestivation* and *Vigna radiata* were collected from farmer. Seeds were carefully selected that was not any apparent infections. The solution of pesticide taken from market as trade name Hamla 550, it contains Chlorpyrifos 50%, Cypermethrin 5% and Emulsifiers.The market solution taken as stock solution we prepared various grades of pesticide solution such as Control, 10 ppm, 30 ppm, 50 ppm, 70 ppm, and 90 ppm concentrations.

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The seedling trays, coco-peat and soil were sterilized before used in experiment. The half proportion of each coco-peat and soil taken as germination and growth medium. In seedling trays, the seeds of *Triticum aestivum* and *Vigna radiata* taken in five replicates. The test solution 2 ml was given to seeds for germination and growth in daily 1-2 days interval and control wells were treated with distilled water in daily interval. All the seedling trays were maintained at room temperature. At third day after sowing germination percentage was counted. Germination percentage was calculated by using formula-

$$Gemination\ Percentage = \frac{Number\ of\ seeds\ germinated}{Total\ number\ of\ seeds\ planted} X\ 100$$

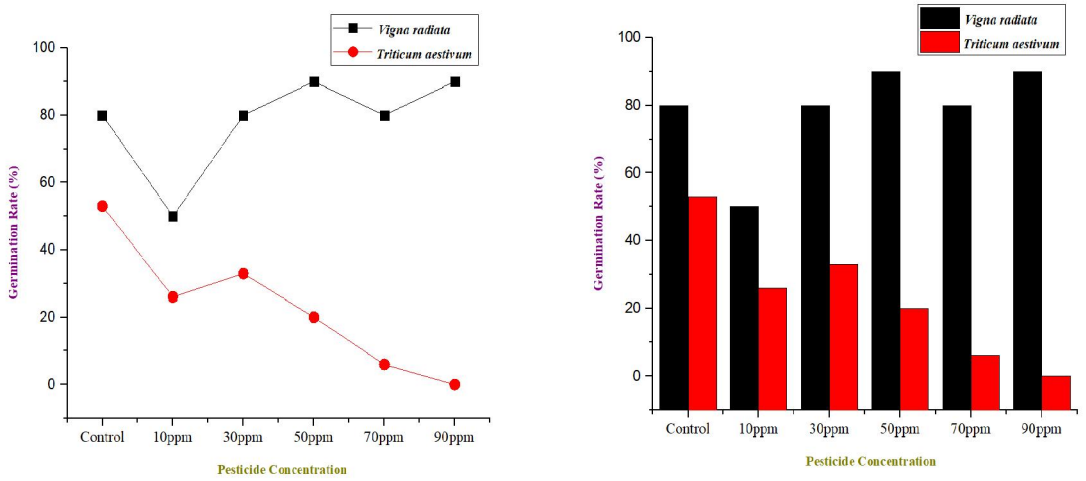
After seventh day of sowing the length of radicle and plumule was counted manually by using ruler. At the end of experiment the weight of wet biomass was taken and weight of dry biomass was taken by oven dried sample at 60°C for 48 hours.

The data was analysed by using MS Excel 2019 and graphs were prepared by using OriginPro 2015 software.

III. RESULTS

Effect of Pesticides on the seed germination of *Triticum aestivum* and *Vigna radiata*

It can be seen in data table 1.1 and graphical data (graph 1.1), In *Triticum aestivum*(monocot) concentration of pesticide (chlorpyrifos and cypermethrin)affects the germination rate. Increased concentration of pesticide decreased the germination rate and data table 1.2 and graphical data (graph 1.1) shows that, In *Vigna radiata* (dicot)concentration of pesticide (chlorpyrifos and cypermethrin) accelerate the germination rate.Monocot shows higher inhibitory effect on germination rate of pesticide (chlorpyrifos and cypermethrin).



Graph 1.1 Graphical data represents germination rate of *Triticum aestivum* and *Vigna radiata*on the effect of pesticide

Concentration	G. R.	S.L.	R.L.	W.B.	D.B.
Control	53%	12.5	9.4	1.52	0.16
10ppm	26%	10.1	9.9	1.23	0.15
30ppm	33%	9.2	8.6	0.77	0.16
50ppm	20%	9.4	10.1	0.82	0.18
70ppm	6%	9.3	8.5	0.92	0.18
90ppm	0%	8.8	8.4	0.8	0.14

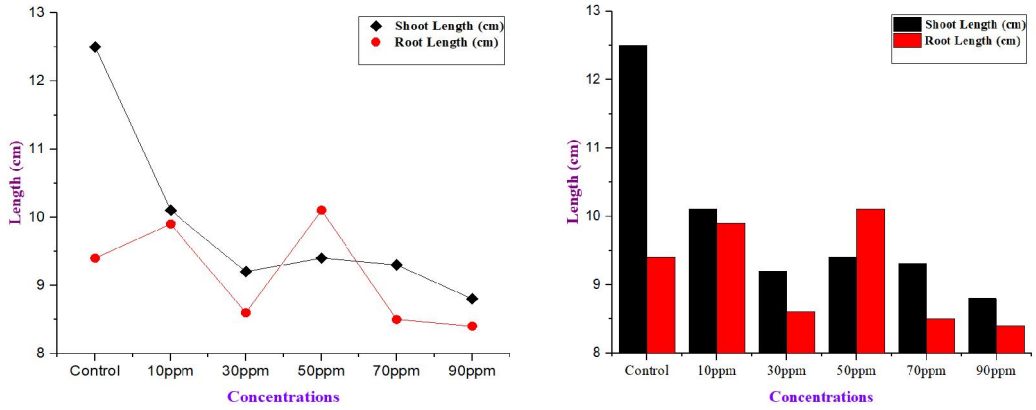
**G.R.-Germination Rate (%), S.L.- Shoot Length (cm). R.L.- Root Length (cm), W.B.- Wet Biomass (gm), D.B.- Dry Biomass (gm)

Table 1.1 Effect of Pesticides on the seed germination, seedling growth, wet biomass, and dry biomass of *Triticum aestivum*

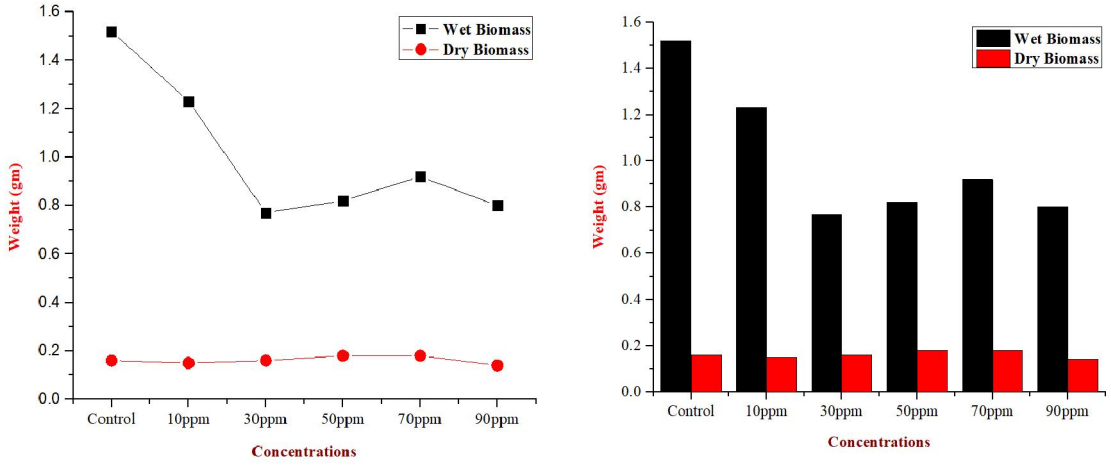
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Volume 3, Issue 3, March 2023
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Effect of Pesticide (chlorpyrifos and cypermethrin) on the seedling growth, wet biomass, and dry biomass of *Triticum aestivum*

The graphical and tabular data (table 1.1 and graph 1.2) shows that given pesticide negatively effect on shoot and root length of *Triticum aestivum*seedlings. At 90 ppm concentration of pesticide there is lower shoot and root length than control seedlings. Tabular (table 1.1) and graphical (graph 1.3) data shows thatdry biomass of *T. aestivum* at various concentration remains same but wet biomass of *T. aestivum* decreased as the concentration of pesticide increased and at 30 ppm, 50 ppm and 70 ppm remain stable and then after it decreased.



Graph 1.2 Graphical data represents shoot length and root length of *Triticum aestivum* on the effect of pesticide



Graph 1.3 Graphical data represents wet biomass and dry biomass of *Triticum aestivum* on the effect of pesticide

Effect of Pesticide (chlorpyrifos and cypermethrin) on seedling growth, wet biomass, and dry biomass of *Vigna radiata*

The table 1.2 and graph 1.4 shows that, on the seedling growth (shoot length and root length)of *Vigna radiata*, the effect of pesticide is stimulatory but at higher concentration (90 ppm) it negatively affected. At 70 ppm shoot and root growth of seedlings higher. The graph 1.5 shows that the wet biomass of *Vigna radiata* is increased at higher pesticide concentration but dry biomass is decreased at higher pesticide concentration. Wet biomass graph is stable up to 50 ppm and dry biomass graph stable at all concentration except control.

Concentration	G.R.	S.L.	R.L.	W.B.	D.B.
Control	80%	6.3	4.4	0.78	0.6
10ppm	50%	5.6	3.7	0.74	0.12
30ppm	80%	8.5	4.8	0.78	0.08
50ppm	90%	8.7	5.1	0.83	0.1

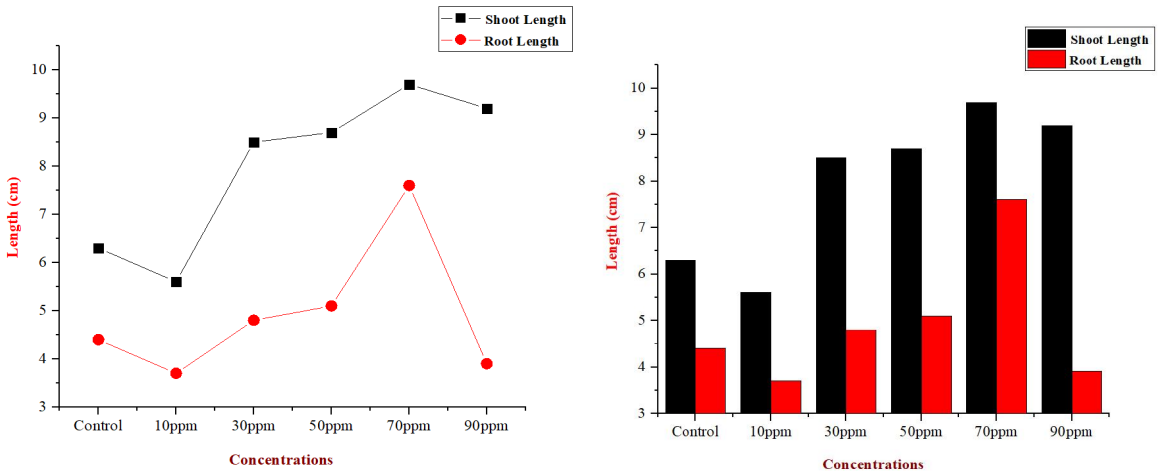
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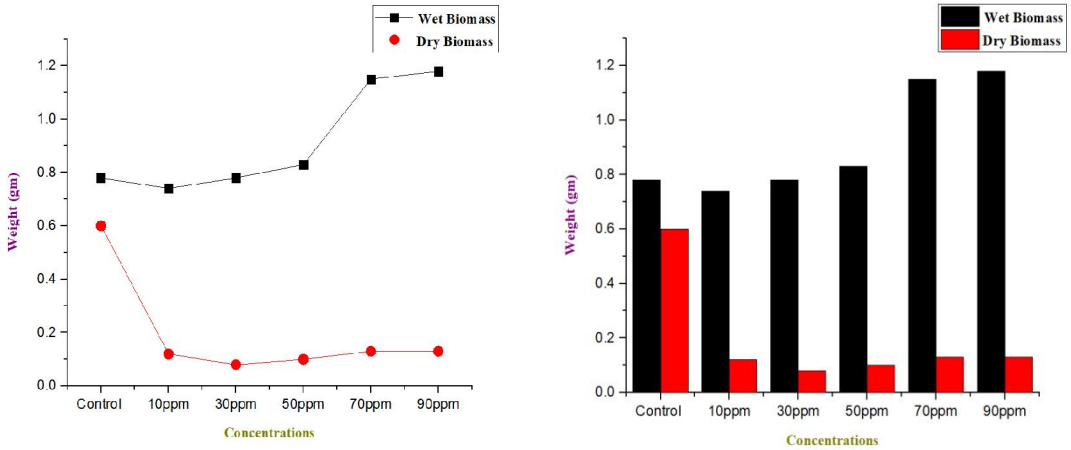
70ppm	80%	9.7	7.6	1.15	0.13
90ppm	90%	9.2	3.9	1.18	0.13

**G.R.-Germination Rate (%), S.L.- Shoot Length (cm). R.L.- Root Length (cm), W.B.- Wet Biomass (gm), D.B.- Dry Biomass (gm)

Table 1.2 Effect of Pesticides on the seed germination, seedling growth, wet biomass, and dry biomass of *Vigna radiata*



Graph 1.4 Graphical data represents shoot length and root length of *Vigna radiate* on the effect of pesticide



Graph 1.5 Graphical data represents wet biomass and dry biomass of *Vigna radiate* on the effect of pesticide

IV. DISCUSSION

Pesticides used in the study shows growth inhibitory as well as growth promotory effect on germination rate and seedling growth. Pesticide shows growth promotory effect on *Vigna radiata* seedlings and germination. Pesticide shows inhibitory effect on *Triticum aestivum* seedlings and germination rate. The growth parameters affected may be due to the suppression or elimination of pathogenic population from the medium because of pesticide (chlorpyrifos and cypermethrin). Increase in growth of seedlings due to the higher production of cytokinin and gibberellins. Seedling growth is affected by osmotic shock effect of systemic pesticides which causes loss of transportability in leaves (Lea and Leonora, 1973). Germination rate of *V. radiata* is higher at 90 ppm and it is lower in *T. aestivum* at 90 ppm.

V. CONCLUSION

Data obtained indicates that pesticide effect on the germination rate, wet-dry biomass and plumule-radicle growth of *T. aestivum* and *V. radiata.* The lower concentration (10 ppm) of pesticide (chlorpyrifos and cypermethrin) is tolerated by both seedlings as compared with control.

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Sensors-Recent Technology Trends in Computer Technology

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Abstract: *The availability and wide range of applications low cost sensors have encouraged a demand for improved sensor performance. Integrated sensors are being developed to meet the designer's need for simpler systems. Smart sensors are becoming integral parts of systems performing functions that previously could not be performed or were not economically viable.*

Keywords: Introduction, Methodology, Review, Privacy, Security, Behavior and influence analytics in social computing**,** Results & Discussion, Conclusion, Acknowledgement and References

I. INTRODUCTION

We can find sensors everywhere, and the whole world is full of sensors and their applications. There are many types of sensors available around us, in our offices, gardens, shopping malls, homes, cars, toys etc. These sensors make our lives so easy and comfortable, starting from applications such as switching on the lights, fans, television (TV), automatic adjustment of the room temperature by air conditioning (AC), fire alarm, detecting obstacles when the car is reversing, making a thumb impression etc. A sensor is a device which receives signals as well as responding to a signal or stimulus. The stimulus signals can be defied by the measure, property, or state which is sensed. We also can say that a sensor is a translator that converts a nonelectrical value to an electrical value [1–3]. The output signal of a sensor may be in the form of voltage, current, or charge. A sensor has many forms of input properties and electrical output properties. If there is small change in the sensed quantity, it will cause a small change in the electrical output and the changes can be detected with their measuring capabilities.

All the sensors are categorized on the basis of their uses, applications, material used and some production technologies. Some sensors are classified also by their characteristics such as cost, accuracy or range of sensor. There are two main types of sensors: passive sensor and active sensor. A passive sensor does not require any extra energy source and electrician signal is produced directly in reply to stimulusthe of external sources. This means that the sensor converts input energy to output signal energy [1, 4, 5]. Examples of passive sensors include photographic, thermal, electric field sensing, chemical, infrared and seismic. The active sensors need external sources of energy for their response, known as excitation signal. To produce the output signals, sensors adopt necessary changes to these input signals. The active sensors are also known as parametric sensors due to their own properties which can be modified in response to an exterior effect and these properties can be afterward changed into electric signals. Active sensors have a variety of applications related to meteorology and observation of the Earth's surface and atmosphere.

Infrastructure and platforms for intelligent systems

Upon receiving the input stimuli, the sensor produces output which is obtained from several conversion steps before it produces an electric signal [1, 6–10]. The performance of sensors is described in terms of relationship between input and output signals. Sensors are characterized depending on the values of some of the important parameters. The characteristics of sensors are described here in this section.

Types of Sensors

There are many sensors commonly used in various applications [1, 11–21]. All these sensors are categorized as per their physical properties like temperature, resistance, pressure, heat flow etc. The following is a brief discussion on different types of sensors.

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Temperature Sensors

A temperature sensor is used to measure the amount of energy in the form of heat and cold produced by an object and system. It allows one to sense or detect any physical change to that energy and gives the output as analog or digital. Temperature sensors are used in various applications such as notification of environmental temperature, medical instruments, automobiles etc. According to application and its characteristics, many different types of temperature sensors are available. There are basically two types of temperature sensors, contact temperature sensor and non-contact temperature sensor. In contact temperature sensor, there is physical contact with the object being sensed and to monitor the change in temperature, conduction is used. It is used to sense solids, liquids or gases over a wide range of temperatures. In a non-contact temperature sensor, we use convection and radiation properties to measure the changes in temperature. It uses radiant energy in the form of heat and cold.

- *Thermostat:* The thermostat is a kind of contact temperature sensor employing an electro-mechanical component and using two thermally different kinds of metals, nickel, copper, tungsten or aluminium etc, which are stuck together to form a Bi-metallic strip. When it is cold, one of the strips is contracted and its contacts are closed and current passes through the thermostat. When it is hot, one metal strip is expanded and opens the contacts to stop the flow of current.
- *Thermistor:* The thermistor is another type of temperature sensitive device or resistance whose electrical resistance changes as the object temperature changes. This is made up of semiconductor materials. When temperature of the object or surroundings increases or decreases, resistance will also increase or decrease. How much the resistance will increase or decrease depends on the properties of the semiconductor material. The thermistor is of two types: positive temperature coefficient, (PTC) and negative temperature coefficient, (NTC). In PTC, resistance value increases with an increase in the temperature and in NTC, its resistance value goes down with an increase in the temperature. Thermistors are used for precise temperature measurement, control and compensation. Thermistors are highly sensitive and exhibit non-linear characteristics of resistance versus temperature. Generally, these are made up of manganese, nickel, cobalt, copper and iron.
- *Resistive temperature detector:* The resistive temperature detector (RTD) is also known as resistance thermometer, and used for measurement of temperature. It is based on the temperature coefficient of sensors and generally composed of high-purity conducting metals like platinum, copper or nickel. These materials are looped into a coil whose changes of electrical resistance depend on a temperature function. The working principle of an RTD is very similar to that of the thermistor.
- *Thermocouple:* The thermocouple is a device which is used for the measurement of the temperature variation in a measurement of sensors. The thermocouples are coupled with two metals joined together forming a junction. Thus, there are two junctions in the metals, one is called hot junction and other is called cold junction, also referred as measuring junction and reference junction, respectively. These junctions are kept at different temperatures due to the change of EMF (electromotive force) induced in a thermocouple and output voltage obtained with the help of the relationship between the voltage and temperature. When the two junctions are at different temperatures, a voltage is developed across the junction which is used to measure the temperature sensor. The thermocouple is based on three main effects: Thomson effect, Seebeck and Peltier effect. It has broadest range of temperatures of all the temperature sensors, covering from −200 °C to 2000 °C.

Position Sensors

The position sensor detects the position of an object either linearly or in rotation with respect to some fixed point or position. Position can be determined by the distance between two points moving away from some fixed points. We can measure the displacement of position in a straight line by linear sensor and angular displacement using rotational sensors. Position sensors are also known as potentiometers and used to measure the displacement of the object. A potentiometer can be an electrical or resistive type of sensor, because its working principle is based on change in resistance of wire with its length. This converts rotary or linear displacement to electrical voltage. The resistance of wire is directly proportional to length of wire. If the length of wire changes then the resistance of wire also changes. Potentiometers are available as rotary and linear potentiometers in the market, and can be used to measure the angular

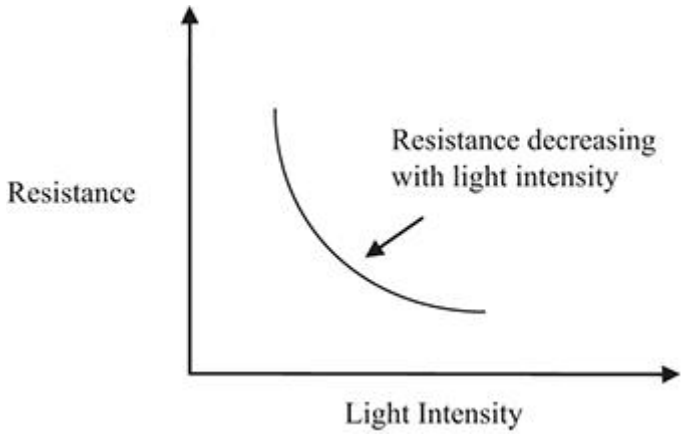
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position and linear position, respectively; through voltage division the changes in resistance can be used to create an output voltage that is directly proportional to the input displacement.

The sensors have three terminals, where the one in the middle is known as the wiper, and the other two are known as the ends. The wiper is a movable contact where resistance is measured with respect to it and either one of the end terminals. The displacement of the moving object is measured with the help of the sliding element of the potentiometer. When position of the moving body changes then its resistance between two fixed points also changes. The result is obtained in the form of differential output voltage which varies linearly with the movement of core position. The resulting output signal has both the amplitude and polarity. Amplitude is calculated as linear function of the displacement and polarity gives the direction of movement. Major advantages of the potentiometer include user friendly operation, low cost, high amplitude output and the sensors are used for measuring even large displacement, but its operating cycles are limited.

Light sensors

A light sensor is a photoelectric passive sensor which changes the light energy into an electrical signal output. It measures the ambient light which is surrounding light, room light and reflected light. The major component of a light sensor is the light dependent resister (LDR) or photoresistor. It is a resistor that depends on the light which changes its resistance depending on the amount of light incident on it. The sensors are made up of semiconductor materials and therefore when light is incident on semiconductor material it becomes low conductive and therefore has less resistance. When we increase the light intensity, its resistance decreases and vice versa which is shown in figure 1.2. Intensity of light falling on an LDR is measured in lux.



There are different kinds of light sensors such as photoresistors, photodiodes, photovoltaic cells, phototubes, photomultiplier tubes, phototransistors, charge coupled devices (CCDs) etc.

Sound sensor

A sound sensor is also known as auditory and used to detect the intensity of sound. It converts the acoustic wave into an electrical signal output. These sensors can also detect sound pressure waves which are not within the audible range, making them suitable for a wide range of tasks. Sound sensors are mostly used for security purposes.

Proximity sensor

A proximity sensor can be used for detecting the presence of a nearby object without any physical contact. It emits an electromagnetic field for a beam of electromagnetic radiation as infrared instances and changes in the field returning a signal. The object being sensed is often referred to as the proximity sensor's target. Depending on different types of proximity sensors, different targets are used. For example, an inductive proximity sensor needs a metal object, whereas a capacitive photoelectric sensor is suitable for a plastic target. A proximity sensor has high reliability due to the absence of mechanical parts and lack of physical contact between the sensor and target. It has very short range when

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used as a touch switch. It is commonly used in industrial applications, manufacturing of food production, mobile phones etc.

Accelerometer

This sensor is used to detect the acceleration of an object, and operates by sensing the acceleration of gravity, and the direction of the object is calculated. This sensor is a kind of microelectromechanical system (MEMS), which uses a silicon integrated circuit. These sensors convert the mechanical motion caused in an accelerometer into an electrical signal by using the piezoelectric, piezo-resistive and capacitive components.

Infrared sensor

An infrared (IR) sensor consists of two packs, one is Rx (receiver) and the other is Tx (transmitter). Transmitters are used in transmitting the rays in the infrared spectrum and the receiver receives the IR spectrum range. In the IR spectrum, the voltage is given between its terminals and then it emits rays. The main principle of working of an IR sensor is reflectivity by an object. When an object is placed in front of the transmitter it tends to reflect the rays that are coming from the IR sensor back to the IR sensor. Whenever a ray that is reflected by an object is received by the receiver it generates a voltage level across the terminal. This voltage level depends upon the intensity of light that is reflected by the object. Transmitter and receiver are placed side by side, and the IR transmitter transmits a signal within a limited range and going to a certain distance. When IR rays hit the surface, some rays are reflected depending upon the colour of the surface. The brighter the colour the more IR rays are reflected; similarly, the darker the surface the more IR rays are absorbed by the surface and fewer IR rays are reflected back.

Pressure sensor

Pressure is an external force exerted on a surface in unidirectional areas. We commonly measure the pressure of liquid, air and other gases. A pressure sensor monitors this pressure and is sometimes called a pressure transmitter as it converts pressure into an electrical signal. The most common type of pressure sensor is the strain gauge-based pressure sensor. Conversion of pressure into electrical signal is achieved through the physical deformation of strain gauge which is bound into the diaphragm of the pressure sensor. The strain will produce a change in electrical resistance which is proportional to the pressure. Change in voltage is the result of ambient pressure. A pressure sensor can also be used to measure other variables such as fluid or gas flow, speed, water level, and altitude.

Ultrasonic sensors

An ultrasonic sensor uses ultrasonic waves for the purpose of sensing and measuring the distance of a particular object. Ultrasonic waves are very high frequency waves. The sensors have two main transducers, namely transmitter and receiver. A transmitter uses 40 KHz of frequency wave transmitted in the air and when it is blocked by an object then its gets reflected and bounced back to the sensor. These reflected waves are absorbed by the receiver of the sensor. So, the total time taken by the ultrasonic waves to travel from the transmitter to the object and again from the object to the receiver of the sensor is given by the output of the sensor. Ultrasonic sensors are used in many applications such as robotics, driverless cars, for measuring distance, and also in radar systems etc.

Touch sensor

Touch sensors are sensitive to touch, pressure and force. The sensors operate as switches and when the surface of the sensor is touched the current starts to flow in the circuit just like current flowing in a closed circuit. When there is no contact, it performs like an open circuit and no flow of current is reported. There are two types of touch sensors, capacitive and resistive. The touch sensors are used popularly in modern gadgets such as smartphones, and other handy devices.

- *Capacitive sensor:* The capacitive sensor has an important element as a capacitor. Parallel capacitors are generally placed like top and bottom plates at some certain distance and between these parallel capacitor plates there is a dielectric medium. The main principle of change in capacitance is used such that it may be caused by

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Volume 3, Issue 3, March 2023
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change in overlapping area, change in distance between two plates and change in dielectric constant. Changes of these parameters can be made by the physical variables like displacement, force, pressure and flow of liquid. Capacitance and output impedance are measured with a bridge circuit. An extremely small force is needed to operate them and hence they are very useful for a small system. The sensors are highly sensitive with good frequency response and high output. As force requirement is small, thus the power requirement is also less to operate the sensors. The metallic parts of the sensor must be insulated from each other in order to reduce the effect of stray capacitance.

- *Resistive sensor:* The resistive sensor is based on the change in resistance of the material and is used to measure temperature, displacement, moisture etc. A slider is free to move between two points and at a certain point we get the zero output and at some other point we get the maximum output. The output voltage is obtained between these two points and it is directly proportional to displacement. So, the change in length of the wire causes the change in the value of the resistance. This property is utilized to measure the changes in displacement using resistivity and resistance. When the fixed voltage is applied across end terminals of the sensor, a proportional voltage is generated across the slider and this voltage can be calculated using voltage divider rule. As distance increases, the output voltage will also increase. The resistive technique used in this sensor can be used to sense or measure linear displacement.

Humidity sensor

Humidity is the amount of water present in the surrounding air and a hygrometer is a device that measures humidity directly. Humidity is a non-electrical quantity that is converted into electrical quantity by using resistance, capacitance and impedance properties. There are various parameters that change due to humidity. There are five basic types of humidity sensors: resistive hygrometer, capacitive hygrometer, microwave refractometer, aluminum oxide hygrometer, and crystal ,hygrometer.

- *Resistive hygrometer:* In a resistive hygrometer, the main element is a material whose resistance changes with the change in humidity or relative humidity. A wire or electrode coated with hydroscopic salt (lithium chloride) can be used for measurement of the humidity. Resistance of salt changes with humidity because hydroscopic salt absorbs moisture and its resistance decreases.
- *Capacitive hygrometer:* In a capacitive hygrometer, the changes in humidity are caused by the changes in the capacitance. Dielectric medium is used in the capacitor and the capacitor consists of two electrodes or plates and a dielectric medium is there between the plates. There is also some hydroscopic material which exhibits the change in dielectric constant with the change in the humidity. Therefore, such hydroscopic material or salt can also be used for construction of a capacitive hygrometer. If the change is very small, then the capacitor includes a frequency determining element in the oscillator and another frequency is produced by the beat frequency oscillator. This frequency is heterodyned and the difference in frequency is a measure of relative humidity.
- *Microwave refractometer:* A microwave refractometer consists of two cavities, each coupled with Klystron. Klystron is a material which produces microwaves in which one cavity is filled with dry air and another cavity is filled with a mixture whose humidity is measured. In the mixture, water vapour will be present and due to the presence of water vapour, there will be a change in dielectric constant, and frequency of one of the oscillators changes consequently. If there is no change in dielectric constant, its frequency is going to be constant, whereas in the mixture water vapours are present, and there is change in dielectric constant which results in change in its frequency. Frequency changes are measured as the measure of humidity.
- *Aluminium oxide hygrometer:* In an aluminium oxide hygrometer, aluminium oxide is coated on anodized aluminium and this aluminium oxide exhibits a change in the dielectric constant with respect to changes in humidity. There are two electrodes in which one is the inner electrode and the other is the outer electrode made from a very thin layer of material like gold. Some pores are presents in the inner layer. Due to the change in humidity, dielectric constant changes and this change can be measured to measure the humidity by

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Volume 3, Issue 3, March 2023
Impact Factor: 5.731

bridge or electric method. The errors are much reduced and the response time is small and therefore the response is very fast.

- *Crystal Hygrometer:* In a crystal hygrometer, crystals are coated with hydroscopic materials (hydroscopic polymers). These crystals are used as frequency determination elements in the oscillator, and therefore just like with the capacitive hygrometer, if there is change in humidity then frequency also changes. Frequency changes due to the humidity as the mass of the crystal changes with amount of water absorbed by the coating. This change in frequency is measured. Humidity sensors are used in industry, agriculture, the medical field, environment monitoring etc.

Colour sensor

A colour sensor is used to detect and identify various colour patterns and convert them into desired frequency as output. It consists of four photodiodes of red, green, blue and clear (no colour). All these photodiodes are connected in parallel and work as filters. For example, if we have to detect red colour, we use red colour filter for this purpose. Colour light signals are sensed by the photodiodes and we get the square wave signals with the frequency directly proportional to light intensity and that is transferred to the microcontroller and we get the result of colour.

Chemical sensor

A chemical sensor is a device which transmits chemical information from a chemical reaction. The chemical information may be of composition, concentration and chemical activity which originates from a chemical reaction or from physical activities. It has different applications such as for home appliances and the chemical industries. The chemical sensor usually contains two basic components, which are a chemical resonance system known as the receptor and a physical chemical transducer. The receptor interacts with analytic molecules and the transducer sends the electric signal. A test sample is given to the receptor which checks composition connected with the transducer. The transducer collects the information from the receptor and sends it to the signal amplifier. This amplifies the signal from the transducer and sends it as output signals. There are two types of chemical sensors used to detect the composition: optical sensor and electro chemical sensor.

- *Optical sensor:* In the optical sensor, there are an emitter and a detector as the main elements. The emitter senses the light to the optical sensor and the light rays fall on the analyte and these rays may be reflected or refracted. These reflected or refracted lights are passed through the detector. Now the detector receives these lights and according to their intensity, the chemical compound present is analysed. Operation of an optical sensor is very simple and it uses absorption coefficient characteristics of the medium and path length travelled by the rays.
- *Electrochemical sensor:* The electrochemical sensor operates by acting on gas molecules of interest and produces an electric signal proportional to the compound present in the gas. It consists of sensing modules and electrodes, separated by a thin layer of electrolyte. There are two plates and the centre is filled by electrolytes. One plate is the cathode and the other plate is the anode. An external membrane is introduced in solution and it is absorbed by certain ions from the solution. Therefore, chemical properties of the solution change and the electromagnetic field will also change; and consequently change in the electromagnetic field ensures that the chemical composition is present in the gas.

Seismic sensor

A seismic sensor measures small movements of the ground and also amplifies and records these small movements. It is also known as a seismometer, and is mostly used in measuring the details of earthquakes, volcanic eruptions and other vibrations. There are two types of seismic sensor, inertial seismometer and strain meter or extensometer seismic sensor.

- *Inertial Seismometer:* The inertial seismometer consists of a weight suspended from a frame by a spring. The frame moves due to the vibration being measured but the mass is held stationary due to the spring. It is used to measure a large-scale vibration such as an earthquake. Now the movement of mass is converted for output as a

digital electric signal. Since both types of seismic sensors most commonly output an electric signal, calibration is necessary to derive a relationship between the input and output.

- *Strain meter or extensometer seismic sensor:* In a strain meter seismic sensor, a strain gauge is used to measure the motion relative to the various points. It generally is used for smaller scale measurement and movement of mass is converted for output as a digital electric signal.

Magnetic sensor

Magnetics sensors respond to the presence or interruption of a magnetic field like flux, strength and direction by producing a proportional output. It converts magnetic information into an electrical signal for processing by the electronic circuit. A magnetic sensor is used in different types of application such as sensing position, velocity and movement of an object. There are different kinds of technology used to design a magnetic sensor. Fluxgate, Hall effect, resistive, inductive, proton processing etc, have a dissimilar approach of using magnetic sensors. A resistive magnetic sensor keeps the electrical resistance of the magnetic field and an inductive magnetic sensor uses coils surrounding its magnetic material, which have the ability to detect changes within the Earth's magnetic field. A fluxgate magnetic sensor uses the approach of changing flux parameters. Each type of technology focuses on a specific area for identifying measurements to be detected. Sensitivity of the magnet is increased by combining layers of magnetic alloys and the magnetic field is surrounded by an electric current, and variation within the field is detected. The output of a magnetic sensor increases with a strong magnetic field and decreases with a weak magnetic field.

Comparison of Different Sensors

This section presents a tabular comparison of different types of sensors [1, 10, 18–30] in terms of advantages and disadvantages, as shown in table 1.3.

Table 1.3. Comparison of different sensors.

Sensors	Advantages	Disadvantages
Temperature sensors	• Reference temperature not required • Large response time • Easy display • Durable	• Self-heating error from applied power • Difficult to calibrate
Position sensor	• Accurate, reliable, and predictable measurement • Higher switching rate • High susceptibility to noise	• Sensing range depends on the type of metal of the target object
Sound sensor	• Used in speech recognition software • Easy to manipulate sound in real time • Does not require cabling compare to wired mic	• Sound files require more memory size • Interference cancelation is required • Limited coverage area
Light sensor	• Requires very small power and voltage • Available in different shapes and sizes • Easy to integrate with a lighting system • Quick response time and low cost	• Nonlinear characteristics • If applied voltage exceeded, it will cause irreversible damage to the photo resistor • Temperature sensitive • Vulnerable to surges and spikes

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Volume 3, Issue 3, March 2023
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Sensors	Advantages	Disadvantages
Accelerometer	• Good response at higher frequencies • Withstands high temperature • Small size	• Sensitive to high frequency • Requires external power
Infrared sensor	• Operates with low power • Capable of detecting presence or absence of light • Does not require contact with object • Not affected by corrosion or oxidation • Strong noise immunity	• Requires line-of-sight deployment • Gets blocked by common objects • Limited range • Affected by environmental conditions • Transmission data rate is slow
Pressure sensor	• High output signal level • Low cost • Technological robustness	• High hysteresis • Sensitive to vibrations • Movable contacts
Ultrasonic sensor	• Sensing capability to all the materials • Not affected by dust, rain, snow etc • Works in any adverse conditions • Higher sensing distance • Not affected by colour or transparency of objects • Can be used in dark environments	• Sensitive to variation in the temperature • Difficulties in reading reflections from soft, curved, thin and small objects • Cannot work in a vacuum • Sensing accuracy is affected by soft materials
Smoke and gas sensor	• Simple and low-cost technology • Measures flammability of gases • Linear output and low power requirements • Wide measurement range • Higher sensitivity, resolution and reliability	• Requires air or oxygen to work • Narrow or limited temperature range
Humidity sensor	• Does not require much maintenance • Flexibility to use • No ageing effects	• Sensitive to dewing and substances • Limited accuracy and measurement range
Color sensor	• Easy to change or modify setups without even re-programing the sensor device • Easy to implement • Common color space, used in a wide range of devices	• Lens subject to contamination • Sensing range affected by colour • And reflectivity of target
Chemical sensor	• Linear output, low power requirements and good resolution • Excellent repeatability and accuracy	• Narrow or limited temperature range • Short or limited life • Cross-sensitivity for other gases

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Sensors	Advantages	Disadvantages
Seismic sensor	• Detects lateral and vertical variations in velocity • Produces detailed images of the subsurface • Used to map stratigraphic units.	• Data processing is time consuming • Equipment is expensive

Modern sensors

Sensor technologies have changed a lot in the last decade in terms of compactness, smartness, and sensitivity. The traditional sensors such as photo sensors, optical sensors, capacitive sensors, and almost all sensors have been replaced by their integrated circuit forms such as MEMS (microelectromechanical system). The sensors are embedded in all modern computing and navigation devices in compact forms and this is why an ordinary smartphone carries around 22 sensors for various purposes. The technologies of sensors have further advanced and become intelligent as smart sensors and available in wearable forms. This may be seen in smart watches, smart gadgets, or a large applications such as self-driving cars where hundreds of smart sensors are involved for seamless and smooth driving without the assistance of a driver. The same can also be seen in robotics, medical diagnosis, brain–computer interface (BCI), and many more, where AI (artificial intelligence) has empowered the sensors with intelligence and smartness for emerging and modern applications such as industry, healthcare, and sophisticated automation.

II. METHODOLOGIES

Smart sensors and ad-hoc wireless networks

CPSs rely on a strong synergy between computational and physical components. A CPS is the integration of abstract computations and physical processes [9] where sensors, actuators, and embedded devices are networked to sense, monitor, and control the physical world. Therefore, smart sensors and wireless sensor networks are major components of CPSs. Wireless sensor networks (WSNs) are composed of tiny devices equipped with sensing, processing, storage, and wireless communication capabilities. Each node of the network can typically have several sensing units, able to perform measurements of physical variables, such as temperature, luminosity, humidity, and vibration, thus being the main components to create a perception of the physical world. WSN nodes operate collaboratively, extracting environmental data, performing same (often) simple processing, and then transmitting them to external systems, via sink nodes, to be analyzed and further processed.

Sensor nodes are severely constrained regarding memory, energy, and processing capabilities. Therefore, several approaches have been proposed to reduce the energy consumption of these nodes in order to extend the overall lifetime of the system. Since radio communication is the dominant factor of energy consumption in most WSNs (except for the hungry devices of multimedia sensor networks), an effective approach is the reduction of data transmission between the sink and the sensing nodes. One of the most commonly used techniques to reduce radio communication is the dual prediction mechanism and several proposals are reported in the literature [10,11,12]. However, while all existing approaches have been proven to be very effective in reducing the amount of data reported to the sink, their efficiency is countered by an increase in complexity. Moreover, they are very sensitive to data loss which renders the dual prediction mechanism obsolete [13]. In the paper "*Fault Tolerant Data Transmission Reduction Technique in Wireless Sensor Networks*" [13], the authors present an alternative technique that has the major benefit to be simple yet robust, and more effective in terms of prediction accuracy and data reduction. Their approach exploits the fact that sensor data changes smoothly over time, therefore they leverage the prediction model proposed in [14] to forecast future readings. They coupled this technique with a data reconstruction algorithm [15] that exploits both temporal smoothness and spatial correlation among different sensed features in order to estimate missing values.

Vehicular ad hoc networks (VANETs) are a subclass of mobile ad hoc networks (MANETs), and a promising approach for future intelligent transportation systems (ITS). A VANET typically supports two communication models, namely Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I). Currently, most VANET applications rely on V2V

communications since they do not require costly infrastructure. However, as VANET is a very dynamic network, information must be exchanged between mobile vehicles in an efficient way by avoiding as far as possible the broadcast storm problem, whichoccurs whenever a huge number of vehicles broadcast messages at the same time thus leading to a network saturation, packet delay, and collision issues. In this context, data aggregation is an appealing approach allowing to integrate of several data about similar events to generate a summary (aka aggregate) and as a consequence potentially reduce the network traffic. There are several proposals for data aggregation in VANETs already reported in the literature. However, the highly complex urban and highway networks produce overwhelming traffic information data that requires efficient selection criteria and smart filtering before the aggregation process. The design of an efficient data aggregation approach that combines correlated traffic information or Floating Car Data (FCD) is still a challenging issue. The authors of the paper "*Towards a Smarter Directional Data Aggregation in VANETs*" [16] introduce a new data aggregation protocol, called Smart Directional Data Aggregation (SDDA), with the goal of selecting the most appropriate FCD messages that have to be aggregated.

Based on the aforementioned research works, it is clear that the future CPSs and intelligent applications heavily rely on the presence and widespread of physical sensors and WSNs. To ensure the functionality of an application, such as intruder detection, it is of critical importance to guarantee the coverage and availability of wireless sensors during deployment. As such, barrier coverage is a critical issue for wireless sensor deployment for many industrial and military applications, where each wireless sensor can sense within its range and a collection of wireless sensors can be deployed to cover the entire range of a barrier. Over the last decade, different barrier coverage algorithms had been established for different types of sensors such as seismic [17] and acoustic [18] sensors, while in recent years, more research efforts are dedicated to radar sensor systems [19, 20]. In *"Optimal Placement of Barrier Coverage in Heterogeneous Bistatic Radar Sensor Networks"* [21], the authors investigate the barrier coverage problem for bistatic radar sensor systems. Different from the traditional passive sensing model, the Cassini oval sensing model is investigated and an optimal placement strategy for heterogeneous transmitters and receivers has been proposed to achieve maximum barrier length coverage. The proposed algorithm has been validated through theoretical simulations to demonstrate the optimal coverage.

Cyber-social networks have significantly improved social relationships among mobile users across device-to-device communications. In the paper *"A Detailed Review of D2D Cache in Helper Selection*" [22], the authors present a survey work that focuses on D2D helper selection techniques according to three basic categories, including the network frame, computing method, and social-aware attribute. Differing from other surveys which mainly consider the energy consumption and latency minimization in D2D networks, they discuss the selection of D2D helper based on different network architectures, such as content distribution networks, peer-to-peer networks, named data networks, cellular networks, and vehicular ad-hoc networks. In particular, a variety of computing paradigms are taken into account to classify D2D helper selection techniques, such as mobile cloud computing, fog computing, and mobile edge computing.

III. CONCLUSION

This chapter presented an overview of sensors with basics, characteristics, and different types of sensors. A sensor is a device that receives a signal and converts it into an electrical signal. These sensors are classified on the basis of their applications, cost, accuracy, and range. Sensors are classified also into different categories like thermal, electrical, magnetic optical, mechanical, and chemical sensors. Sensor technologies have become advanced now and cognitive and smart sensors are being used in all modern applications.

IV. ACKNOWLEDGMENT

The paper consists of information related to smart computing. It focuses on the following elements and values such as introduction, methodologies, privacy, security, behavior and influence analytics in social computing, results, and discussion followed by conclusion and references. I hereby declare that all the information provided in the respected paper is authenticated, authorized, and hence reliable. I would like to thank all the viewers and readers of this paper for their precious time.

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Socio-Economic, Educational and Health Status of Fishermen in Paithan Region Dist. Aurangabad (M.S.)

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Abstract: *The present study deals with various socio-economic educational and health status of the fishermen in Paithan region district Aurangabad. Better health is very essential to lead a happy life for every person, and also necessary for all creative activities in the society. The health of workers on a large measure will also be influenced by environment existing at their work place. Fishing is one of the example such occupation in which the environment plays a major role. Fishing is one such hazardous occupation, which involves irregular diet, stress, alcoholism, tobacco and pernicious habits. Fishermen have lower socio-economic status and their illiteracy adds to their poor hygiene, which may affect general health. Fishermen have prolonged hours of continuous work, which are found to be correlated with high cigarette and alcohol consumption. Diet without fresh fruits and vegetables and meals lack of nutrients are eaten at irregular intervals. Fishermen are prone to excess ultraviolet radiation due to open atmosphere with constant exposure to sun light. They are economically backward. They have no permanent and regular sources income. Jayekwadi project at Paithan region district Aurangabad is one of the prominent fishing centres for local fishermen. The fishermen are confronted with a lot of socio-economic, educational and health problems and they faced a great challenge to maintain their good health status. Nevertheless dangerous life of fisherman and hazardous nature of fishing occupation very little research have been conducted reported on socio-economic, educational and health status of fishermens. The research on this group of population is limited. Therefore the present study was executed to assess and compare the socio-economic, educational status and health care treatment needs of fishermen population.*

Keywords: Socio-economic, educational, health status, irregular diet, stress, fishermen

I. INTRODUCTION

Health is very essential to lead a happy life for an individual, and also necessary for all productive activities in the society. Health is a function of the overall integrated development of the society and the health status is one of the indicators of the quality of life. Good health is an essential not only for the personal development of an individual but also for the development of a nation as a whole. A person depends upon his intellectual calibres, curiosity and constructive thinking, but all these qualities depend upon his good health. Good Health confers on a person or group's freedom from illness and the ability to realize one's potential. Good health, as people know their own experience, is a crucial part of well-being but spending on health can also be justified on purely economic grounds. Health is considered as the most important thing for a human being.

Disease arises when there is mal adjustment of the person with his surrounding environment. The health of workers on a large measure will also be influenced by conditions prevailing at their work place. The example of one such occupation in which the environment plays a vital role is fishing. Fishing is one such hazardous occupation, which involves irregular diet, stress, alcoholism, tobacco and pernicious habits. Fishermen have lower socio-economic status and their illiteracy adds to their poor hygiene, which may influence general health. Right from the beginning of the first Five Year Plan, this sector has been receiving considerable attention from the Government. Various schemes for

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providing housing facilities, hospitals and community amenities, approach roads etc. are given priority. Organised attempts are made to promote fishery co-operatives in our country.

Fisheries plays a vital role in the economic development, employing over 14.5 million people. India was the sixth largest producer of marine and freshwater capture fisheries, and the second largest aquaculture farmed fish producer in the world in 2008 . Marine and freshwater catch fishing combined with aquaculture fish farming is a fast developing industry in India. Fish as food both from culture fisheries and capture fisheries offers India one of the easiest and fastest way to address malnutrition and food security. Higher productivity, knowledge transfer for sustainable fishing, continued growth in fish production with increase in fish exports have the potential for increasing the living standards of Indian fishermen. Fishing was difficult business for fisherman in India because of poor rural road infrastructure, lack of cold storage and absence of organized retail in major regions of the India. Fishing still remains a hazardous and stressful occupations it presents difficult physical conditions, dislocation, isolation and less than ideal personal habits. Fishermen have prolonged hours of continuous work, which are found to be correlated with high smoking and alcohol addiction. Daily diet without fresh fruits, vegetables and meals are eaten at very irregular intervals. Fishermen are prone to excess ultraviolet solar radiation due to constant exposure to sunlight. All these things affected to daily life of fisherman.

1.1 Purpose of the Study

Even though fishing sector occupies a vital position in Indian economy, most of the fishermen are living below poverty level. They are economically backward , not have permanent and regular income. Paithan region is one of the prominent fishing centre of Aurangabad district in Maharashtra where the fishermen are confronted with a lot of economic problems and faced a great challenge to maintain their better Socio-economic , educational and health status. Therefore the present study was executed to study the socio-economic educational and health status of fishermen population in Paithan region .

1.2 Objectives of the Study

- To study the Socio-Economic Status of the Fishermen.
- To study educational status of the Fishermen.
- To study the Health Status of the Fishermen.
- To study the Awareness of the educational and Health Care Facilities for fisherman.

II. METHODOLOGY

Present study is based on primary data completed by fisherman. The primary data is used to collect the information through personal interviews specially prepared interview schedules and questionnaires. The data collected from the various fishermen from the Paithan region related to the socio-economic, educational and health status of fishermen were analysed. There are more than 500 fishermen in Paithan region out of this, 60 fishermen were selected by the convenience sampling method for study.

III. REVIEW OF LITERATURE

The present study deals with various socio-economic educational and health status of the fishermen in Paithan region district. Various workers of the different regions works and gave their views on this topic. Shukla (1990) had outlined the basic characteristics of the Indian fishery sector and stated that the contribution of the Indian fisheries to world fisheries was just three percent even though investment to employment ratio was very high. Sathiadas et al., (1991) have collected information relating to housing pattern, ownership of means of production, Employment status, occupation, annual income, indebtedness, marketing problems etc. Sekara, D. B. Set.al,(1992)reported that, the main source of borrowing is the moneylenders. Easy availability of credit through institutional agencies, opportunities for supplementary occupations and better infrastructural facilities for marketing are some of the suggestions given for the economic improvement of traditional fishermen. Fernando (1981) suggested the improving the socio-economic conditions of fishermen at all fishing centres, sufficient cold storage and ice plants facilities must be provided to

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prevent fish from going waste. Fishermen in the coastal area should be provided with proper sanitation and medical facilities, drinking water, wells and electricity. According to Nuruddin Adnam Bin(1994) necessary provisions were to be made in regard to infrastructural, technological, financial, managerial, policy strategy and other such inputs. Sehara et al., (1992) described the monsoon period fishing operation is only at subsistence level. The household income during monsoon is very low and consequently fishermen become permanent debtors. To overcome these difficulties, it is suggested to constitute a public agency to purchase fish at a minimum price whenever there is a glut at the landing centre, and to provide adequate finance at reasonable terms and conditions through co-operatives. One more studies have shown that subjective symptoms from the musculo-skeletal system are very common among fishermen. Crepitations in the shoulder tend to be more common among the fishermen. This indicates heavy dynamic work and prolonged static work. Osteoarthritis of knee among them may result from working and living in the vertical environment of a moving ship (Chhaya, M.D., Jani,G.M., Amrelliya, J.A). Various studies have shown that high incidence of hypertension may be related to ischemic heart disease and cerebrovascular illness (CMFRI, Special publication,1988). This may be influenced by poor eating habits, which include higher sodium intake, accompanying high consumption of salted fish or higher prevalence of tobaccos making, poor health awareness and other social and environmental factors which are common fishermen. Fluoride levels are also high in some coastal areas and the excessive exposure to them can give increasing number of adverse effects. These may range from mild dental fluorosis to crippling skeletal fluorosis as the level and period of exposure increase. Apart from that, there are reports that excess fluoride consumption promotes cancer, hip fracture, leads to stillbirth or birth defects and has detrimental neurological effects. Fishing is one such hazardous occupation, which involves irregular diet, stress, alcoholism, tobacco and pernicious habits. Fishermen have lower socio-economic status and their illiteracy adds to their poor hygiene, which may influence general health (Paul valikandathil, S.J., Poonthura,). The access of fishermen to general health services is very limited, making regular check-ups and treatment of caries difficult. Fishermen have poor health when compared to that of general population (Sathiadas, R., Panikkar., K.K.P-1990).

IV. RESULTS AND DISCUSSION

The present study focus on the information about socio- economic status of the fishermen such as age, sex,education, marital status, Religion status, type of family, Housing condition, Income level, Pattern of expenditure, savings, value assets, source of capital, nature of ownership to boat and health possessed by fisherman.

4.1 Age-wise Distribution

Age is one of the determining factors of ability to work of an person. A society which has more number of children and old age people will suffer since their productive capacity is low. On the contrary a society will be better if it has more number of people in the young age group.The following table gives the information about the age of the fisherman.

Table -1: Age-Wise Distribution of fisherman:

Sr No.	Age	No.of fishermen	Percentages(%)
1	Below-25	9	15
2	25 –50	27	45
3	50 –75	18	30
4	75 andabove	6	10
Total		**60**	**100**

The findings of the present study revealed that 15%(9) of the fishermen belonged to age group below 25 , 45%(27) of them were coming under age group of 25– 50 years, 30%(18) of the fishermen were in the age group of 50-75 year, 10%(6) fishermen were comes under the age group of 75 years and above.

4.2 Sex Status

The following table shows the sex status classification of fishermen in Paithan region

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Table- 2: Sex Status of Fishermen

Sr. No.	Sex	No. of fisherman	Percentages(%)
1	Male	42	70
2	Female	18	30
Total		**60**	**100**

During study it was found that out of the total 60 fishermen 70%% (42)of them were male and 30%(18)of them were female.

4.3 Educational Qualification

Education is the basic necessity for creating social awareness among the people. Education means both the acquisition of knowledge and experience as well as the development of skills, hobbies and attitudes which help a person to lead a worthwhile life is this world. Following table shows educational qualifications of fishermen in Paithan region.

Table 3: Educational Qualification

Sr.No.	Educational Qualification	No. of fisherman	Percentage
1	Illiterate	3	5
2	Elementary	27	45
3	SSC	18	30
4	HSC	6	10
5	Graduate	6	10
Total		**60**	**100**

The above table indicates that out of 60 fishermen, 5% (3) were illiterate, 45%(27) of the have studied up to elementary level of Education, 30%(18) have studies SSC,10%(6) HSC. The remaining 10% (6) have studied Higher Education.

4.4 Marital Status

The distribution of the fishermen on the basis of their marital status given below.

Table 4: Marital Status

Sr.No.	Marital Status	No. of fisherman	Percentage
1	Unmarried	18	30
2	Married	42	70
Total		**60**	**100**

It is clear from the above table that out of the 60 fishermen30%(30) of them got married and 70%(42) of them were unmarried.

4.5 Religious Status

The following table shows the religious status of fisherman in Paithan region.

Table 5: Religious Status

Sr No.	Social Status	No. of fisherman	Percentage (%)
1	SC	6	10
2	OBC	33	55
3	MBC	9	15
4	Other	12	20
Total		**60**	**100**

The religious status have been explained from the abovetable.Out of the total 60 fishermen, 10%(6) were belonging to SC category,55% (55) of them were belonging to OBC category,15% (9) MBC category and 20% (12) other categories.

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Volume 3, Issue 3, March 2023
Impact Factor: 5.731

4.6 Type of Family

Type of family is an important because it plays an important role in the decision making of a man to work at their work place. The present data deals with the family structure of the fishermen is presented at Paithan region.

Table-6: Type of Family

Sr.No.	Type of Family	No. of fisherman	Percentage (%)
1	Nuclear Family	45	75
2	Joint Family	15	25
Total		**60**	**100**

The above table shows that out of 60 fishermen 75% (75) lead nuclear family and 25% (25) were living in joint family system.

4.7 Housing Condition

Housing condition is one the indicators of the economic conditions of the people. Hence an attempt was made to know the housing condition of the fishermen. The following table presented the housing condition of fishermen in Paithan region.

Table -7: Housing Condition

Sr. No.	Type of House	No. of fisherman	Percentage (%)
1	Raw clay bricks wall with tin roof	15	25
2	Fire Bricks wall with tin roof	42	70
3	Fire breaks plaster walls with Concrete roof	3	5
Total		**60**	**100**

From the above table it can understands out of 60 fishermen,25% (15) were living in raw clay bricks wall with tin roof, 70% (42) were living in Fire Bricks wall with tin roof. Remaining 5%(3)were living infire breaks plaster walls with Concrete roof fire breaks plaster wall houses.

4.8 Economic Status

Income of the person is an important factor which determines the standard of living of the people. The following table shows the details of economic status of the fishermen in Paithan region.

Table -8: Income Status of Fishermen

Sr. No.	Annual Income of fishermen (Rs)	No. of fishermen	Percentage(%)
1	Below Rs.1,00,000	12	20
2	Rs.1,00,000 To 2,00,000	15	25
3	Rs.2,00,000 To 3,00,000	21	35
4	Rs.3,00,000 To 4,00,000	9	15
5	Above 4,00,000	3	5
Total		**60**	**100**

The above table shows that out of 60,20%(12) annual income of fishermen having below Rs. 1,00,000. 25% (15) fishermen having annual income between Rs, 1,00,000 – Rs.2,00,000, 35%(21) of the fishermen having annual incomes under Rs.2,00,000 –Rs.3,00,000. 15% (9) of the fishermen having annual incomes under Rs.3,00,000 – Rs.4,00,000 and 5% (3) of the fishermen having annual incomes aboveRs.4,00,000 .From the data for the above table, it can be concluded that the average annual income level of the fishermen hardly sufficient to maintain their family at the minimum subsistence level.

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4.9 Pattern of Expenditure

Expenditure is the function of income. The standard of living is revealed mainly by the pattern of expenditure of a person. The expenditure pattern of the fishermen in Paithan region is presented in the following table.

Table 9: Pattern of Expenditure of the Households

Sr. No.	Households expenditure	No. of fisherman	Percentage (%)
1	Below Rs.50,000	12	20
2	Rs.50,000 To Rs.1,00000	18	30
3	Rs.1,00000 To Rs.1,50000	15	25
4	Rs.1,50000 To 2,00000	9	15
5	Above 2,00000	6	10
Total		**60**	**100**

From the above table, it is observed that out of total expenditure pattern of the household20% (12) of the fishermen spent below Rs. 50,000. 30%(18)of the fishermen spent of Rs.50,000 – Rs.1,00,000. 25%(15) of the spend between Rs.1,00,000 – Rs.1,50,000.15%(9)of the fishermen Rs.1,50,000- Rs.2,00,000 and 10% (6) fishermen spend above Rs. 2,00,000 annually.

4.10 Annual Savings

Savings plays very significant role in the life and the economy of the person. The fishermen were tried to save their income in some amount which are mentioned in following table.

Table 10: Annual Savings

Sr. No.	Annual savings	No. of fisherman	Percentage(%)
1	Cash in hand	9	15
2	Bank	18	30
3	Mutual fund(Bhishi)	15	25
4	Co-operative Society	12	20
5	Post office	6	10
Total		**60**	**100**

The above table shows that 15% (9) of the fishermen preferred to keep amount cash in hand. 30% (18) of the fishermen save in banks, 25% (15) of the fishermen preferred to save in mutual fund (Bhishi), 20%(12) of the fishermen preferred to save in co-operative society. 10%(6) of the fishermen preferred to keep the cash in post office.

4.11 Value of Assets

The term total value of assets includes the value of the all movable and immovable properties like land, house, domestic animals, jewels consumer durable, vessels, and two wheelers.

Table 11: Value of Assets

Sr. No.	Value of Assets (in lakh)	No. of fishermen	Percentage(%)
1	Below 1	6	10
2	1– 2	12	20
3	2-3	18	30
4	3-4	15	25
5	Above 5	9	15
Total		**60**	**100**

The above table shows out of 60,10%(6) of the fishermen had their assets value below Rs.1 lakh, 20% (12) of the fishermen, assets value between Rs. 1-2 lakhs, 30% (18) of the fishermen assets value was about Rs.2 – 3 lakhs,

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Volume 3, Issue 3, March 2023
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25%(15) of the fishermen assets value was above Rs.3-4lakhs and 15%(9) of the fishermen assets value was above Rs.50 lakh.

4.12 Source of the Capital Amount

The following table gives the information about the source of capital used by the fishermen in their occupation.

Table- 12: Source of the Capital Amount

Sr. No.	Sources of capital Amount	No. of fishermen	Percentage(%)
1	Own	27	45
2	Loan	33	55
Total		**60**	**100**

From the above table it is observed that 45%(27) of the fishermen, have been used their own capital for buying vessels, nets and fishing equipment whereas 55%(33) of the fishermen have borrowed and obtain their capital by taking loan from banks, society, money lenders, friends and relations.

4.13 Nature of Ownership of Boat

Among the fishermen, holding ownership of boat enjoys a higher status in the community. Hence the researcher made an attempt to know whether the sample respondents are having their own boat or not and the result are given in the following table.

Table 13: Nature of Ownership of Boat or oar

Sr. No.	Nature of Ownership of boat /Oar	No. of fishermen	Percentage(%)
1	Own boat	12	20
2	Hired boat	9	15
3	Thermocol boat	39	65
Total		**60**	**100**

The above table shows that the 20%(12) of the fishermen were having their own boat and 15%(9) of the fishermen used Hired boats. The poor fishermen do hired the boats from the rich fishermen. They depend highly on the rich fishermen for their livelihood. Where as 65 %(39) of the fishermen used thermocol boat due to poor economical condition.

4.14 Health Status of Fishermen

The five point scale has been used to measure the health status of fishermen.The following table gives the information about the present health status of fishermen.

Table-14: Health Status of Fishermen.

Sr No.	Health Status	No. of Fishermen	Percentage (%)
1	Very good	6	10
2	Good	15	25
3	Average	24	40
4	Poor	12	20
5	Very poor	3	5
Total		**60**	**100**

During study the health status of fisherman observed that 10% of the fishermen were very good their health condition, 25% (6) of the fishermen good health condition. 40%(24) of the fishermen were average health condition. 20% (12) of the fishermen poor health condition and 5%(3 of the fishermen explained that their health condition was very poor. But they were in position of getting money to run their families. They could not afford to pay to undergone any treatment. They can get benefit from the Government health care units.

V. CONCLUSION

Fishermen are the integral part of our society. Even though they provide excessive fish production. Fishermen have lower socio-economic, educational and health status and their illiteracy adds to their poor hygiene, which may influence general health. Majority of fishermen in India are struggling for their welfare in the socio-economic , educational and health security spheres. The poor economical, educational and health status among fishermen in India leads to low productivity and low fish production. The pathetic condition of fishermen affects the health status and health seeking behaviour. There is the urgent need of government's attention in this regard to make them aware of importance of their economic, education and health. Some social workers, social institutions, association, organization, health care units and banking sector need to pay attention towards fisherman. The Government must provide sufficient financial facilities at low rate of interest to the fishermen. The Government should come forward to establish cold storage and freezing plant to cater to needs of the fishermen. The Government must provide free education for kids of fishermenup to graduate level and special scholarships for higher education. The Government must provide fishing equipment to the fishermen at the subsidized cost. The Government must be provide various health care facilities at cheaper cost. The government should conduct the awareness camp for the awareness of Health care services and health insurance.

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Screening, Isolation and Biochemical Characterization of Plant Growth Promoting (PGP) Bacteria Colonizing the Rhizosphere of *Zea mays* L.

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Abstract: *Plant growth promoting Rhizobacteria (PGPR) are a group of bacteria that can be found in the rhizosphere, in association with roots which can enhance the growth of plant directly or indirectly. Rhizospheres of crop plants have been well studied with the objective of screening PGPR, play an important role in maintaining ecological balance. Plant growth promoting Rhizobacteria (PGPR) are an attractive eco-friendly alternative to chemical fertilizers in agriculture. The present work explores the characterization of Rhizobium and azotobacter isolated from root nodules of corn (Zea mays). Each isolates were morphologically and biochemically characterized. Each samples were tested for plant growthpro motion assays including indole acetic acid (IAA), ammonia, NaCl variation assay, to select for ones possessing multi-trait plant growth promoting (PGP) properties. The present study shows the antifungal activity of Rhizobacteria and azotobacter against some fungal spp. The Rhizobacteria were gram negative rod shaped and mucous producing. It utilizes glucose and starch as a carbon source.*

Keywords: PGP bacteria, Indole Acetic acid, NaCl assay, Rhizosphere soil, Azotobacter

I. INTRODUCTION

Plant growth-promoting rhizobacteria are bacteria that colonize plant roots and promote plant development by a number of processes, including phosphate solubilization, siderophore generation, HCN production, and biological nitrogen fixation (Vejan et al., 2016).Today, food and environmental quality are the majorissues from the context of global concern, by utilizing the ecologically beneficial bacteria likePGPR will not only reduce the utilization of chemical fertilizers but also promote yield in regular agriculture practices (Verma et al, 2015).The important role is played by plants in selecting and enriching the types ofbacteria by the constituents of their root exudates. The use of bio-fertilizer and bioenhancer such as N2 (nitrogen) fixing bacteria and beneficial microorganism can reduce chemical fertilizer applications and consequently lower production cost. Utilization of PGPR in order to increase the productivity may be a viable alternative to organic fertilizers which also helps in reducing the pollution and preserving the environment in the spirit of an ecological agriculture(Ştefan , et al 2008).The classical approaches along with biotechnological and molecular tools combined will definitely aid in understanding rhizophorebiology and their efficient interactions with PGPRs. Kamaruzzaman et al., (2020) isolated bacteria from rhizosphere of *Scirpus grossus* growing in the lead contaminated soil. When rhizobia colonize the roots from non-legume plant in a non specific relationship and may behave as PGPR. It has been proven that plant productivity increases when the Rhizobiaare present in rhizosphere. It provides the major biological source of fixed nitrogen in agricultural soils (Shahzad et al 2012).*Azotobacter* is generally regarded as a free-living aerobicnitrogen-fixer. *Azotobacter* strains could affect seed germination and seedling growth in a plant. It hasbeen shown that wheat yield increased up to 30% with *Azotobacter* inoculation (Gholami et al 1992.). Modern agriculture relies on extreme use of chemical fertilizers and pesticides to increase crop production which caused severe adverse effect on soil health and environment(Aktar et al, 2009).

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However, use of PGPR in agriculture in order to enhance the growth of plant via circulating the nutrients in the soil is an ecofriendly strategy to minimize the need of synthetic fertilizers as much as possible(Verma et al, 2015 and Saharan et al, 2011).There are many species of soil bacteria which are reported to promote plant growth by producing growthregulators, inducing root exudation and enhancing the availability of nutrients to plant besides control of soil born plant pathogenic fungi. PGPR may induce plant growth promotion by direct or indirect modes ofaction. The mechanism involved in PGPR-mediated plant growth promotion is directly by production ofplant growth regulators (auxins, cytokines, gibberellins) and facilitation of the uptake of nutrients(nitrogen fixation, solubilisation of phosphorus). The indirect promotion of plant growth occurs whenPGPR lessen or prevent the deleterious effects of plant pathogens on plants by production of inhibitorysubstances (antibiotics, antifungal metabolites, iron-chelating siderophores, cell wall-degrading enzymesand competition for sites on roots) or by increasing the natural resistance of the host (induced systemicresistance).

II. MATERIALS AND METHODS

Screening, Isolation and identification of *Azotobacter*species

The soil sample was collected from agricultural field of Dharangaon, Maharashtra, India. The soil samplewas suspended in 10 ml autoclaved distilled water and serially diluted up to 10^{-8}. 0.1 ml of each dilutionwas spread on sterile Ashby's agar plates and plates were incubated at 30^0C for 48-72 hr. After incubationwell isolated colonies were randomly selected on the basis of colony morphology and maintained onsterile Ashby's agar slants. Each isolate was characterised by gram staining and motility.

Morphological Characteristics

Morphological characteristics of bacteria were observed by using Gram staining technique as describedby Arora, 2003 and observed under oil immersion objective of microscope.

Biochemical Tests

The isolated sample was biochemically characterized viz, Catalase Test, Indole Production Test,Methyl Red Test, Vogas Proskaure Test, Citrate Utilisation Test as described by (Lowe et al,1962), Starchhydrolysis Test and motility test as mentioned by Arora,2003.

Isolation of *Rhizobium* from Corn roots

The fresh root nodules of Corn were collected from the plants grown in the field from MalkapurDist- Buldana, Maharashtra. The collected nodules were surface sterilized with 75 % and 0.1% ethanol andmercuric chloride respectively and washed thoroughly with distilled water. The root nodules were crushedand the suspension was streak on YEM (Yeast Extract Mannitol pH 7.0) agar plates and incubated at29.4°C for two days (Aneja 2003). After two days of incubation, *Rhizobium* colonies were obtained.Isolates colonies were used for morphological and biochemical tests.

Morphological Characteristics

The morphological characteristics comprised colony morphology, colony morphology parameters werediameter, form, transparency and colour Aneja,2003. Motility and Gram staining was performed toevaluate type of strain.

NaCl variation Assay

Rhizobium cultures were grown in triplicates on YEM medium of different concentrations of NaClranging from 0.1 to 1.0% (w/v). Growth was determined by measuring the optical density (O.D) at 600nmafter 48 hours of inoculation.

Gelatin Hydrolysis

To determine capability of *Rhizobium,* to determine gelatinase enzyme as use gelatin as media source.Degradation of gelatin indicates the presence of gelatinase enzyme (Aneja, 2003). The actively growingculture were inoculated in

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Volume 3, Issue 3, March 2023
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nutrient gelatin medium (5g/L peptone, 3g/L beef extract, 12g/L gelatine) andincubated for 48 hours. On subjecting the growing culture to low temperature treatment at 4o C for 30 to60 minutes, the cultures which produce gelatinase remain liquefied while others due to presence of gelatinbecome solid.

Starch Hydrolysis

The test was performed to determine capability of *Rhizobium* to use starch as a carbon source (deOliveira, 2007). Starch agar medium (5g/L peptone, 3g/L potato starch, 3g/L beef extract, 15g/L agar, pH 7.0) were inoculated with culture and incubated at 29.5oC for 48 hours. In the presence of starch theproduction of extra cellular enzymes occurs indicating the potential of the organism to use starch ascarbon source. Drops of Iodine solution (0.1 N) were flooded on 48 hours old incubated Petri plates.Formation of blue colour indicates non ionization of starch and vice versa.

Catalase Test

This test was performed by adding 2-3 drops of 3% hydrogen peroxide in fresh YEM broth cultures ofisolates. Transfer a colony on microscope slide and add the drop of 3% hydrogen peroxide. If catalase is present, the hydrogen peroxide is broken down into the water and oxygen, which result in the immediateformation of gas bubbles.

Antagonistic activity of *Azatobacter*and *Rhizobium*

The *Azatobacter* isolates were grown at 30^0C on a rotary shaker (170rpm) in 250 ml flasks with 100 mlproduction medium containing (g/l^{-1}): Sucrose, 20; Yeast extract, 0.5; K_2HPO_4, 0.2; $MgSO_4.7H_2O$, 0.2;$FeCl_3$, 0.0016 and Na_2MoO_4, 0.001 for 72 Hrs. The bacterial cells were separated by centrifugation at10,000rpm for 30 min. Agar well diffusion method was used to check the presence of antifungalmetabolites. The 0.1 ml suspension of *Fusarium oxysporum* was spreaded on potato dextrose agar plates.The 0.1 ml of cell free supernatant (CFS) was added in well and the plates were incubated at 30^0C andobserved the zone of inhibition around the well.

Morphological Characteristics

The bacterial colonies were observed under oil immersion objective of microscope. Similarly usingGram staining technique was also performed.

Biochemical Tests

All the isolated organisms were biochemically characterized through different biochemical tests viz,Catalase Test, Indole Production Test, Methyl Red Test, Vogas Proskaure Test, Citrate Utilisation test,Starch hydrolysis test as mentioned by (Arora,2003).

Sugar Fermentation Tests:

The isolates were also examined for fermentation of the various sugars including Glucose, Mannitol,Galactose, and Maltose. 1% aqueous stock solution of the test sugars were prepared in small tubes whilefor sialicin 4%sugar solution was prepared and sterilized as mentioned by (Hugh, 1953).

Antagonistic activity of *Rhizobium*

Antagonistic activity of *Rhizobium* was determined by method mention for azatobacter.

III. RESULTS AND DISCUSSION

Isolation of Sample 1species

Isolated Sample 1 colony of bacteriawas selected on the basis of their colony morphology. The isolated Sample 1was gram negative, motile, produce large mucoid, opaque and yellow colour colonies on Ashby's agarplate.

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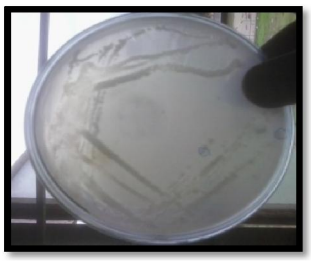


Fig 1: Isolated colony of bacteria of Sample 1

Colony Characteristics:

Table 1: Colony Characteristics of sample 1 bacteria

Sr. No	Colony Characters	Characteristics
1.	Shape	Circular
2.	Size of colony	2.5 mm
3.	Colour	Yellow to green
4.	Elevation	Convex
5.	Margin	Entire
6.	Opacity	Opaque
7.	Motility	Motile
8.	Gram character	Gram negative

Zone of inhibition in antagonistic activity of Sample 1:

The isolated Sample 1 has showed maximum zone of inhibition against *Fusarium* sp. in antagonisticactivities.

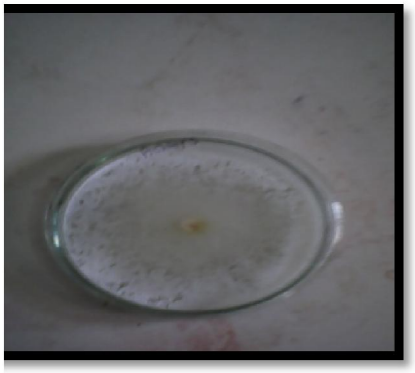


Fig 2: Antagonistic activity of Sample 1 bacteria

Isolation of Sample 2species

Colonies of sample 2 bacteria was obtained on YEM agar medium after incubation at 29.4°C for twodays. Isolated sample 2 bacteria were selected on the basis of their colony morphology. The isolated sample 2 bacteria were gram negative, motile, producing large mucoid, opaque and yellow colour colonies onyeast mannitol agar plate.

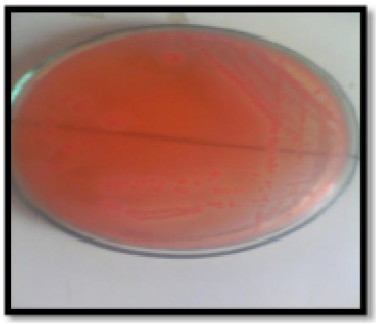


Fig 3: Isolated Sample 2colony of bacteria

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Table 2: Colony Characteristics of sample 2 bacteria

Sr. No	Colony Characters	Characteristics
1.	Shape	Circular
2.	Size of colony	03 mm
3.	Colour	White to pink
4.	Elevation	Convex
5.	Margin	Entire
6.	Opacity	Opaque
7.	Motility	Motile
8.	Gram character	Gram negative

Zone of inhibition in antagonistic activity of sample 2:



Fig 4: Antagonistic activity of Sample 2 bacteria

The isolated sample 2 bacteria as showed maximum zone of inhibition against *Fusarium sp.* in antagonistic activities.

NaCl variation assay of sample 2

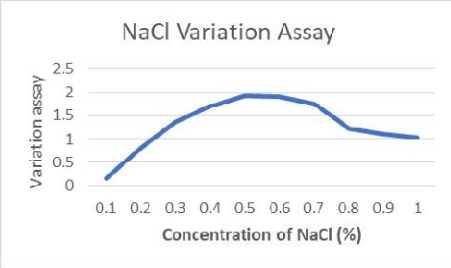


Fig 5: Effect of NaCl % on sample 2 bacteria

Biochemical and Sugar Fermentation tests of sample 2 bacteria

Table 2: Biochemical and Sugar Fermentation test for Sample 2

Sr. No	Tests Performed	Results
1.	Catalase test	Positive
2.	Motility test Positive	Positive
3.	Methyl red test	Negative
4.	Voges- proskauer test	Negative
5.	Indole test	Negative
6.	Glucose	Positive
7.	Galactose	Positive
8.	Maltose	Positive
9.	Mannitol	Positive

Morphological and sugar fermentation tests for identification of Sample 1species

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Table 3: Morphological and sugar fermentation tests for sample 1 species

Sr. No	Tests
1.	Grams nature
2.	Motility
3.	Pigmentation
4.	Amylase production
5.	Mannitol Negative
6.	Galactose Negative
7.	Maltose Negative

IV. CONCLUSION

From the present study, the screening and isolation of sample 1 and 2 bacteria on their selective medium. On the basis of morphological, biochemical and sugar fermentation test, the resulted isolates sample 1 maybe Azotobacter and sample 2 maybe Rhizobium spp. of bacteria. It will be confirmed by the DNA sequencing in near future. We analysed the various plant growth promoting assays for their growth promoting activity. It can be concluded that the *Rhizobacteria* showed bio control characteristics. *In vitro* fungal growthinhibition assay showed antagonism against *Fusarium* spp.

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Arsenic in Drinking Water and Its Hazardous Effects

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Abstract: *The presence of metal and metalloids like Arsenic and Selenium in potable water, domestic waste and industrial effluents is a serious problem due to their toxic properties. They affect public health to large extent waste water systems and the biological system of water bodies. The impact of traces of heavy metals in drinking water is dangerous for human health in long run. Acute Arsenic poisoning can arise from the ingestion of as little as 100 mg/l of As .Chronic effect can appear from its accumulation in the body at low intake levels for prolonged periods. The study is focused on Arsenic concentration of Pakurdist's Penum coal mines, Udalbani Stone chips mines and Dumkadanga Stone chips mines surface water Arsenic concentration and its impact on human health.*

Keywords: Arsenic, Selenium, Water, Hazardous Effects

I. INTRODUCTION

Arsenic (As)is a metalloids and is highly toxic in its inorganic form. As occurs naturally in the earth crust. Most As in drinking water comes from natural rock formation. Water containing As flows through and they dissolve Arsenic in drinking and other water underground and surface water sources. It is found in concentration about 1% in Pb-Zn concentrate use in smelters and because of its volatility. It can spread into the atmosphere as pollutant. However, the greatest source of pollution from arsenic is its used in agricultural chemical such as weedicide, fungicide, insecticide and rat poison. Arsenic occurs in air wherever coal is burn particularly near smelter and refineries. Sea water contains 2 to 5 ppm of arsenic and in public water supplies its concentration may be higher. In areas where continuous arsenical sprays are used high level can be present .Arsine (AsH3), which is a by product of much industrial process involving arsenic, is the poisonous of all arsenical compounds. It is toxic even at dilution of 1:20, 000, cases of chronic arsine poisoning reported in workers involved in ore smelting and metal refining, leaching, soldering, galvanizing and lead plating operations. Arsine may be liberated by the action of fungi in sewage plants. Accidental arsine poisoning was reported in petroleum industry. Arsine (AsH3) combines with hemoglobin and is oxidized to a hemolytic compound that does appear to act by sulphydryl inhibition. Low chronic doses of arsenic ingested tend to accumulate in lipid rich tissues. High arsenic in man is usually found in hair, nails and skin. When arsenic inhaled it is deposited in lungs tissues for a long time. Soluble arsenicals are absorbed from all mucous membranes. Arsenic containing ointments or soluble vesicants is absorbed through the skin. Non-allergic contact dermatitis and conjunctivitis frequently suffered by workers exposed to arsenic containing dusts. Continued inhalation of arsenic dust may causes perforation of the nasal septum, as in the case with chromium another metallic dusts. Chronic ingestion of inorganic arsenic causes peripheral arteriosclerosis, commonly known „black foot disease". It may also cause peripheral neuritis resulting in motor and sensory paralysis of nerve extremitis. Arsenic is toxic to liver and it produces fatty infiltration and cause central necrosis, cirrhosis. Arsenic poisoning also affects bone marrow and cellular elements of blood. Most human foods like vegetable, fruits, dairy products and meats contain less than 0.5 ppm and rarely exceed 1ppm of arsenic. Arsenites being more soluble in water are more phytotoxic than arsenates. The toxicity of arsenic to aquatic biota generally decreases with increasing pH of the medium due to the oxidation to arsenic toxicity whereas grapes, carrots, apple, tomato, potato and tobacco are more resistant .

Arsenic in drinking water is the greatest threat to public health .Long term exposure of inorganic As in drinking water is known to cause human health problems including cancer, thickening and discoloration of skin etc.

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Volume 3, Issue 3, March 2023
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II. METHODS AND METHODOLOGY

All the samples are collected in plastic container doubly washed with chloroform as per the standard procedure of APHA. Samples are collected from Panem coal mines, Udalbani Stone chips mines and Dumkadanga Stone chips mines surface water from different places. Water samples are collected and tested for different parameters for domectic uses and irrigation purpose .This study is focused on the value of Arsenic and it is tested by following procedure:

Silver Diethylduthiocarbamate Method :

Inorganic As is reduced to AsH3 by Zn in acid solution in a Gutzeit generator. AsH3 is then led through a scrubber containing glass wool impregnated with Pb($CH_3COO)_2$ solution and into absorber tube containing Ag-Diethyldithiocarbamate ($AgSCSN(C_2H_5)_2$) dissolve in pyridine. As react with this Ag -salt forming a soluble red complex which is measured at 535 nm.

Procedure:

1. Take 25-35 ml sample in a clean generator bottle (Gutzeit generator). Add successively, with thoroughly mixing after each addition ,5 ml conc. HCl ,2 ml KI (15%) solution and 0.5 ml of 40% SnCl2 reagent. Allow 15 minutes for reduction of As (v) to As (lll) .
2. Add 3 g Zn (20-30 mesh) to the solution in the generator and connect the scrubber absorber assembly immediately.
3. Allow 30 mins to complete the evolution of AsH3. Warm the generator slightly to ensure that all the AsH3 released. AsH3 passes through scrubber containing glass wool impregnated with 4-5 drops of 10% (CH3COO)2 and then to the absorber containing 4 ml of 0.05 % Ag -Diethylduthiocarbamate in pyridine for 45 minutes.
4. Pour the solution from the absorber directly into 1cm cell and measure the absorbance of the red solution at 535 nm against a reagent blank.

III. RESULT AND DISCUSSION

Value obtained for As for different samples are discussed below in pi chart and bar diagram .

Average Seasonal Arsenic for Different Samples from May 2017 to December 2018

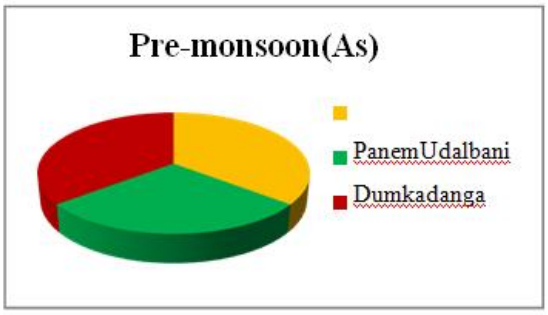


Fig 1

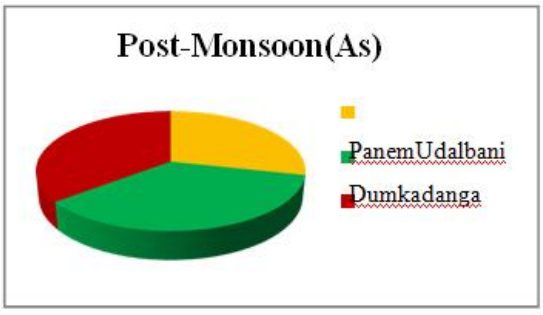
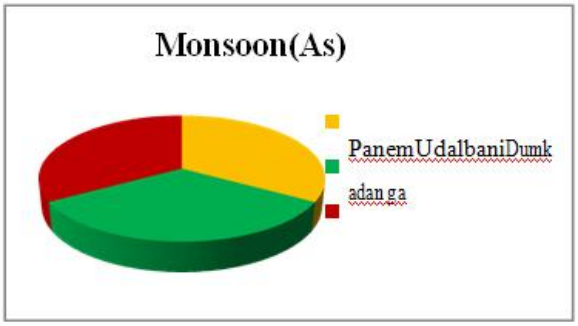


Fig - 2



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Volume 3, Issue 3, March 2023
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Average Seasonal As(mg/Lorppm) for Different Samples from May 17 to December 18

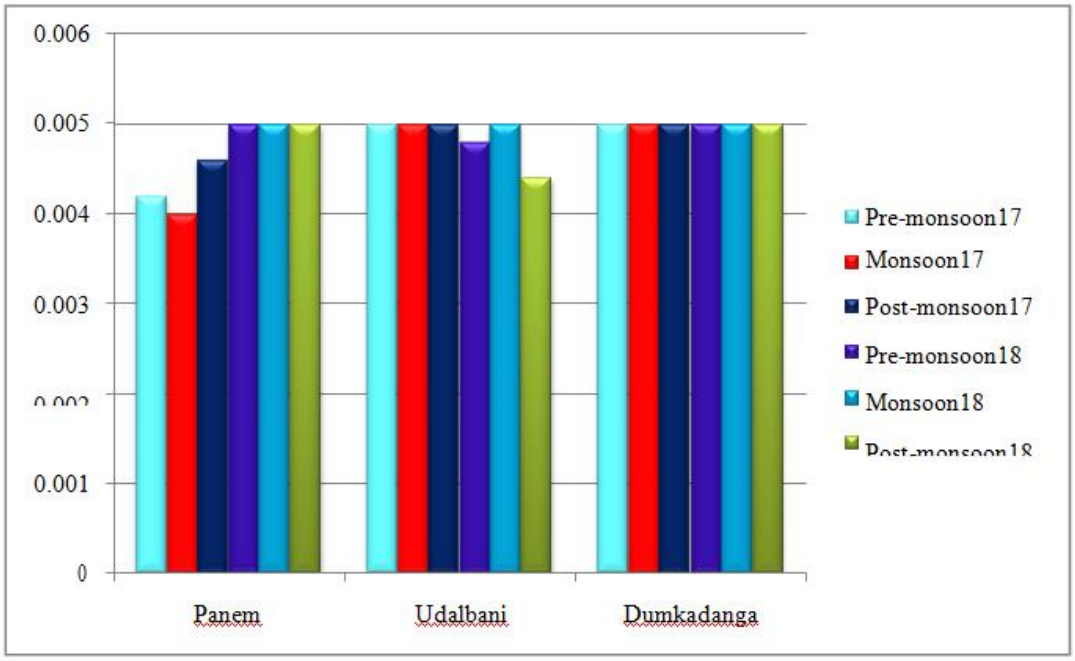


Fig - 4

From the above data it is found that the samples have arsenic value in desirable range. There is no Arsenic contamination in these water sources.

IV. CONCLUSION

As is a heavy metalloids in water . It cause many human health problem called "Arsenicosis " which cause discoloration of skin ,thickening of palm or foot , muscular pain ,weakness , tiredness and pin prick sensation of foot. In extreme condition it causes cancer and digestive problems. Arsenic has no color ,odour and taste so it is not easy to detect it in water. Only procedure for detection of As in water is laboratory test . Tube well water and other drinking water sources must be tested for As contamination time to time . As cannot be removed by boiling alternatively boiling of water increases its concentration. So there is no home treatment for removal of As from water . The most effective method for removing Arsenic from domestic water supply is reverse osmosis (RO).Some food like shellfish may contain Arsenic so avoid using these type of foods regularly . And drink purified supply or home RO water .

V. ACKNOWLEDGEMENT

The author is thankful to her research guide Dr. C.S .Azad PG Head Deoghar college Deoghar . The author is also thankful to SKMU PG Head and Professors of Chemistry department for their support and providing research facilities in university lab . She is also thankful to her family members for their support and motivation.

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A Bioactive Imidazole Synthesis with an Eco-Friendly Approach

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Department of Chemistry

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Abstract: *A special and expanding area of chemistry is green chemistry. Chemical synthesis occurs more frequently every day in our environment. Toxins are bad for our health and the environment, yet chemistry has advanced as medicines have been created to solve our concerns. If you want to lower the risk associated with a system, change the cause rather than the consequence. Green chemistry is a strategy for reducing the production and usage of dangerous compounds by improving chemical industrial processes. A sustainable method for manufacturing benzimidazole derivatives is by green synthesis of benzimidazole. By avoiding the use of risky chemicals, harmful solvents, and excessive energy inputs, this artificial approach lessens the impact of the process on the environment. The process makes use of natural or renewable resources, such as plant extracts or biological waste, as catalysts or reagents to manufacture high-yield and high-purity benzimidazole derivatives. By the use of green chemistry, benzimidazole derivatives are finding new and unheard-of applications in a range of fields, such as medicine, materials science, and agriculture. Moreover, it provides a viable and environmentally responsible substitute for traditional synthesis techniques.*

Keywords: Benzimidazole, green synthesis, eco-friendly

I. INTRODUCTION

The heterocyclic aromatic chemical benzimidazole is thought to have strong pharmacological activity and the potential to be physiologically active. It has a unique structure in medicinal chemistry and is a significant pharmacophore. [1] This compound is bicyclic in nature which Consists of the fusion of benzene and imidazole (Fig.1).[2]

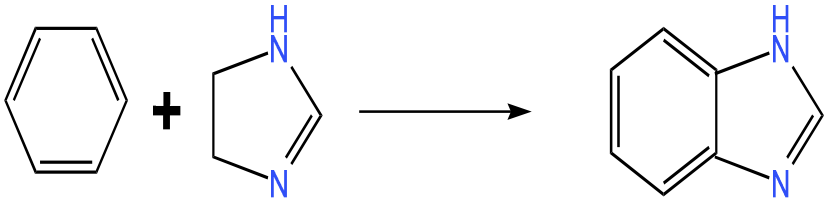
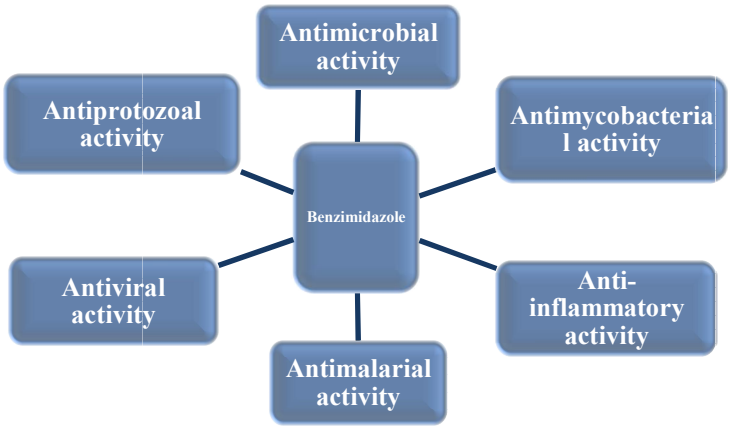


Fig 1: Structure of Benzimidazole.

It has a significant impact on medical science and a variety of therapeutic benefits, including anti-ulcer[3], anti-hypertensive[4], analgesic[5], anti-inflammatory[6], anti-viral[7], anti-fungal[8], anti-cancer[9], and anti-bacterial[10] properties.

"The design of chemical products and processes that minimise or count the use and manufacture of harmful compounds," is how Paul Anastas and John Warner described green chemistry in 1990. Environmental challenges and concerns that mortal society encounters frequently include ozone depletion, air pollution, climate change, soil and water pollution, acid rain, the depletion of natural resources, and the build-up of hazardous waste. Green Chemistry is based on twelve principles. The 12 principles of green chemistry were first presented by Paul T. Anastas and John C. Warner in their 1998 book, Green Chemistry Theory, and Practice. The California Green Chemistry Scientific Advisory

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Volume 3, Issue 3, March 2023
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Council counts both people as members. The 12 principles are, in essence.

1. Encourage garbage rather than treating or gathering it.
2. Include in the finished product all the equipment utilised during the manufacturing process.
3. Employ synthetic methods that produce compounds that are either not harmful to people or the environment or only mildly so.
4. Create chemical goods that are efficient but less harmful.
5. Where feasible, avoid using cleaning agents and supplemental materials.
6. Employ energy-efficient procedures at room temperature and pressure to cut costs and harm to the environment.
7. Make use of sustainable raw materials as feedstocks.
8. Reuse chemical blockers and intervenors to cut back on or count waste.
9. Choose catalysts that carry out a single reaction several times alternatively than lower effective reagents.
10. Employ compounds that easily degrade into harmless substances in the environment.
11. Improve the reasoning behind real-time monitoring to cut down on harmful drugs.
12. Employ chemicals that pose little risk of mishap, explosion, or fire.[11]



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Volume 3, Issue 3, March 2023
Impact Factor: 5.731

Green Synthesis of Benzimidazole

In 2010, Davood Azarifar and colleagues used a microwave oven to condense o-phyneline diamine to create benzimidazoles. They came to the conclusion that the benefits of this system include a gentle, manipulable process, eco-friendly and green characteristics that avoid harmful detergents, quicker response times, and high product yields.[12]

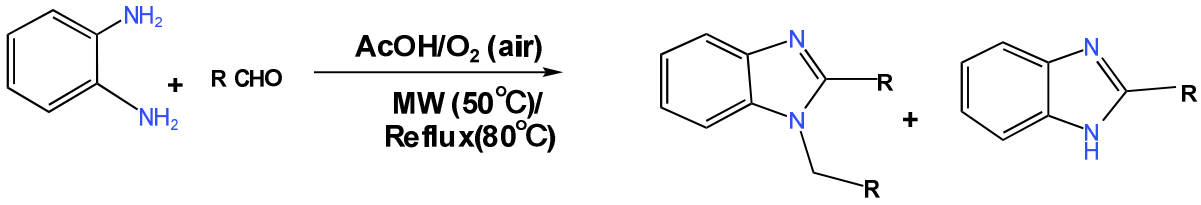


Fig 1: Microwave-assisted benzimidazole synthesis from OPD by Davood A et al

By treating 1, 2-diamine with aldehydes and employing the essence match complex K4(Fe(CN)) 6 as catalysis, Kabeer A. Shaikh et al. (2012) successfully synthesised Benzimidazoles in high yields. Via the environmentally friendly, moderate, and cost-effective technique of oxidising the carbon-nitrogen bond, the system was operated without the use of any solvents.[13].

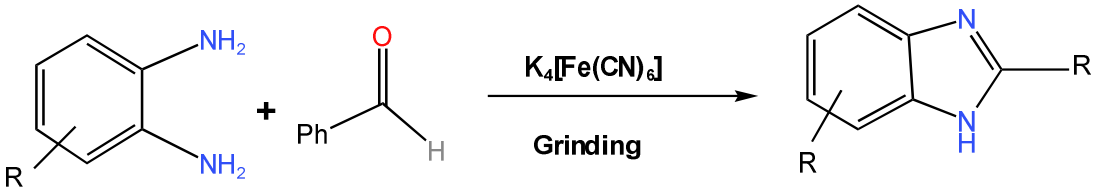


Fig 2:B.N.B. Vaidehi et al synthesis of benzimidazole from OPD in the presence of ring closure agents,

M. Rekha and colleagues investigated the catalytic activity of alumina, zirconia, manganese oxide/alumina, and manganese oxide/zirconia in the condensation reaction between o-phenylenediamine and an aldehyde or a ketone to synthesise, respectively, 2-substituted benzimidazoles and 1, 5-disubstituted benzodiazepines, and discovered that it was straightforward and affordable.[14].

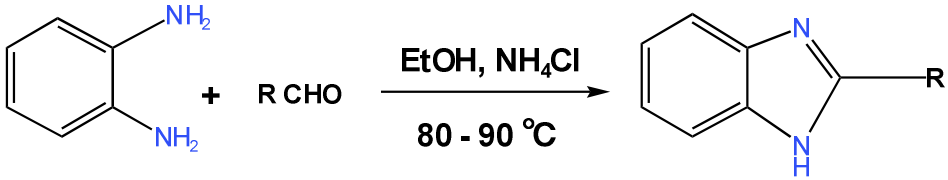


Fig 3: Benzimidazole synthesis from OPD in the presence of a green catalyst

The research of Chunxia Chen et al. The intermolecular cyclization of N-(2-iodoaryl) benzamidine produces benzimidazole derivatives in moderate to high yields and is a simple technique for the synthesis of the benzimidazole ring system through a carbon-nitrogen cross-coupling reaction in the presence of K2CO3 in water at 100 °C for 30 h. Amazingly, the process only uses water and doesn't employ any additional reagents or catalysts, making the technology incredibly advantageous from both an economic and environmental standpoint.[15].

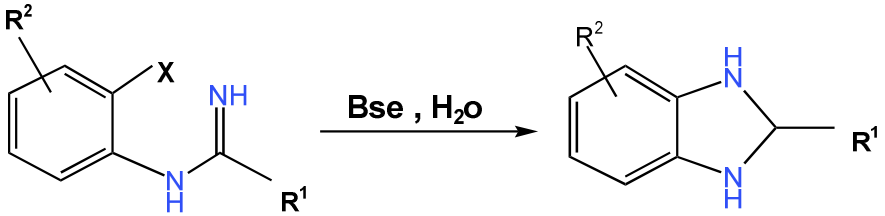


Fig 4: Chunxia Chen et alsolvent/reagent-free synthesis of benzimidazole from N-(2-haloaryl) benzamidine,

2018 K. Kantharaju et al. By using water extract of papaya bark ash (WEPBA) as a green catalyst and reacting substituted Ophenylenediamine with various substituted benzoyl chlorides at room temperature, a quicker, more ecologically friendly method has been created to make 2-substituted benzimidazole. The overall environmental and financial benefits of this strategy are numerous. high output.[16]

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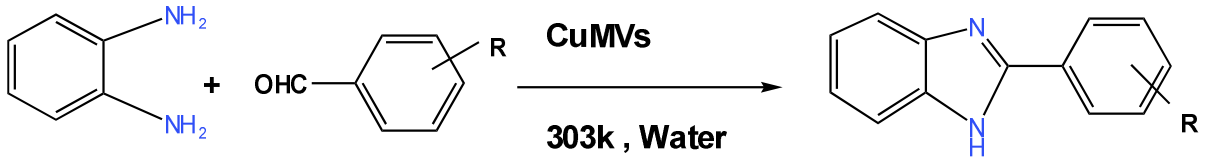


Fig 5 : Benzimidazole is made from OPD utilising a green solvent and a green catalyst,

Ramineni Srinivasulu et al. synthesise 2-substituted benzimidazole derivatives from o-phenylenediamine and substituted aldehydes in ethanol solvent at reflux temperature using zinc triflate as an efficient catalyst. They deduced that zinc triflate had been created to serve as a trustworthy catalyst for the synthesis of benzimidazole from aldehydes and o-phenylenediamine. The use of this inexpensive and easily accessible catalyst is what gives this process its usefulness, environmental friendliness, and economic allure. Other advantages of the current strategy are the simple setup procedure, great product yields, and nontoxic catalyst.[17].

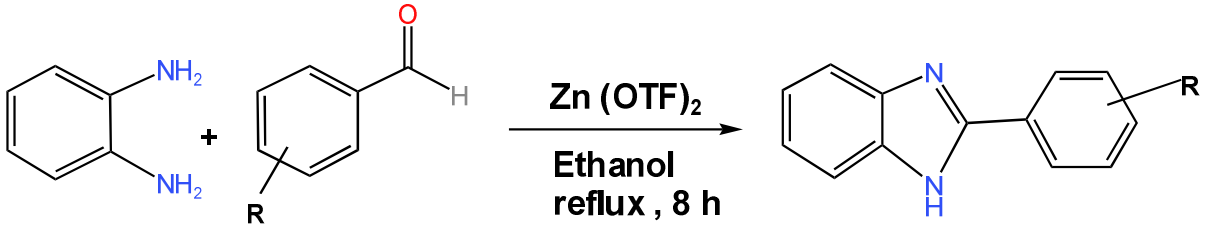


Fig 6: Ramineni Srinivasulu et al efficient green catalyst-based synthesis of benzimidazole from OPD

By utilising a catalytic quantity of zinc acetate and reacting modified o-phyneline diamine with aldehyde derivatives at room temperature, Vishvanath D. Patil et al. were able to create excellent yields of benzimidazole derivatives. An appealing aspect of this approach is the excellent selectivity in mild, neutral, and solvent-free conditions with a readily available, affordable catalyst.[18].

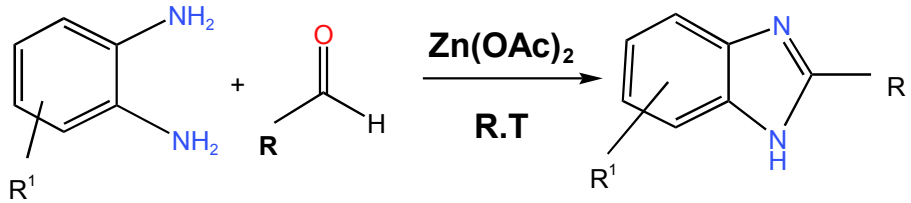


Fig 8: Benzimidazole is made from OPD using an effective green catalyst by Vishvanath D. Patil et al.,

With the help of aldehydes, boric acid, and water at room temperature, Zahed Karimi-Jaberi et al. were able to produce 2-Substituted in a single pot. The process was convenient and proved to be eco-friendly, and the products were isolated with high yields.[19].

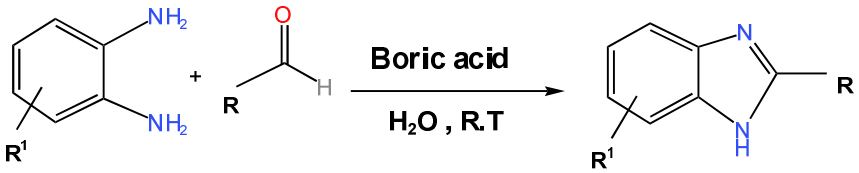


Fig 9: benzimidazole Synthesis from OPD by using efficient green catalyst by Zahed Karimi-Jaberi et al .,

Mazahir Kidwai and colleagues created benzimidazole derivatives using o-phenylenediamine and aldehydes as starting materials and ceric ammonium nitrate (CAN) as a catalyst in PEG as the solvent. This technology offers a fresh method for the efficient and low-catalyst-loading mixing of benzimidazoles. It is appealing for large assiduity activities due to the recovery and successful reutilization of the detergent as well as the simple setup and cleaning tasks of this sustainable system.[20].

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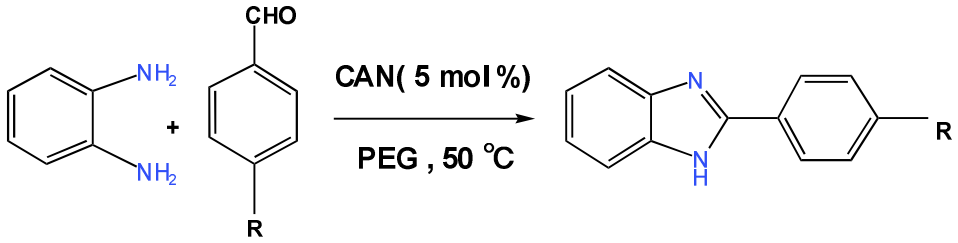


Fig 10: Benzimidazole is made from OPD using a green solvents and green catalyst by Mazaahir Kidwai et al.,

By employing the environmentally friendly solvent PEG400 to combine o-phenylenediamine with a number of aldehydes, Mita D. Khunt et al. were able to successfully produce the benzimidazole.[21].

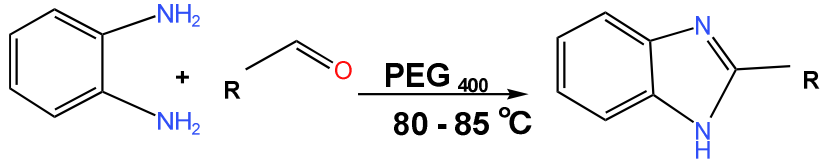


Fig 11: Benzimidazole is made from OPD utilising an effective green solvent by Mita D. Khunt et al.,

R.Azzallou et al. (2011) described a quick and simple procedure for producing 2-aryl benzimidazole from o-phenylenediamine and aldehyde utilising microwave irradiation and a tiny quantity of newly developed Moroccan clay catalyst that has been modified with a surfactant. For the synthesis of benzimidazole derivatives, the heterogeneous reaction condition provides a very straightforward, clean, inexpensive, and selective methodology.[22]

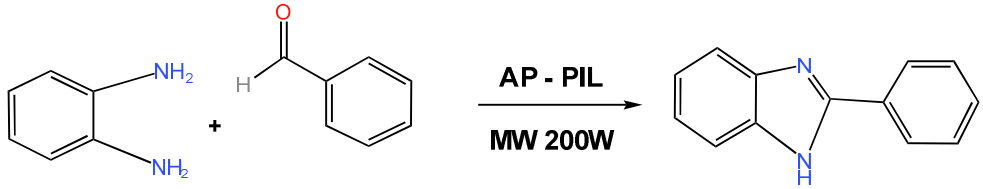


Fig. 12: Al-PILC-catalyzed 2-substituted benzimidazole synthesis with microwave radiation.

By condensing phenylenediamine with different aryl aldehydes, M. Forouzani et al. (2012) created 2-aryl-benzimidazole. 1,3-dibromo5,5-dimethyl hydantoin (DBH) catalyses a more ecologically friendly approach that operates effectively in high yields without the use of organic solvothermal conditions or microwave irradiation..[23]

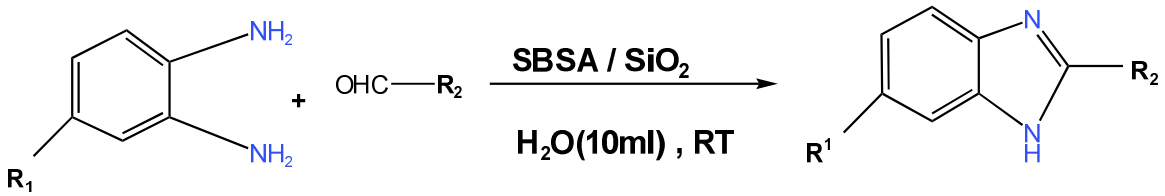


Fig. 13: Benzimidazole can be made utilising a novel, effective catalyst called SBSA.

F. Rajabi et al. (2015) used cobalt(II) supported on mesoporous silica type material to synthesise benzimidazole from o-phenylenediamine and benzaldehyde under mild conditions. After the reaction was finished, the supported cobalt catalyst could be easily collected and used seven more times..[24]

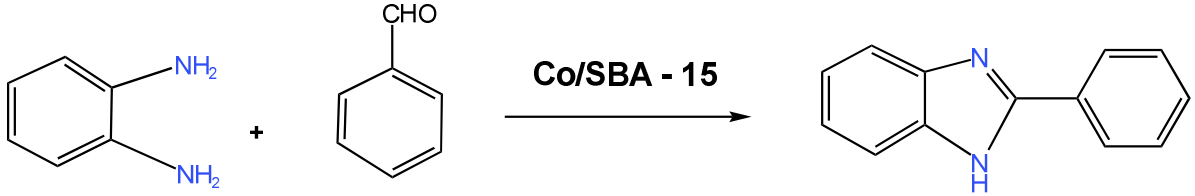


Fig. 14: Synthesis of using Co/SBA-15 as a catalyst to produce benzimidazole from o-phenylenediamine and benzaldehyde.

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ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
Volume 3, Issue 3, March 2023
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The synthesis of 1-(1H-benzimidazole-2-yl)-3-[5- 9trichloromethyl)-1,3,4-oxadiazol-2-yl] was described by M. Rashid et al. in 2012. By reacting with trichloroacetic acid under microwave irradiation, 4-(1H-benzimidazole-2-yl)-4-oxobutane hydrazide can be converted into propane-1-one in a good yield..[25]

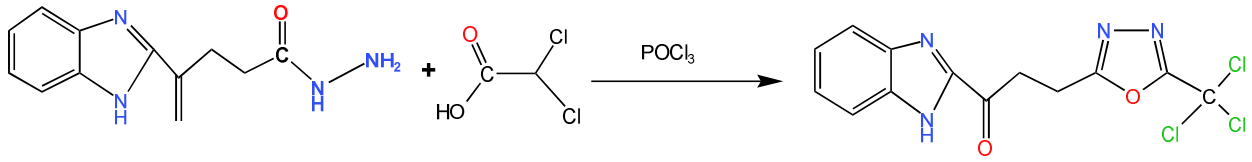


Fig 15: Synthesis of benzimidazole when exposed to microwave energy.

Di Gioia, M.L., et al., 2019. Starting with o-phenylenediamine in the presence of benzaldehyde, a green 2-substituted benzimidazole is synthesised. DES (ChCl: urea DES) is also added. Between 600C and 800C, the reaction mixture was left on a magnetic stirrer while being checked by TLC. Derivatives of the benzimidazole are produced. Without the need of an external solvent, using deep eutectic solvent as the reaction medium and reagent offers benefits for both yields and reaction setup.[26]

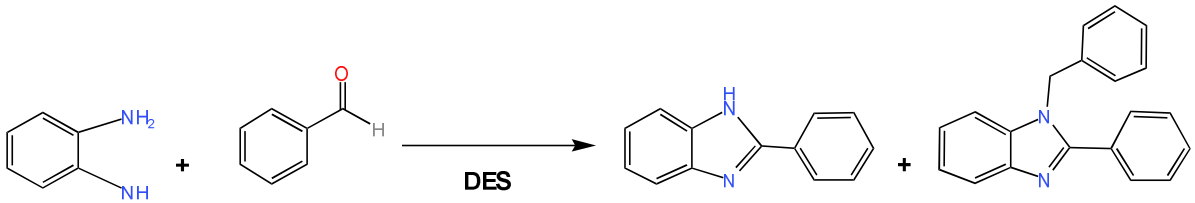


Fig 16: Using an active eutectic solvent, green synthesis of favoured benzimidazole scaffolds.

II. CONCLUSION

Obtaining benzimidazole derivatives using an environmentally friendly process and chemicals is known as "green synthesis" of benzimidazole. Compared to conventional synthetic methods, this strategy has a number of benefits, such as the use of renewable starting materials, a decrease in waste production, and a reduction in energy usage. Additionally, a number of methods, including catalyst-free, microwave-assisted, and ultrasound-assisted synthesis, can be used to produce benzimidazole in an environmentally friendly manner. These techniques have been proven to be successful, economical, and capable of producing large quantities of the required output. Consequently, building sustainable and environmentally friendly synthetic methods for creating important organic molecules is made possible by the green synthesis of benzimidazole.

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Growth and Spectral Analysis of Pure and Potassium Doped L-Prolinium Trichloro Acetic Acid Crystal

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Abstract: *In current study growth and analysis of pure and potassium doped L-prolinium trichloro acetic acid single crystals have been performed by alike characterization technique. The single crystal has been harvested by slow solvent evaporation technique. The functional groups of grown crystals have been identified by Fourier transform infrared technique. The constituent elements of pure and doped crystal have been confirmed by employing the EDS analysis. The transmittance window of grown crystal has been evaluated within 200-1100 nm by means of UV-Visible spectral analysis. The tolerance to thermal exposure was confirmed by using the TG/DTA technique.*

Keywords: Crystal growth, Spectral analysis, Optical studies, Thermal studies

I. INTRODUCTION

Currently there is an increasing interest in developing compounds with large non-linear optical susceptibilities. Some organic compounds are the target to develop such materials due to their highly polarizable electronic clouds and the strong impact of changes of the molecular structure on their NLO properties. Amino acids is one of the promising building block material which have been widely studied and there are a number of research papers reporting NLO compounds synthesized by a combination of an amino acid with an inorganic counterpart [1-5]. Among the amino acids, all except glycine, are characterized by chiral carbons, a proton donating carboxyl (-COOH) group and a proton-accepting amino ($-NH_2$) group. L-proline is vital amino acid amongst the family because it is the only one in which the amine group is part of a pyrrolidine ring, thus making it rigid and directional in biological systems [8]. L-proline has been exploited for the formation of salts with different organic and inorganic acids [9]. L-prolinium picrate exhibits second harmonic generation (SHG) efficiency 52 times higher than KDP [10]. L-prolinium trichloro acetic acid (LPTCA) is significant organic material that has gained attention in the field of crystal growth due to its remarkable properties such as high optical quality, high thermal stability, and tunable nonlinear optical properties. Recently, doping of LPTCA with various organic and inorganic materials has been studied to enhance its properties for different applications. The present study focuses on growth and spectral analysis of pure and K doped LPTCA crystals. The aim of this study is to investigate the effect of doping on the crystal morphology and spectral properties of LPCTA crystals. The spectral analysis of the LPTCA crystals was performed using UV-VIS spectroscopy. The results of this study will enable better understanding of crystal growth and effect of doping on optical and thermal properties of LPTCA crystals. The results will be evaluated for exploring the potential applications of K-doped LPTCA crystals in optics, sensors and nonlinear optical devices.

II. EXPERIMENTAL DETAILS

L-prolinium trichloroacetic crystal growth was achieved by dissolving the high purity grade L-proline and acetic acid in double distilled water in equimolar proportion. The solution was stirred for 4-5 hours and filtrate was kept for slow

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evaporation to obtain the pure LPTCA crystal [1]. potassium (K) doping was achieved in saturated solution of LPTCA material by adding 0.1 mol of potassium. The K-LPTCA crystal were obtained by slow evaporation within period of two weeks. Generally, the presence of the impurities is found to have a strong influence on the growth rate [4] and to gain purity pure and K-LPTCA crystal were repeatedly recrystallized Fig. 1a and Fig. 1b shows the pics of harvested pure and K^+ doped $_L$-PTCA crystals respectively.



Fig1.(a) $_L$-PTCA

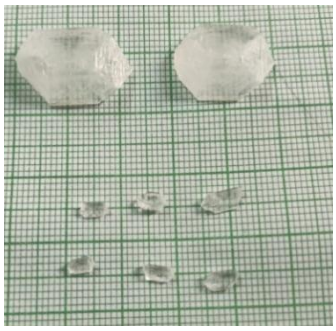


Fig1(b). K^+ doped $_L$-PTCA

III. CHARACTERIZATION

The FT-IR spectra of $_L$- PTCA crystals were recorded in the range 400–4000 cm^{-1} by BRUKER method to study the functional groups in sample. The metal element detected by EDS. Linear optical properties of the crystals were studied using a UV–vis–NIR spectrometer in the region 200–1100 nm. The thermal stability was identified by thermogravimetric (TG) and differential thermal analyses (DTA). Thermogravimetric and differential thermal analysis of L-PTCA crystals were carried out between temperature range 25 ^oC and 900 ^oC in nitrogen atmosphere at heating rate of 10 ^oC/min.

IV. RESULTS AND DISCUSSION

4.1 FT-IR

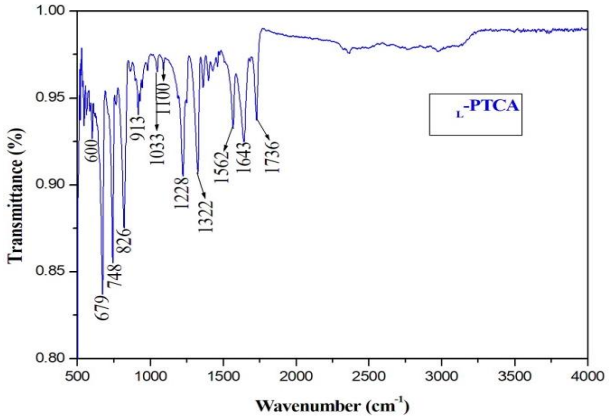


Fig.2a Pure LPTCA

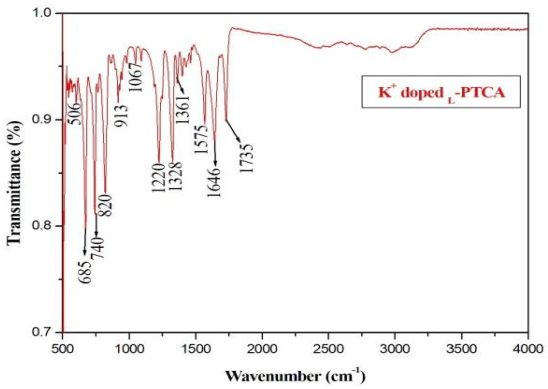


Fig. 2b K^+ doped LPTCA

In this study, pure L-prolinium tricholoro acetic acid and potassium doped LPTCA were characterized using FTIR spectroscopy. The FTIR spectra were recorded using a BRUKER Alpha-ATR spectrophotometer. In the FTIR spectra the main peaks observed were at 1736 cm^{-1} (C=O stretching of carboxylic acid), 1562 cm^{-1} (N-H) bending of amine) and 1322 cm^{-1} (C-C stretching of proline). In the potassium doped sample, the additional peak observed was at 1575 cm^{-1}, due to the presence of K^+ ion. In addition, the shift in frequency of the peaks was observed in the potassium doped sample with respect to spectrum of LPTCA crystal. The C=O stretching peak shifted to 1735 cm^{-1} , indicating the formation of a hydrogen bond between the oxygen of the carboxylic acid group and the potassium ion. The N-H bending peak also shifted from 1562 cm^{-1} to 1565 cm^{-1} due to the interaction with the K^+ ion.

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EDS:

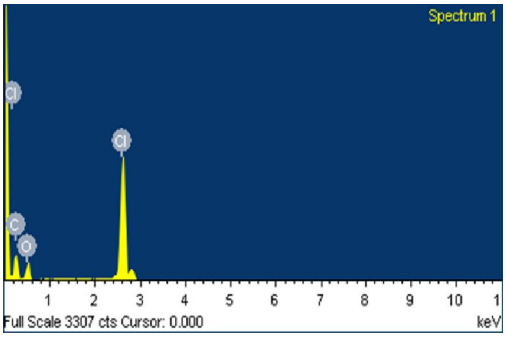


Fig.3a pure LPTCA

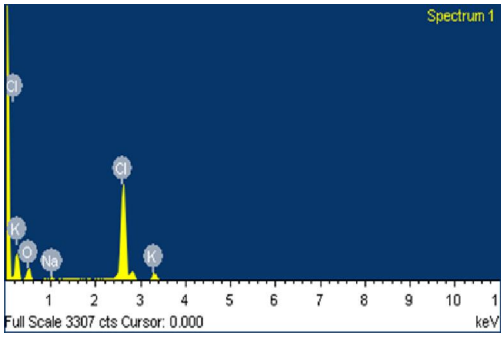


Fig.3b. K doped LPTCA

EDS (Energy Dispersive Spectroscopy) is an analytical technique that is used for the elemental analysis of a sample. In this study, pure and K-doped LPTCA crystal were characterized using EDS analysis. The sample was loaded onto the sample holder and placed under the electron microscope for analysis. In the EDS spectra of LPTCA crystal, the main elements observed were carbon, oxygen, and chlorine. The presence of these elements is consistent with the chemical composition of LPTCA. The EDS analysis revealed that there is no contamination in pore LPTCA crystal. In the K-LPTCA sample the additional peak observed was due to presence of potassium ions. The presence of K+ ion was confirmed by the energy peak evident in the spectrum. The results of the EDS analysis showed that the sample was doped with potassium ions.

4.2 UV–Visible–NIR Spectral Analysis

UV Vis NIR spectroscopy is a widely used analytical technique employed for linear optical analysis of materials. It is used to determine important information such as electronic transitions, molecular structure, and concentration of light – absorbing species in a sample. In this study, pure and K-LPTCA crystal were characterized by UV VIS NIR spectrometer. Within 200-1100 nm range. In the spectral analysis of pure and K-LPTCA crystal sample, the cut-off wavelength was observed at 298 nm wavelength. The transmittance of pure and K-LPTCA crystal is found to be 61% and 70% respectively. The transmittance spectrum reveals that transmittance of LPTCA is increased due to K^+ doped LPTCA crystal as compared to that of pure LPTCA crystal

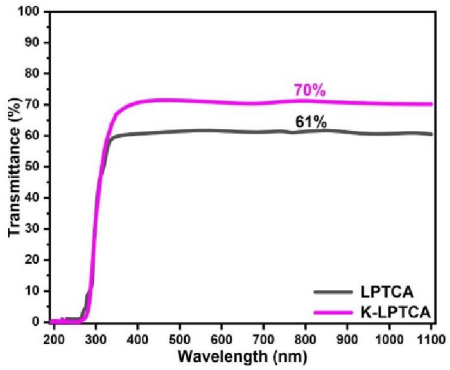


Fig. 4 Transmittance of pure and K doped LPTCA

4.3 TG/DTA

TG/DTA is used to measure the thermal stability of a sample. It evaluates the weight loss and heat flow of a sample within given range of temperature. In this study, pure and K doped LPTCA crystal were characterized using TG/DTA analysis. The TG/DTA analysis was carried out on a Perkin Elmer thermo gravimetric analyser. The TG and DTA analysis was simultaneously performed within 25 to 900 ^oC at a heating rate of 10 ^oC/minute. A flow of nitrogen gas

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helped prevent oxidation of the samples. The TG curve obtained for the pure LPTCA crystal showed a prominent weight loss starting at 107 °C, which evidences absence of moisture in crystal. There was a significant change in DTA curve at around the same temperature as the weight loss, indicating the endothermic process. The K-LPTCA crystal showed weight loss at 109°C compare to pure LPTCA. The observed curve can be attributed to thermal degradation of the crystal.

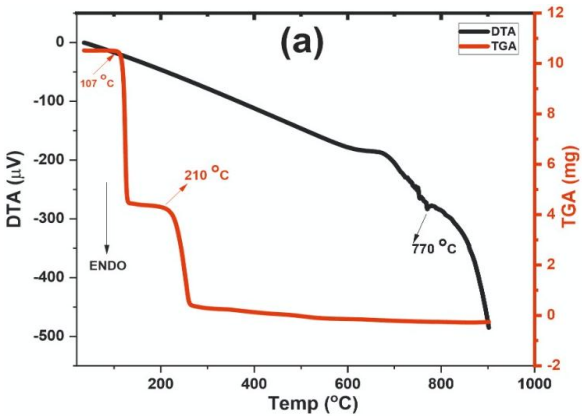


Fig.5a Pure LPTCA

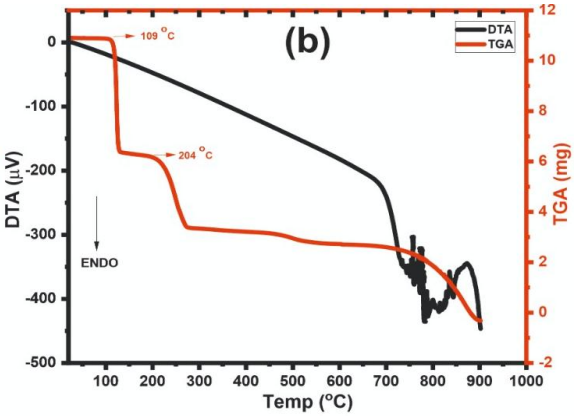


Fig.5b K doped LPTCA

V. CONCLUSION

In the present work single crystal of pure and K-LPTCA were grown by slow evaporation solution growth method. The functional groups of grown crystals were qualitatively identified by FTIR spectral analysis. K metal has been detected by EDS analysis. UV–Visible–NIR spectra revealed that transmittance of LPTCA crystal has been enhanced by 9% due to incorporation of K expressing the improved optical quality of K-LPTCA crystal. Thermal stability of the grown sample was studied by TG/DTA analysis. TG analysis revealed that LPTCA and K-LPTCA crystal is thermally stable up to 107 °C and 109 °C respectively. Conclusion derived in the present work evidently show that K+ doped LPTCA crystal is potential candidate as compared to LPTCA single crystals for device applications

VI. ACKNOWLEDGMENT

I would like to express my sincere thanks to Prof. Dr. Mohammed Anis sir from Molana Azad College for guiding me during this complete work.

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Post-Harvest Management of Agricultural Produce

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Abstract: *The minimization of wastage of agricultural produce is the ultimate goal of post-harvest management. The post-harvest management has increasing population and shrinking agricultural land and other resources. Present situation is the main global challenge to ensure food security in a sustainable manner safe to mankind and environment. The production of agricultural crops have increased during the recent years, but the development and adoption of post harvest technology is lacking and resulting in huge post harvest losses. The factors which affect on post harvest during harvesting, storing, transporting, and marketing is microbial activity. The highly perishable crop like horticultural produce need much more attention and to ensure promotion of processing and value addition. The value chain for processing has become a important to improve the food safety and strengthen national food security. The value chain in post-harvest management of horticultural crops mainly comprise of pre-harvest factors, harvesting, market preparation (common storage, sorting, grading, packaging and on-farm storage), transportation, storage by-product waste management.*

Keywords: Agricultural produce, economics, harvest, Post-harvest management, quality, Post-harvest techniques in vegetables. Post-harvest management, processing of vegetables

I. INTRODUCTION

1.1 Objectives

- To improve awareness and understanding of environmental impact of product horticulture
- The use of such resources in a concentrated space and time has the potential to negatively impact on the local environment and worker welfare.
- In addition the transport of horticultural produce over long distances, particularly by air transport, and reported in term of food miles, is known to have a negative contribution to
- The overall process leads to postharvest deterioration of the produce. However, the losses can be reduced with adoption of postharvest management and use of processing technology of vegetable crops

II. RESEARCH DESIGN AND METHODS /RESEARCH METHODOLOGY

The present study will be mainly based on primary and secondary sources of data. Primary data will be field based study and survey method where data will be collected through structured questionnaire.

2.1 Preliminary Work / Survey

This research is directly and indirectly contributed in understanding of post harvesting of crop issueOn horticulture production . It improves awareness of the public and communities to adapt to the impact on crop production

2.2 Expected Outcome

1. Researchers are trying to find out how to increase the horticulture production. And which environmental impact are affect the horticulture product
2. Research is useful to find out which crop is more affected by environment

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3. Research are trying to find out how the understanding of wider issues relating to the environment has developed over recent years

2.3 Benefits to the Society

1. Cultivation are dependent on the environment temperatures and carbon dioxide can increase crop yields. Chief benefits of global warming are fewer winter deaths and lower energy costs, better agricultural yields maybe richer biodiversity
2. Post-harvest management practices Post-harvest losses can be reduced by adopting breeding technologies for longer shelf life, improvement of pre-harvest factors and harvesting techniques, proper methods of handling, marketing, packaging, transportation and storage, development of appropriate processing technology change losses to horticulture production costly disruptions to society

2.4 Cost Benefit Analysis

This research will not be required that much cost for functioning. Here researchers trying to use reviewed 221 papers that used crop models to assess impacts of environment on horticulture production. The benefit of work is nothing but due to research we findout longer frost-free seasons, increases in growing degree days, and even increased atmospheric CO2 can, in theory, lead to better harvesting if crop yields and productivity..

III. FUTURE SCOPE

Post-harvest technology useful in maintaining quality of agricultural produce .the importance of post-harvest, management is that it has been capability to meet food requirement of growing population by eliminating loss, making more nutritive food item from raw commodities i.e. fruits and vegetable, and by proper processing and fortification.

IV. SWOC ANALYSISL/ LIMITATION

Strength

- Good climate for horticulture production
- Relative low labor cost
- Improved business environment

Weakness

- Lack of reliable data and weak rural infrastructure
- Limited access of finance
- Unclear land tenure system combined with land scarcity and growing population.

Opportunity

- New available techniques to improve productivity and quality of the crop (product and process upgrading)
- Reduce sing post-harvest losses via processing crop, transforming into marketable food product (functional upgrading)

Challenges

- Climatic change – un predictable weather pattern and lack of historical data undermine potential for development of agriculture insurance
- Inflow of free product, programs and food aid from donor countries may disrupt internal , market

V. CONCLUSION

A study was conducted on the effects of postharvest handling and storage temperature on the quality and shelf of produce during 2021-2022. Which revealed that rough handling of produce can result in the destruction of the fruit cell wall leading to softening and reduced marketability of the produce. Also, high storage temperature can result in

increased respiration (3.8 mlCO2/kg-h) and ethylene production (7.85 µl/kg/h) significantly as well as accelerate ripening (16.80) and weight loss (97.08 %). Therefore these conditions (rough handling and high temperature) accelerate the metabolic rate of produce and thereby reduce the shelf life of the produce. This research is based on the study on shelf life and quality of produce by using post-harvest technique like produce packed in perforated (0.25%) polyethylene bag and kept at ambient temperature (20-25 °C) & relative humidity 70-90%) condition resulted in substantial reduction in decay and weight losses.

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Efficient Synthesis of One- Pot Knoevengel Condensation with Potassium Carbonate in PEG

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Abstract: *The Knoevengel condensation of aldehydes with active methylene compound proceeded efficiently at room temperature with potassium carbonate as a catalyst and PEG as a green solvent. C-C bonds formation reactions are important derivation in perfume, pharmaceutical, polymer applications.*

Keywords: Knoevengel condensation, Potassium Carbonate, Green Chemistry, PEG, Room Temperature

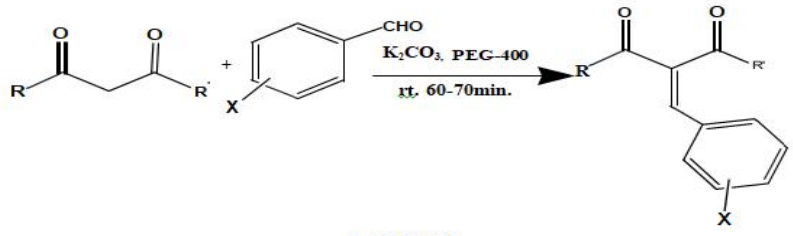
I. INTRODUCTION

The development of cleaner technologies is a major goal in green chemistry [1-2]. Among the several aspects of green chemistry, the catalytic amount of catalyst and the reduction or replacement of volatile organic solvents from the reaction medium is of at most importance [3- 5]. Polyethylene glycol (PEG) is more popular alternate reaction media, due to their properties like non-toxicity, bio-compatibility, and bio-degradability. Moreover, PEG is considered as a natural, inexpensive, safe, recyclable, degradable, non-flammable, facile, environmentally benign and abundantly available green solvent[6].C-C bonds formation reduction are important derivation in perfume, pharmaceutical, polymer applications [7-8]. These adducts are good Michael acceptors and can be used directly in the Diels-Alder reaction for further transformations also, the importance of Knoevenagel adducts has led to an exploration of several other reagent to promote knoevenagel condensation such as acid catalysts $CeCl_4.7H_2O/NaI$[8],$HClO_4$-SiO_2[9], $TiCl_4$[10] and $ZnCl_2$[11].Reports without any catalysts are also present with high temperature [12-14] ormicrowave irradiation [15] has been used for this transformations. Methylene active compounds carrying two electron withdrawing groups such as β-keto ester and acetylacetone are generally used in the known condensations. Very often, prolonged reaction condition or dangerous chemicals and high temperatures become a barrier for low field. Accordingly the development of a facile and efficient methodology for the knoevenagel condensation is desired. In this paper, we are describing our work in the successful use of potassium carbonateasa catalyst and PEG-400 as a green solvent at room temperatureforknoevenagelcondensationofaldehydeswithactivemethylenecompounds.

II. EXPERIMENTAL

The mixture of aldehyde (1mmol), Active methylene compounds (1mmol), and Potassium Carbonate (15mol%) in PEG as reaction media was taken in round –bottom flask at room temperature and stirred 60-70 min. After completion of the reaction (TLC), water was added stirred for a minute. The precipitate was filtrated and recrystallized from hot ethanol to obtain the pure product. Solvent used in TLC – Ethyl acetate and chloroform. Ratio – 1:3.

PRESENT WORK



R=Me, Ph, OEt
R'=Me, Ph, OEt, OMe
X= 4-NO2, 4-Me, 4-F, 4-OMe, 3-Cl, 2-F, Cinnamaldehyde, 2- OMe, 2-Cl, 4-Cl.

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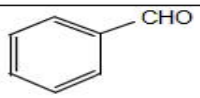
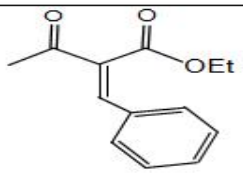
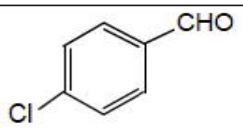
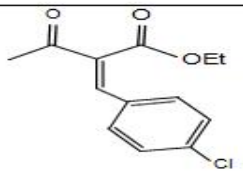
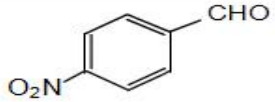
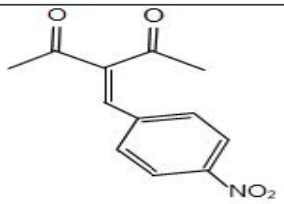
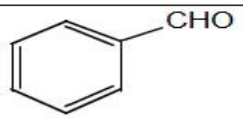
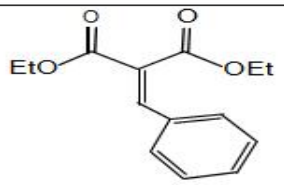
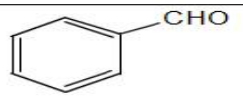
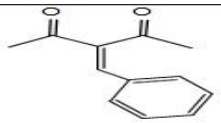
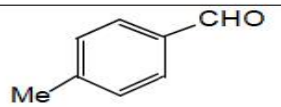
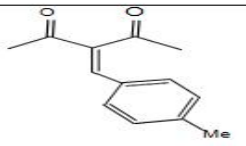
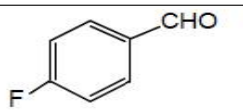
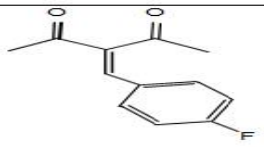
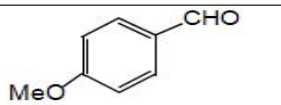
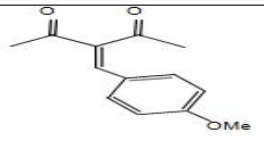
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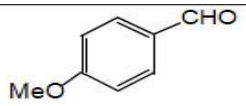
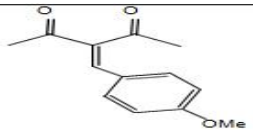
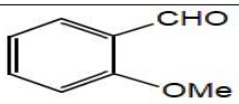
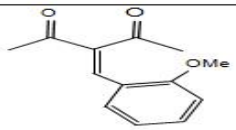
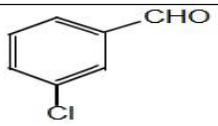
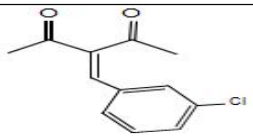
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Table: The Knoevengel condensation of β-keto ester or β-Diketones with aldehydes.

Entry	Aldehyde	Time (min)	Products	Yield (%)[a]	M.P. (°C)
1		70		92	60-62
2		60		91	87-89
3		60		93	169-170
4		60		93	52-54
5		70		93	54-56
6		60		83	80-82
7		60		88	90-92
8		60		81	80-84

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Volume 3, Issue 3, March 2023
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8		60		81	80-84
9		60		87	69
10		60		86	85-86

The products were isolated and characterized by 1H NMR, 13C NMR and mass spectroscopy.

III. RESULT AND DISCUSSION

Apart of our program aimed at developing new selective and environment friendly methodologies, particularly C-C and C-N bond formation here we wish to present an efficient method for performing the knoevengel condensation between substituted aldehydes and β-diketones at room temperature and PEG-400 as a green solvent.The reaction is complete in 60-70 min. with a facile recovery of products in high yields (70- 93%).

ISOLATED YIELD (%)

Impressed with the result obtained, a few more examples were investigated for the generality of the reaction. Several aromatic and aliphatic aldehydes were treated with β-diketones to yield the corresponding condensation products. In this context aromatic aldehydes with electron withdrawing group afforded slightly higher yields compared to aromatic aldehydes bearing electron donating group.

IV. CONCLUSION

In conclusion, we have developed an economically and environment friendly catalysed for simple and efficient synthesis of trisubstituted alkenes in relatively short reaction times at room temperature condition. This involves the use of potassium carbonate as a very inexpensive and easily available catalyst under neutral and PEG-400 as a green solvent. Present methodology offers very attractive features such as reduced reaction times, higher yields and economics viability of the catalyst, when compared with other catalysts, which will have wide scope in organic synthesis.

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Protease Inhibitor Activity of Selected *Calatropis* Species

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Abstract: *Protease inhibitors are widely distributed in all plant groups. There are several reports on application of protease inhibitors in medicines as well as in agriculture fields; The present study aimed to screen the plants for its protease inhibitor activities (PIs) by using the dot blot assay technique. The selected plants were screened for protease (Trypsin) inhibitor activities viz. Calotropisprocera (Aiton) W. T. Aiton and Calotropisgigantea (L.) W. T. Aiton. The plant samples (leaf, stems flower)shows potent protease inhibitor activity For screening of PI's activity. Trypsin and inhibitors (Plant sample) are loaded on gelatin coated X-ray films with respective concentration [3:1], [1:1], and [1:3] Appearance of The faint spot (gelatin) indicates total inhibition of enzymes, while dark blue spot (gelatin hydrolysis) indicates no inhibition. In present experiment C. procera (Aiton) W. T. Aiton leaf extract and C. gigantea (L.) W. T. Aiton leaf as well as stem extract shows the Protease Inhibitor activity.*

Keywords: *Calatropis*; Dot Blot assay; Protease inhibitor activity

I. INTRODUCTION

Plant it is autotrophic organism which contains Proteins, lipid, carbohydrate, vitamin, and minerals also. Presence of protease inhibitor activity are recorded in plants(H. Azzouz*et al*. 2005) animals and microorganisms(C. Shee& A. K. Sharma 2007)and algae (R. A. Bagwan *et al.* 2021).Protease inhibitors are well known as one of the prime candidates to have numerous applications in biotechnology and medicine and Agricultural sector.

The one best counter action to control of *H. armigera*infestation in *Cicerarietinum*(L.) fields is the use of chemical insecticide and pesticides. But due to the high costs of insecticides, pesticides, their risk andhazardous for the balance of environment and human health, proteinase inhibitor becomes a defense alternative by creating an insect-resistant plant(Nair *et al.*2013).

II. MATERIALS AND METHODS

2.1 Materials and Chemicals

Gelatin coated X-ray films were purchased from Agfa (CP-BU New). Electrophoresis systems and Molecularweight markers were obtained from Genei (Bangalore) India. Trypsin and Bovine serum albumin (BSA) wereobtained from HiMedia. Solvent viz. hexane and acetone from Qualigens, India.

The plant sampleswere collected from the Government Institute of Science Aurangabad and were authenticated by using standard literature Flora of Maharashtra Naik(1998)

Plant Material

Sr. No.	Botanical Name	Family
1	*Calotropisprocera* (Aiton)W.T. Aiton	Apocynaceae
2	*Calotropisgigantea*(L.) W.T.Aiton.	Apocynaceae

Table 1: List of Plant materials used for screening

2.2 Removal of fats and pigments from sample

1 gram of the powdered sample were de-pigmented by repeatedly washing with ice chilled acetone (1:6 w/v) forfour to five times and further defatted with n-hexane for two times and it was allow to air dry.The air dried material wasused for extraction of PIs.

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2.3 Extraction of PIs

Extraction of protein from defatted and de-pigmented plants samples was performed in 0.1M phosphate buffer (pH7.0) containing 1% Poly Venyl Pyruvate. 0.1 gram of each sample was dissolved in 10 ml extraction buffer at room temperature(28°C ±2°C) on shaker for 12 hours. Later the mixtures were centrifuged at 8000 rpm for 20 min at 40 C. Theclear supernatant pipette out and this crude extract was used for Screening of protease inhibitor activity, quantification total protein contents.

2.4 Screening of PIs

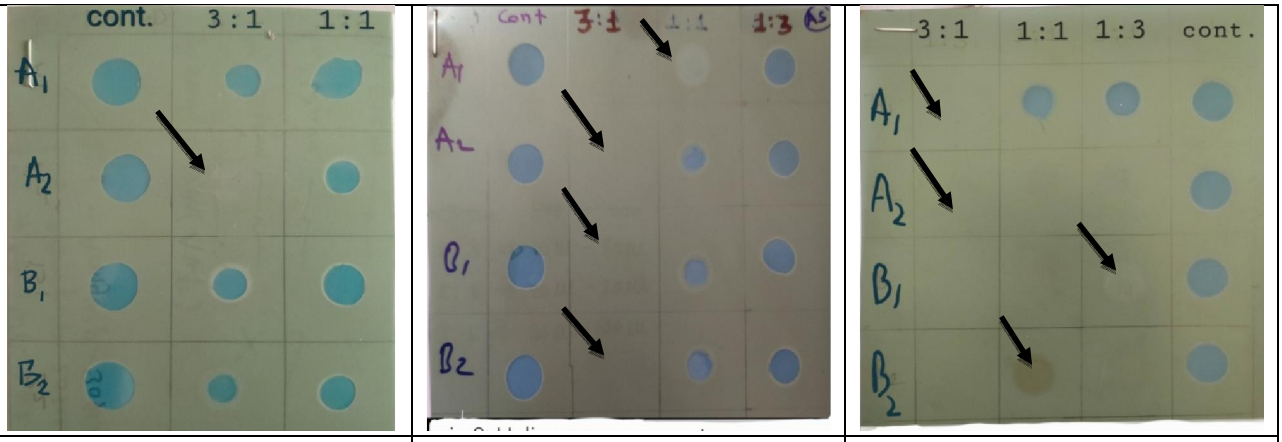
The Screening of Protease inhibitor activity was performed as follow:10ml of Trypsin was prepared in 100mM Tris-HCL (pH 7.8) buffer with final concentration 0.1 mg/ml. Three different concentrations of the enzyme and crude extracts cocktail was prepared in ratio 3:1, 1:1, and 1:3 (v/v).The total volumes of the cocktails were adjusted to 30µl with Tris-HCL buffer out of this 20µl each samples werespotted on undeveloped X ray film with spots of trypsin with buffer as a control. The reaction mixture were incubated on X-ray film for 20 min at 37°C and then the X ray film was washed under running tap water. Change in the color of X ray film at the point of spot of mixture was visually observed to note the activity of PIs.

III. RESULTS

Sample code	**AWP**			**HWP**			**Trypsin**		
Cont.	**1:3**	**1:1**	**3:1**	**1:3**	**1:1**	**3:1**	**1:3**	**1:1**	**3:1**
A1*(C.procera* leave)	-	-	+	-	+	+	-	-	+
A2*(C.procera stem)*	-	-	-	-	-	+	+	+	+
B1*(C.gigantea* leave)	-	-	-	-	-	+	+	+	+
B2*(C.gigantea stem)*	-	-	-	-	-	+	+	+	+

AWP: Army warm protease, HWP: Helicoverpa warm protease.

Table 2: Screening of PIs from extracts by spot test



AWP	**HWP**	**Trypsin**

Photo no. Detection of protease inhibitor activity of AWP, HWP and trypsin by the spot test. In lane 1 only Protease loaded ascontrol while three different concentrations of Protease and inhibitors are loaded in lane withrespective concentration [3:1], [1:1], and [1:3] for the screening of PIs. The faint spot (gelatin) indicates totalinhibition of enzymes, while dark blue spot (gelatin hydrolysis) indicates no inhibition.

IV. CONCLUSION

The present study deals with primary screening of protease inhibitor activity in the commonly growing Calotropis species. Interestingly to record that Trypsin Inhibitor activity is found to be positive in all four samples (leave & stem) studied except the 1:3 & 1:1 concentration for C. procera leave. While in HWP minimum inhibition was recorded in

C.procera leave only. Similarly minimum activity was also recorded in AWP at very low concentration of protease. This study will help in developing insect resistant varieties in near future with the help of biotechnological tools.

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Utilization of Mangrove Plant by Local Coastal Community in Maharashtra

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Abstract: *The present paper deals with the study of utilization of mangroves diversity along different sites of Maharashtra coastal region, India. Mangroves along the coast of Maharashtra have well developed ecological and economical potentials, therefore an attempt have been made to survey on utilization of mangrove plant by local coastal community. It was observed that the Sonneratia alba, and Avicennia marina species are commonly utilized. The increasing population in the areas of coastal Maharashtra with increased demands of resources especially natural resources has forcefully reducing the area of mangroves. The piece of work is significant in gathering information of mangrove plants and aware about degradation of mangroves.*

Keywords: Mangroves, Degradation of mangroves, utilization

I. INTRODUCTION

Usually, mangroves are rich in polyphenols and tannins. Mangrove leaves contain phenols and flavonoids. Substances in mangroves have long been usedin folk medicines to treat diseases. Extracts of variousparts of mangrove plants have significant activity againstanimal, human and plant viruses including humanimmunodeficiency virus. The comprehensive uses of various mangrove plant species in human sufferings provide strong evidence of their healing power and demands further research.

Mangrove plants grow up at the edge between sea and land in subtropical and tropical regions of the world. Where they exist in high temperature, strong winds, extreme tides, high salinity, and anaerobic soil. Mangrove plant tolerate high salt concentration and remain submerged in saline water. The mangrove plants are natural alternative route for new drugs, because of their low production costs, novelty, and structural diversity. Mangroves arewoody treesor shrubsand the salt marshhalophytes areherbs and sledges. The mangrove plants aredistributed in 121 countries. Mangroves are used in traditional and medicine for the treatment of many diseases. Mangrove forests are among one of the world's most productive tropical ecosystems and are highly potential. Because theecosystem is always under stress which leads to the production of certain compounds for their survival.

Mangrove plants have been used in folklore medicines and extracts from mangrove species have proven inhibitory activity against human, animal and plant pathogens. Several species of mangrove produce bioactive compounds that may control microbial growth. Secondary metabolites likealkaloids, phenolics, steroids and terpenoids have beencharacterized from extracts mangroves and have toxicological, pharmacological and of ecological importance. However, these studies are restricted to the mangroves of muddy region. Only few species like Pemphisacidula aregrowing only in coral sand substrates. Traditionally, the mangroves have been exploited for firewood and charcoal and their uses include construction of dwellings, furniture, boats and fishing gear and production of tannins for dying and leather production. Mangroves provide food and a wide variety oftraditional products and artefacts for mangrove dwellers. The mangrove leaves are useful contributors to the nutrient system of the mangrove environment. It is known that mangrove leaves contain amino acids, vitamins andminerals which helps in the growth and development of marine organisms.

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Therefore, it is necessary to gathered all information on utilization of mangroves plants at the micro level. Assessment studies will be beneficial for monitoring the sites periodically. Thus, a present attempt has been made to survey on utilization of mangrove plant by local coastal community in various sites of Maharashtra.

II. MATERIAL AND METHODS

Survey on utilization of mangroves plants was carried out in 10 sites of coastal regions of Maharashtra between August 2023 and March 2023. Information was obtained through interviews using semi- structured questionnaires. Field excursions with traditional healers and herbal medicine collectors were carried out. Descriptive statistics were used to present the data. Fidelity ratios and Informant consensus agreements were calculated.

III. RESULT AND DISCUSSION

The mangrove ecosystem in coastal region playing significant role, provide various benefits to the costal community. The various species of mangrove are utilized by local people along the coasts of Maharashtra. The traditional uses of mangroves are capturing fishery, fuel, fodder, tannery, and medicines. Medicinal importance of mangroves is known to local people since ancient time. The medicinal use of mangroves has a wide spectrum. Different species of mangroves are used for different medicinal purposes to cure certain disorders. In 20th centuries Nadkarni, Kirtikar and Basu have given a detailed account of mangrove species for their medicinal importance and mode of action of few species. Watt has reported the mangrove use by local inhabitants. Naskar and Guha Bakshi stated that the mangroves are widely used in Sundarbans for curing diseases on traditional basis.

Table no. 1 shows the major sites of mangroves visited in present work.

Table 1: Major sites of mangroves in Maharashtra

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2	Raigad	Hareshwar
3	Ratnagiri	Anjarle
4	Ratnagiri	Vijaydurg
5	Sindhudurg	Achara
6	Sindhudurg	Vengurla
7	Mumbai	Mahim
8	Mumbai	Malad
9	Thane	Vasai
10	Thane	Dahanu

Numerous Studies have been documented in view of the status, biodiversity, and distribution. From Table- 2 it is clear that mangroves are useful for medicines. Their detailed use should be focused. The tables represents that the different species of mangroves are medicinally used on traditional basis along the study area. Naskar has identified many mangrove species of Sundarbans delta from village folk and folk literature for medicinal use. Similar technique has been used in present study.

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*Acanthus ilicifolius*for asthma and rheumatism, *Rhizophora mucronata* forangina and *Excoecariaagallocha* for leprosy. [18]

Table 2: Mangroves species in Maharashtra and its uses

Sr. No.	Botanical Name	Common Name	Family	Part used	Uses
1	*Avicennia marina* (Forssk.) Vierh.	Tivar	Avicenniaceae	Leaves	Rheumatism, small pox, ulcers, fodder for livestock
2	*Avicennia officinalis* L.	Tivar	Avicenniaceae	Root, Bark & Seeds	Used in small pox, boils, abscesses, skin parasites and wounds Joint pain, Urinary disorder,
3	Rhizophora mucronate Poir	Kandal	Rhizophoraceae	Bark	Used in diabetes, leprosy Hemorrhage, dysentery, ulcer, febrifuge
4	*Acanthus ilicifolius* L.	Marandi	Acanthaceae	Roots, Tender shoot &Leaves	Used in snake bite, asthma, cough, nerve tonic, for dressing wounds and boils, aphrodisiac, diabetes rheumatism. Skin disease, kidney stone, small pox & ulcer snake poison
5	*Rhizophora apiculata*	Kandal	Rhizophoraceae	Leaf, Fruit	Astringent for diarrhea, vomiting, Nauses hepatitis, insecticide
6	*Bruguiera cylindrica*L.	Kandal	Rhizophoraceae	Bark,	used as astringent, hepatitis
7	*Bruguieragymnorhiza* L.	Ekmane	Rhizophoraceae	Bark, Fruit	eye medicine, used as astringent
8	*Kandeliacandel* L. Druce	Kandal-guriya	Rhizophoraceae	Bark	Used in diabetes
9	*Ceriops tagal* (Perr) C.B.Rob.	Kirkiri	Rhizophoraceae	Bark, Shoot,Fruit	Used in hemorrhage, Ulcers
10	*Sonneratia alba Kurz.*	Pandharichipi	Sonneratiaceae	Fruit	Used in hemorrhage, swellings
11	*Sonnertia apetala L.*	Chipi	Sonneratiaceae	Fruit	Swellings
12	*Sonneratiacaseolaris* Engler	Chipi	Sonneratiaceae	Fruit	Fruits edible and isused to prepare a local cuisine and is valued for its sour taste. Fruit extract is used as an anthelmintic medicine
13	*Lumnitzera racemose*Willd.	Huri	Combretaceae	Bark	Used in asthma, anti-fertility, diabetes
14	*Xylocarpus granatum* Koenig	Samudraphal	Meliaceae	Leaves, seeds, and bark	Used for treating jaundice, cholera,dysentery, fever, cough in the newly bornchilds, dysentery, tonic, astringent, forbreast cancer,

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					cholera, diarrhoea.
15	*Exoecariaagallocha L.*	Phungi	Exphorbiaceae	Root, Branches &Leaves	Used in epilepsy, Ulcers & Leprosy
16	Aegicerascorniculatum	Sugandha	Mysinacene	Root, Bark &Stem	Used as fish poison
17	*Heritieralittoralis* L.	Sundri	Malvaceae	Seed	Seed is grounded and used to treat dysentery.
18	*Dolichandronespathacea* (L.) Schum	Gorshingiah	Bignoniaceae	Seed	Seed powder is used as antiseptic and in enteric spasms
19	*Acrostichumaureum* L.	Kateri	Pteridaceae	Rhizomes leaves	Boils, wound

Forest Department of Maharashtra reported that there are 20 species of Mangroves that have found in Coastal districts of Maharashtra. Most of the people from all visited sites poor knowledge about mangroves as an ecosystem is more serious in terms of the future degradation of the mangroves. The study reveals that, 35.64% respondents do not know the function of mangroves. About 32.70% respondent know only one function of mangroves i.e., Wind Breaker. more than half i.e., 53.83% of the respondent used mangroves as a fuel wood. Besides that, 5% respondents are used for other purposes like construction, fishing etc. Costal vegetation is a good source of anticancer drugs. This coastal vegetation comprises mangroves, salt-marshesand sand-dunes. They have mentioned the role of mangroves species like *Avicenniaafricans*, *Brugueriaparviflora*, *Bruguieraexaristata* [21].

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IV. CONCLUSION

The present investigation reveals the traditional uses of nineteen species of mangrove flora. It is seen that these plant parts are used in variety of ailments including ulcers, boils, stomach problems, urinary diseases and many others. Growth of modern medicine along with the cultural transgression of developing society with constrains imposed onresource utilization due to conservation issues, is putting these ancient traditions under enormous stress. But these practices shed light into the hidden aspects of utilization of different natural products from plants, which can be benefitting to humans and can pave the way for development of different sustainable medicinal products with minimum post-therapeuticcomplications.It can be concluded that mangrove species are most important and useful to mankind. In context with the present status of mangroves, it is necessary to protect such natural resources by conducting the awareness programmed; and implementing strict rules and regulation.

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Cyber Crime: Prevention and Detection

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Abstract: *Cybercrime is a complex and ever changing phenomenon. Cyber criminals are becoming more sophisticated and are targeting consumers as well as public and private organizations. Therefore, additional layers of defense are needed. Cyber crime has been increasing in complexity and financial costs since corporations started to utilize computers in the course of doing business. Some of the case studies of cyber crime include Parliament attack case. In this paper we have discussed about Cyber crime and cyber security and different cyber crimes that we come across and prevention techniques and detection techniques such as Tripwires, configuration checking tools, Honey Pots, anomaly detection system and operating system commands. In this we also discuss about regulation acts imposed against Cybercrime and also online safety tips.*

Keywords: *Cyber Crime, Cyber Security, Honey pots, Trip wires, Anomaly detection, Case Study, Regulation Acts, Online safety tips*

I. INTRODUCTION

Usually, mangroves are rich in polyphenols and tannins. Mangrove leaves contain phenols and flavonoids. Substances in mangroves have long been used in folk medicines to treat diseases. Extracts of variousparts of mangrove plants have significant activity against animal, human and plant viruses including humanimmunodeficiency virus. The comprehensive uses of various mangrove plant species in human sufferings provide strong evidence of their healing power and demands further research.

Mangrove plants grow up at the edge between sea and land in subtropical and tropical regions of the world. Where they exist in high temperature, strong winds, extreme tides, high salinity, and anaerobic soil. Mangrove plant tolerate high salt concentration and remain submerged in saline water. The mangrove plants are natural alternative route for new drugs, because of their low production costs, novelty, and structural diversity. Mangroves arewoody treesor shrubsand the salt marshhalophytes areherbs and sledges. The mangrove plants aredistributed in 121 countries. Mangroves are used in traditional and medicine for the treatment of many diseases. Mangrove forests are among one of the world's most productive tropical ecosystems and are highly potential. Because theecosystem is always under stress which leads to the production of certain compounds for their survival.

Mangrove plants have been used in folklore medicines and extracts from mangrove species have proven inhibitory activity against human, animal and plant pathogens. Several species of mangrove produce bioactive compounds that may control microbial growth. Secondary metabolites likealkaloids, phenolics, steroids and terpenoids have beencharacterized from extracts mangroves and have toxicological, pharmacological and of ecological importance. However, these studies are restricted to the mangroves of muddy region. Only few species like Pemphisacidula aregrowing only in coral sand substrates. Traditionally, the mangroves have been exploited for firewood and charcoal and their uses include construction of dwellings, furniture, boats and fishing gear and production of tannins for dying and leather production. Mangroves provide food and a wide variety of traditional products and artefacts for mangrove dwellers. The mangrove leaves are useful contributors to the nutrient system of the mangrove environment. It is known that mangrove leaves contain amino acids, vitamins and minerals which helps in the growth and development of marine organisms.

Therefore, it is necessary to gathered all information on utilization of mangroves plants at the micro level. Assessment studies will be beneficial for monitoring the sites periodically. Thus, a present attempt has been made to survey on utilization of mangrove plant by local coastal community in various sites of Maharashtra.

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II. MATERIAL AND METHODS

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III. RESULT AND DISCUSSION

The mangrove ecosystem in coastal region playing significant role, provide various benefits to the costal community. The various species of mangrove are utilized by local people along the coasts of Maharashtra. The traditional uses of mangroves are capturing fishery, fuel, fodder, tannery, and medicines. Medicinal importance of mangroves is known to local people since ancient time. The medicinal use of mangroves has a wide spectrum. Different species of mangroves are used for different medicinal purposes to cure certain disorders. In 20th centuries Nadkarni, Kirtikar and Basu have given a detailed account of mangrove species for their medicinal importance and mode of action of few species. Watt has reported the mangrove use by local inhabitants. Naskar and Guha Bakshi stated that the mangroves are widely used in Sundarbans for curing diseases on traditional basis.

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8	Mumbai	Malad
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Numerous Studies have been documented in view of the status, biodiversity, and distribution. From Table- 2 it is clear that mangroves are useful for medicines. Their detailed use should be focused. The tables represents that the different species of mangroves are medicinally used on traditional basis along the study area. Naskar has identified many mangrove species of Sundarbans delta from village folk and folk literature for medicinal use. Similar technique has been used in present study.

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Utilization of Kitchen Scab for Home Gardening

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Abstract: *Despite of sufficient food grain product of public position, malnutrition is still a public health concern in our country. India is one of the commanding nations in vegetable product but the problem of malnutrition is especially the micronutrients scarcities are veritably common among the pastoral ménage. The underpinning cause may daily input of vegetables should be 300 gm/ person including roots and tubers, green leafy and other vegetables. Keeping into consideration the high frequency of malnutrition especially micronutrients insufficiency and shy vacuity of vegetables. The major ideal is to improves the vacuity of vegetables and nutrient input at a ménage position and to ameliorate the knowledge of pastoral women regarding colourful technology aspects of kitchen gardening and it's significance. The result of the study shows an enhancement in vacuity of vegetables for consumption at both ménage and individual position.*

Keywords: Malnutrition, vegetables, kitchen garden

I. INTRODUCTION

Vegetables are major source of vitamins, minerals and fibres. Their nutritive and medicinal value in mortal life are well proved. The major vegetables crops are Chilli, Coriander, Tomato, Methi, Spinach, Radish etc. Vegetables are veritably important part of a good diet as they contain colorful nutrients for numerous body functions. These vegetables also provides taste, better insipidity to us an increases the appetite. Vegetables are suitable grown in kitchen gardenis generally located near to house and is used for growing vegetables fruits and other food crops for the family.

It not only saves our plutocrat and time but also can feeds a healthy, useful and terrain friendly hobbyhorse for full family. Kitchen garden can help us in recycling of ménage waste especially when a compost hole is developed. One of the easiest way of icing a coitus to a healthy diet that contain acceptable macro and micronutrients is to produce numerous kind of food in the home garden.

This is especially important in pastoral areas where people have low copping power and distance request. Kitchen gardening directly provides food and nutritive security by making access to food that can be gathered incontinently prepared and fed to family members daily or whenever needed. Kitchen garden is also getting an decreasingly important source of food and income for poor homes in semi civic and civic areas. Kitchen garden can be grown in the space available at the vicinity of the house or roof and land.

Kitchen scrap gardening is the ultimate in recycling. It's environment friendly can save on grocery bills and it's a fun hands on science lesson for young children.

II. METHODOLOGY

Take a clean pots. Filled it with the soil mixture. Now the remaining apical shoot of plants in the soil mixture and water it regularly. After 6 to 7 day smallapical shoots arises then they sow in the pots. It takes at least 15 to 20 days to grow as a shrub.

The soil mixture Is containing soil and the manual.

Peels and twigs of fruits and vegetables, unusable parts of and leaf over of vegetables after washing and rice, pulses, meat and fish these waste material can be used as a manure.

III. LITERATURE REVIEW

Auditoriums have always been dependent on land politics. They can be defined by both the shops being grown and the walls that compass them. Pelletier etal.(1999,p. 1) defines community food security(CFS) as the "re-localization of

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numerous food system conditioning in response to values concerning the social, health, profitable, and environmental consequences of the globalizing food system ".

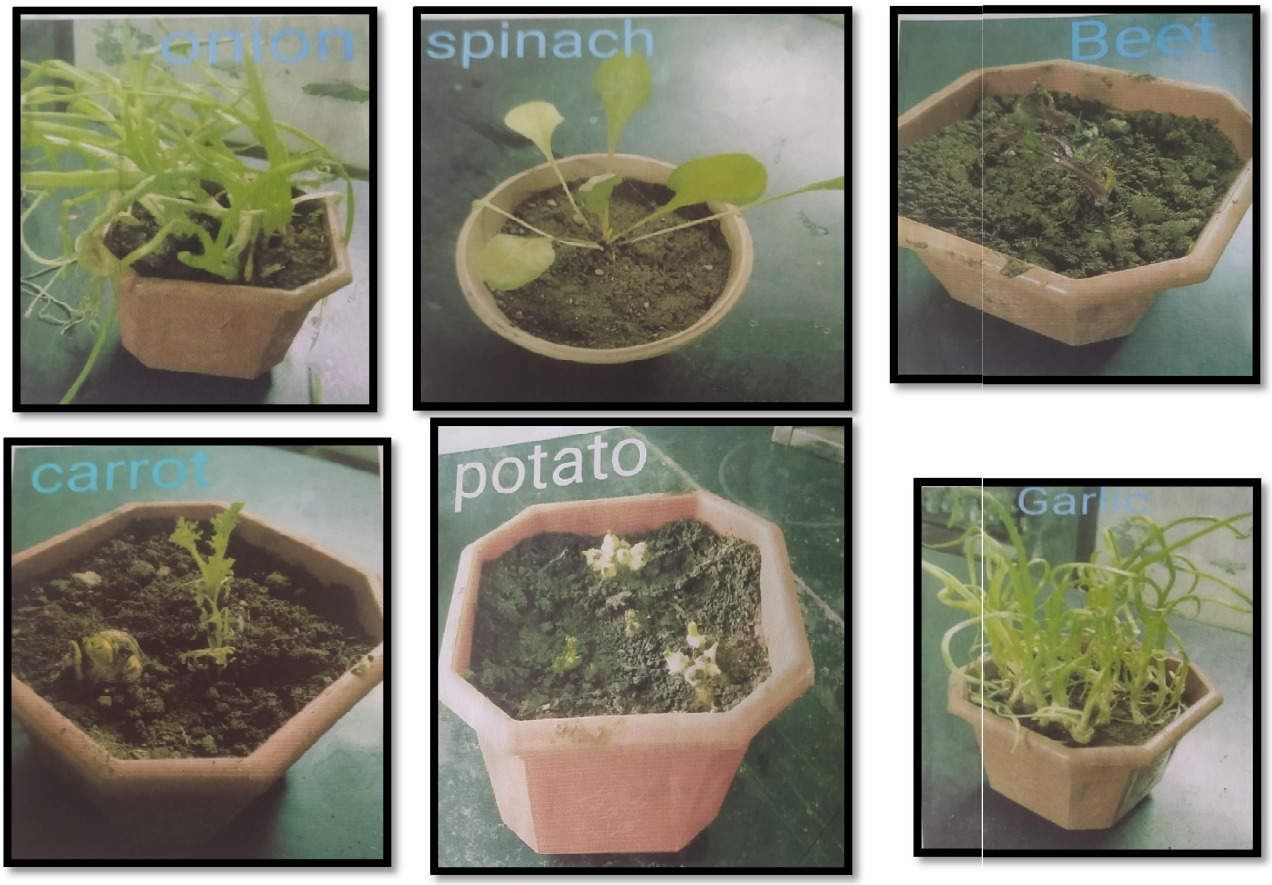
Doljanin/ van Herweden(2002,p. 5) offer a description for food instability from a original perspective, which " exists whenever the vacuity of nutritionally acceptable, safe foods or the capability to acquire tête-à-tête respectable foods in socially respectable ways is limited or uncertain. "

The kitchen gardening design was initiated by the Government of Punjab in the time of 2010 – 2011 with the thing of promoting and guarding peoples ' health and reducing their food expenditures.

IV. RESULT AND DISCUSSION

Kitchen garden is indigenous livelihood practices especially among women scientific approach in prevision and creation of this livelihoods through training sessions aim to make this livelihoods sustainable. Most of the beneficiaries valued livelihood backing. The result were especially visible in the poor ménage kitchen gardening training has served the target community to exercise indispensable livelihoods. Still a follow up plan is demanded to insure that similar ways are rehearsed on a large scale with request links to help ecological and provident development.

The result of this work is as below:



Sr. No.	Plant	Grown period
1.	Onion	10-15 days.
2.	Ginger	15-22 days.
3.	Spinach	10-12 days.
4.	Potato	20-22 days.
5.	Carrot	15-20 days.

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6.	Radish	10-15 days.

V. CONCLUSION

Home gardens are a low input high return venture most of the inputs are arranged from the locating available resources like family members as a workers, organic compost made from the waste, bio fertilizers, nutrient reducing etc. Multiple use values of products available from garden make home gardening economically viable option and future of home gardens in rural landscape seems to be secure.

One alarming fail notice during the study was lack of knowledge about the types names and dosage of the chemical fertilizers pesticides being used resulting in their inefficiency and wasteful use of chemical fertilizers and pesticides watch predominant in commercial home gardens than the non commercial home gardens.

Home gardens being mostly the second Sikh source of income to households also enhancing the social status of owners. Sharing of produce from home garden with neighbours relatives and fellow villagers resulted in strengthening of ties and enhancement in social status of the home garden owners families.

The results of the study reveal the local farmers planted various species in the limited area of home gardens to the greatest degree possible suggesting that the role and function of the home garden remain. Indispensable for daily life in spite of recent rapid changes in socio economic condition.

As per experiment we can reuse vegetables as in a kitchen garden. As per onion spinach takes less time to grow as compared to other vegetables.

VI. ACKNOWLEDGEMENT

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The Impact of Technology Trends on Healthcare Systems: A Study on Opportunities and Threats

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Abstract: *The importance of health in human lifestyles is considerable. The technologies advanced and the research on this area has brought about differences within the discipline of health as in all regions. The purpose of this have a look at is to observe the needs inside the area of health and to set the criteria for figuring out the most suitable technology. Inside the have a look at, three new technology tendencies in literature are examined. The principles of area computing, fog computing, and cloud computing have been evaluated inside the scope of the examination. The literature on those three concepts has been tested and the areas in which they can be desired inside the area of fitness offerings are presented. Further, at the cease of the examination, the need for Futurist Healthcare structures, on the way to cover all health services, is said.*

Keywords: Healthcare, Information and communication technologies, Infrastructure, Cloud computing, Fog computing, Edge computing

I. INTRODUCTION

The significance of fitness in human lives is undisputed. With the development of technology, great changes and traits have commenced within the area of health. Together with these changes, generation has taken its region amongst the necessary factors of the fitness subject. Programs and structures which can be modern in health have been developed. In this manner, changes that have touched the lives of humans have passed off. However, it is inevitable for the health sector to conform to those tendencies with the advancing technology. In the technological field, classical and conventional records centers had been used for decades ago. This phenomenon continues to be operating and serving the era of infrastructure. But, with the deficiencies and technological developments, the traditional statistics centers have been changed by one-of-a-kind technological infrastructures. Conventional facts centers these days seem to have been changed by way of cloud computing, fog computing, and aspect computing. The primary motives underlying this need for change are listed under.

- An elevated amount of statistics to be saved
- The want to percentage and transmit saved statistics
- The requirement to investigate stored records

The intention of this take a look at is to examine the technologies that can be used in health systems and health infrastructure. As a result of the exam, suggesting the most suitable infrastructure for the target will offer notable enhancements in health services. However, previous to the determination of the infrastructure this is maximum appropriate for the desires, it's miles important to identify the substructures that come with technological tendencies and to discover their benefits and disadvantages.

II. LITERATURE REVIEW

Earlier than the distinct observation of the research to be achieved, it ought to be referred to in the research performed in the beyond length inside the literature. To reveal the results of technological developments in the fitness discipline absolutely, the studies have been tested by giving a date variety to technological principles. To this degree, the surveys at the version of data and communique technology (ICT) to the discipline of fitness services have been evaluated to list more systematic and clear studies. It will now not be incorrect initially cloud computing, which is the maximum usually

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heard generation idea in this field. As seen within the literature studies, cloud computing is of top-notch importance within the subject of health offerings. Similarly, cloud computing continues to be the favored and used infrastructure [1-5].

Another famous technology developed in parallel with technological tendencies is the net of factors (IoT) [6]. On the idea of IoT, there's the creation of a global network structure with facts from physical gadgets. In this manner, its miles aimed to attach the physical devices via this community. Even though it was initially restrained with the aid of the radio frequency recognition (RFID) era, the currently spoken IoT has reached unique stages. In recent times, while the idea of IoT is pointed out, as not the most effective RFID era, however additionally global positioning gadgets (GPS), mobile devices and all devices linked to the network truly come to thoughts [6]. As noted earlier, no development may be left unresponsive to technological developments, and the healthcare area has now not been indifferent to this development. Research on the subject of healthcare offerings and research on IoT is to be had in the literature [2, 7-11].

Some other subject within the literature is massive facts. These days, the significance of large information has expanded. One of the essential reasons for this importance is the described IoT technology. Considering information from sufferers, doctors, diagnoses, treatments, and hospitals in the field of health, the massive information trouble in this vicinity is undisputed. Therefore, studies on the management of large statistics in the area of fitness have been conducted in the literature [2, 12-15].

Similarly, there are a lot of standards used in the area of healthcare with technological tendencies. Wi-fi frame location networks (WBAN) [16], Wi-Fi Sensor network (WSN) [17], system-to-system communication (M2M) [8], network technologies [2], 3D printing [18], robotics [19], social networks [20] and synthetic intelligence [21] troubles are out of scope.

In addition to cloud computing, some answers are an opportunity to cloud computing and the deficiencies in cloud computing are eliminated.

The concepts of side computing and fog computing could be studied in this take look at. There also are investigations and investigations on these issues within the health care literature [2, 22-24]. The standards of cloud computing, which has emerged as a phenomenon on this subject with fog computing and edge computing within the discipline of health services, had been determined as the scope of this examination.

III. TECHNOLOGY TRENDS

Cloud computing, fog computing, and aspect computing topics can be tested on this heading. The architectures, advantages, and drawbacks of those 3 standards might be described. A good way to pick the maximum appropriate provider kind inside the discipline of health, these standards want to be certain.

3.1 Cloud Computing

Cloud computing is the well-known call of internet-based IT offerings for computer systems and other devices, providing computer assets that can be used at any time and shared among users [25]. Inside the literature, there is the research associated with cloud computing-primarily based packages and services in the subject of fitness offerings [3, 4, 25-27]. The studies within the literature were examined and the highlights are indexed below [3, 4, 25-27].

1. Using cloud computing can develop and improve healthcare quarters, and also carry critical opportunities.
2. The transmission of all facts over the net causes concerns approximately the safety and confidentiality of patient statistics and facts management. Research is nevertheless continuing in this area.
3. Cloud computing strength can be used in the selection of support mechanisms in healthcare. Cloud computing makes it easier to process huge statistical analyses within the fitness discipline.
4. Excessive bandwidth requirements due to information transfers required. Another hot topic in the literature is IoT and cloud computing is insufficient in this era which is a big problem [28].
5. Cloud computing is disadvantageous in phrases of integrating with the sorts of services it affords inclusive of software program as a carrier (SaaS), Platform as a service (PaaS), and Infrastructure as a carrier (IaaS) [29].
6. Storing documents in the cloud in distributed garage structures [30].
7. Problems in reading massive records because of allotted documents or statistics shape [31].

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3.2 Fog Computing

Fog computing is the architecture that indicates that clever devices must be analyzed first at a local point and sent to primary servers, as adversarial to the structure that lets the information be despatched and processed to a valuable server [32, 33]. The approach primarily based on fog computing is filtering, processing, and storage operations through organizing an intermediate layer just before all facts are kept on the cloud.

As of 2020, the variety of IoT gadgets within the international is estimated to be five.63K [34]. As may be seen in the estimates, it's far certain that IoT will continue to be a hot subject matter for a long time. Developments in the IoT era will make this technology desired in the fitness sector properly. Therefore, it is vital that the technological trend, which will be the subject of choice within the subject of fitness, be in keeping with the IoT technology. In response to IoT problems in cloud computing, the proposed gadget presents answers to IT problems. For clearer know-how of the concept of fog computing, an exemplary structure from a take look is shown in figure 1 [35].

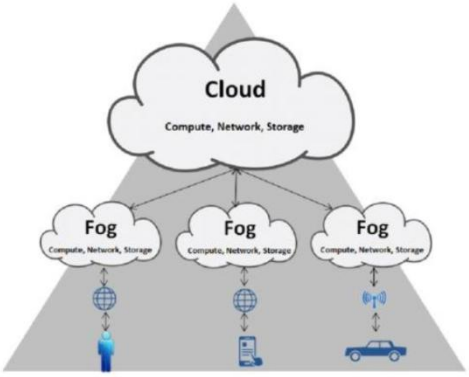


Figure 1: Sample fog computing architecture [35]

The studies about fog computing in the literature were tested and the highlights are indexed below [23, 36, 37].

1. Fog computing is appropriate for actual-time applications in healthcare offerings with low latency and high reaction time.
2. It is suitable for use with IoT generation used in healthcare services and programs.
3. It presents big facts evaluation with its processing electricity and storage area with its local architecture.
4. It offers higher scalable architecture than cloud computing.
5. More powerful allotted processing thanks to nearby processing strength.
6. Safer and fault-tolerant architecture thanks to local operations.

3.3 Edge Computing

Side computing and fog computing have similarities due to the fact they provide nearer information processing and information collection. However, although there are similarities among those standards, they have very important differences. The principle difference between this generation trait is wherein the calculation and processing strength are placed. Sis computing includes processing on the local location community (LAN). In comparison, edge computing is based totally on the location of computing and processing electricity into devices. Fog computing uses side gadgets over LAN. The need for the development of part computing is IoT technology, just as in the case of fog computing. In the literature, the research associated with the part calculation is tested and the essential factors are indexed under [22, 38, 39].

1. In e-healthcare or telemedicine applications and services, extensive affected person records are obtained thru wi-fi sensors. In such cases, side computing can respond to this need.
2. It's far completely well suited and suitable for the IoT era.
3. Value is higher than cloud computing.
4. It is appropriate to be desired in packages with low latency lengths.
5. It's miles required to have the storage ability and processing capacity of the devices it includes.

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IV. SUGGESTIONS

The effect of technology developments on healthcare structures has been examined. Cloud computing, fog computing, and area computing fields, which are certainly one of the newest trends in technology, have been included in the observation. Reputedly it is not feasible to speak about an unmarried technology fashion for every health device. Consequently, fitness regions are classified according to their wishes. As a result of this take a look at, the following pointers were provided.

4.1 Traditional Health Systems

Cloud computing systems meet the needs of modern conventional health structures. Cloud computing systems are inherently more value powerful than traditional records centers. In-depth records go with the flow to be had inside the systems used in fitness offerings. Therefore, the bandwidth requirement of this machine is sizeable. Within the fitness care machine, affected person information, and personal records about the patients, are to be had. Storing those statistics inside the cloud brings to mind the protection trouble. It is said that there is research in the literature on this challenge.

4.2 IoT-Based Health Systems

IoT is one of the new tendencies of the era. IoT research is also carried out within the field of fitness offerings. The IoT generation is inherent in its common sense and it gets data from all area gadgets. Given the information flowing from those devices, the number of records reaches large dimensions. The use of facet computing in such fitness applications is considered appropriate. However, at all aspect factors, statistics processing and garage desires value.

4.3 Real-Time Application-Based Health Systems

The use of cloud computing in fitness systems in which real-time offerings are available may not be considered very suitable as it can motivate a lack of time and bandwidth compression. Actual-time programs are important systems that are inherently in want of immediate response. In such structures, fog records or side computing can be desired according to extra certain wishes. In this way, it's far more feasible to switch statistics independently from the internet and bandwidth.

4.4 Futurist Health Care Systems

The issue cited in this category is to provide the most excellent answer protecting all health structures. The targeted answer should consist of both fog computing, side computing, and cloud computing primarily based on the infrastructure needed. Real-time applications can speak thru cloud computing and traditional fitness packages through the fog and side computing. However, there is a need for a whole structure and framework that may meet this want.

V. CONCLUSION

In this study, new technology developments in health services systems and programs are tested and suggestions are supplied. The developing era influences all regions of our lives. However, every technological fashion and idea may not be suitable for each software. Therefore, fog, edge, and cloud computing technology that could be used in fitness devices are examined and tips are provided as a result of examinations. Beneficial research has been brought for new systems to be developed and new programs to be developed in the subject of health. It became additionally determined that there turned into a want for a framework where all these technologies have been introduced together.

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Comparative Study of Various Fruit Juices of their Nutritional Content

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Abstract: *Over the past decade, fruit juice consumption has increased rapidly in almost all parts of the country, while fresh fruit consumption has remained relatively stable. In addition to influencing the statistical importance of fruit and fruit products in the diet, this increase in intake also contributed significantly to the increase in vitamin C intake over the study period. Citrus juices such as 100% Orange Juice (JO) are widely available around the world.[1] This review examined the effects of orange juice on nutrient intake, diet quality, and fruit consumption, and confirmed that citrus juice is a nutrient-dense beverage. Citrus juice is the best source of vitamin C and provides other essential nutrients like potassium, folic acid, magnesium and vitamin A.Orange juice consumption is associated with better nutritional quality in both children and adults. Compare the type and amount of carbohydrates, acidity and pH of fresh fruit juices. The nutritional value of fresh juices from organic and conventional oranges and apples was examined.[1] The parameters used for the evaluation included total soluble sugar content, ascorbic acid content, folic acid concentration, acidity, sugar content (glucose, fructose, maltose, and sucrose), potassium, calcium, iron, zinc, and copper concentrations, as well as sodium concentrations. Detection of total and simple sugars by HPLC. Foods rich in nutrients essential to human health and productive life are often lacking. The purpose of the study was to evaluate the nutritional value of fruit juices; ten (2) different juice samples from different samples are sufficient. In addition, these juices contain ascorbic acid (vitamin C), a very important antioxidant. Recommendations to increase productivity, marketing and consumption of healthy fruits and juices. Guava is known worldwide for its nutritional value and nutritional values. Guava Leaf (GL) is a rich source of various micro and macro elements as well as health-promoting bioactive compounds. They contained 82.47% moisture, 3.64% ash, 0.62 t, 18.53% protein, 12. 74 carbohydrates, 103 mg ascorbic acid and 1717 mg gallic acid equivalent (GAE)/g total phenolic binding.*

Keywords: orange juice, apple juice, guava juice, nutritional content, vitamin C, acid content, ph level, electrical conductivity, health benefits

I. INTRODUCTION

Whole foods, especially citrus fruits, play an important part in mortal nutrition as they're excellent sources of antioxidants like ascorbic acid, carotenoids, tocopherols and phenolic composites. It also contains a variety of other nutrients, similar as proteins, carbohydrates and certain minerals.[3]

Ascorbic acid(vitamin C), the most abundant nutrient in oranges, is demanded for collagen conflation, and lack of vitamin C can lead to scurvy, which can lead to tooth loss. Orange juice has been scientifically proven to have numerous health benefits due to presence of vitamins and other antioxidants minerals.[1] Apples and oranges are fruits that grow on unfolding trees. Oranges are significantly advanced in nearly all vitamins, including vitamin C, vitamin A, and B-complex vitamins. Apples are a popular fruit that contain antioxidants, vitamins, salutary fiber, and a range of vitamins. other nutrients. Due to their different nutritive profile, they can help help a variety of health issues. For illustration, they can help reduce the threat of cancer, rotundity, heart complaint, diabetes, and several other conditions. Benefits Apples are rich in fiber, vitamins and minerals, all good for your health. They also give a variety of antioxidants.[4]Vitamin C also boosts the vulnerable system, helping the body fight infection and complaint. Potassium helps relax blood vessels, reducing the threat of high blood pressure and cardiovascular complications. The guava is one of numerous trees and shrubs of the rubric Psidium(Myrtaceae) native to tropical America. Common kinds of

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guava are apple guava, unheroic cherry guava, strawberry guava, and red apple guava[2]. Guava has a rich history of ethnical medicinal use. Different corridor of the factory are used in colorful indigenous drug systems, substantially for the treatment of gastrointestinal diseases. Some ethno medical uses include pressing the leaves and applying the splint liquid to injuries, cuts, injuries, ulcers, skin and soft towel infections, rheumatism. Guava is an excellent source of vitamins, minerals, protein, fat andfurther. It's known to be a visual health supporter.[2]

II. METHODOLOGY

We named 3 brands in the request and bought 3- 5 different types to anatomize. Samples of each juicewere taken from different sources or brands to ensure data diversity. assay was achieved within 24 hours of sampling. For this study, we assured that all reagents used were of chemical chastity and logical grade. In addition, we calibrate all volumetric tableware analogous as burettes, pipettes, graduated cylinders and other outfit. collection at the Department of Chemistry laboratory. system used to prize the juice appears to be a standard and valid system for carrying fresh juice for further analysis. To start, fruits can be washed and dried to remove any adulterants and reduce the trouble of bacterial growth. Manual dehulling and seed separation ensure that the performing juice is of high quality and free from any undesirable factors. Use a mechanical alcoholic to help prize farther juice more efficiently, and strain the juice through a muslin cloth to remove any solids or impurities.

Storing the juice in the refrigerator at 4 °C will help save its freshness and help corruption. It's important to note that the juice should be used for analysis as soon as possible to ensure accurate results. In general, this system of juicing is a suitable system for carrying fresh, high- quality juice foranalysis. ensure accurate results. Overall, this system of fruit juice birth is an applicable approach to carrying fresh and high- quality fruit juice for analysis. Obtain a representative sample of the juice to be tested. Calibrate the pH meter according to the manufacturer's instructions. Using a dropper or pipette, transfer a small sample of juice to the clean, dry glass electrode of the pH meter. Immerse the glass electrode in a demitasse of distilled water to wash out any residual juice and stabilize the reading. Fit the electrode into the sample and stay for the pH reading to stabilize(this may take a numerous seconds). 6. Record the pH displayed on the pH meter. 7. duplication way 3 through 6 for atleast two farther juice samples. 8. Calculate the average pH of the juice samples tested. 9. still, repeat the test with another pH meter or another batch of juice to confirm the results, If necessary. However, repeat the test using a different pH meter or a different batch of the juice to confirm the result.

III. LITERATURE REVIEW

Numerous studies have been conducted to compare the nutritional content of different fruitjuices.

A study by Bo et al. (2017): compared the antioxidant capacity, polyphenol content, and vitamin C content of nine commercially available fruit juices, including orange, apple, grape, and pineapple. The study found that the highest antioxidant capacity was found in pomegranate and blueberry juices, while the highest vitamin C content was found in orange and pineapple juices.

Another study by Castro et al. (2019): compared the nutritional content of five different types of fruit juices, including grape, orange, peach,pear, and pineapple. The study found that all juices contained high levels of antioxidants, vitamin C, and phenolic compounds, with grape and pear juices having the highest levels.

A study by Maurya et al. (2020): compared the nutritional content of four different fruit juices, including pomegranate, guava, orange,and pineapple. The study found that all four juices contained high levels of antioxidants, vitamin C, and phenolic compounds, with pomegranate juice having the highest levels of these nutrients.

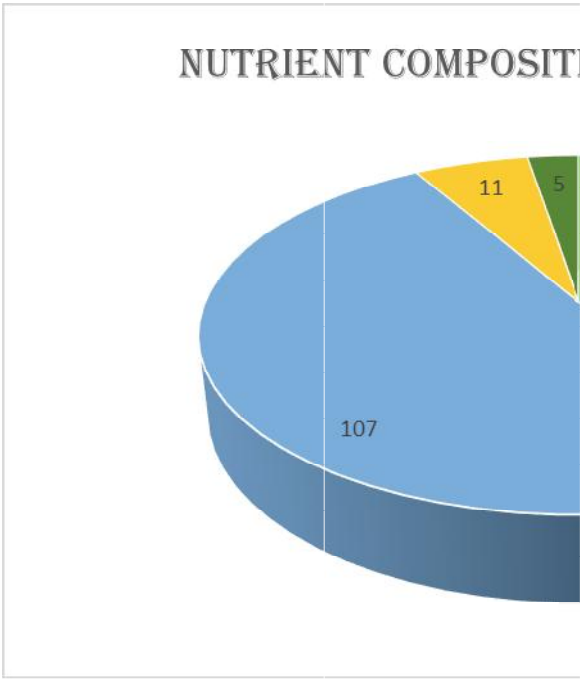
A study by Mirmiran et al. (2016): compared the antioxidant capacity and total phenolic content of pomegranate, grape, orange, and apple juices. The study found that pomegranate juice had the highest antioxidant capacity and totalphenolic content.

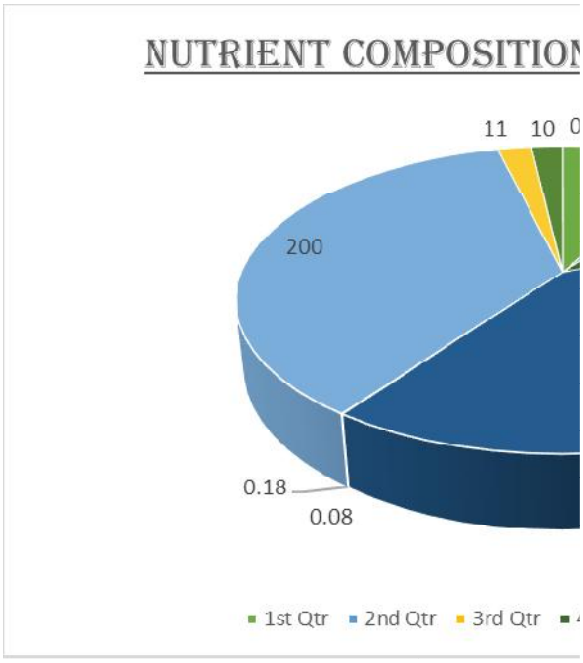
Another study by Bolukbas et al. (2018): compared the nutritional content of cherry, grape, orange, and pomegranate juices. The study found that pomegranate juice had the highest vitamin C content, while grape juice had the highest anthocyanin content.

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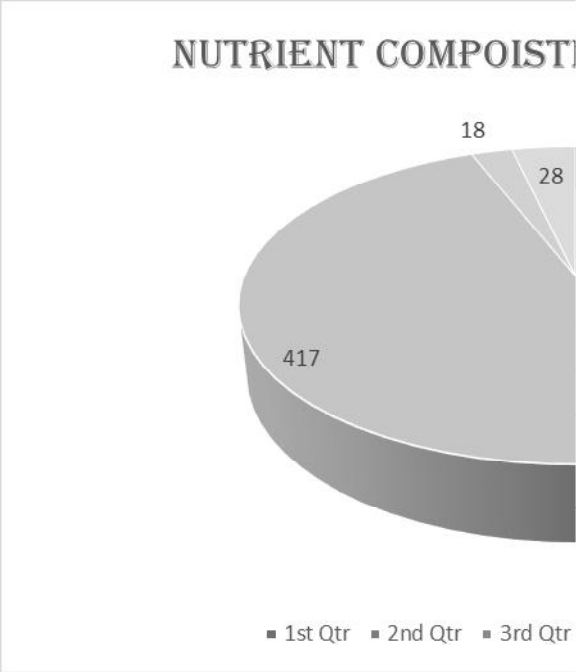
IV. RESULT AND DISCUSSION

From the results, we can see that guava juice has the highest content of vitamin C, an essential antioxidant that helps boost the immune system. Guava juice also contains high amounts of fiber, which is essential for maintaining the digestive system. Orange juice contains the highest amount of vitamin A, which is essential for healthy skin and vision. Apple juice has the highest potassium content, whichis essential for maintaining healthy blood pressure





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Fruit juices	Ph level
Apple juice	3.35 - 4.0
Orange juice	3.3-4.2
Guava juice	3.3-4.2

V. CONCLUSION

Eventually, all three credits own their own solitary nutritive benefits. Guava juice is an excellent root of vitamin C and fiber, while orange juice is an excellent source of vitamin A. Apple heft is an excellentorigin of potassium. People can choose their favorite authorities grounded on their nutritive requirements and taste preferences. still, it's important to drink fruit authorities in temperance as they contain natural sugars that can lead to weight gain and other health issues if consumed in excess.

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Artificial Intelligence - Recent Technology Trends in Computer Technology

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Abstract: *AI has received increased attention from the information systems (IS) research community in recent years. There is, however, a growing concern that research on AI could experience a lack of cumulative building of knowledge, which has overshadowed IS research previously. This study addresses this concern, by conducting a systematic literature review of AI research in IS between 2005 and 2020. The search strategy resulted in 1877 studies, of which 98 were identified as primary studies and a synthesise of key themes that are pertinent to this study is presented. In doing so, this study makes important contributions, namely (i) an identification of the current reported business value and contributions of AI, (ii) research and practical implications on the use of AI and (iii) opportunities for future AI research in the form of a research agenda.*

Keywords: Artificial intelligence, AI Machine learning, Systematic literature review Research agenda

I. INTRODUCTION

AI has been claimed to offer transformational potential across sectors and industries, ranging from supply chain management. Studies have reported that AI provides opportunities to reinvent business models, change the future of work performance improvements, and even enhance human capabilities.

The aim of this research is to understand the various characteristics of AI studied within the context of IS. A systematic literature review is important as it can be used to provide a valuable baseline to aid in further research. The aims of this systematic review are to:

1. Identify the reported business value and contributions of AI
2. Examine the practical implications on the use of AI
3. Identify the opportunities for future AI research in IS.

The structure of the paper is as follows. First, an introduction to related work on AI in the IS field is presented. Then the methodology of the systematic literature review is explained, and limitations of the study are acknowledged. The paper ends with a conclusion and directions for future research.

Intelligence usually means “the ability to solve hard problems”.

“AI is concerned with methods of achieving goals in situations in which the information available has a certain complex character. The methods that have to be used are related to the problem presented by the situation and are similar whether the problem solver is human, a Martian, or a computer program” (McCarthy, 1988).

II. METHODOLOGIES

This section outlines the systematic review process adopted for this study. A Systematic Literature Review is defined as “means of identifying, evaluating and interpreting all available research relevant to a particular research question, or topic area, or phenomenon of interest”. This systematic approach was chosen for its ability to offer reviews of high quality and transparent and replicable review . Additionally, it is useful for studies with a clearly formulated research question and summarising large quantities of research studies. Thus, the SLR was chosen for the following reasons: (i) the study will generate large amounts of literature; (ii) this study aims to answer a specific research question; (iii) we intend to systematically extract relevant AI references from the studies transparently; and (iv) the rigour and

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replicability it offers leads to an unbiased scientific study. The foundation of our guide was taken from the guideline developed by Okoli (2015).

III. LITERATURE REVIEW

Okoli (2015) propose a systematic review process that consists of 8 steps, namely planning (2 steps), selection (2 steps), extraction (2 steps) and execution (2 steps) that are completed across 4 phases (see Fig. 1.). Each of these four phases and eight steps are discussed in detail in the remainder of the section.

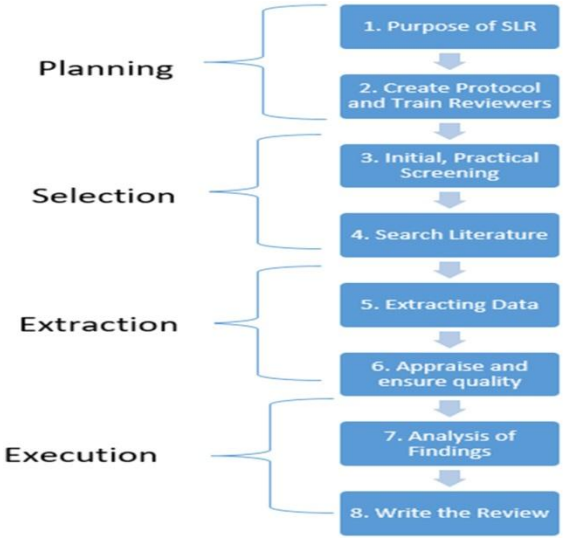


Fig. 1. A systematic guide to literature review development (Okoli, 2015).

Fig2. shows the study selection process. After the initial step of identifying a search string was complete, pilot steps were carried out on the databases used. This entailed refining the search string for each database. However, the terms used to search the databases were used the same throughout.

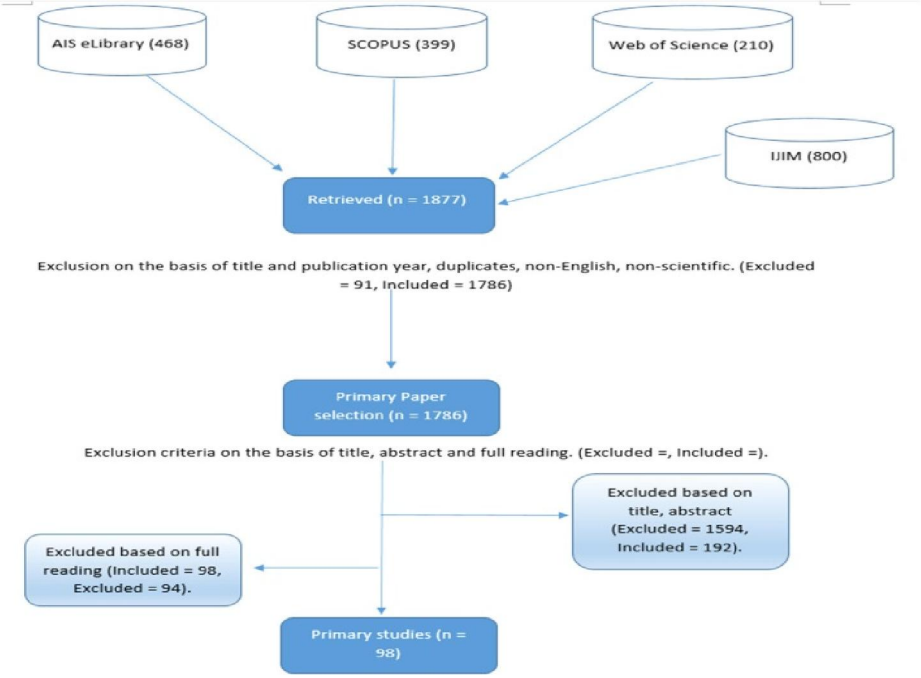


Fig. 2. Study selection process.

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The lead author analysed the 1877 studies retrieved in the initial search. A second reviewer was invited to analyze these studies as well, to pre-emptively combat potential bias. The two reviewers had to agree for a study to stay a primary study. Based on the removal of duplicates, non-scientific and non-English studies, 91 were removed, leaving 1786. These 1786 studies were then analysed based on title. The title gave a clear indication on whether they were outside the focus of the study, and thus excluded. If a title did not clearly reveal application domain of the study it was included for review in the subsequent steps, where title, keywords and abstract were examined. Based on title, abstract and keyword, the 1786 studies were further narrowed down to 187. There were still cases where the abstract was unclear, so these studies carried onto the next stage, where the contents of the full study were examined. An in-depth examination of the 187 remaining studies was undertook by the reviewers, which resulted in a further 90 studies being excluded. This resulted in a total of 98 primary studies used as the basis of this SLR.

How is AI being defined in the field of IS?

The aim of this research question is to identify and analyze the different definitions of AI used in the field of IS. It was noted in Section 2.1 the difficulties the field of AI had with definitions, and this research questions aims to look at how IS has handled those difficulties. However, despite AI and Machine Learning being a large part of the primary studies, many did not provide a definition, or used definitions that were not cited (see Fig. 3).

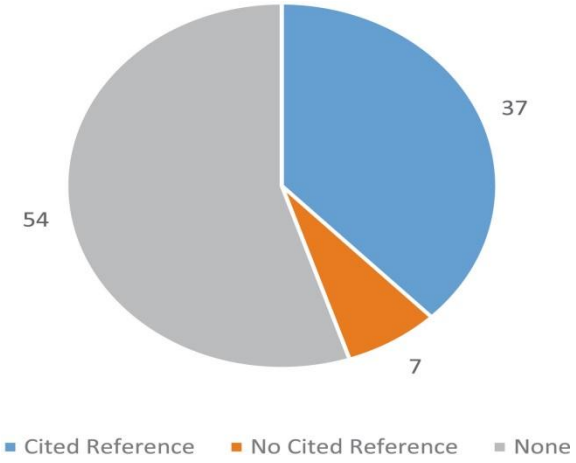


Fig. 3. AI definition cited.

Of the 98 primary studies, 54 of them gave no clear definition of the AI relevant to the study. And of the 44 studies that did give a definition, 7 of them cited no reference for the definition given. The definitions of AI used in the primary studies varied in both term of definition and source cited. Disregarding the seven studies that defined AI without citing a source, Russel & Norvig's book Artificial Intelligence: A Modern Approach was the most frequently cited source for defining AI, though the actual edition of the book varied, with each studies using the latest edition at the time

What number of IS academic studies on AI has been published between 2005 and 2020?

The aim of this research question is to identify the number of academic studies involving Artificial Intelligence and Machine Learning in the field of Information Systems, specifically those between the years 2005 and 2020 (see Fig. 4.). Fig. 4. reveals that studies on AI remained relatively low for most of this period, with a total of 11 studies between the years 2005 and 2015. 2019 and 2020 show an immense surge in AI related studies in IS, signifying a much greater interest in the field. Due to the inclusion and exclusion criteria of this study, there were no studies on AI in Information Systems in the years 2007, 2008, 2010, and 2012.

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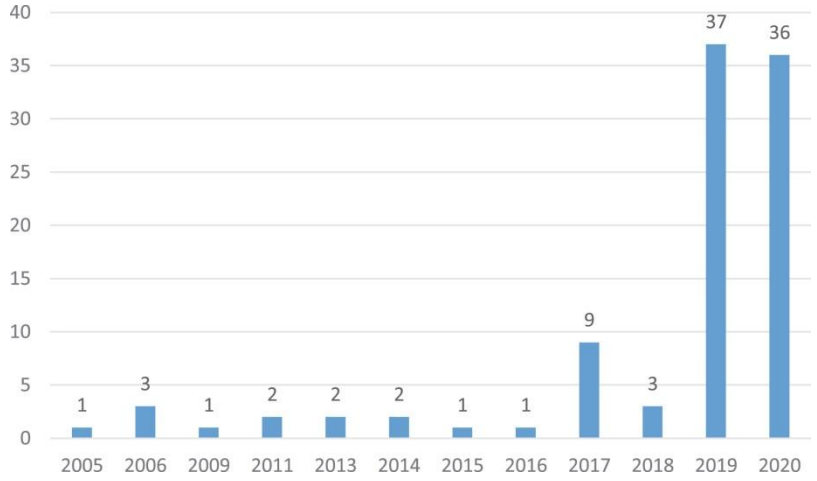


Fig. 4. Number of studies by year.

What types of AI technologies are used by IS researchers?

The aim of this research question is to categorise studies on AI based on the type of AI used in the primary study. It is possible to combine a variety of these types together into a single AI system. For example, IBM's Watson combines NLP, ML and machine vision techniques (Jarrahi, 2018, Jarrahi, 2018). However, for the purpose of this SLR, the study will be categorised solely based on the primary AI type of the study (see Fig. 5.).

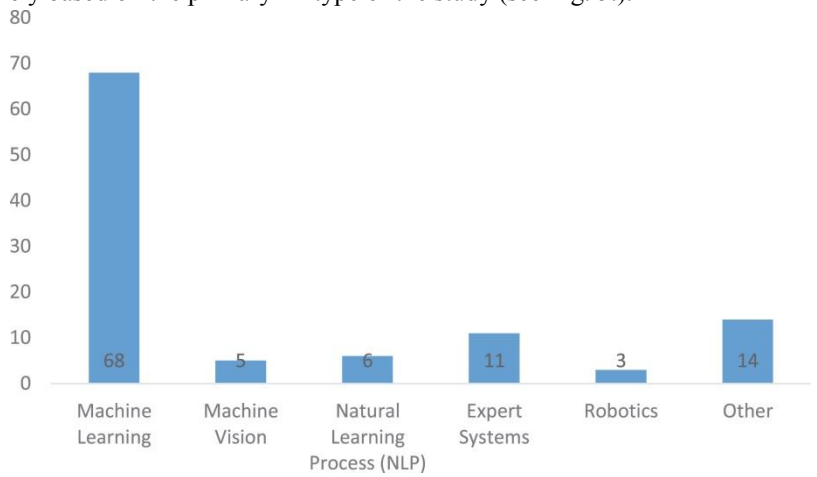


Fig. 5. Types of AI.

Fig. 5 shows that ML is the most popular form of AI used in the primary studies, with 69 studies categorised under it. There was less range between the other types, expert systems having 11, machine vision with five and NLP at 6. Robotics was the least common with 3 studies having it as the primary focus.

IV. RESULT AND DISCUSSION

This section summarises the findings of the SLR and highlights some areas that research to date has focused and the key findings from these studies. It is then followed by a discussion on the theoretical contributions and implications for practice. The overall goal is to uncover themes that are relevant for research and practice and identify areas which warrant further research. This section will discuss relevant insights we found from the literature, starting with the lack of cohesion around the definition of AI, the resurgence of AI interest and research in recent years, the specific contribution types of AI literature, and the disproportionate focus on machine learning and process automation.

In this study we conducted a SLR that provides a comprehensive overview on AI in IS related studies. By using a systematic literature review, we identified, classified, and analysed 1877 studies on AI and ML in IS that were published between 2005 and 2020. Of these, 98 were identified as primary studies, after a rigorous filtering process. To understand the fundamentals of AI in IS we examined and studied the articles based on studies by year, publication channel, research methods used, and their contribution to IS contributions research. Prior to commencing this task however, we had to consider the problem that the definitions of artificial intelligence were largely varied and ambiguous.

Our findings show that while there was a lack of studies in the first decade of the relevant time, there has been a resurgence in recent years. Over half of the primary studies were published in 2019 and 2020.As previously shown in Fig. 4., there was a resurgence in interest in AI in 2017, before it seemed to really expand in 2019 and 2020.

V. CONCLUSION

This systematic literature review study provides a structured understanding of the state-of-the-art of AI research in IS. This was achieved by identifying 98 primary studies out of 1877 related AI articles over a fifteen-year period (2005 – 2020) and analysed them with respect to (i) definitions of AI, (ii) frequency of publication by year, and (iii) type of AI.

VI. ACKNOWLEDGEMENT

I hereby declare that all the information provided in the respected paper is authenticated, authorized and hence reliable. I would like to thanks all the viewers and readers of this paper for their precious time.

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Plastics in the Environment: Understanding Impacts and Identifying Solutions

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Abstract: *Plastics are one of the most used materials in the world. They are broadly integrated into today's lifestyle and are present in almost all product areas. Unfortunately, one of the characteristics of plastics that make them so useful – durability – also enables them to persist in the environment for very long periods of time. Additionally, because of their low cost, many plastic objects have long been perceived as disposable. The result is the ubiquitous presence of plastic debris all over the planet. Close attention has been paid over the years to the increasing amount of plastics in the oceans and to their adverse effects on marine fauna. The earliest discoveries of plastic debris inside dead marine birds as well as the first attempts to quantify floating plastic debris in the western North Atlantic Ocean date back more than 40 years. Since then, a large number of studies has documented their increasing prevalence and undesired effects, with a recent exponential increase in attention to microplastics.*

Keywords: Plastics, Environment and Solutions

I. INTRODUCTION

Plastics are one of the most widely used materials in the world which society will always be dependent on. This dependency has been clearly highlighted by the requirements for hygiene and protection during the recent global COVID pandemic. Plastics are broadly integrated into today's lifestyle and are present in almost all consumer and industrial sectors and their production continues to increase.

Unfortunately, one of the characteristics of plastics that make them so useful—their durability—also ensures that they persist in the environment for very long periods of time. Additionally, and because of their low cost, many plastic objects have long been perceived as disposable. The consequence of this, coupled with the difficulty in developing effective waste management strategies, has been the ubiquitous contamination of the entire planet by plastic debris.

Research on plastics is now an extremely dynamic field involving a great deal of funding and effort. There are calls to integrate and introduce more biodegradable or recyclable plastics into the market, in order to shift towards more sustainable supply chains, but there some debate about which solutions make the most sense economically and sustainably. There is also concern about some additives used in plastics, many of which are endocrine disrupting substances or otherwise harmful to the environment if released from the material. Plastics are complex matrices and understanding their complete life cycle and the (eco)toxicological implications of their extensive use is a very much needed, albeit difficult, task. We would like to welcome contributions covering all aspects of plastic research in this Research Topic in Frontiers in Environmental Science. A global, transdisciplinary problem requires a global, transdisciplinary response

Even if proposed global actions to recycle more plastic or prevent the export of plastic waste to countries with poorly developed waste infrastructure through the Basel Convention are implemented, plastic emissions are expected to increase for the foreseeable future unless significant breakthroughs in plastic design or waste management are realized. Increasing emissions also imply that exposure to plastic pollution and its degradation products, like microplastics, nanoplastics, plastic additives, and other chemical leachates, will continue to increase. Such an accumulating plastic cocktail can result in complex and unpredictable impacts, including those on ecological processes (Rillig et al., 2021) or the global carbon cycle.

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II. METHODOLOGY

The solutions are complex and include improving regulation, ramping up recycling and introducing incentives to encourage a reduction in virgin plastic production. But experts say there are several things everyday people can do to help tackle the mounting toll plastic is taking on the environment.

If someone is looking to break your addiction to plastic, take these simple steps.

Adopt a circular lifestyle

Embrace what's known as circularity, the idea that products – and the materials that go into them – should be reused instead of being thrown away.

Invest in sustainable, ocean-friendly products, like reusable coffee mugs, water bottles and food packaging. Also check out options like reusable nappies and menstrual products, bamboo toothbrushes and solid shampoos. You could save money and protect the oceans and climate at the same time.

Try to reduce your plastic footprint by choosing food without plastic packaging and bringing a reusable bag. Some shops now have plastic-free aisles and many offer loose produce or use dispensers and refillable containers. Use your own coffee mug when out and about instead of accepting a plastic one. And, of course, ditch the plastic straws and stir sticks. When shopping online, look for options that will allow you to opt out of plastic packaging.

Plastic is everywhere: it's in parks, rivers and on beaches. Join global and local movements, such as World Cleanup Day, or organize a cleanup yourself. If you jog, become a 'plogger' and pick up any litter you see on your way (all the while observing COVID-19 hygiene protocols). Some 80 per cent of marine litter originates on land and in rivers.

III. LITERATURE REVIEW

According to the main systematic literature review methodology, different types of questions were formulated, in order so that it can be schematic and to get a broad view about the evolution of green chemistry research.

The selected articles were analyzed through different criteria, were divided into different clusters, according to purposes, impacts and scope of each research.

Although the problem of plastic pollution was recognised several decades ago, research on plastics lost to the environment and their environmental and health impacts is now an extremely dynamic field involving a great deal of funding, support and effort. As an attempt to find solutions, there have been calls to integrate and introduce more biodegradable or recyclable plastics into the market in order to shift towards more sustainable supply chains. There is also some debate about which solutions make the most sense practically and economically, although it is likely that a combination of approaches may be required. An additional concern centres around the additives used in plastics, many of which are endocrine disrupting substances or otherwise harmful to the environment if released from the material.

Chemical regulators, and particularly those in Europe, have become increasing active to make plastics safer and more recyclable, but clearly plastics are complex and diverse materials and understanding their complete life cycle and the (eco)toxicological implications of their extensive use and management is a highly justified, albeit difficult, task.

IV. RESULT AND DISCUSSION

The more you recycle the plastic, the less plastic waste will be deposited in soil and seawater. Pollution of seawater is a significant concern in front of the modern world. Keeping immense benefits of reducing plastic waste in mind, innovative techniques are being used to recycle plastic quickly and sustainably.

In the production of plastic from scratch, oil is burnt. This burning of oil increases the emission of greenhouse gases into the environment and surroundings. This emission is the cause of growing pollution. Plastic production also contaminates soil and water. It is harmful to animals and plants as well.

Many resources are being used to manufacture plastic, such as energy, water, oil, coal, natural gases, etc. All these resources can be saved by recycling the existing plastic waste. Moreover, the resources and energy saved by recycling plastic can be used to produce other essential products.

By opting for recycling, you can manage your plastic waste in a better way with reduced cost. You can always use waste equipment rentals to sort and manage recyclable and non-recyclable plastic waste. This will save you huge prices, which you usually pay for plastic waste disposal.

Creation of Eco-friendly Community of Customers & Team Members

V. CONCLUSION

Plastics offer considerable benefits for the future, but it is evident that our current approaches to production, use and disposal are not sustainable and present concerns for wildlife and human health. We have considerable knowledge about many of the environmental hazards, and information on human health effects is growing, but many concerns and uncertainties remain. There are solutions, but these can only be achieved by combined actions (see summary table 1). There is a role for individuals, via appropriate use and disposal, particularly recycling; for industry by adopting green chemistry, material reduction and by designing products for reuse and/or end-of-life recyclability and for governments and policymakers by setting standards and targets, by defining appropriate product labelling to inform and incentivize change and by funding relevant academic research and technological developments. These measures must be considered within a framework of lifecycle analysis and this should incorporate all of the key stages in plastic production, including synthesis of the chemicals that are used in production, together with usage and disposal.

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Nanomaterials for Future

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Abstract: *Nanotechnology is described as an emerging technology—one that not only holds promise for society, but is also Capable of revolutionizing our approaches to common problems. Naturally occurring Nanomaterials like volcanic ash, ocean spray, magneto tactic bacteria, mineral composites et al. exist in our surroundings. Incidental Nanoparticles, also referred to as waste particles, are produced as a result of some industrial processes. The third category of Nanoparticles is engineered nanoparticles—these are the particles related to nanotechnology. Nanotechnology has direct beneficial applications for medicine and the environment, but like all Technologies it may have unintended effects that can adversely impact the environment, both within the physical body and within the Natural ecosystem. Advantage of this new technology for health, environmental, and sustainability benefits, science must Examine the environmental and health implications.*

Keywords: Nano materials, Technology

I. INTRODUCTION

The nanomaterial is a material having structural components with at least one dimensional in the nanometer scale, that is 1-100 nm. This includes both nano-Objects, which are discrete pieces of fabric and nanostructured materials, which have internal or surface structure on the nanoscale; a Nanomaterial could also be a member of both these categories.

1.1 Nanoparticles

Nanoparticles exhibit different dislocation mechanics, which, together with their unique surface structures, results in mechanical properties that are different from the bulk material Nanoparticles have all three dimensions on the nanoscale.

A. One-dimensional nanostructures:

1D nanomaterials have been regarded as the most promising building blocks for nanoscale electronic and optoelectronic devices. In addition, 1D nanomaterials can offer large surface area, facile strain relaxation upon cycling, and efficient electron transport pathway to achieve high electrochemical performance. Hence, 1D nanomaterials have attracted increasing interest in many application fields.
Example - Representative1D nanomaterials
Carbon nanotubes, silver nanowires, copper nanowires, zinc oxide nanowires, 1 D polymeric nanomaterials

B. Two-dimensional nanostructures

2D materials are crystalline materials consisting of a two-dimensional single layer of atoms. Box-shaped graphene (BSG) nanostructure Is an example of 3D nanomaterial. BSG nanostructure has appeared after mechanical cleavage of pyrolytic graphite. This nanostructure May be a multilayer system of parallel hollow nanochannels located along the surface and having quadrangular cross-section. The Thickness of the channel walls is approximately adequate to 1 nm. The standard width of channel facets makes about 25 nm. Thin films With nanoscale thickness are considered nanostructures but are sometimes not considered nanomaterials because they are doing not exist Separately from the substrate.

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C. Bulk Nanoatructures

Some bulk materials contain features on the nanoscale, including nanocomposites, nanocrystalline materials, nanostructured films, and nanotextured surfaces.

1.2 Advantages of Nanomaterials

1. With nanomaterials, we can create unique materials and products which are stronger, lighter, cheaper, durable, precise.
2. Less pollution.
3. Mass production in food and consumables.
4. Manufacturing at very low cost or no cost.
5. Automatic pollution clears up.

1.3 Disadvantages of Nanomaterials

1. Nano pollution is created by toxic waste.
2. Atomic weapons could be more accessible and destructive.
3. Health and safety issue: nanoparticle can cause serious illness or damage to the human body carbon nanotubes could cause infection to the lungs.
4. The recycling and disposal of nanotubes are difficult.
5. Loss of jobs in manufacturing and farming etc.
6. Mass production in food and consumable oil and diamonds could become worthless.

1.4 Applications of Nanomaterials

1. Nanomaterials in electronics
   - In electrical circuits, as an electrical cable wire, as a paper battery, in display technologies, in the solar cells.
2. Nanomaterials in the environment
   - In hydrogen storage.
   - In catalysis.
3. Nanomaterials in medical
   - Nanoscale devices can be employed for drug delivery.
   - Nanoparticles can be used to deliver drugs in a targeted fashion to specific cells in the body.

1.5 Advance Applications of Nanomaterial

1. Carbon Nanotube Membrane for Water Purification: A Bright Future in Water Desalination
2. Nanotechnology and Cancer Treatment
3. Military Nanotechnology
4. Paper Power Battery
5. Nano-Materials in Drug Delivery
6. Nanotechnology Safety in Automobile Industry

II. DISCUSSION

Nanophase ceramics are of particular interest because they're more ductile at elevated temperatures as compared to the coarse-grained Ceramics. Nanostructured semiconductors are known to point out various non-linear optical properties. Semiconductor Q-particles also Show quantum confinement effects which can cause special properties, just like the luminescence in silicon powders and silicon Germanium quantum dots as infrared optoelectronic devices. Nanostructured semiconductors are used as window layers in solar cells. Nanosized metallic powders are used for the assembly of gas tight materials, dense parts and porous coatings

Magnetic nanocomposites are used for mechanical force transfer (ferrofluids), for high-density information storage, and magnetic Refrigeration.

Nanostructured metal-oxide thin films are receiving growing attention for the belief of gas sensors (NOx, CO, CO2, CH4, and aromatic hydrocarbons) with enhanced sensitivity and selectivity. Nanostructured metal-oxide (MnO2) finds application for rechargeable batteries for cars or commodity.

III. FUTURE SCOPE

1. Nanobots
2. Nano-sensors
3. Hydrophobic Materials
4. Cancer Research
5. Genetic Therapy and Medicine
6. Nanomaterials in Food and Agriculture

IV. CONCLUSION

Nanotechnology may be a fresh technology that has just begun, it's a revolutionary science that will change all that we knew before. the longer term that we were watching just in fantasy movies will in the near future be real. This new technology will, first of all, keep us healthy due to nanorobots which will repair every damage that we've in our bodies. Secondly, it'll give scientists the power to control the mixture of atoms in an object and to show it into a lighter, stronger, and more durable object than before, just by using carbon nanotubes that are known to be 100 times stronger than steel and additionally thereto they're very flexible. Nanotechnology will give us abundant energy because it'll transform energy more effectively, for instance, windmills which are known to possess the power to rework wind energy into electricity, well new windmills which will use Nanotechnology will have lighter and stronger blades (using carbon nanotubes) which will transform tons more energy than before. So, in this way, nanotechnology will change our future.

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The Review Study on Health Issues Due to Chemically Adulterated Food

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Abstract: *Now-a-days adulteration of food is the major problem faced by world; hence it is important to ensure quality of food before it is used. This review paper mainly focuses on What actually mean by adultery? Any substance used to adulterate a certain food is called an adulterant and each added substance reduces the purity of the effectiveness of the product. The health of peoples is dependent on the nature of the food and its wholesomeness in terms of their nutritive value. An adulterant is found in the samples of the various products. So, it is recommended to opt standard products which have FSSAI certified mark along with the license number, ingredients list, date of manufacture and expiry date on it for safe and hygienic food. All are suggested to avoid dark, junk, and other processed foods. Clean and store all grains, legumes, and other foods. Always Wash fruits and vegetables thoroughly with water before consuming. Before purchasing food items such as milk, oil, or other bags, check to see if the seal is valid. By keeping these points into consideration one can remain safe from eating adulterated food.*

Keywords: FSSAI, adulteration, nutritive value, safe, hygienic food

I. INTRODUCTION

Food is the introductory need of all living beings for their growth. It composed of carbohydrates, fats, proteins, minerals and essential oils. It is a right of every human being to have healthy, safe and nutritious food which is essential for the growth, repair and maintenance of body tissues and for the regulation of vital processes. The health and the productivity of population these two are dependent on the nature of the food and its wholesomeness in terms of their nutritive value [1]

Food commodities, especially essential food commodities are becoming a target of Adulteration. Food adulteration has evolved from a simple scam to a highly developed and profitable business. Although simple methods of adulteration such as adding water to milk and adding coloured starch to turmeric or red chili powder are still common, but now new forms and types of adulteration are emerging. Pesticide residues in vegetables, fruits, grains, bottled water and antibiotic residues in milk and meat now have more evidence. The use of newer disintegrating agents such as ultramarine blue in dry ginger to cover holes and other insect damage, urea in puffed rice to improve its texture, and aluminium foil in betel nut or in supari was observed. What actually do we mean by adultery? Any substance used to adulterate a certain food is called a adulterant and each added substance reduces the purity of the effectiveness of the product[2].

Proper nourishment is a key to good health but when the food we are eating in order to gain health, gets adulterated; its beneficial effects are lowered, which leads to adverse effect on health and sometimes leads to and high mortality. Adulteration acne also be defined as “the process by which the quality or the nature of a given substance is reduced through the addition of a foreign or an inferior substance and the removal of vital vitamins [3].

Adulteration was first proposed by the German chemist Frederick Accum in 1820. The reason behind adulteration is increase the quantity, dishonesty of traders, to make easy money, ignorance towards consumers rights regarding food safety which ultimately results in buying unsafe and adulterated products [4].

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Nidhi Gupta et.al mentioned in the Journal as there are three types of adulteration which are intentional adulterants, metallic contamination and incidental adulterants. Intentional adulterants include sand, marble chips, stone, mud, chalk powder, water, mineral oil and coal tar dyes Metallic Contamination includes arsenic from pesticides, lead from water, and mercury from effluent of chemical industries, etc. Incidental adulterants which include pesticides, D.D.T and marathon residue present on the plant body [5].

The growing trends in food impurity in urban areas are largely attributed to pollution in urban agriculture, defiled food transport and supply chains, poor market, aseptic conditions and the use of defiled or waste water for irrigation purposes. And therefore, Diarrhoea is most frequently found in school going children in the age group of 1- 5 years, 45 % of the total sample in urban area was affected by diarrhoea [6]. Just imagine! Buying Diseases by our own money... (Prevention of Food Adulteration Act) PFA act 1954 was legislated by Indian parliament and was amended time ago 1956, 1976 and recently in 1986 to make the act stricter [7]. Under this act government has set some food norms to check contamination and defaulters are assessed fine and life imprisonment depending on the nature and extent of regulation. norms are also set by AGMARK (Agricultural Marketing), FPO (Fruit Products Order), and ISI (Indian Standards Index) to ensure quality, hygiene, preservation, composition etc. Adulterated or unhygienic food causes an estimation of 2 million people along with children annually. Isn't it shocking? [8].

There are certain considerations that are essential to determine whether a food is adulterated or not. These points are summarised below[9].

1. A lower quality substance that decrease the quality of food or makes it hazardous is added to it.
2. Cheaper or inferior quality of substances are used as a substitute as a whole or a few ingredients.
3. Element of food is incompletely or wholly taken out, reducing the quality of food.
4. It's made decorative and mouth watering with harmful substances or its colour is changed to make it look presentable.
5. Anything that diminished the quality of food is added to or abstracted from it.

This review paper focus on adsorption technique to remove all the impurities present in the water hence making it suitable to reuse. The research paper has been designed by keeping in mind to purify wastewater generated by dairy industries and making it suitable for daily use by suggesting optimize technique with a simple and affordable.

Why is food adulterated?

Food contamination or adulteration is common in developing countries.

For example: milk can be diluted by adding water to increase its volume, and starch powder is often added to increase its solids content.

Listed below are the main reasons for food adulteration:

- Practiced as part of a business strategy.
- An imitation of some other food.
- Unawareness about the correct consumption of food.
- Increase food production and sales.
- Increase demand from fast growing population.
- To get maximum profit from food with smaller investments.

II. EXPERIMENTAL

2.1 Materials

Commonly used food products were selected for evaluating the food adulteration. Three of the available groups were selected. First is the FSSAI which is the standard, substandard (packed but not FSSAI) and loosely available sample. FSSAI stands for Food Safety and Standard Authority of India. 11 various samples were taken. The selected food products were turmeric powder, Asafoetida, salt, sugar, wheat, essential oil, coffee powder, honey, Pulses, Milk, Ghee, Jaggery and Maida.

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2.2 Experimental Procedure

Method which are used in this review paper are listed below:

- Detection of Chalk in Sugar:Take a sample and dissolve 10 g in a glass of water, allow it to stand. The result will be chalk will settle down at the bottom.
- Detection of Urea in Sugar: When sugar is dissolved in water, smell of ammonia can be smelled out
- Detection of Soapstone or earthy material in Asafoetida: First shake little portion of the sample with water and stand it. Soap stone or earthy material will obtain at the bottom.
- Detection of coloured saw dust in turmeric powder: Take a full tea spoon of turmeric powder in a test tube. Add a few drops of concentrated HCl.
- Detection of adulterant in honey:Mix a few drops of honey into vinegar water, if the mixture starts to foam, then your honey is fake.
- Detection of tamarind in Coffee:Sprinkle a little coffee powder on a piece of bloating paper and spread a few drops of KOH solution on the paper. If brown colour appears around the coffee powder, then it is adulterated.
- Detection of Metanil Yellow in pulses:Shake 5 gm of the suspected pulses with 5 ml of water and add a drop of hydrochloric acid. An indication of pink colour shows the presence of Metanil yellow.
- Detection of Vanaspati in pure ghee:Take about one teaspoon of melted butter and an equal amount of concentrated hydrochloric acid in an airtight test tube and add a pinch of sugar to it. Shake for one minute and let stand for five minutes. The appearance of red colour in the bottom (acid) of Vanaspati or margarine.
- Detection of Formalin in Milk:Take 10 ml of milk in a test tube. Add 5 ml of sulphuric acid with a small amount of ferric chloride without shaking. The presence of purple or blue colour at the intersection of the two fluid layers indicates the presence of formalin.
- Detection of Argemone oil in Edible oils:In this test, 5 drops of oil is taken in a dry test tube and mixed successively with 0.5 ml of 2% salicylic acid in methanol, 2 ml of conc. nitric acid, then 2 drops of concentrated sulphuric acid and shake well. During adulteration of Argemone oil, a purplish-red or deep orange-red colour develops in 20-30 seconds.
- Detection of Washing soda in Jaggery:Add a few drops of hydrochloric acid solution. Emulsion oreffervescence shows presence of washing soda.
- Detection of Boric Acid in Maida:Take a small amount of sample in a test tube, add some water and shake. Add a few drops of HCl. Dip a strip of turmeric paper, when it turns red, it is boric acid

III. RESULTS AND DISCUSSION

Food adulteration has a significant negative impact on our health. Regardless of the type of adulterate, long-term use of fake food is extremely harmful to the human body. Eating adulterated food increases the number of toxic elements in the body. The nutritional value also decreases as more and more inferior quality substances are added to the food, leaving the body with the least amount of nutrients. Chemical degraders and dyes repeatedly added to food prove to be deadly because they present health risks or dangers due to the high percentage of carcinogenic substances they contain. Some adulterated products can directly affect organs without delay, causing damage or failure of the heart, kidneys, liver, and many other organs.

Let's look at our list of adulterants added in food items :

Food products	Adulterants	Harmful effect
Sugar	Chalk , urea	Highly toxin to human body
Turmeric powder	Coloured saw dust	Stomach disorder
Asafoetida	Soapstone, earthy matter	Dysentry
Honey	Water, sugar solution	Affect the quality of product
Coffee powder	Tamarind seeds	Causes diarrhoea, stomach disorder giddiness, severe joint pain
Pulses	Metanil yellow.	Highly carcinogenic, leads to

		stomach disorder if consumed continuously
Pure ghee	Vanaspati	Heart attack and stroke, very high in trans fats
Milk	Formalin, water	Highly toxic causes liver and kidney damage
Edible oils	Argemone oil	Loss of eyesight, heart disease, tumour
Jaggery	Washing soda	Vomiting, diarrhoea
Maida	Boric acid	Oral and skin irritation

IV. CONCLUSION

Adulterants are found in the samples of the various products. So, it is recommended to opt standard products which have FSSAI certified mark along with the license number, ingredients list, date of manufacture and expiration date on it for safe and hygienic food. Everyone should have to avoid dark, junk, and other processed foods. Clean and store all grains, legumes, and other foods. Always Wash fruits and vegetables thoroughly with water before consuming.Before purchasing food items such as milk, oil, or other bags, check to see if the seal is valid. By keeping these points into consideration, one can remain safe from eating adulterated food

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The Performance of Congress Grass (*Partheniumhysterophorus*) in Response to Air Pollution Tolerance Index (APTI)

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Abstract: *With the tremendous scientific and technological advancement, man has to a large extent succeeded in controlling and dominating nature. Plant species contain a tremendous amount of genetic variation, both within and between populations. This genetic variation shows up in the morphological and physiological traits of plants adapted to survive in different climates. Turreson (1922) defined an ecotype as a population of plants that is genetically differentiated in response to the conditions of a particular habitat. An ecotype reflects the elevation, precipitation, temperature, growing season, soil and site characteristics where the population is found. Sessile modular organisms, such as plants, which cannot migrate when environmental conditions change and whose modules may experience different environments, benefit from mechanisms to cope with environmental heterogeneity. Because most organisms, and certainly plants, change their phenotype in response to environmental change, it is often assumed that phenotypic plasticity has frequently evolved as an adaptation to environmental heterogeneity. Many phenotypic responses to environmental stress, however, may be the consequence of passive reductions in growth due to resource limitation (Dorn et al., 2000; van Kleunenet al., 2000a). Moreover, phenotypic plasticity does not necessarily evolve as an adaptation but alternatively can evolve due to genetic correlations with other traits that are under selection or due to genetic drift. Therefore, plasticity of a trait does not necessarily imply that it is adaptive (Sultan, 1987; Schmid, 1992). We found strong phenotypic plasticity in Partheniumhysterophorus regarding life span, height of plant, flowering time, under pollutant stress, particularly air pollution tolerance. Environment might be more important in determining genetic and phenotypic changes. The very existence of phenotypic plasticity means that the same genotype can express different phenotypes in diverse environments. There is also increasing evidence that the amount and pattern of expressing genetic variation itself is environment dependence. Partheniumhysterophorus shows adaptive phenotypic evolution within range of environments.*

Keywords: Phenotypic plasticity, *Parthenium,* Ecotype, Environmental variation, APTI

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Smart Computers - Recent Technology Trends in Computer Technology

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Abstract: *Current user interfaces are not very "smart" in that computers dumbly do what the user explicitly commands it to do via buttons or menus. As computers become more capable and applications become complicated, more "smart" user interfaces are desired. We are exploring possible "smart" user interfaces in the domain of pen-based computing and interactive 3D graphics. The idea is to allow the user to intuitively express his/her intention by combining sketching and direct manipulation and have the computer take appropriate actions without explicit commands. This talk consists of many live demonstrations to illustrate the idea of interactive "smart" interfaces. I plan to show 2D geometric drawing programs, electronic whiteboard systems, sketch-based 3D modeling, automatic zooming, clothing manipulation interfaces, and other interesting systems*

Keywords:. Introduction, Methodology, Review, Privacy, Security, Behavior and influence analytics in social computing**,** Results & Discussion, Conclusion, Acknowledgement, and References

I. INTRODUCTION

Following the well-known concepts of computerization and informatization, an emerging era of cyberization, which is considered as a reformation of the present physical, social, and mental worlds, has become a hotly discussed trend in the new cyber world. Cyberization refers to using communication and computer technologies to interconnect computers and various electronic terminal devices distributed in different locations. It allows users to share software, hardware and data resources according to certain network protocols. Cyberization has greatly improved the practical utility of computers and has been widely applied in transportation, finance, business management, education, telecommunications, commerce, and so on in our daily life (Raza et al., 2015).

During the cyberization process, a large number of real things will conjugatively map to various kinds and levels of cyber existence in cyber world. It is said that cyberization has already taken place in a variety of fields along with the development of several emerging computing paradigms and information communication technologies, such as ubiquitous/pervasive computing, social computing and networking, and wearable technologies, etc. Specifically, with the rapid growth of the Internet of Things and cognitive cyber-physical systems, more and more digital things, or cyber entities, are engaged or generated in the integrated cyber world. Emerging technologies in smart environments, such as smart computing and smart objects, become very significant, promising, and enabling issues in cyberization, to enhance the efficiency of sensing, processing, and communication in the conjugations of physical, social, and mental worlds. Accordingly, cyber technology is playing an important role in developing effective methods of resource management, data acquisition, and pattern recognition across cyber-related systems and applications. All these provide us with opportunities to explore smart computing methodologies and computational intelligence algorithms to facilitate the cyberization process in the cyber world.

This special issue aims to report high-quality research on recent progress in the various areas related to Smart Computing and Cyber Technology for Cyberization. Our goal is to shed light on the multiple aspects involved in cyberization, encompassing algorithms, techniques, applications, enabling technologies, and platforms, besides security issues. A total of 36 papers were submitted from all over the world. After a careful review process performed by reviewers selected by the Guest Editors, 18 papers were accepted addressing subjects that were classified in the following categories: (i) infrastructure and platforms for intelligent systems, (ii) smart sensors and ad-hoc wireless networks, (iii) behavior and influence analytics in social computing, (iv) machine learning and intelligent applications,

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and (v) privacy and security in smart computing. The detailed contributions of each paper are summarized in the next section.

1.1 Infrastructure and Platforms for Intelligent Systems

An important component in the cyberization process is the computational intelligence techniques and methods that are at the core of cyber world enabling processes. Recently there has been a tremendous advance in the fields of machine learning (ML) and artificial intelligence (AI). However, much of this advance has focused on algorithms and their applications. Much less emphasis has been given to the underlying infrastructure of these intelligent systems. Currently, the mainstream in ML/AI consists of work being done individually by experts in the field, following ad-hoc processes that make collaboration difficult, and with little support from abstractions and tooling to facilitate the deployment of intelligent systems at scale. Ultimately, this is mainly due to a delay in infrastructure evolution, which has so far been far outweighed by innovation in machine learning techniques. One can say that the systems and tools that helped usher in the present era of hands-on machine learning are not suitable to feed future generations of the intelligent applications they have generated. Therefore, it is important to advance not only the algorithms but also the infrastructure and computing platforms that allow the effective and efficient execution of such algorithms.

In the context of ubiquitous/pervasive intelligent systems and cyber-physical systems (CPSs), cloud computing has been the most prevailing model and platform for data processing and storage. Because of the richness of resources typical of cloud platforms, cloud-based CPSs, and cloud-assisted IoT extend and augment the computing capacity of CPSs to conduct resource-hungry applications. The Cloud computing model is keen to use centralized shared resources and addresses the raising popularity of smart apps by integrating exclusive resources and the data obtained from them (An *et al.,* 2016).

In order to provide the physical resources dynamically, virtualized technology is extensively used for resource management in the cloud platforms, which provides an effective way to improve the resource efficiency of the cloud-based CPSs. Running applications on virtual machines (VMs) makes it possible for high resource utilization and low energy consumption (Wu *et al.,* 2016). Although virtualization techniques have been extensively studied in the cloud computing field, there are still several open issues involved in the allocation and migration of VMs to meet the quality of service (QoS) demands of cloud-based CPSs. A key challenge involves considering the benefits of migrating VMs to provide better QoS to the user while taking into account migration costs, for example in terms of transmission delays. In addition, energy consumption in cloud-based systems is also an increasingly relevant challenge to consider. To meet the growing demand for new scenarios such as CPSs and IoT, the capabilities of cloud data centers have grown steadily. Such growth results in the increasing power consumption of these data centers. In times of energy crisis and with the growing demand for greener and more sustainable technology solutions, reducing energy consumption in data centers has become a key goal. The authors in the paper "*A QoS-Aware Virtual Machine Scheduling Method for Energy Conservation in Cloud-based Cyber-Physical Systems*" aim to tackle the aforementioned challenges. Their goal is to find an optimal VM scheduling strategy in cloud-based CPSs with QoS enhancement. For such, they propose a QoS-aware VM scheduling method for energy conservation, named QVMS. By offloading several applications to other physical machines (PMs), the workloads on some under-load physical servers are migrated out, and these servers could be set to idle mode for energy saving. In the paper, they first define some basic concepts and present the system model. Then, they formalize the objective function and present the constraints assumed to model the solution. Non-dominated Sorting Genetic Algorithm (NSGA-III) is adopted to find the optimal VM scheduling strategies and achieve the goal of QoS enhancement including energy consumption, downtime, and resource utilization. Besides, SAW (Simple Additive Weighting) and MCDM (Multiple Criteria Decision Making) are adopted to select the most optimal scheduling strategy. They performed extensive experimental evaluations to verify the effectiveness of their proposed VM scheduling method them (An *et al.,* 2016).

However, despite the popularity of cloud computing as a backend of intelligent ubiquitous systems and CPSs, newly emerging applications and information technologies are very demanding when it comes to latency and bandwidth. Their requirements for the optimized transport network and processing of data performed as close to the end devices as possible are also rapidly increasing (J, Jeba et al., 2023). Some of the drawbacks of cloud platforms such as latency and jitter effects, distance to the server, data security and privacy, and support of mobility cannot be solved by the adoption

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of the hyper-scale cloud computing technology. To overcome some of such limitations, the Edge Computing paradigm has recently emerged as a solution for delivering data and real-time data processing closer to the data source. The combination of Edge Computing with ML/AI gave rise to a new paradigm known as Edge intelligence (EI). EI comprises edge computing that is supported by machine learning algorithms and advanced networking abilities. The implication is that a number of information technology and operational technology industries are gravitating to the edge of the network. The result is that issues such as cybersecurity, self-learning, real-time networks, and tailored connectivity can all be adequately dealt with. In their previous work, the authors of the paper "*A Lightweight and Cost Effective Edge Intelligence Architecture based on Containerization Technology*" proposed the idea to build and integrate Docker containers within the edge and pinpoint the Edge Intelligence's potential in the vertical-specific scenarios of use. Their current study, included in this Special Issue, extends this idea further and focuses on the utilization of Docker technology in the recognition of human activity.

They expect their presented architecture to provide significantly shorter delays in communication and decision-making as well as decrease the costs related to these processes thanks to the adoption of a lightweight and economical platform. Since the proposed architecture is using ML algorithms and eliminating any unnecessary communication with the cloud, it is able to provide more effective and quick decision-making. Unwanted delays are decreased thanks to avoiding unreasonable roundtrips. As another contribution of their proposal, decreased use of public-wide area networks along with the adoption of local algorithms and caching result in less costly communication. They also promote a good balance of applications, networks and user requests among the edge and core infrastructure. Finally, the proposed computing model can utilize decisions related to the pre-processed data and adopt alarms traded between several edge devices (Abbasi, et al., 2007).

Also leveraging the computational resources at the edge of the network, the paper "*LW-CoEdge: A lightweight virtualization model and collaboration process for Edge Computing*" proposes a novel distributed and lightweight virtualization model targeting the edge tier. Besides a novel virtualization model tailored to the edge tier and meeting the specific requirements of IoT applications, their proposal encompasses a set of heuristic algorithms along with a P2P collaboration process to operate upon the virtualization model. The algorithms perform (i) a distributed resource management process, and (ii) data sharing among neighboring virtual nodes (VNs, deployed at edge nodes). The distributed resource management process provides each edge node with decision-making capability, engaging neighboring edge nodes to allocate or provision on-demand VNs. Thus, distributed resource management improves system performance, serving more requests and handling edge node geographical distribution. Meanwhile, data sharing reduces the data transmissions between end devices and edge nodes, saving energy and reducing data traffic for IoT-edge infrastructures (Gao et al., 2014).

Among the existing CPSs, manufacturing, and enterprise applications are one of the major drivers of advanced and intelligent networked systems following the trend of Industry 4.0. Massive data are generated in a distributed fashion and cross-domain data need to be shared and analyzed in an efficient manner to realize effective supply chain management. Therefore, master data management (MDM) that manages how data are stored in a distributed system plays a critical role in enterprise data warehousing and analyses. The paper "*Master Data Management for Manufacturing Big Data: A Method of Evaluation for Data Network"* proposes a multi-layer master data management architecture and investigates the use of Set Pair Analysis (SAP) to model the distributed data network. The proposed methodology is validated using aviation enterprise data and has demonstrated the ability to support timely updates, responses, and distribution of data at each stage of the supply chain (Khan et al., 2012).

II. METHODOLOGIES

2.1 Smart Sensors and Ad-Hoc Wireless Networks

CPSs rely on a strong synergy between computational and physical components. A CPS is the integration of abstract computations and physical processes where sensors, actuators, and embedded devices are networked to sense, monitor, and control the physical world. Therefore, smart sensors and wireless sensor networks are major components of CPSs. Wireless sensor networks (WSNs) are composed of tiny devices equipped with sensing, processing, storage, and wireless communication capabilities. Each node of the network can typically have several sensing units, able to perform measurements of physical variables, such as temperature, luminosity, humidity, and vibration, thus being the main

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components to create a perception of the physical world. WSN nodes operate collaboratively, extracting environmental data, performing the same (often) simple processing, and then transmitting them to external systems, via sink nodes, to be analyzed and further processed.

Sensor nodes are severely constrained regarding memory, energy, and processing capabilities. Therefore, several approaches have been proposed to reduce the energy consumption of these nodes in order to extend the overall lifetime of the system. Since radio communication is the dominant factor of energy consumption in most WSNs (except for the hungry devices of multimedia sensor networks), an effective approach is the reduction of data transmission between the sink and the sensing nodes. One of the most commonly used techniques to reduce radio communication is the dual prediction mechanism and several proposals are reported in the literature. However, while all existing approaches have been proven to be very effective in reducing the amount of data reported to the sink, their efficiency is countered by an increase in complexity. Moreover, they are very sensitive to data loss which renders the dual prediction mechanism obsolete. In the paper "*Fault Tolerant Data Transmission Reduction Technique in Wireless Sensor Networks*", the authors present an alternative technique that has the major benefit to be simple yet robust, and more effective in terms of prediction accuracy and data reduction. Their approach exploits the fact that sensor data changes smoothly over time, therefore they leverage the prediction model proposed in to forecast future readings. They coupled this technique with a data reconstruction algorithm [15] that exploits both temporal smoothness and spatial correlation among different sensed features in order to estimate missing values (Luo et al., 2012).

Vehicular ad hoc networks (VANETs) are a subclass of mobile ad hoc networks (MANETs), and a promising approach for future intelligent transportation systems (ITS). A VANET typically supports two communication models, namely Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I). Currently, most VANET applications rely on V2V communications since they do not require costly infrastructure. However, as VANET is a very dynamic network, information must be exchanged between mobile vehicles in an efficient way by avoiding as far as possible the broadcast storm problem thatoccurs whenever a huge number of vehicles broadcast messages at the same time thus leading to a network saturation, packet delay, and collision issues. In this context, data aggregation is an appealing approach allowing to integrationof several data about similar events to generate a summary (aka aggregate) and as a consequence potentially reduce the network traffic. There are several proposals for data aggregation in VANETs already reported in the literature. However, the highly complex urban and highway networks produce overwhelming traffic information data that requires efficient selection criteria and smart filtering before the aggregation process. The design of an efficient data aggregation approach that combines correlated traffic information or Floating Car Data (FCD) is still a challenging issue. The authors of the paper "*Towards a Smarter Directional Data Aggregation in VANETs*" introduce a new data aggregation protocol, called Smart Directional Data Aggregation (SDDA), with the goal of selecting the most appropriate FCD messages that have to be aggregated.

Based on the aforementioned research works, it is clear that the future CPSs and intelligent applications heavily rely on the presence and widespread of physical sensors and WSNs. To ensure the functionality of an application, such as intruder detection, it is of critical importance to guarantee the coverage and availability of wireless sensors during deployment. As such, barrier coverage is a critical issue for wireless sensor deployment for many industrial and military applications, where each wireless sensor can sense within its range and a collection of wireless sensors can be deployed to cover the entire range of a barrier. Over the last decade, different barrier coverage algorithms had been established for different types of sensors such as seismic and acoustic sensors, while in recent years, more research efforts are dedicated to radar sensor systems. In *"Optimal Placement of Barrier Coverage in Heterogeneous Bistatic Radar Sensor Networks"* authors investigate the barrier coverage problem for bistatic radar sensor systems. Different to the traditional passive sensing model, the Cassini oval sensing model is investigated and an optimal placement strategy for heterogeneous transmitters and receivers has been proposed to achieve maximum barrier length coverage. The proposed algorithm has been validated through theoretical simulations to demonstrate the optimal coverage (Wang et al., 2010).

Cyber-social networks have significantly improved social relationships among mobile users across device-to-device communications. In the paper *"A Detailed Review of D2D Cache in Helper Selection"* , the authors present a survey work which focuses on D2D helper selection techniques according to three basic categories, including the network frame, computing method, and social-aware attribute. Differing from other surveys which mainly consider the energy consumption and latency minimization in D2D networks, they discuss the selection of D2D helper based on different

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network architectures, such as content distribution networks, peer-to-peer networks, named data networks, cellular networks, and vehicular ad-hoc networks. In particular, a variety of computing paradigms are taken into account to classify D2D helper selection techniques, such as mobile cloud computing, fog computing, and mobile edge computing.

III. REVIEW

3.1 Behavior and Influence Analytics in Social Computing

In recent years, the recommendation system has been well developed and is playing an important role across social media. In the paper *"ICFR: An Effective Incremental Collaborative Filtering based Recommendation Architecture for Personalized Websites"*, the user-based collaborative filtering algorithm is applied in an incremental recommendation implementation method, in which three important elements: user, item, and rating, are redefined, and relationships between user preferences and recommended content are utilized to improve the user-based collaborative filtering algorithm. Moreover, users' browsing behaviors are extracted based on the analysis of Web logs from personalized websites, which can facilitate the update of users' historical preference in the design of an incremental algorithm. Experiments demonstrate the high performance of the proposed method comparing with traditional updating methods.

Following the rapid development of mobile social networks, the paper *"From Crowdsourcing to Crowdmining: Using Implicit Human Intelligence for Better Understanding of Crowdsourced Data"* discusses the concept of crowdmining and presents a generic model for the development of crowdmining systems. The basic idea is to discover and better utilize the implicit human intelligence hidden in individual behavior patterns and crowd-object interaction patterns under a certain community context. The authors introduce a basic framework to understand the crowdsourced data with a formal description and discuss its usage in several general tasks in terms of data mining including classification, filtering and grouping. Based on these, they describe two case studies, namely the crowdevent and crowdtrip, which utilize the power of implicit human intelligence to facilitate the event sharing and trip planning respectively. Detailed scenario applications are presented, and the experiment evaluation demonstrate the effectiveness of the proposed method in event localization and detection, and travel route generation using online/offline crowd sourced data.

Behavioral analysis has drawn more and more attentions for mobile computing application in big data environments. In the paper *"TBI2Flow: Travel Behavioral Inertia Based Long-Term Taxi Passenger Flow Prediction"*, the authors focus on the analysis of travel patterns of taxis in cities using GPS data. Specifically, the travel behavioral inertia, which mainly includes two basic components: driver inertia and passenger inertia, is newly defined and introduced as a new metric for the long-term taxi passenger flow prediction. A traffic flow prediction framework, called TBI2Flow, is designed to forecast the distribution of taxi passengers in each small region of a district over different time intervals. The multi-layered neural network is utilized to extract and represent the new features from the taxi trajectory data based on the travel behavior analysis. The results of simulation-based experiments demonstrate the significance and efficiency of the proposed model for traffic management in the design of a smart city.

To deal with the special problem of influence maximization in social networks, the paper *"Three-hop Velocity Attenuation Propagation Model for Influence Maximization in Social Networks"* proposes a three-hop speed attenuation propagation model, based on which the authors design an algorithm for the maximum of influence considering the greedy algorithm with heuristic algorithm (Gao et al., 2014). In the constructed network model, the sum of modified degrees of the active nodes is employed to measure the impact of a node. In such a way, the influence of a single node can be effectively modeled and represented, and the lack of subtle influence caused by the three-hop simulation can be further made up. Two different datasets collected from DBLP and Facebook are used to conduct the propagation simulations, and the experiment results demonstrate the high efficiency of the proposed method comparing the traditional greedy algorithms.

IV. RESULTS

4.1 Machine Learning and Intelligent Applications

Sensors and WSNs play an important role in the CPSs and intelligent applications by offering fundamental infrastructure and data sources. However, how to process data to support decision making and provide "intelligence" in systems and applications remains a big challenge. In recent years, ML has demonstrated great potential to many

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applications in consumer electronics, industrial, and security and surveillance applications. In this special issue, several unique research works are presented on various novel ML techniques and intelligent applications.

As networked systems are becoming more and more complex, automated operations and maintenance are becoming highly important to ensure efficient and reliable system operations. The paper *"Intelligent Maintenance Frameworks of Large-scale Grid using Genetic Algorithm and K-Mediods Clustering Methods"* investigates the automation and scheduling problem of maintenance of a large-scale smart grid system, where a smart grid management system (GMS) is proposed with genetic algorithm and K-mediods clustering. This research identifies and addresses different severity levels according to the faulty devices. The two proposed algorithms are validated with five real-world datasets collected in five different cities in China.

As the technologies evolved, the focus of advanced technologies also shifted to offer more intelligent and more "personalized" services to end users. This trend can be observed from consumer electronics to even manufacturing enterprises to have customized products and services. Therefore, advanced technologies for identifying the user are becoming a very important topic to ensure the delivery of safe and secure personal services. While there are various unimodal personal identification techniques such as password, facial, voice, and fingerprint, each modality exists its own weaknesses which may make the overall system vulnerable. In the paper *"An Accurate Multi-Modal Biometric Identification System for Person Identification via Fusion of Face and Finger Print"*, a multi-modal person identification approach is proposed by fusing facial and fingerprint information. The proposed method has been verified with four different datasets and has achieved a promising recognition accuracy of 99.59%.

Different to traditional artificial intelligence (or machine intelligence), research efforts are also dedicated to mimicking unique human traits, behaviors, and personalities. In addition, to offer intelligence, researchers are seeking ways to capture and represent the uniqueness of human beings in achieving human-like (or even individual-like) artifacts such as digital avatars and humanoid robots. However, there is yet a comprehensive model to systematically describe human traits and personalities. The paper *"From Effect, Behavior, and Cognition to Personality: An Integrated Personal Character Model for Individual-like Intelligent Artifacts"* offers a broad overview of the existing Personal Character Models (PCMs) from different research arenas and perspectives such as psychology and computational intelligence. A novel PCM is proposed to capture comprehensively personal affects, behaviors, cognition, and the intra- and inter-relationships between these personal characteristics. The feasibility of the proposed PCM model has been demonstrated by extracting representative personal characteristics through various personal data such as wearable devices and cognitive tests.

V. DISCUSSION

5.1 Privacy and Security in Smart Computing

One of the biggest concerns in the cyber world is security. By delegating control of physical processes to virtual entities, often accessed via wireless networks, a number of vulnerabilities arise. Without solving security issues, it is not possible to leverage the paradigms linked to the cyber physical systems. As cyber-attacks become more frequent, the research community has presented several approaches (e.g. heuristic methods) to detect and analyze malicious programs (also referred to as malware). However, designing effective and efficient malware detection approaches poses several challenges and still has open issues, for example due to counter-malware detection efforts by malware authors and cyber criminals. There are three major approaches for analyzing malware: static, dynamic and hybrid, each of them with their own pros and cons. Trying to mitigate some of the drawbacks of current static, dynamic and hybrid malware detection approaches, multi-view learning is a promising solution. Multi-view data are very common in real world applications, where data are often collected from different sources, using different measuring methods. Different data sources form different feature sets, and each set is referred to as a view. Any particular single-view data cannot comprehensively describe the phenomenon under observation. Motivated by this, multi-view learning is an emerging direction in machine learning which considers learning with multiple views to improve the generalization performance. To adapt multi-view learning for malware threat hunting, the authors of the paper "*A Multiview Learning Method for Malware Threat Hunting: Windows, IoT and Android as Case Studies*" leverage the potential of using executable files for either malware or goodware (i.e. non-malware) as the source for multi-view data extraction. The challenge they tackle in this context is to determine what algorithm can be used to effectively extract features from executable files.

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Existing approaches generally use single view information for malware detection or a combination of some views in the form of a single view. In their paper, the authors propose an efficient ensemble multi-view learning method, which automatically assigns optimized weights to different views. The proposed method is a large margin classifier that improves generalization using a global optimum hypothesis. To demonstrate adaptability of the proposed approach in detecting malware on different platforms, they evaluate their system with datasets comprising Internet of Things (IoT), Windows and Android malware.

VI. CONCLUSION

This special issue aims to promote the development of cyber-related information and communication technologies in smart computing. In Particular, a variety of important topics are addressed in this special issue, including: Knowledge Modeling and Management for Cyberization, Information Sharing and Dissemination in Smart Computing, Smart Control and Monitoring for Cyberization, Cognitive Physical-Social Networks, Content Analysis and Mining in Cyber-Social Networks, Behavioral Analytics across Smart Networks, Deep Learning in Cyberization, Resource Management in heterogeneous Networks, Intelligent Transportation Systems Using Smart Networks, Smart Internet of Things, Cyber-Physical-Social Data Processing and Intelligence Mining, Smart Data Streaming and Real-Time Processing, Smart Sensors and Ad-Hoc Wireless Networks, Data Storage and Integration in Cyberspace, Semantic Web Mining in Smart Computing, Infrastructure and Platform for Intelligent Network Systems, Wearable Technologies in Smart Environments, Mobile Computing with Smart Sensors, Smart Energy Management and Sustainability, Privacy and Security in Smart Computing, and etc.

VII. ACKNOWLEDGMENT

The paper consists of information related to smart computing. It focuses on the following elements and values such as introduction, methodologies, privacy, security, behaviour and influence analytics in social computing, results, and discussion followed by conclusion and references. I hereby declare that all the information provided in the respected paper is authenticated, authorized, and hence reliable. I would like to thank all the viewers and readers of this paper for their precious time.

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Effect of Pb^{2+} Doping on the Electrical Properties of Cobalt Ferrite Nano Particles Prepared via Sol-Gel Route

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Anjuman Islam Janjira Degree College of Science, Murud Janjira, Maharashtra, India[1,2]

Abstract: *$Co_{1-x}Pb_xFe_2O_4$ (where x=0.1,0.2,0.3,0.4,0.5) is a cobalt (Co) nanoferrite that has been substituted with lead (Pb^{2+}) using the sol-gel auto combustion process. At a temperature of 600^0C, sintered samples were created. By using X-ray diffraction, the particles that resulted from this synthesis were identified (XRD). The grain size was determined to be between 34.5 and 54.5 nm. It was discovered that for increased Pb^{2+} substitution, grain size first increases up to x = 0.3 and then drops. From DC electrical resistivity study of the samples it is found that with increase in concentration of Pb^{2+} from x = 0.1 to x = 0.5, the conductivity decreases and conductivity increases with increasing potential difference across it*

Keywords:. Pb^{2+}, Co nanoferrite, sol-gel, X-Ray Diffraction, DC Conductivity

I. INTRODUCTION

Cobalt ferrites are currently the subject of interest because of its wide application in industrial as well as research areas. $CoFe_2O_4$ has got some peculiar properties like high saturation magnetization (Ms), high coercivity (Hc), moderate magnetization properties,remarkable chemical stability among all the ferrite family [1]. Further the substitution of Zn^{2+}, Ni^{2+}, Cu^{2+}etc. in cobalt ferrite allows some tunable changes in its properties make Cobalt ferrite be suitable for many applications[2]. High frequency devices, memory cores, high density information storage, and the biological industry are only a few of their uses [3].

The general formula of spinel ferrites is AB_2O_4, in which tetrahedral (A sites) and octahedral (B sites) interstices are occupied by the cations. In spinel ferrite with divalent ions in tetrahedral sites are called normal spinel ferrite, while compounds with the divalent ions in the octahedral sites are called inversespinel ferrite. Co Fe_2O_4 exhibits an inverse spinel stricture with the Co^{2+} ions present in the B sites and Fe^{3+} ions distributed almost equally between the A and B sites[4],whereas $PbFe_2O_4$ has a normal spinel structure with Pb^{2+} ions in tetrahedral and Fe^{3+} in octahedral sites[5]. Therefore, Pb substitution in $CoFe_2O_4$ may have some distorted spinel structures depending upon the concentration of the precursor solutions. As substitution of Zn^{2+}, Ni^{2+}, Cu^{2+}etc. in cobalt ferrite allows some tunable changes in its properties,the present work deals with the synthesis of nanoparticles of lead (Pb) substituted cobalt ferrite ($Co_xPb_{1-x}Fe_2O_4$ where x = 0.1, 0.2, 0.3,0.4, 0.5) via sol-gel method and study the effect of Pb^{2+} ion concentration on the structural and electrical properties of the Co-ferrite nanoparticles.

II. EXPERIMENTAL

2.1 Materials:

Raw material are used in experiments are analytical grade nitrate i.e. cobalt nitrate ($Co(No_3)_2.6H_2o$),lead nitrate($Pb(No_3)_2$), ferric nitrate ($Fe_2(No_3)_2$) and citric acid ($C_6H_8O_7$) is used as fuel in the ratio 1:3 provided by Merck with ~99 % purity were used as a starting materials without further purification for the synthesis.

2.2 Synthesis Procedure:

Pb^{2+}substituted $CoFe_2O_4$ ferrite with a chemical formula $Co_{1-x}Pb_xFe_2O_4$(where, x = 0.1, 0.2, 0.3, 0.4 and 0.5) have been synthesized via sol-gel method. The stoichiometric amounts of cobalt nitrate $Co(No_3)_2.6H_2O$, lead nitrate (Pb $(No_3)_2$) and ferric nitrate ($Fe(NO_3)_2$) were dissolved in 100 ml distilled water under magnetic stirring. Then citric acid ($C_6H_8O_7$) was mixed in the metal nitrate solution to chalet Co^{2+}, Pb^{2+} and Fe^{2+} ions in the solution. The molar ratio of citric acid

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to total moles of nitrates was maintained at 1:3. A small amount of ammonia was added drop-wise into the solution to adjust pH value to about 7 and stabilize the nitrate-citrate solution. The solution was evaporated by intensive stirring and heating for 1 hour at 100˚C and kept at this temperature until the sol turned into a gel. The gel was then heated at 150˚C for auto-combustion to take place. To obtain the nanoferrite particles, the resultant powder is crushed in an agate mortar and then sintered at 600 °C for four hours.[6]

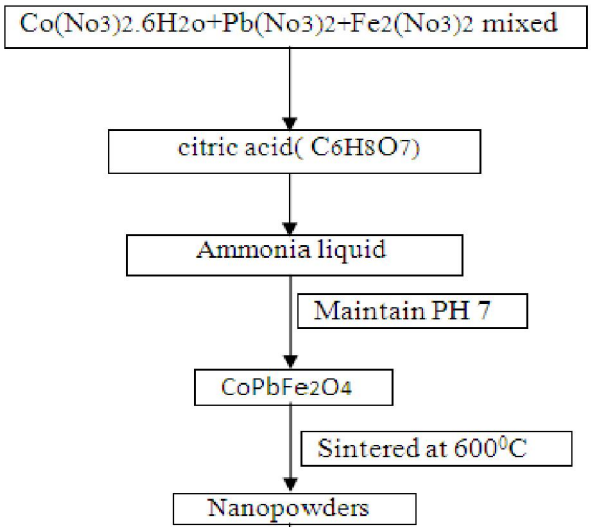


Fig. 1 Synthesis process of Pb^{2+}substituted $CoFe_2O_4$ ferrite

2.3 Characterization Techniques:

Structural identification and phase analysis of Pb^{2+}substituted $CoFe_2O_4$ ferrites were carried out by XRD pattern. The pattern was recorded using Cu-Kα radiation (λ = 1.54182 Å) in the 2θ range 20°- 80° with step size 0.01°and time/step 2s. The powders samples were mixed with polyvinyl alcohol (PVA) agent as a binder and pressed into cylindrical pellets with 9-mm diameter and 2-mm thickness under the pressure of 5 tons. The pellets were sintered in a muffle furnace at 200 °C for 2 hr. for removal of binder. These pellets were used for electrical property measurements. The pellets were polished for smooth parallel faces and coated with silver paste to ensure good Ohmic contact. Using the standard two-probe method, the DC electrical conductivity of all samples was calculated.

III. RESULTS AND DISCUSSION

3.1 X-Ray Diffraction:

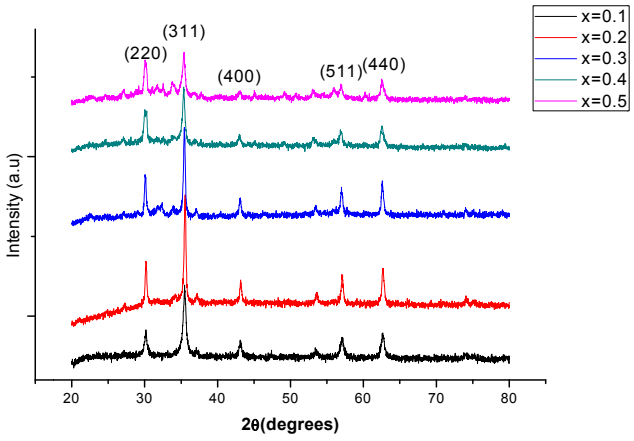


Fig. 2 stacked XRD patterns for the Pb substituted $CoFe_2O_4$ samples with the Pb^{2+} concentration of x = 0.1, 0.2, 0.3,0.4,0.5.

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Figure 2shows the XRD patterns for the Pb substituted $CoFe_2O_4$ samples with the Pb^{2+} concentration of x = 0.1, 0.2, 0.3,0.4,0.5. The average crystallite size (t) was calculated using the Debye-Scherrer's formula. The average crystallite size was found to be in the range of 34.5–54.5 nm (Table 1).

Table 1

Concentration	$t = \frac{0.9\lambda}{\beta cos\theta}$ (nm)	Lattice parameter (Å)	Interplanar spacing (d)
$Co_{0.9}Pb_{0.1}Fe_2O_4$	34.5392	8.3877	2.137682
$Co_{0.8}Pb_{0.2}Fe_2O_4$	54.5346	8.3793	2.135334
$Co_{0.7}Pb_{0.3}Fe_2O_4$	54.1060	8.3994	2.140821
$Co_{0.6}Pb_{0.4}Fe_2O_4$	39.0993	8.4108	2.143574
$Co_{0.5}Pb_{0.5}Fe_2O_4$	34.7407	8.4090	2.143156

In Table 1, the computed particle sizes for each sample are shown. The particle size estimated shows random nature with increase in Pb^{2+} content though all the samples were prepared under identical conditions[7].

The absence of any extra peak in diffraction pattern ensures the phase purity for all samples. All of the peaks match the $CoFe_2O_4$ standard JCPDS data very well (22-1086). The lattice parameter (a) was calculated using the following equation,

$$a = d \times \sqrt{h^2 + k^2 + l^2}$$

where (hkl) is the index of the XRD reflection peak and (d) is the interplanar spacing. Each peak of the XRD pattern's "a" lattice parameter was calculated in order to determine the lattice constant accurately, and their average was then taken. It is found that lattice parameter is in the range from 8.3877 Å to 8.4108 Å Table1. The increase in lattice parameter with increase in Pb^{2+} content could be explained on the basis of ionic radii, where the radius ofPb^{2+} (1.19 Å) is larger than that of Co^{2+} (0.7 Å) causing lattice expansion. The shift in diffraction angle 2θ towards lower value with increase in Pb^{2+} content is shown in Figure 3. It is found that there is shifting of peak at lower angle for x=0.3,0.4,0.5 with respective x=0.1 and shifting of peak at higher angle for x=0.2. Lower angle shifts of peak suggest that there is compressive strain and increasing value of interplanar spacing (d) and higher angle shifting suggest that there is tensile strain and decreasing value of interplanar spacing (d).

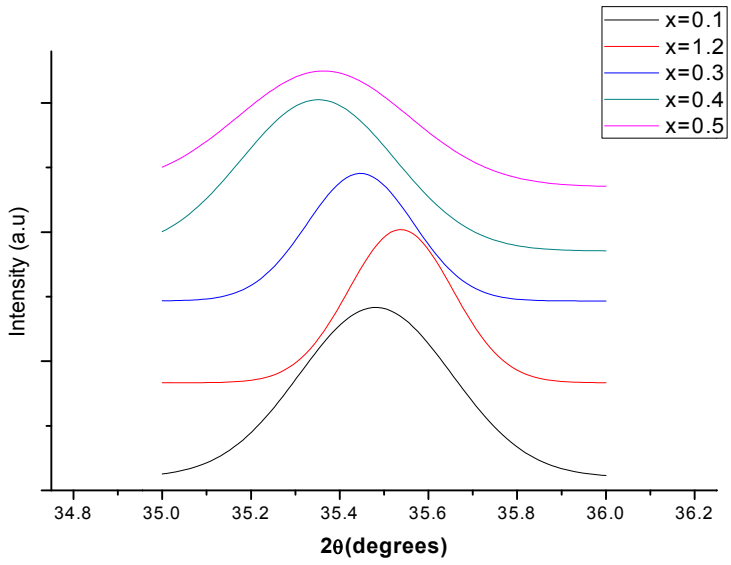


Fig. 3 The shift in diffraction angle 2θ with increase in Pb^{2+} content

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Volume 3, Issue 19, May 2023

3.2 Electric Property

According to it, the electrical conduction in ferrites is due to the hopping of electrons between the ions of elements of different valence states present at the octahedral sites. The conduction in ferrites is the result of hopping of electrons between Fe^{3+} and Co^{2+}, Pb^{2+} ions present at octahedral sites. One of the factors to consider for microwave applications is the extremely high resistance of ferrites. According to the chemical composition of the material, ferrites have resistivities that range from 10^{-2} ohm-cm to 10^{11} ohm-cm at room temperature[8]. If the material has to be conducting, lattice must contain the same cations in at least two different valence states. In spinel, since distance between two [A] site cations is larger than the distance between adjacent [B] site cations and as tetrahedral and octahedral sites are not energetically equivalent, conductivity is mostly due to the electron exchange between [B] site cation. In $CoPbFe_2O_4$ though the conductivity is due to hopping of electron from Co^{2+}, Pb^{2+} to Fe^{3+} ion at [B] site, in this mechanism initial and final states are equivalent.

$$Co^{3+}+Fe^{2+}\rightarrow Fe^{3+}+Co^{2+}$$

DC electrical conductivity of the samples was found to be decrease with increasing Pb^{2+} from $x = 0.1$ to $x = 0.5$ (Fig. 4). As Lead is less conductive than the Cobalt with increasing concentration of Pb^{2+} it replaces the Co^{2+} ions on the Octahedral(B) site. As a result, the number of Pb^{2+} ions at B sites which are responsible for low electrical conductivity in ferrites increases consequently conductivity decreases by increasing Pb^{2+} ion concentration. That means the conductivity decreases with increasing concentration of lead but it increases with increasing voltage.

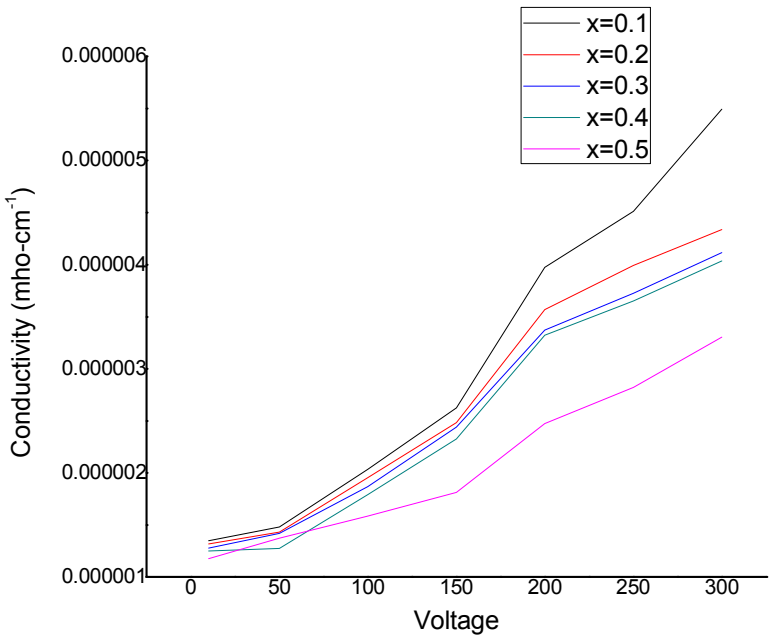


Fig. 4 Conductivity Vs Voltage

IV. CONCLUSIONS

Sol-gel auto combustion method was used to prepare lead substituted cobalt ferrite nanoparticles ($Co_{1-x}Pb_xFe_2O_4$ with x = 0.1, 0.2, 0.3, 0.4, and 0.5).From x-ray analysis, it has been found that the average crystallite size is in the range of 34.5–54.5 nm. The absence of any extra peak in diffraction pattern ensures the phase purity for all samples. All of the peaks match the CoFe2O4 standard JCPDS data very well (22-1086). It was also found that lattice parameter is in the range from 8.3877 Å to 8.4108 Å. DC electrical resistivity study of the samples was found to be increases with increasing $Pb^{2+}$from x= 0.1 to $x = 0.5$. That means the conductivity decreases with increasing concentration of lead but it increases with increasing voltage.

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Review on Current Aspects of Technique, Applications and Scope of DNA Sequencing

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Abstract: *Science and technology are in contentious developing phase. It also develops advanced tools and techniques for DNA sequencing. The recent advance well known Sanger sequencing is based on microfluidic separation platforms as a reported by Michael 2005. Similarly DNA sequencing is developed with best standards protocol with optimization of dideoxy sequencing and worked out by Jay A. 2008. Further DNA sequencing becomes advanced with the introduction of plus and minus technique given by Sanger and reported by Clyde A. Hutchinson 2007. There were also introductions of DNA sequencing method for methylated DNA, DNA Protein and RNA Protein interactions from earlier days as reported by George M. Church 1988. Here with this review will try to summarise all advanced techniques in DNA Sequencing*

Keywords: DNA sequencing, Application, Techniques, Scope and Sanger

I. INTRODUCTION

DNA sequencing is the process of determining the precise order of nucleotides (A, C, G, T) within a DNA molecule (Loman & Pallen, 2015). It is a fundamental tool for research in genetics and molecular biology and has numerous applications in fields such as medicine, biotechnology, and forensics. The first method of DNA sequencing, known as the Sanger method, was developed in the 1970s and revolutionized the field of molecular biology (Sanger et al., 1977). Since then, many different methods have been developed that allow for faster, cheaper, and more accurate sequencing of DNA.

The basic steps of DNA sequencing involve fragmenting the DNA molecule into smaller pieces, amplifying these fragments through a process called PCR, and then determining the order of nucleotides within each fragment. This information is then assembled to create a complete sequence of the original DNA molecule (Goodwin et al., 2016).

There are two main types of DNA sequencing: whole-genome sequencing and targeted sequencing. Whole-genome sequencing involves sequencing an individual's entire genome, while targeted sequencing focuses on specific regions of interest within the genome. Both approaches have their own advantages and disadvantages depending on the research question and available resources (Mardis, 2017).

The applications of DNA sequencing are vast and include identifying genetic mutations that cause disease, studying the evolutionary history of species, and understanding the genetic basis of complex traits such as intelligence and personality (Burgess et al., 2018). DNA sequencing has also been used in forensics to help solve crimes and identify human remains. In recent years, advances in DNA sequencing technology have led to the development of portable and handheld devices that can sequence DNA in real-time, making it possible to rapidly diagnose infectious diseases and monitor environmental samples in the field (Quick et al., 2015).

More recently, researchers have focused on developing new methods for DNA sequencing, such as microfluidic separation platforms. Michael et al. (2005) reported on the use of microfluidic separation platforms for Sanger sequencing, which allowed for faster, more accurate sequencing of DNA. In addition to developing new methods for DNA sequencing, researchers have also worked on optimizing existing protocols. Jay et al. (2008) developed a best-practice protocol for dideoxy sequencing, which involves using modified nucleotides to terminate DNA synthesis during sequencing. This protocol has been widely adopted in the field of DNA sequencing and has helped to improve the accuracy and reliability of sequencing results.

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1.1 Development in DNA Sequencing Techniques

DNA sequencing is an ever-evolving field with new technologies and techniques constantly being developed. In recent years, several advancements have been made in DNA sequencing that have increased speed, accuracy, and cost-effectiveness.

One of the most significant developments in DNA sequencing has been the introduction of next-generation sequencing (NGS) technologies. NGS platforms, such as Illumina, PacBio, and Oxford Nanopore, have dramatically increased the speed and throughput of DNA sequencing, allowing researchers to sequence whole genomes in a matter of hours or days (Goodwin et al., 2016). These platforms also offer higher accuracy and longer read lengths compared to previous sequencing technologies, making them ideal for applications such as transcriptome analysis, epigenetics, and metagenomics (Metzker, 2010).

Another recent development in DNA sequencing has been the advent of single-cell sequencing. This technology allows researchers to sequence the genome of individual cells, which is essential for studying cellular heterogeneity in complex tissues such as tumors or the brain (Haque et al., 2017). Single-cell sequencing technologies, such as Drop-seq, 10x Genomics, and Seq-Well, have also enabled the study of rare cell populations, such as circulating tumor cells or fetal cells in maternal blood (Navin, 2015). Finally, there have been recent advances in long-read sequencing technologies. Long-read sequencing platforms, such as PacBio and Oxford Nanopore, can generate reads that are tens of kilobases or even megabases in length, enabling the sequencing of complex regions such as centromeres, telomeres, and structural variants (Chaisson et al., 2019). Long-read sequencing has also allowed for the phasing of haplotypes, which is essential for understanding the genetic basis of complex diseases (Edge et al., 2019).

Here several new advancements in DNA sequencing technologies that have emerged since the references cited in my previous response. Here are some of the recent advancements:

Nanopore sequencing: Nanopore sequencing is a long-read sequencing technology that uses a nanopore sensor to directly read the sequence of individual DNA molecules. This technology has continued to advance, with new developments in flow cells, sample preparation, and base-calling algorithms that have increased the accuracy and throughput of nanopore sequencing (Jain et al., 2022).

Spatial transcriptomics: Spatial transcriptomics is a technique that enables the mapping of gene expression in individual cells within their tissue context. This technology has advanced in recent years, with the development of new spatially resolved transcriptomic methods such as MERFISH and Slide-seq (Ståhl et al., 2021).

CRISPR-based sequencing: CRISPR-based sequencing is a new approach to DNA sequencing that uses the CRISPR-Cas system to target specific genomic regions for sequencing. This technology has the potential to be faster and more cost-effective than traditional sequencing methods, and several companies are currently developing CRISPR-based sequencing platforms (Perez-Pinera et al., 2021).

Third-generation sequencing: Third-generation sequencing technologies, such as PacBio and Oxford Nanopore, continue to advance with improvements in accuracy, throughput, and read length. These platforms have enabled the sequencing of previously intractable regions of the genome, such as repetitive regions and structural variants (Jain et al., 2022).

The continued development of DNA sequencing technologies is enabling new discoveries in genomics, transcriptomics, and beyond, and is paving the way for new applications in fields such as personalized medicine, synthetic biology, and environmental science.

1.2 Time and Coast of DNA Sequencing

In the early days of DNA sequencing, the process was slow and expensive, requiring weeks or even months of work and costing millions of dollars. The development of automated sequencing machines in the 1990s, such as the Applied Biosystems 3730xl DNA Analyzer, helped to speed up the process and reduce costs, but sequencing a human genome still required years of work and cost billions of dollars (National Human Genome Research Institute, 2021). However, the cost and time required for DNA sequencing have decreased dramatically over the past decade. This is due to the development of high-throughput sequencing technologies, which allow researchers to sequence multiple DNA molecules in parallel, greatly increasing the efficiency of the process. One of the most widely used high-throughput sequencing technologies is Illumina sequencing, which can generate millions of reads in a single run. Today, with the

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help of high-throughput sequencing technologies, researchers can sequence multiple genomes in a matter of weeks or months at a fraction of the cost (National Human Genome Research Institute, 2021).

The decreasing cost and time required for DNA sequencing have also led to an explosion in the amount of sequencing data generated. This has created new challenges for researchers, including how to store, analyze, and interpret the massive amounts of data generated by sequencing projects. To address these challenges, researchers have developed new computational tools and algorithms that can process and analyze sequencing data at a scale never before possible (Kulkarni & Im, 2018).

Despite these advances, there are still challenges to be addressed in the field of DNA sequencing. For example, current sequencing technologies can produce errors, particularly in regions of the genome that are difficult to sequence. Additionally, some sequencing applications may require deeper coverage than others, which can increase the cost and time required for sequencing (Biankin et al., 2015). Despite these challenges, the decreasing cost and time required for DNA sequencing have made it a powerful tool for a wide range of applications, including identifying disease-causing mutations, tracking the spread of infectious diseases, and understanding the genetic basis of traits and behaviors. As sequencing technologies continue to improve, it is likely that DNA sequencing will become even more accessible and efficient, paving the way for new discoveries and breakthroughs in the fields of genetics, medicine, and biology.

The cost of DNA sequencing has decreased dramatically in recent years, making it more accessible and affordable for researchers and clinicians. As of 2021, the cost of sequencing a human genome using Illumina technology is around $1,000-$1,500, while the cost of sequencing using nanopore technology is around $1,500-$2,000 (National Human Genome Research Institute, 2021; Jain et al., 2016). It's worth noting that the cost of DNA sequencing can vary depending on the specific goals of the sequencing project, the quality of the sequencing data required, and the depth of coverage needed for a particular application (Biankin et al., 2015). Therefore, it is important for researchers to carefully consider their sequencing needs and budget when planning a project.

1.3 Advancement in applications of DNA Sequencing

DNA sequencing is a powerful tool that has revolutionized the field of genetics and has a wide range of applications in research, medicine, and agriculture. Over the years, advancements in DNA sequencing technology and the development of new applications have significantly expanded its potential uses. One major area of advancement in the applications of DNA sequencing is in the field of personalized medicine. DNA sequencing allows for the identification of genetic mutations and variations that can be linked to specific diseases or conditions. By analyzing a patient's genome, healthcare professionals can develop personalized treatment plans tailored to an individual's unique genetic makeup. This approach has been particularly useful in the diagnosis and treatment of cancer, where genetic testing can help to identify targeted therapies and predict response to treatment (Gargis et al., 2016).

Another area of advancement in DNA sequencing applications is in the study of microbiomes. Microbiomes are communities of microorganisms that live on and within the human body and play a crucial role in maintaining health. DNA sequencing allows researchers to analyze the genetic makeup of these microorganisms and study their interactions with the human body. This has led to the development of new treatments for conditions such as inflammatory bowel disease and infectious diseases (Dethlefsen et al., 2007). DNA sequencing has also been applied in the field of forensic science, where it is used to identify suspects in criminal investigations and to determine the source of biological evidence found at crime scenes. By analyzing DNA samples from suspects and comparing them to DNA samples from crime scenes, forensic investigators can determine whether an individual was present at the scene of a crime (Butler, 2015).

Another area of advancement in DNA sequencing applications is in agriculture. DNA sequencing can be used to identify genetic variations that are linked to desirable traits, such as drought resistance or disease resistance, in crops and livestock. This information can be used to develop new breeding strategies to produce crops and livestock that are better suited to specific environments and have improved traits (Tanksley & McCouch, 1997).It led to new applications in environmental science. DNA sequencing can be used to analyze microbial communities in soil and water samples, allowing researchers to study the impact of environmental factors on these communities. This information can be used to develop strategies for environmental conservation and to understand the impact of climate change on ecosystems (Hug et al., 2016).

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Advancements in DNA sequencing technology and the development of new applications have significantly expanded its potential uses. DNA sequencing has become an essential tool in personalized medicine, microbiome research, forensic science, agriculture, and environmental science. As technology continues to improve, it is likely that DNA sequencing will continue to play a vital role in expanding our understanding of genetics and its impact on various fields of study.

1.4 Scope in DNA Sequencing

Over the past two decades, DNA sequencing technology has made significant advancements, leading to an expansion of its scope and applications in various fields, including medicine, agriculture, forensics, and environmental science. DNA sequencing has been increasingly used in clinical medicine to identify genetic variations associated with inherited diseases and to personalize medical treatments. This has led to the development of targeted therapies and precision medicine, which can improve patient outcomes and reduce healthcare costs (Gargis et al., 2016).

In agriculture, DNA sequencing has been used to identify genes responsible for desirable traits in crops and livestock, leading to the development of new varieties with improved yields, resistance to pests and diseases, and better nutritional value (Tanksley & McCouch, 1997). Forensic DNA sequencing has also made significant progress in recent years, with the development of more sensitive and accurate methods for analyzing DNA evidence, such as STR markers (Butler, 2015). Environmental DNA (eDNA) sequencing has emerged as a powerful tool for studying biodiversity, ecology, and conservation. By analyzing DNA in environmental samples such as water, soil, or air, researchers can identify the presence and abundance of species, monitor ecosystem health, and detect invasive species (Hug et al., 2016).

The scope of DNA sequencing has also expanded beyond traditional DNA sequencing methods such as Sanger sequencing to include high-throughput sequencing technologies such as Illumina and nanopore sequencing. These technologies allow for the rapid and cost-effective sequencing of large amounts of DNA, enabling large-scale genomic studies and the discovery of new genetic variants (Goodwin et al., 2016). Furthermore, recent advances in single-cell sequencing technologies have opened up new possibilities for studying cellular heterogeneity and the dynamics of gene expression in individual cells (Mereu et al., 2020).

According to a study by Wang et al. (2019), deep convolutional neural fields can be used for predicting protein secondary structure from DNA sequencing data. Additionally, Poplin et al. (2018) developed an AI-based tool called DeepVariant that uses neural networks to identify genetic variations in DNA sequencing data with high accuracy. Furthermore, a recent study by Zhao et al. (2021) and J, Jeba (2022) demonstrated that AI-based approaches can be used to predict the impact of genetic variations on protein stability, which can have important implications for drug development and personalized medicine and AI techniques for efficient and accurate detection of cardiac diseases using ECG wave data..

Scope of DNA sequencing has expanded greatly in the past two decades, driven by advancements in technology and methods. DNA sequencing has become an indispensable tool for various fields, including medicine, agriculture, forensics, and environmental science, and it is expected to continue to evolve and grow in scope as new applications and technologies emerge.

1.5 Advances Approaches of DNA Sequencing for Plants

Advancements in DNA sequencing technologies have made it possible to sequence plant genomes with greater accuracy and speed. One such approach is whole genome sequencing (WGS), which involves sequencing the entire genome of a plant. This approach has been used to sequence the genomes of numerous plant species, including *Arabidopsis thaliana*, rice, maize, and soybean (Ming et al., 2013; Sato et al., 2008; Schnable et al., 2009; Schmutz et al., 2010). WGS provides a comprehensive view of the plant genome and allows researchers to identify genetic variations that contribute to various traits such as disease resistance, phytochemical production, increase yield, and quality (Varshney et al., 2013, Khan and Hafiz, 2023; Patil and Khan, 2017a, 2017b; Tanveer. A. Khan et al., 2020).

Another approach is exome sequencing (Based on Exon), which involves sequencing only the protein-coding regions of the genome. This approach has been used to identify genes associated with traits of interest in plants such as drought tolerance and disease resistance (Yang et al., 2013; Xu et al., 2018). Exome sequencing is more cost-effective than WGS and allows researchers to focus on regions of the genome that are most likely to be functional. RNA sequencing

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(RNA-Seq) is another powerful tool for plant genomics research. RNA-Seq involves sequencing the transcriptome of a plant, which is the set of all RNA molecules produced by the plant's genes. RNA-Seq can be used to identify genes that are differentially expressed under different conditions, such as during plant development or in response to environmental stress (Wang et al., 2009). RNA-Seq can also be used to identify alternative splicing events and non-coding RNAs that play important regulatory roles in the plant genome (Wang et al., 2011).

Metagenomics is an emerging approach for studying the microbiome of plants. Metagenomics involves sequencing all the genetic material present in a sample, including the genomes of the microorganisms that live in and on the plant. This approach has been used to study the role of plant-associated microorganisms in nutrient cycling, plant growth promotion, and disease suppression (Bulgarelli et al., 2013; Lebeis et al., 2015). Metagenomics can also be used to identify potential biocontrol agents for plant pathogens.

II. CONCLUSION

The field of DNA sequencing has undergone remarkable advancements in recent years. The cost and time required for DNA sequencing have decreased dramatically due to the development of high-throughput sequencing technologies, making it more accessible and affordable for researchers and clinicians. With the decrease in sequencing costs, there has been an explosion in the amount of sequencing data generated, leading to new challenges for researchers in terms of data analysis and interpretation. Furthermore, the advancement in applications of DNA sequencing has led to a wide range of applications, including identifying disease-causing mutations, tracking the spread of infectious diseases, and understanding the genetic basis of traits and behaviors. This has paved the way for new discoveries and breakthroughs in the fields of genetics, medicine, and biology. Moreover, there is a vast scope for DNA sequencing in various areas of research, including metagenomics, environmental microbiology, and personalized medicine. The development of new sequencing techniques such as nanopore sequencing and third-generation sequencing has further expanded the scope of DNA sequencing and enabled the study of previously inaccessible genomic regions.

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AUTHOR'S CONTRIBUTIONS

AK, BW and MB are designed concept designed for topic; were MB and SV provided the preliminary data analysis of manuscript. AK, SV and MB did proofreading. MB supersized the work with its authentication. All authors are carefully read and approved the final manuscript.

COMPLIANCE WITH ETHICAL STANDARDS

Conflict of interest: Authors do not have any conflict of interests to declare.

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The Impact of Cloud Computing on Small and Medium-Sized Businesses

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Abstract: *Cloud computing has had a significant impact on small and medium-sized businesses (SMBs). The benefits of cloud computing adoption, including cost savings, scalability, flexibility, and improved data security, have made this technology increasingly popular among SMBs. However, several challenges prevent SMBs from adopting cloud computing, including a lack of technical knowledge and expertise, security concerns, and concerns around the reliability and availability of cloud computing services. Despite these challenges, many SMBs have successfully implemented cloud computing and have seen significant improvements in their operations. Case studies have shown that SMBs that migrated to cloud-based services experienced a reduction in IT costs and an increase in revenue. Additionally, SMBs that adopted cloud computing services saw a reduction in downtime and improved disaster recovery capabilities. The impact of cloud computing on SMBs extends beyond operational improvements. Cloud computing has also improved the competitiveness and profitability of SMBs, enabling them to access enterprise-grade technology at an affordable cost and allowing them to scale their operations quickly and efficiently. Cloud computing has also enabled SMBs to compete with larger businesses by providing them with the same technological capabilities. Cloud computing has had a significant impact on SMBs by providing them with cost-effective access to enterprise-grade technology, improving operational efficiency, and enhancing competitiveness and profitability. While several challenges prevent SMBs from adopting cloud computing, successful implementation can bring significant benefits to their operations*

Keywords: Cloud computing, SMBs

I. INTRODUCTION

Small and medium-sized businesses (SMBs) are crucial for economic growth and development. However, these businesses often encounter significant difficulties when it comes to adopting and implementing new technologies. Cloud computing is a technology that can provide a range of benefits to businesses of all sizes, including cost savings, flexibility, scalability, and improved data security.

The aim of this research paper is to examine the impact of cloud computing on SMBs. Specifically, this study investigates the benefits and barriers to cloud computing adoption for SMBs and analyzes case studies of businesses that have successfully implemented cloud computing. The research questions guiding this study are: What benefits can SMBs derive from cloud computing? What are the primary barriers to cloud computing adoption for SMBs? How can SMBs overcome these barriers and realize the potential benefits of cloud computing?

This research paper begins with an overview of cloud computing, followed by a comprehensive literature review of the benefits and barriers to cloud computing adoption for SMBs. The methodology section describes the research design, data collection methods, data analysis techniques, and limitations of the study. The findings and discussion section presents an analysis of the collected data, a discussion of the findings in relation to the research questions, and a comparison with existing literature. Finally, the research paper concludes with a summary of key findings, implications of the study, recommendations for SMBs, and suggestions for future research.

Overall, this research paper adds to the understanding of the impact of cloud computing on SMBs and offers practical recommendations for SMBs to overcome barriers to cloud computing adoption and realize the full benefits of this technology.

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A. Background and description of Cloud Computing

Cloud computing is a model that provides on- demand access to participated computing resources, similar as servers, storage, operations, and services, over the internet. It offers a flexible and cost-effective alternative to traditional IT structure and enables businesses of all sizes to measure their operations rapidly and efficiently. Cloud computing providers offer a range of services, including Software as a Service(SaaS), Platform as a Service(PaaS), and Infrastructure as a Service(IaaS), which can be acclimatized to meet the specific requirements of businesses.

B. Significance of the Study

Cloud computing has disintegrated the IT industry, changing the way businesses operate. Small and medium- sized businesses, in particular, have the chance to access enterprise- grade technology at an affordable cost, opening up new chances for growth and innovation. As cloud computing adoption continues to increase, it's important to understand its impact on small and medium- sized businesses, including the challenges and opportunities it presents.

C. Research Questions

The research paper searches to answer the following research questions

- What are the benefits of cloud computing for small and medium- sized businesses?
- What are the challenges that small and medium- sized businesses face when taking up cloud computing?
- What factors impact the decision to borrow cloud computing among small and medium- sized businesses?
- How has cloud computing affected the competitiveness and profitability of small and medium- sized businesses?
- What are the stylish practices for applying cloud computing in small and medium- sized businesses?

D. Objectives of the Study

This research study aims to achieve the following objectives:

- To review existing literature on cloud computing and its impact on small and medium- sized businesses.
- To identify the benefits and challenges of cloud computing adoption for small and medium- sized businesses.
- To analyze the factors that impact the decision to adopt cloud computing among small and medium- sized businesses.
- To estimate the impact of cloud computing on the competitiveness and profitability of small and medium-sized businesses.
- To give recommendations and stylish practices for successful cloud computing implementation in small and medium- sized businesses.

II. LITERATURE REVIEW

A. Overview of Cloud Computing: Cloud computing has transformed the IT industry by providing access to shared computing resources over the internet. The National Institute of Standards and Technology (NIST) defines cloud computing as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction" [1]. Cloud computing offers several benefits, including increased efficiency, scalability, and reduced IT costs.

B. Benefits of Cloud Computing for Small and Medium-sized Businesses: Cloud computing adoption can provide several advantages for small and medium-sized businesses (SMBs). Firstly, cloud computing enables SMBs to access enterprise-grade technology that would be unaffordable otherwise, including high-end software, hardware, and security services [1]. Secondly, cloud computing allows SMBs to scale their IT infrastructure quickly and efficiently, providing them with the flexibility to respond to changing business needs. Additionally, cloud computing eliminates the need for costly on-premise infrastructure, reducing IT costs significantly [2].

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C. Barriers to Adopting Cloud Computing: Although cloud computing offers significant benefits, several barriers prevent SMBs from adopting this technology. The lack of technical knowledge and expertise required to deploy and manage cloud computing services is one primary barrier. SMBs may not have the resources to hire IT professionals with the necessary skills to implement cloud computing. Security concerns are another barrier as SMBs may hesitate to store their sensitive data on third-party servers. Moreover, there may be concerns around the reliability and availability of cloud computing services, as SMBs may fear downtime or data loss [3].

D. Case Studies of Small and Medium-sized Businesses that have Implemented Cloud Computing: Case studies demonstrate the benefits of cloud computing for SMBs. A study conducted by Microsoft found that SMBs that migrated to cloud-based services experienced a 20% reduction in IT costs and an increase in revenue by 25% [4]. Another study by the International Data Corporation (IDC) found that SMBs that adopted cloud computing services saw a 40% increase in employee productivity and a 20% increase in IT staff productivity [5]. These case studies demonstrate the significant impact of cloud computing on SMBs and highlight the potential benefits of its adoption.

III. METHODOLOGY

A. Research Design and Approach: The research design for this study is a qualitative type case study. The case study design is appropriate for exploring the benefits and challenges of cloud computing adoption in small and medium-sized businesses. The approach involves the analysis of data collected from a selected sample of businesses that have adopted cloud computing.

B. Data Collection Methods: The data for this study will be collected using semi-structured interviews with key informants from selected small and medium-sized businesses that have adopted cloud computing. The key informants will include business owners, IT managers, and other relevant stakeholders. The interviews will be conducted either in person or via video conferencing and will be recorded and transcribed for analysis.

C. Data Analysis Techniques: The data collected from the semi-structured interviews will be analyzed using thematic analysis. Thematic analysis is a qualitative analysis technique that involves the identification of patterns and themes in the data. The analysis will involve the identification of key benefits and challenges of cloud computing adoption in small and medium-sized businesses.

D. Limitations of the Study: There are several limitations to this study. Firstly, the study will be limited to a small sample of businesses, and the results may not be generalizable to the wider population. Secondly, the study is limited to the perspectives of the key informants and may not capture the views of other stakeholders. Finally, the study is limited to a specific geographical area, and the findings may not be applicable in other contexts.

IV. FINDINGS AND DISCUSSION

A. Analysis of the Data Collected: The results of the semi-structured interviews with key informants from small and medium-sized businesses indicate that cloud computing adoption can bring significant benefits to these businesses. These advantages include cost savings, improved flexibility and scalability, and enhanced data security. However, the analysis also revealed some obstacles to cloud computing adoption, including concerns about data security and privacy, lack of technical expertise, and limited resources.

B. Discussion of the Findings in Relation to Research Questions: The study's findings provide insight into the research questions. The research has shown that small and medium-sized businesses can gain substantial benefits from cloud computing adoption, including cost savings, flexibility, scalability, and improved data security. However, these benefits can only be fully realized if the barriers to cloud computing adoption are addressed.

C. Comparison with Existing Literature: The results of this study are consistent with previous research on the advantages and challenges of cloud computing adoption. The study contributes to the existing literature by providing a

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more in-depth understanding of the specific benefits and obstacles to cloud computing adoption for small and medium-sized businesses.

V. CONCLUSION AND RECOMMENDATIONS

A. Summary of Key Findings: The study found that small and medium-sized businesses can benefit from cloud computing adoption in terms of cost savings, flexibility, scalability, and improved data security. However, there are significant barriers to cloud computing adoption, including concerns about data security and privacy, lack of technical expertise, and limited resources.

B. Implications of the Study: The study's results have significant implications for small and medium-sized businesses. It highlights the importance of thoroughly evaluating the benefits and challenges of cloud computing adoption before making a decision. Furthermore, it emphasizes the necessity of addressing the barriers to cloud computing adoption to maximize the benefits of cloud computing.

C. Recommendations for Small and Medium-Sized Businesses: Based on the study's findings, we recommend that small and medium-sized businesses should:

- Conduct a thorough cost-benefit analysis before adopting cloud computing.
- Address concerns about data security and privacy before adopting cloud computing.
- Invest in technical expertise and training to overcome technical barriers to cloud computing adoption.
- Consider partnering with a reliable cloud service provider to overcome resource limitations.

D. Suggestions for Future Research: Further research is needed to explore the impact of cloud computing adoption on small and medium-sized businesses in different geographic areas and across various industries. Additionally, future research can investigate the long-term impact of cloud computing adoption on business performance.

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Review on Genus *Acacia*: Special Reference to *Vachelli aeburnea* – an Unexplored Traditional Medicinal Plant of Indian Subcontinent

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Abstract: *The medicinal plants are widely used by the traditional medical practitioners for curing various diseases in their day to day practice. Vachelliaeburnea (Mimosaceae) is one of traditional medicinal plant in India which is used for treatment of various diseases. Different parts of plants (i.e., leaves, bark, stem, and fruits even whole plant) have shown to have various pharmacological activities like antimicrobial activity, antioxidant activity, hepatoprotective activity, antimalarial activity, anti-diabetic activity, anti asthmatic and antibacterial Activity. Phytochemicals reported in the plants have been listed based on their pharmacological activity. Although Phytopharmacological reports are very less, still it is considered as a valuable source of treatment against various diseases*

Keywords: Vachellia eburnean, Antimalarial activity, Anti-diabetic activity, Asthmatic

I. INTRODUCTION

Acacia eburnea (L.f.) Willd., Sp. Pl. 4: 1081. 1806; Baker in Hook. f., Fl. Brit. .Small trees; young branches purplish-brown. Stipular spines straight, varying 3-6.5 cm long, gradually tapering from a broad base to a very sharp point, ivory white, polished. Leaves c. 2.5 cm long; pinnate up to 7 pairs, 1.5 cm long; sessile or nearly so; leaflets 5-8 pairs, upto0.4 cm long, linear, subobtuse, pubescent on both sides. Flowers bright yellow with a disagreeable odor, in globose heads 9 mm in diameter; peduncles axillary, pubescent; bracts about the middle of the peduncle. Calyx 1.5 mm long, campanulate; teeth short, deltoid.Corolla 3 mm long, lobes ovate-oblong, acute. Ovary stalked, glabrous. Pods stalked 6-10 x 0.5-1 cm, flat, slightly curved, and indented on both sutures, longitudinally veined, glabrous. Seeds 6-10. Phenology: Flowering: November-February & Fruiting: March-May. Distribution: World: Afghanistan, Arabia, Pakistan, Sri Lanka and INDIA: Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Uttar Pradesh and Maharashtra: Osmanabad, Solapur and Yavatmal. Ecological Note: Frequent in open scrub jungles, and bunds of field in Solapur region in state. Note: *Acacia eburnea* (L. f.) Willd., is very similar to *Acacia* campbelliiArn., but distinct by white thorns. Specimen Examined: Dharwad, 1889, W. A. Talbot 3969 (BSI, Pune); Ganesh Khind (Pune).

The bark of A. eburnea has been reported to possess antimicrobial, anti-inflammatory, and analgesic properties (Srivastava et al., 2011). It has been traditionally used for the treatment of fever, diarrhea, dysentery, and skin diseases. The bark extract has also been reported to have wound healing properties (Jain et al., 2016. Khan & Hafiz 2023).

The leaves of A. eburnea have been reported to have antioxidant, antidiabetic, and hepatoprotective properties (Kumar et al., 2011). They have been traditionally used for the treatment of diabetes, liver disorders, and as a general tonic. The leaves have also been reported to have antitumor properties (Jain et al., 2016).

The pods of A. eburnea have been reported to have hypoglycemic and antidiabetic properties (Yadav et al., 2011). They have been traditionally used for the treatment of diabetes and liver disorders. The pods have also been reported to have antimicrobial and antioxidant properties (Jain et al., 2016, J, Jeba et al., 2022).

II. MATERIALS AND METHODS:

Study site Maharashtra State is fundamentally a part of Miraj Tahasil, which covers a large area of Acacia eburnea species. Among these types dry tropical forests includes the „Babul (Acacias) forests" which mainly came across 7 district of the Deccan (Desh) division in the state and most likely to be the „residence of Acacias" in Maharashtra.More

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importance was mainly given to dry tropical forests type of vegetation in the state. During the field visits, observations were made on distribution, phenology,Enzymatic activity, present status, reproductive behavior and habitat of the *Acacia* species (*Shrivastava et al., 2016*).

III. RESULT AND DISCCUSSIOS

The genus *Acacia* is known for its diverse range of medicinal properties, including anti-inflammatory, anti-diabetic, anti-cancer, and antioxidant effects (Patil and Khan 2017a and 2017b Singh et al., 2021). Vachelliaeburnea (Roxb.) P.J.H. Hurter & Mabb is a member of the Acacia genus that has not been extensively studied for its medicinal properties (Garg & Kumar, 2017). However, studies have shown that Vachelliaeburnea has potential therapeutic properties, such as anti-inflammatory, analgesic, and antimicrobial activities (Singh et al., 2021). In traditional medicine, Vachelliaeburnea is used for the treatment of various ailments, such as respiratory disorders, fever, wounds, and skin diseases (Shrivastava et al., 2016).

Enzymatic and hormonal studies

Enzymatic and hormonal studies are an important aspect of plant biology and traditional medicine research. These studies help to identify the active compounds present in plants and their mechanisms of action (Shrivastava et al., 2016). Vachelliaeburnea is a species of plant that has been used in traditional medicine for the treatment of various diseases. However, there is limited information on its enzymatic and hormonal properties (Taiz et al., 2010, *Singh et al., 2021*).

To conduct a study on enzymatic and hormonal properties of Vachelliaeburnea, one would typically start by collecting samples of the plant from the wild or growing them under controlled conditions (*Garg et al., 2017*). The samples are then subjected to various biochemical and molecular biology techniques to identify and quantify the enzymes and hormones present in the plant. Enzymatic assays can be used to measure the activity of specific enzymes, while hormonal assays can be used to measure the levels of various hormones (Kuo, Y. H. and Lin, Y. S. 2017).

The results of such a study can provide valuable information on the potential therapeutic benefits of Vachelliaeburnea and its active compounds (*Saini et al., 2019,* Tanveer et al., 2020). However, it is important to note that enzymatic and hormonal studies alone are not sufficient to establish the efficacy or safety of a traditional medicine. Clinical trials and other studies are necessary to validate the medicinal properties of a plant and its extracts (*Jain* et al., 2014, Mithila, J. and Hall, J. C. 2017).

According to K.R.Gandhe(2007)*Acacia eburnea* producing hypertrophy of infected parts, mainly thorns, inflorescence, flower and fruits. The hypertrophied part is edible and consumed with relish and also studied enzymatic during disease developing fungi.

Molecular characterization:

Dhakad Kumar (2018) suggested that *A. pseudoeburnea* is genetically similar to Acacia nilotica based on DNA sequence of rbcL gene,

Cytological and Antimicrobial activity:

Dr.S B Divya (2023) revealed that*Acacia nilotica*& Thymus vulgaris based mouthwash is more antimicrobial and less cytotoxic than chlorhexidine mouthwash.

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Vachelli aeburnea

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A Black Fungus Infection Reported after Covid -19

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Abstract: *The mucormycosis is a life threating fungal infection, can used after the Covid-19 Sarccov 2 crises precariously from 2019 novel coronavirus is a major source of disaster in the 21st century and has not yet ended in the country. Human inhale 1, 70,000 fungal spores per day and entering through lungs are sporangiospores about 3-11 µm. The people have low virulence capabilities with low immunity level. The highly predisposing factors for mucormycosis are diabetes mellitus, drugs like corticosteroids. Any immunodeficiency state, blood cancers, organ transplantation, history of multiple blood transfusion and industrial oxygen is used are seen in prevalence case of studies. The molecular assay, plasma therapy, adjunctive therapy, surgery and antifungal treatment are performed or treated in severe and chronic situations of patient. The black fungus, white fungus, yellow fungus, etc. are commonly cause by different fungal species as we discussed in paper. Despite the efforts for better understanding of the pathogenesis, early antifungal treatments of mucormycosis, the mortality rate of the disease remain high*

Keywords: Covid-19, mucurmycosis, antifungal treatment, cytokine storm

I. INTRODUCTION

The majority of human illness caused by the mucorales. The mucoraceae family's *Rhizhopusarrhizus* species are the most leading cause of mucormycosis in human being. It is spread rapidly when people inhaled or in contact with fungal spores for example the infection may manifest itself in the lungs to the brain, sinuse, heart ,kidney or skin ,etc. When developed, however the fungus can quickly replicate in blood vessel walls effectively reducing to cutting off blood flow to tissues and producing its own decaying organic food supply, resulting in widespread tissue damaged. An epidemic of black fungus is screening India in the wake of a severe surge in Covid-19 cases. Expert said that , the cause is a combination of factors might include contaminated oxygen equipment and use of steroid drugs to treat certain Covid-19 patients. White fungus in Patna, yellow in Uttar Pradesh Ghaziabad, Black fungus due to its acute effect on lungs and other body parts after Covid-19. Both mucormycosis and Aspergillus aren't harmful to most people even as they come in everyday contact with the fungus, say CDC but it may attack people with weakened immune system and cause severe infection. It is also affecting those coronavirus patients who are on oxygen support.

Report Rating from 1992 to 2021

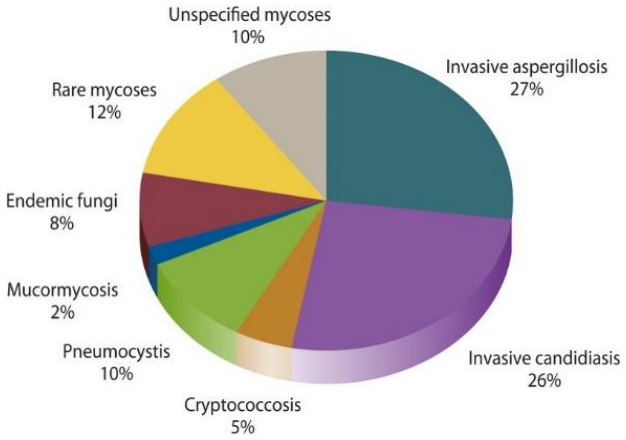


Figure 1: Reported global cases of fungal infections

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Mucormycosis is rare but the exact number of cases is difficult to determine. San Francisco Bay area during 1992-1993 yearly rate 1.7 cases per 1 million population. Prospective surveillance 16,808 transplant recipient during 2001- 2006 in mucormycosis. Stem cell recipient 8% a counted from 983 patients. Solid organ transplant 2% of all 1,208 patients. Mortality rate of 54% overall cause rate. Sinus infection 46% rate, 76% pulmonary infection, 96% for disseminated mucormycosis.Diabetic and Covid-19 are high rate. Overall 101 cases of mucormycosis in people with Covid-19 82 cases from India and 19 from rest of the world.

In males (78.9%) active people 59.4% and recovered 40.6% from Covid-19. Dm was present in 80% of cases while dKA was present in 14.9%corticosteroid intake for the treatment of Covid-19 was recorded 76.3% of cases. Mucormycosis nose and sinuses, 88.9% Rhino- orbital, 56.7%.Mortality was noted 30.7 % of the cases (1), (2).

Prevalence- Cases study (correlation between Covid-19 and mucormycosis and fungal infection)

Few cases include in this article but there are Covid-19 patients, especially severely ill or immune-compromised have a higher probability of suffering from invasive mycoses (3). A 60 year old male suffering from diabetics and positive in RT-PCR checkups.

A nasal biopsy revealed broad aseptae filamentous fungal hyphae confirmed in Rhino-orbital areas the overdose of steroids / monoclonal antibodies /broad spectrum of antibiotics may lead to provide preexisting environment to fungal disease (4). Patients with Covid-19 are high risk of acute cardiac injury, arrhythmias, throm-baemboilic complicating (pulmonary embolism and acute stroke), and secondary infection to name a few 33 year old women suffering from mental status and apoptosis. She was ultimately diagnosed with mucormycosis and orbital compartment syndrome in addition to Covid-19 in morbidity conditions (5). Covid positive 86 year old male patients was admitted with acute diarrhea cough, dyspnea and fever from 5 days the rare and fatal gastrointestinal mucormycosis found patient (6).Ophthalmic manifestation of coronavirus disease 19 (Covid-19) between Jan 1 to Jan 31 2021, 46 cases reports, 8case series, 11 cross sectional observational studies analysis were included covid19 and ophthalmic manifestation of Covid-19 (7).

Akshay Nair an eye surgeon said that, worst hit cities including Mumbai 40 patients suffering from fungal infection in April, who has recovered from Covid-19. Mumbai, Bangalore, Hyderabad, Delhi and Pune reported 58 cases of infection after recovery of 12 to 15 days from Covid-19, eleven had to lose an eye, six of them died. Southern city of Bangalore 19 cases of mucormycosis, 10 cases in Mumbai. Some Physicians remove the fungal infections by surgery after Covid-19 recovery patients and some treated the patients by antifungal treatments which 3500 Rs. per dose. He treated 800 diabetic Covid-19 patients (8).

Mucormycosis is mainly an opportunistic fungal infection with grave outcome if not diagnosed on treated in time. Covid-19 is a multiorgan disease involving most all the vital systems of the body raised level of D dimer, prothromb in time, apTT troponin, 7 levels to prolonged immobilization dehydration, cytokine storm or other cardiovascular risk factors (1).



Figure 2: Mucor mycosis- Deadly black Fungus

7 cases of diabetic patients with rhino-cerebral mucormycosis. 3 male and 4 female with ages ranging from 18-64 years. 4 patients with underwent surgery, two died in the post-surgical period after Amphoterian B as part of treatment & including those who did not undergo surgery (9).

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Fungi that most commonly caused mucormycosis

Rhizhopus species, mucor species, Aspergillus flavus, rhizomucor species, Syncephalastrum species *Cunninghamellabertholletiae*, Apophysomyces species and lichtheimia (formerly *Absidia Species*, *Candida Albicans*, *Aspergillus fumigatus*(10).

Types/classification of infection

Gastrointestinal mucormycosis is more common among young children than adults, especially premature and low birth weight infants less than 1 month of age, who have had antibiotics surgery or medication that lower's the body ability to fight germs and sickness. Disseminated mucormycosis occurs when the infection spread through the blood stream to affect the part of the body. Rhino cerebral (sinus & brain) is an infection in the sinuses that can spread through the brain patient in uncontrolled diabetes and who transplant kidney. Pulmonary (lung mucormycosis caused in cancer and those people who transplant organ or stem cell. Cutaneous (skin) mucormycosis caused when the fungi enter through a break in the skin burn skin trauma, etc. (10), (11)

Aspergillus fumigatus **(Yellow fungus)**

It is most commonly isolated over the 185 species of Aspergillus. Aspergillus spores are ubiquitous in the environment and concentrated in hospitals, ventilation systems. The fungus found in Soil and decaying organic matter. The Aspergillus fungus affects the opportunistic, allergic state toxicoses, lungs and immunosuppressant patients it can also be fatal. *Aspergillus fumigatus* a tri morphic filamentous fungus with vegetative myceliumin nature and in patients, asexual canidia produced after mycelial starvation and the resting as co spores produce from two heterothallic strains and opposite sex(12).The Benign symptoms lethargy, lack of appetite and loss of weight and in severe cases the pus, wounds taking a long time to heal malnutrition, organs not functioning or sunken eyes (13).

Candida albicans **(White fungus) :**

The morphology is in between yeast and hyphal form. The species are present in the oral cavity of up to 75% throughout the population. Some immunocompromised people are Suffering from recalcitrant infections of oral cavity fat also called oral Candidiasis. Approximately 75% of all women's are suffering from valvo-vaginal candiasis at least once in their lifetime (14) (15).

Black and white fungus:

Main reasons for this are poor hygiene, contaminated resource, steroids, antibacterial medicine, excess moisture, immunosuppressive medication, yellow fungus mostly caused from bad food and dirty places. (16)

Sign and symptoms(17),(18),(19)

Symptoms of rhino cerebral (sinus and brain) mucormycosis: - One sided facial swelling, headache, nasal or sinus congestion, black lesions on nasal bridge or upper inside of mouth that quickly become more severe, fever.
Symptoms of Pulmonary (lung mucormycosis): - Fever, cough, chest pain, shortness of breath.
Cutaneous (skin mucormycosis): - Blisters or ulcers, infected area turn black, pain warmth, excessive redness, swelling around a wound.
A Symptoms of gastrointestinal mucormycosis: - Abdominal pain, nausea and vomiting, gastrointestinal bleeding.
Disseminated mucormycosis: -Mental status changes, coma.

Molecular assay

To determine or analyzed mucorates the molecular based assays include conventional PCR, RELP, DNA Sequencing of defined gene regions and melt curve analysis of PCR products Recent attempts the molecular based diagnosis which is from blood and serum. The molecular assay targets the internal transcribed spacer or when one the 18 S rRNA genes using either formalin-fixed, paraffin embedded of fresh tissue sample (20).

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Antifungal treatment

Antifungal infection which is diagnosed by via cotton swab Sample of nasal cavity, which is examed under microscope lab test CBC, KFT &CT Scan and then MRI to confirm infection (21).

L. Liposomal amphotericin B (L-AmB) (preferred treatment) 5mg/kg/day, dilute in 200 cc 5% dextrose over 2-3 hours infusion (avoid slow escalation; higher dose 10mg/kg/day may be given in brain involvement).Amphotericin B deoxycholate (D-AmB): only if cost and availability of L-AmB is an issue; 1 mg/kg/day in 5% dextrose, slow infusion for 6-8 hours. Pre-mediation may be required to avoid infusion reaction. Monitor renal function and potassium level while treating with amphotericin B. Patients who are intolerant to amphotericin B, alternative agents are posaconazole or isavuconazole (injection/ tablets).Tabposaconazole: 300 mg twice a day on first day, followed by 300mg once a day. Check posaconazole trough level after 7 days of therapy and avoid interacting drugs. Tab isavuconazole: 200mg three time a day for two days, followed by 200 mg once a day (11).

Cutaneous mucormycosis is an emerging fungal infection caused by opportunistic fungi phylum of Glomeramycota to occur in poorly controlled diabetic patient and immune-supprent. The treatment of choice is amphotericin B, but new azoles, such as Posaconazole andisavuconazole (21). Patients were Covid-19 and suffering from shine orbital mucormycosis treated by liposomal Amphoterin B with addition of posaconzole and surgical debridement of necrotic tissue (7). Ongoing corona virus disease 2018 patient including heart transplant for severe heart failure treated with plasma therapy and supportive care antifungal therapy (8). Patient with Covid-19 and pan sinusitis the amphotericin and antibiotics, repeat CT brain showed improvement in mucosal thickening and sinutis(22).

The investigational drug VT 1161 and inhibitor with selective activity against the fungal cyp51 has in vitro activity against mucorales including R-oryzaeleichtherming and cunninghansella. Surgery when needed and possible must be very aggressive not only necrotic tissues but also surrounding infected healthy looking tissues should be removed the extension of the infection by the mucoraleshypae is enormous. Another salvage treatment, adjunctive are performed in severe and chronic cases. Amphotericin B based therapy with hematological malignancies for > 5 days in an approx. two fold 7 in 12 week mortality (82.9%. compared to 48.6%. for those who started treatment immediately (20). Adjunctive therapy beneficial because of oxygen pressure of the ability of neutrophils to kill the fungus. Another e.g. which if it affect the eye removing the eye is the solution to prevent further Spread to brain (11).

Major Role of cytokine Storm

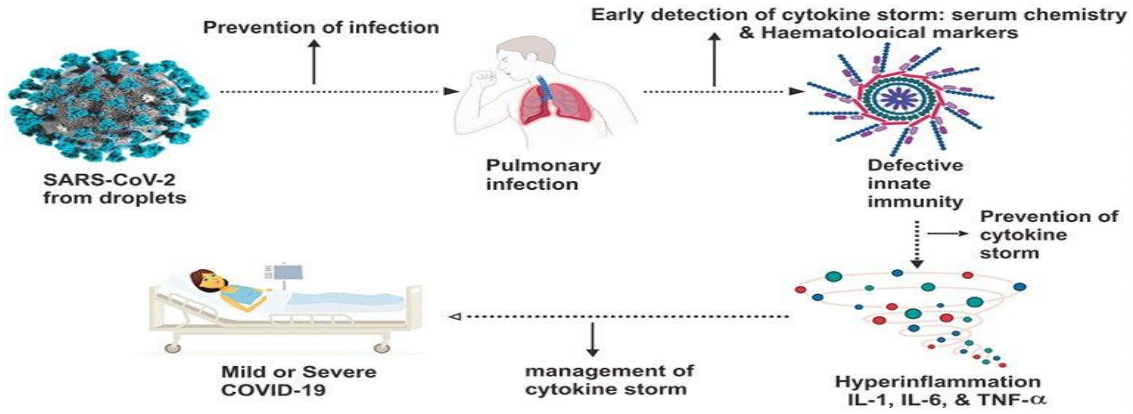


Figure 3: Prevention, Immunopathogenesis and Management of Covid-19

A growing body of clinical data suggest that a cytokine storm is associated with Covid-19 Severity and is also a crucial cause of death from Covid-19 the identification and treatment of the cytokine storm are important component for rescuing patients with severe Covid-19 and fungal infections (23). High blood levels of cytokines and chemokine's have been detected in patients with Covid-19 infection. The ensuing cytokine storm triggers a violent inflammatory immune response that contributes to ARDS multiple organ failure and finally death in severe cases of sars Cov2 infection. The direct cause of death from acute Covid-19 Involves cytokine storm damage to lungs and multiple organ of the body: heart kidney and liver, leading to multiply organ exhaustion (24),And invasion of fungal infection depends on directly immune status of the host and the virulence of the fungal strain (25). Type 1 interferon is a common therapy

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for autoimmune and inflammatory disorder. The effectiveness of type 1 IFN in the treatment of inflammatory disease of fungal disease or infections (26).

II. CONCLUSION

We conclude that, as per discussion the cytokine storm is directly proportional or correlate with covid-19 and fungal infection respectively.

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Green Synthesis of the Some 2-amino Benzothiazole Derivatives and their Antinflametry Activity

Gurumeet C Wadhawa[1], Maryappa Sonawale[1], Pranali Satpute[2], Jamku Chadana[2], Smita Tandale[1],
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Abstract: *Novel 2-amino benzothiazole compounds were created and their potential for reducing inflammation was tested. In an intermediate step of substituted Compounds are oxidized by the by aqueous bromine in an acidic medium, the aforementioned compounds were created from the aromatic amines which are substituted . Analyses of various synthetic compounds' C, H, and N elements were used to determine their purity, and IR, 1HNMR, and mass spectrum data were used to determine their structural details. Synthesized compounds are tested for their ability to reduce inflammation. Synthetic Substances demonstrates the improvement in activity over the norm*

Keywords: aqueous bromine in an acidic medium, Benzthiazoles, Green Method

I. INTRODUCTION

Due to their biological activity, benzothiazoles, a bicyclic ring structure with numerous applications, have drawn a lot of attention. [1-3] A review of the literature showed that benzothiazole has a number of CNS effects in addition to its anti-tumor, anti-tumor, analgesic, and anti-inflammatory properties. It also has anti-candidal, anti-fungal, anti-malarial, and anti-HIV-1 protease activity. Long-term use of nonselective NSAIDs may result in stomach problems ranging from GI bleeding and ulceration to life-threatening stomach irritation [11-16]. Even with selective agents, unexpectedly harmful cardiovascular effects have been found [17–18]. Hence, there is still a critical need for efficient NSAIDs with enhanced safety profiles. In the current investigation, substituted aromatic amines were converted into 2-aminobenzothiazole derivatives using the ammioniumthiocyantes.

II. EXPERIMENTAL

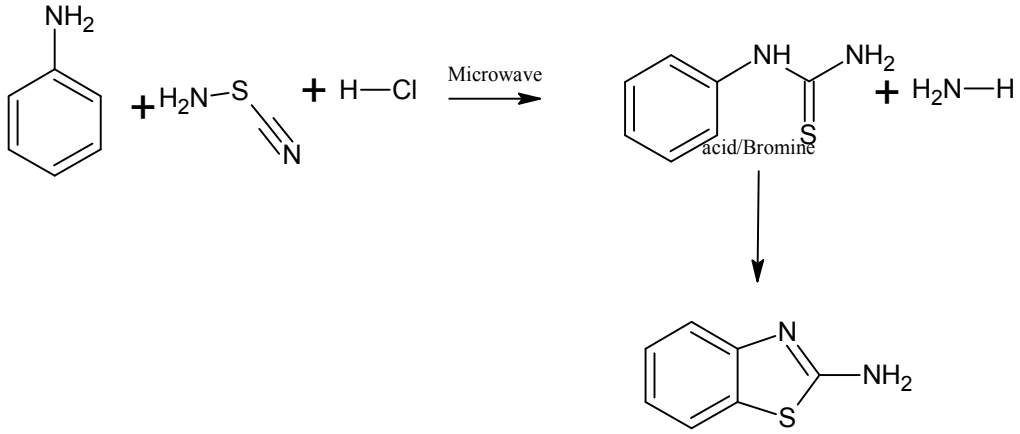
transparent capillary tubes, the compounds' melting points were ascertained. Infrared spectra were captured using the KBr pellet-free technique. Tetramethyl silane was used as an internal standard to help identify the NMR Spectra was recorded in the 300 MHZ Instrument . At 25.2 MHZ, the FT 13C NMR in CDCl3 was observed. 200-600 nm used for the U.V/Visible spectra

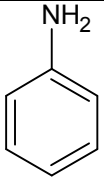
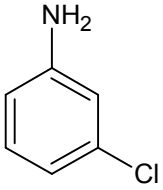
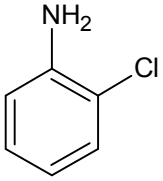
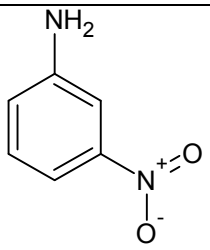
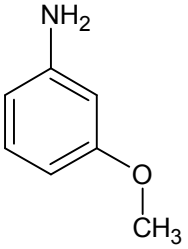
Synthesis: Generalmethodofsynthesis

In ethanol containing 2ml of concentrated hydrochloric acid, Equimolar amounts of substituted aniline ten milimole,and other reagents ammonium thiocyanate 10 milimolewere taken in the round flask . This was mixed with (20 mmol) of bromine in solvent, like glacial acetic acid, and the reaction was microwaved for certain period of the time given in the table 1. It was then chilled in a solution of ice and water. The resulting precipitate was thoroughly filtered, adds the cold water, and dried. Recrystallizeof crude product from ethanol in fig.1 .

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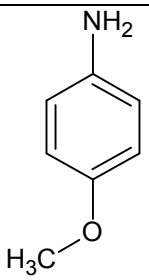
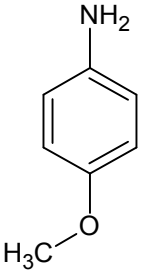
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Sr.No	Substitution	M.P.	Nature of Compound	Yield in %
1		163^0C	Solid,	95
2		186^0C,	Solid	94
3		192^0C	Solid	94
4		123	Solid	87
5		186	Solid	86

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6		193	Solid	90
7		203	Solid	88

1) Compound UV in ethanol: 260 nm, (IR): 3349 (NH), 3088 aromaticstretching, 1620 Nitrile, 1483 CN, 1290 C-S, 978, and 788 1H-NMR ppm 3.65 (s, 2H, NH2), 7.14 (dd, aryl H), and 7.47 (dd, aryl H,).
2) (IR): NH(3375), 3064(Aromatic=C-H) 1587(C=N),1465(C-N), 1275(C-S), 966,735 , 780(C-Cl),\s 1H-NMR (δ-ppm): 3.75(s,2H,NH2), 6.54 (s,1Hydrogen ,Aryl ring ortho-H to chlorine , J= 4.7Hz), 7.25 (t,1H,ortho,), 7.36\s
3) Compound (IR): NH(3330), 3036(Ar=CH), 1602(C=N),1470(C-N), 1262(C-S),920,730(Ar-H), 785(C-Cl),\s 1H-NMR (δ-ppm): 3.72(s, 2H, NH2), 6.78 (dd, 1H, Ar-ortho-H toCl J= 4.9Hz), 7.29(t), 7. (m)
4) Compound UV in ethanol: 247 nm (IR): NH(3335), 3031 Aromatic =C-H , 614 C=N), 1476 (C-N), 1356 (C-NO2), 1265 (C-S), 924,735 Aromatic -H), 1H-NMR ppm 3.70s,2H,NH2 , 7.49 dd,1H,Aromatic -ortho- (dd,1H).
5) Compound: (IR) : NH(3320), 3034(Ar=C-H) 2951(C-CH3), 1625 (C=N), 1470(C-N), 1260 (C-S), 1291 (C-O), 920,7 34(Aromatic H bending vibration),s1H
NMR (ppm): 1.81 (s, 3H, of OCH36.78 (dd, 2H), 7.19 (t, 1H), 7.06 (s), and 7.34 (s, 2H, NH2) (dd,1H).
6) Compound: (IR) : NH-3415 , 3073 (Aromatic =C-H , 2985 C-CH3 , 1631 (nitrile), 1489 (C-N single bond), 1275 (C-S single bond), 1269 (C-O , 929, 732 (Aromatic bending vibrations , 1H-NMR 1.76 singlet,3H, of O CH3), 3.42 dd, 1H .
7) Compound: (IR): NH (3335), 3064 (Ar=C-H), 1585 Nitrile, 1478 (C-N single bond), 1275 (C-S single bond), 933,765 Ar-H bending vibration), C-Br,3.75(s, 2H, NH_2), 6.91(dd,1H,Ar-ortho-H to Br J= 3.8Hz), and 7.95 (t, 1H)

In-vitro models for the Synthesized Compounds and Anti-inflammatory Compounds

Compounds were curtained for the anti-inflammatory by using shynessof in vitro prototypical of the albumin denaturation procedure which was premeditatedaffording to Muzushima and Kabayashi with minoradjustmentat the doses of two hundred mg/kg as per [19-21].

Table -2: -Synthetic Compounds and their Anti-inflammatory activity

Activity	Dose in the (mg / kg)	value (Mean + SE) Absorbance	denaturation (%) Inhibition
Control for the Comparison	Five milligram /Kg	0.098	----
Standard for the study	100 milligram/kg	0.184	90
Compound 1	200mg/kg	0.154	55
Compound 2	200mg/kg	0.143	60
Compound 3	200mg/kg	0.134	70
Compound 4	200mg/kg	0.168	82.89
Compound 5	200mg/kg	0.175	86.00

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Compound 6	200mg/kg	0.14	31.77
Compound 7	200mg/kg	0.13	42.08

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A Brief Review on the Synthesis of the Heterocyclic Derivatives

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Abstract: *In our daily lives, heterocyclic compounds are a big concern. The family of organic compounds that is the largest and most diverse is made up of these chemicals. One or more heteroatoms can be found in heterocyclic compounds. As a result of substantial synthetic research and their application in synthetics, the number is rapidly growing every day. They might display cyclic or noncyclic characteristics. The main uses of these materials are as pharmaceuticals, agrochemicals, and veterinary supplies. Moreover, they are used as solvents, developers, corrosion inhibitors, antioxidants, copolymers, dyes, and cancer-fighting medications. They serve as a catalyst in the synthesis of other organic substances. This study includes the majority of newly synthesised or isolated from plants physiologically active heterocyclic compounds, such as antibiotics like penicillin and cephalosporin and alkaloids with heterocyclic moiety like vinblastine, morphine, and reserpine*

Keywords: Biological Activity, Medicinal Chemistry, Heterocyclic Compounds

I. INTRODUCTION

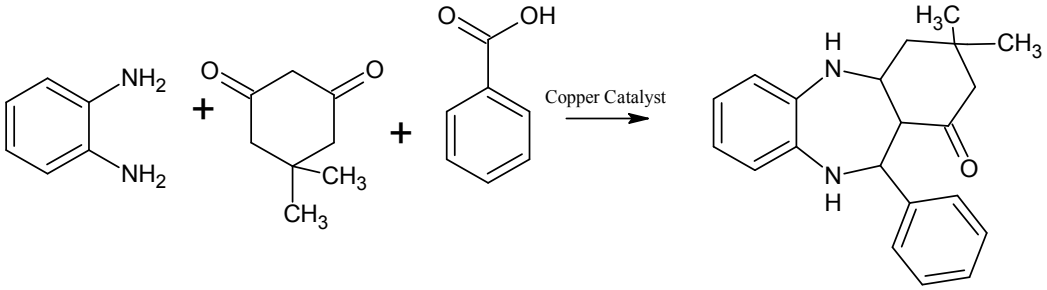
The most prevalent heteroatoms are nitrogen, oxygen, and sulphur, while heterocyclic rings with additional hetero atoms are also well-known. Heterocyclic compounds are cyclic organic molecules that contain at least one heteroatom. A carbocyclic compound is an organic cyclic compound in which all of the carbon atoms are arranged in rings [1–13]. The most typical heterocycles have five or six members and contain heteroatoms of sulphur, oxygen, or nitrogen (S). The most well-known simple heterocyclic compounds are pyridine, pyrrole, furan, and thiophene. A ring of six carbon atoms and one nitrogen atom make up a pyridine molecule. Each of the five-membered rings in the molecules of pyrrole, furan, and thiophene is composed of four carbon atoms and one each of nitrogen, oxygen, or sulphur [14-18]. The nitrogen heterocyclic compounds pyridine and pyrrole also have nitrogen atoms in their rings in addition to carbon atoms [19–22]. Many natural products, biologically active chemicals, functional materials, ligands, and catalysts contain heterocyclic compounds with nitrogen, oxygen, and sulphur atoms. These chemicals are also utilised in the synthesis of organic compounds as flexible building blocks [23]. Heterocyclic moieties are widely present in commercial medications and agrochemicals [24]. Establishing synthetic methods for producing heterocyclic molecules has received significant interest [25–27]. As part of our ongoing research, we are creating novel synthetic techniques that can produce a variety of heterocyclic molecules under regulated, ecologically friendly settings [28]. The use of eco-friendly solvents, biodegradable resources, and sustainable catalyst materials are just a few areas where the idea of "green chemistry" has had a considerable impact [29, 30]. Environmentally friendly methods have been devised to lower energy consumption, promote atom economy, and boost reaction yields for the synthesis of heterocyclic compounds [31, 32]. High-efficiency processes that operate at room temperature and make use of alternative energy sources are becoming more and more common. The use of multicomponent reactions (MCRs), which incorporate more than three reactants in a single pot, is a significant advancement in synthetic organic chemistry [33,34]. MCRs frequently save time, are environmentally benign, selective, and don't require the separation or purification of intermediates [35–37]. The usage of MCR techniques to manage stereo isomers has significantly increased in pharmaceutical chemistry and drug development [38]. The reactants, solvent, and catalyst must cooperate with one another throughout the course of the reaction for MCR to be successful [39]. As a result, MCRs have delighted in producing numerous organic building blocks using a variety of molecular entities as reactants to create various

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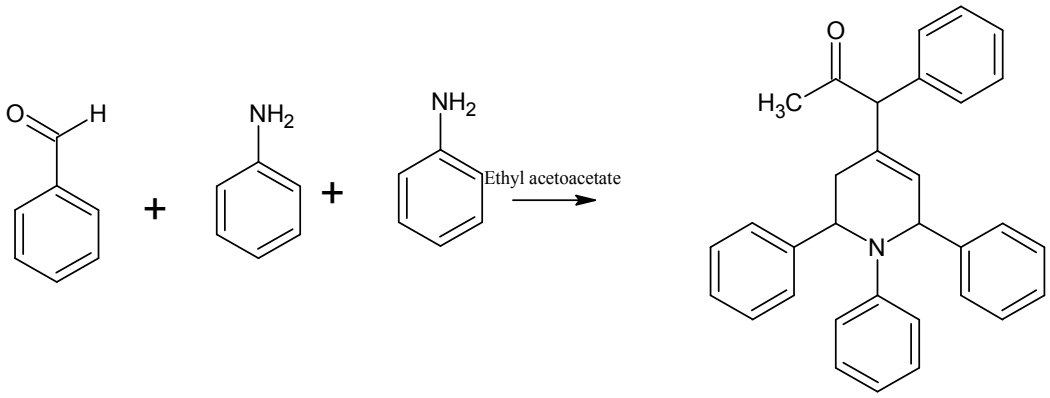
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intriguing heterocyclic frameworks [40]. The published procedures for making heterocyclic compounds are summarised in this review, yet the majority of studies From 2005 through 2020, this study examines multicomponent procedures that produce heterocyclic compounds under MW, conventional, and ultrasonic irradiations. The four-component reactions that involve the introduction of the most chemicals are the most challenging.

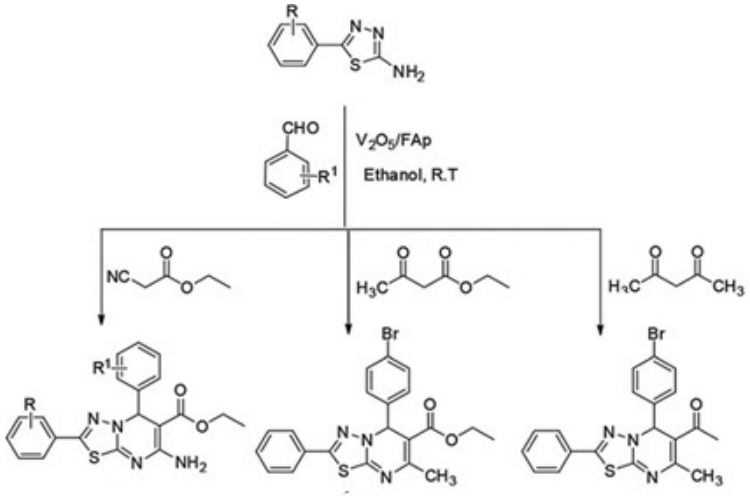


Scheme 1 :Three-component synthesis of benzodiazepines

Maleki et al. describe a three-component, one-pot catalytic process that is effective and environmentally benign and produces a variety of substituted 1,5-benzodiazepine derivatives (Scheme-1). The reaction utilised O-phenylenediamine, dimedone, and aldehyde derivatives, and a magnetic heterogeneous CuFe2O4 nanocatalyst was used. The reaction took place in a ball mill at room temperature. Short response times, ease of use, mild reaction conditions, non-toxicity, simple work-up, and facile [41] are all positive product attributes.



Scheme 2 :One-potmulti-componet synthesis of substituted piperidines



Scheme - 3: Synthesis of Heterocyclic Compounds

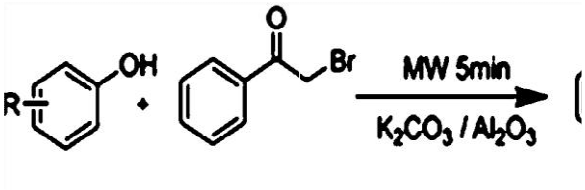
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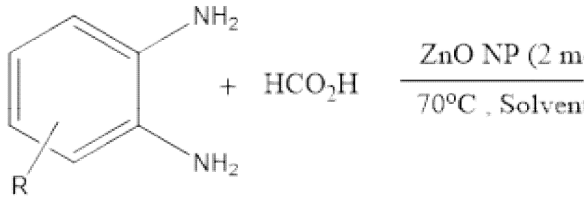
Highly functionalized piperidines can be produced fast and efficiently by condensation of aldehydes, amines, and -ketoesters in water at room temperature with the help of non-toxic, recyclable, and ecologically friendly sodium lauryl sulphate, according to Ravi et al (SLS). [42]

According to Ravi et al., condensation of aldehydes, amines, and -ketoesters in water at room temperature can quickly and efficiently produce highly functionalized piperidines (SLS).



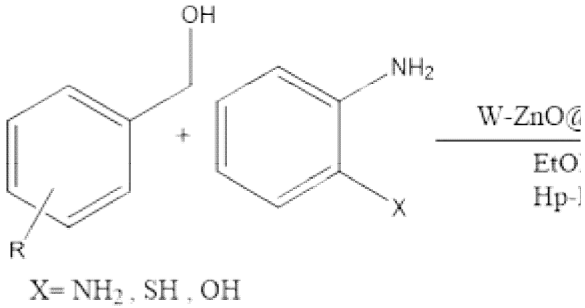
Scheme-4 :MW-assistedsolid-statesynthesisof3-phenylbenzofurans. [43]

By condensing substituted o-phenylenediamine with formic acid in the presence of a catalytic amount of mechanochemically synthesised zinc oxide nanoparticles (2 mol%) under the solvent-free condition at 70oC, Alinezhad Heshmatollah et al. produced substituted benzimidazole derivatives with excellent yield [24].

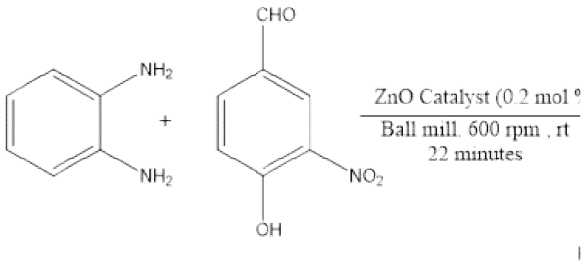


Scheme 5

Ruijuan Chen et al. used W-ZnO@NH2 nanoparticles as a catalyst to produce benzimidazolesand 2-substituted benzimidazoles from the reaction of o-phenylenediamine with benzylic alcohols in ethanol at ambient temperature [12].



Scheme 6

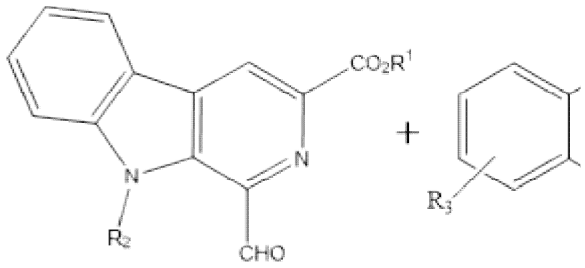


Scheme 7

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By treating o-phenylenediamine with 4-hydroxy-nitrobenzaldehyde in the presence of ZnO nanoparticles (0.2 mol%) at room temperature for 22 minutes, HemantSharma and colleagues successfully synthesised 1,2-disubstituted benzimidazoles [13]. They accomplished this by employing a ball milling method.

Vipin Kumar et al. created luminescent b-carboline C-1 tethered benzimidazole derivatives under the catalysis of ZnO (0.3 eq.) nanoparticles. The reaction between 1-formyl b-carboline and substituted o-phenylenediamine, which creates a Schiff base, is carried out at room temperature for 16–28 hours in the presence of dry chloroform. Thereafter, a successful intramolecular cyclization procedure was conducted to obtain b-carboline-linked benzimidazole [43].



Scheme 8

II. CONCLUSION

The study of nitrogen-based heterocyclic chemistry is a distinctive and significant area of organic chemistry that has recently attracted a lot of interest. There has been a lot of interest in creating new structures for this family of chemicals. N-Heterocyclic compounds' pharmacological properties have been documented. The investigation examines the degree of heterocycle union across a broad range while illuminating the function of modified blended oxides as impetus transporters and impetuses. Because of their appealing and adaptable surface features, blended oxides are used as reusable catalysts to address a fascinating class of materials for reasonable enhancement of the compound industry. The prominent corrosive base qualities of the dynamic environment, the tendency for redox reactions of metal cations, and other components all significantly enhance the speed and selectivity of the chosen responses. Inorganic processes, green chemistry, the petroleum industry, and fine chemical synthesis heavily utilise mixed oxides, which make up more than 30% of all industrially utilised heterogeneous catalysts. Many industries, such as medicine and agriculture, depend on the nitrogen-containing heterocycles in their efficient manufactured forms. Broadly speaking, it has been found that a number of metal oxides may cooperate with the C-C security arrangement in the substrate particles to successfully blend a variety of smart heterocyclic subordinates through multicomponent reactions. The one-pot green method makes use of a wide range of mixed oxide catalysts and offers a flexible framework for the synthesis of novel heterocyclic compounds with intriguing characteristics. Heterocyclic compounds have a lot of potential, and much more research is still needed to fully understand the existing reaction routes on catalyst surfaces.

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Zinc Oxide Nano Particles from Waste Cabbage Ultrasound-Assisted-One-Pot Synthesis of Simple Heterocyclic Compounds

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Abstract: *Amalgamation of diverse aromatic Beta acetamido ketones using various aromatic aldehydes, acetophenone, and acetyl chloride in acetonitrile underneath sonication, we use plant-assisted nanoparticles as a heterogeneous catalyst made from the waste of the cabbage. The sonication process has many benefits, including a high yield, gentle reaction conditions, reusable catalysts, quick reactions, non-toxic ingredients, and environmental friendliness*

Keywords: One pot-synthesis, β-Acetamidoketones, Plant assisted Nanoparticles, heterogeneous catalyst Cabbage

I. INTRODUCTION

One pot conversion is a term used to describe a sort of chemical reaction in which more than two ingredients are mixed together to produce a final result. Atom economy is 100% in these reactions. Different functional groups are produced by each of these reactions. It results in the creation of several heterocyclic compounds. These processes have a good atom economy, boost yield, and are environmentally beneficial. MCR are currently of concentration to chemists (MCR). As early as 1850, Strecker offered powerful and efficient tools for the synthesis of organic molecules. [1-4] MCR are very useful for building libraries of chemicals for medicinal research. Acetamido ketones are used in medicinal chemistry. MCR are very useful for building libraries of chemicals for medicinal research. Due to their wide biological and pharmacological features, acetamido ketones serve as the foundation of medicinal chemistry. Nikkomycins (nucleoside-peptide antibiotics), -amino ketones, -amino acids, and -amino alcohols are only a few of the compounds they can produce [5-7]. Neopolyoxines [8] The most popular reaction is Dakin-West reaction, uses azalactones to condense an amino acid with acetic anhydride in the existence of a base. [9-11] Sc(OTf)3 [13], Fe(ClO4)3.6H2O [12]. FeCl3.6H2O [15], Co(OAc)2 [16], ZrOCl2.8H2O [17], BiCl3 [19], SiO2/H2SO4 [20], p-TSA [21], H6P2W18O62 [14], SnCl2.2H2O [23], and ZnO are other examples. Longer reaction times and active reaction environments are facilitated by them. The yields are quite low when using an expensive catalyst. Acetamido ketones are a mild, highly catalytic, and ecologically friendly technique that we have used. As a result, we developed a novel method to produce -Acetamido ketones in acetonitrile using a reusable [38] nano catalyst generated from leftover cabbage. This procedure yields a lot and takes only 25 minutes to finish. The over-all synthesis scheme is shown in Diagram 1. Ultrasound aids organic synthesis. This entails the rapid, clean, effective, and cost-effective fusion of a great quantity of organic bits. With a much faster tempo of reaction, this technique increases yield and product quality. This approach makes sense for drug development, combinatorial chemistry, screening, and medicinal chemistry. Green chemistry is becoming more and more popular because of its capacity to drastically cut down on energy use, by products, and waste production. Because of its skill to link right with the reaction molecule and by passing current conductivity that produces a speedyup surge in temperature, ultrasound-irradiation has been used to enhance a lot of chemical synthesis. Ultrasound-irradiations are cast-off to carry out chemical conversions that are solvent-able, pollution-free, environmentally benign, cheap, and produce high yields with ease of processing and handling [2433]. It is discussed how to make -acetamido ketones using MCR aldehydes, enolizable ketones or 1,3-dicarbonyls, acetonitrile/benzonitrile, and acetyl chloride. Nickel substituted Zinc Nano Ferrite is a gentle, inexpensive, and very

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effectual catalyst. In keeping with the foregoing, we have created zinc oxide nanoparticles with plant assistance for application in diverse organic transformations. Throughout the previous decade, synthetic chemists focused a lot on developing carefully worthwhile methods for the synthesis of biologically active mixtures with industrial and medicinal applications [34–41]. [42-48] In view of these aspects, we have successfully explored and developed a catalyst for the synthesis of complexes from ultrasound-assisted reactions in solvent-free environments. Aldehydes, acetophenone, and acetonitrile were utilized to make a range of -Acetamido ketones in an acetyl chloride solution. A comparative investigation was conducted for these processes, and the best conditions were used. The key elements of this system are its ease of use and mild upbringing.

II. MATERIALS AND METHODS

Preparation of the Zinc oxide nanomaterial from waste Cabbage

The stoichiometric amounts of zinc acetate, sodium hydroxides, and sodium hydroxides S.D. fine, AR grade were dissolved in a small amount of deionized water. After adding the leftover cabbage solution, the PH was then brought down to 7 by adding ammonia. The powder showed up. When that powder had been calcinted to 800oC, we used particle size analysis, FT-IR XRD, SEM, and TEM to characterize it [49–51].

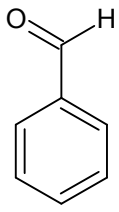
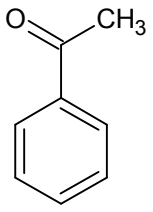
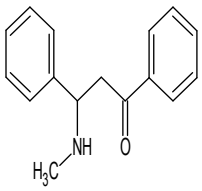
Experimental procedure for β-Acetamido esters

When exposed to ultrasonic radiation, the bulk of these reactions happen. In this experiment, 0.5g of the catalyst was combined in stoichiometric amounts with various aldehydes (10 mmol), acetophenone (10 mmol), acetonitrile (10 mmol), and acetyl chloride (10 mmol), and assortment was then exposed to ultrasonic irradiation for specified period of time at apartment temperature. reaction was observed by TLC , with the mobile phase elutes being chloroform and methanol (7:3 ratios). The compound was uninvolved, recovered by separation and then wash away with diethyl ether after desired product had been achieved. After the catalyst separated, it was added, bear away through ethyl acetate, and finally result was dissolved. harvests were characterized and contrasted using UV, IR, MASS, and NMR.

Reuse of the catalyst

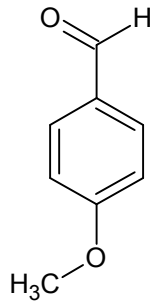
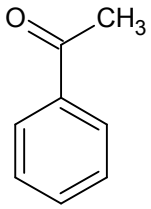
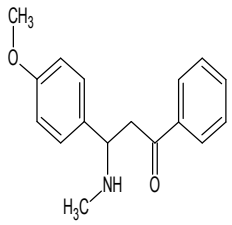
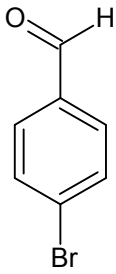
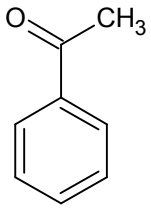
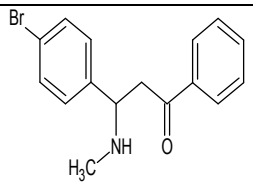
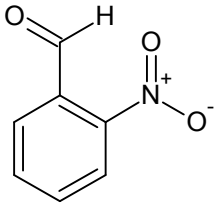
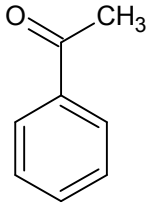
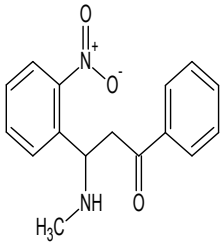
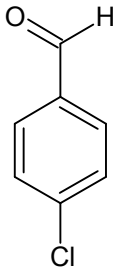
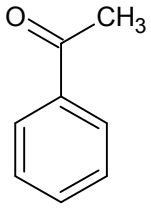
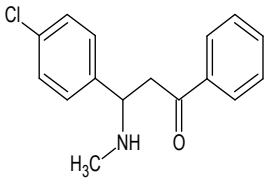
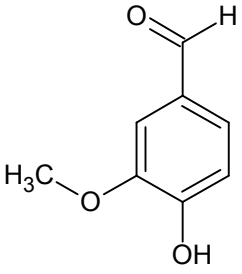
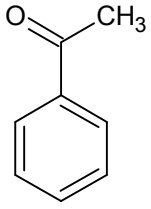
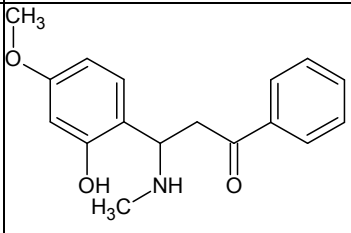
Reusability catalyst is a foremostalarm in heterogeneous catalysis. Studies regarding regainingthen reuse catalyst were conducted. Using a strong magnet to magnetically hold the catalyst in place at the bottom of the flask, a pipette was used to remove the solution, the solid was washed twice ethyl alcohol, and the reaction was then restarted using fresh substrate that had been dissolved in the same solvent. The catalyst was used five times in a row with no noticeable decrease in catalytic activity. This makes it possible for them to be swiftly and virtuallywhollyseparated by filtration which is particularly beneficial aimed at a heterogeneous catalyst.

Along with the improved catalyst, catalyst remains employed aimed at a few extra cycles. The catalysts were reused after being carefully cleaned, dried, and heated before the subsequent cycle, and it was found that there was no catalyst leaching.

S. No	Aldehyde Substrate	Acetophenone	β-acetamidoketone product	Time(min)	Yield(%)
1				25	92

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2				28	89
3				25	85
4				26	88
5				27	87
6				28	90

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Compound 1
Colorless,
Melting Point (158^0-159^0C);
IR Data 3402,3072,2885,1670,1622,1528,1496,1458,1254,758,
706,686cm^{-1}
^{1}HNMR(200MHz,CDCl3/TMS)=1.2(singlet , 3H), 2.0(doublet,2H), 5.1 (multiplet,1H),8.3(bs, N-H), 7.15(doublet, 2H), 7.31(doublet, 2H), 7.9(triplet, 1H), 7.45-7.54(multiplet, 4H), 8.1(multiplet, 1H);
Compound 2
Colorless, M.P.(104^0–105^0C); FTIR:υmax:3421,3219,2962,1725,1683,1577,1567,1510,
1271,1211,8340,633,611cm^{-1};
NMR(300MHz,)δ(ppm) = 2.3(s,3H),2.5(d,2H), 4.4
(s 3H),9.7(broad,NH),7.984(doublet,2H),7.791(doublet,2H),7.529(doublet,2H),7.508(doublet,2H), 5.01(multiplet,1H)

III. CONCLUSION

Using zinc oxide nanoparticles made from scrap cabbage, an effective method has been created to create -acetamido ketones. This technique has a number of benefits, including a high yield, a rapid rate of reaction, simplicity in separation, and the capacity to recycle the catalyst.

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Impact of Floriculture and Landscaping on Sustainable Environmental Management

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Abstract: *Natural environment is of crucial importance for social and economic life. Environmental management is a purposeful activity with the goal to maintain and improve the state of an environmental resource affected by human activities. Floriculture or flower farming is a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and for floristry comprising the floral industry. It involves both the growing of trees, shrubs, vines, ground covers and herbaceous perennials and their uses in designed aesthetic environments. Landscaping is the art and science of developing the outdoor environment using soft landscaping. This paper highlights the functionality of floriculture and landscaping as moderating temperature, abating noise, reducing glare and increasing privacy and security. It discusses their importance in improving the aesthetic or beautification of environment, re-integration of structures in to the natural environment. They also solve ecological problems such as flooding, control of erosion and absorb chemicals from the soil (oil spillage). They act as environmental control in prevention of hazards such as windbreaks, shade trees for guide against sun glares. The paper further reviewed the environmental impact of the floriculture activities from the use of fertilizers, pesticides, and waste water disposal. These chemicals are said to have adverse effects on biodiversity, soil, atmosphere and water. Conclusion is drawn on the importance of sustainable floriculture and landscaping for an ideal and holistic environmental management*

Objectives

- *To improve awareness and understanding of environmental impact of product horticulture*
- *The use of such resources in a concentrated space and time has the potential to negatively impact on the local environment and worker welfare.*
- *In addition the transport of horticultural produce over long distances, particularly by air transport, and reported in term of food miles, is known to have a negative contribution to the global environment*
- *Daily activities can collectively make big difference it fight against environmental change.*
- *To motivate people and ather citizens to undertake these small significant changes to their daily routine.*
- *sustainably increasing horticultural productivity or incomes to environment change*
- *reducing or removing greenhouse gas emissions.*

Keywords: Environment

I. INTRODUCTION

RESEARCH DESIGN AND METHODS /RESEARCH METHODOLOGY

The present study will be mainly based on primary and secondary sources of data. Primary data will be field based study and survey method where data will be collected through structured questionnaire.

PRELIMINARY WORK / SURVEY:-

This research is directly and indirectly contributed in understanding of environmental issues. On horticulture production . It improves awareness of the public and communities to adapt to the impact

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EXPECTED OUTCOME :-

- Researchers are trying to find out how to increase the horticulture production. And which environmental impact are affect the horticulture product
- Research is useful to find out which crop is more affected by environment
- Research are trying to find out how the understanding of wider issues relating to the environment has developed over recent years

BENEFITS TO THE SOCIETY:-

Cultivation are dependent on the environment temperatures and carbon dioxide can increase crop yields. Chief benefits of global warming are fewer winter deaths and lower energy costs, better agricultural yields maybe richer biodiversity Environment change is projected to increase the frequency and intensity of extreme weather events, such as heat waves, droughts, and floods.These change losses to horticulture production costly disruptions to society

COST BENEFIT ANALYSIS:-

This research will not be required that much cost for functioning. Here researchers trying to use reviewed 221 papers that used crop models to assess impacts of environment on horticulture production. The benefit of work is nothing but due to research we findout longer frost-free seasons, increases in growing degree days, and even increased atmospheric CO2 can, in theory, lead to better crop yields and productivity.

FUTURE SCOPE:-

This Research is useful for adaptions of horticulture production according to the environment crop is modified and increase the product of cultivation. Future climate change could reduce yields .

SWOC ANALYSIS / LIMITATIONS: -

Strength:-

- The collected information about research is very much beneficial to the society.
- Farmer can increase the yield of crop
- Environmental changes will help clarify the risks that climate changes pose to human and natural systems.

Weakness:-

- Global warming could lead to an increase in pest insect populations, harming yields
- While warmer temperatures create longer growing seasons, and faster growth rates for plants, it also increases the metabolic rate

Opportunity:-

- High temperatures could well enhance growth of crop and faster maturation of plants that allow earlier planting and earlier harvesting of winter crop.
- Crop yields are expected to increase in these areas as well as expansion of the crop area because of increase in temperature.

Challenges:-

- In Cultivation Rain-deficit monsoon and unseasonal rains have disturbed the floriculture crop
- Water: Some parts of India are facing shrinking of water supplies, others are facing rising seas.

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Dihydropyrimidin-2-(1H)-ones Can Be Made in One Pot using the Solvent-Free Biginelli Reaction Waste Aluminum Foil Served as the Catalyst for the Reaction

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Students, Department of Chemistry Veer Wajekar ASC College, Phunde[3]

Abstract: *A number of beta-ketoesters, a substituted amide, and an Substituted aromatic aldehyde were combined Biginelli reaction, which resulted in the amalgamation of functionalized 3,4-dihydro-2(H)-pyrimidinones , as well as their byproducts and derivatives. For the synthesis of dihydropyrimidinones and their byproducts, a three-component process is used. This reaction has gotten new attention for the purpose of producing DHPM in an environmentally friendly manner with improved good yields because of the use of green technological approaches as a snowball, due to its many advantages over the conventional process, and because there is a need for supportable chemistry of various examples. Aldehyde, substituted beta-ketoesters, substituted urea, and substituted thiourea were successfully synthesized into 3,4-dihydropyrimidinones (DHPMS) by standard heating and microwave irradiation without the use of a solvent utilizingwaste aluminum foil as a catalyst. The solvent-free microwave-assisted green technique offers advantages such as quicker reaction times, simplified processing, and outstanding yield compared to conventional frying.*

Keywords: Dihydropyrimidinones

I. INTRODUCTION

Biginelli first reaction is a single -pot condensation synthesis of an aromatic aldehyde, beta-toester, besides substituted urea underneath very acidic circumstances. Product yields are frequently agonizingly low, especially in a variety of relieved aromatic aldehydes. Prepare 3,4-dihydropyrimidin-2(1H)-ones by using a variety of acid catalysts, such as H_2SO_4 (sulfuric acid) [5], BF_3•EtOH/CuCl as a Lewis acid [6], $LaCl_3$•7H2O with catalytic concentrated HCl [7], InCl3 [8], heteropolyacids [10], BiCl3 [11], Cu(OTf)2 There has been extensive usage of $InBr_3$[16], $FeCl_3$.6H20/HCl acid [17], TMSI [18-22] and sCdCl2 [22-26]. Many of the aforementioned catalysts are difficult to dispose of and have negative environmental effects. Moreover, the procedures employed to produce 3,4-dihydropyrimidin-2(1H)-ones are time-consuming, difficult to operate on a large scale, and require extremely acidic environments. Recent studies have demonstrated the potential of sulfuric and silicosulfuric acids to take the place of traditional acidic catalytic materials in this synthesis [27–30]. These days, 3,4-dihydropyrimidin-2(1H)-ones are produced by means of sulfuric then silicic acids, which are also extensively employed as catalysts [30-34] for a variety of chemical processes. Our goal was to compare the synthesis of 3,4-dihydropyrimidin-2(1H)-ones and thionesby means of microwave heating without the use of a solvent and outmoded heating.

II. EXPERIMENTAL

In an open capillary in a paraffin bath, the compounds' uncorrected melting points were ascertained. The chemical shift values were calculated in units of 5 (ppm), and the IR spectra were recorded using a Schimandzu 1H NMR spectrophotometer. Tetramethylsilane (Me4Si) was used as an internal reference. The 1H NMR spectra were captured with CDCl3 as the solvent using a 300 MHz FT-NMR spectrometer. [35]

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Procedure

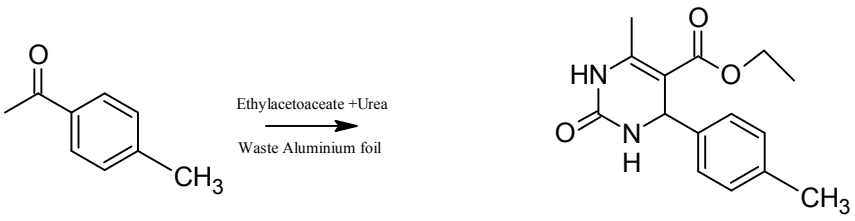
By solvent free microwave irradiation:

A watch glass-covered 100 mL beaker was filled with aldehyde (10 mmol), ethyl acetoacetate (10 mmol), urea (15 mmol), or thiourea (20 mol%), and Waste Aluminum Foil nano (20 mol%) before being exposed to radiation exposure of 300 watts as needed for the duration of the experiment. reaction (TLC) (TLC). Add ice water to the filtered product once it has been done. It is dried at a specified temperature in an oven.

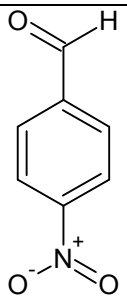
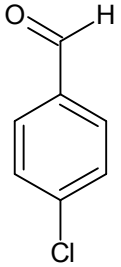
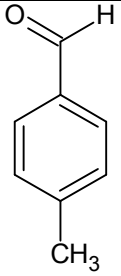
Conventional Method

Urea or thiourea (15 mmol), ethyl alcohol as a solvent, aromatic aldehyde (10 mmol), ethyl acetoacetate (10 mmol), and Waste aluminum foil (20 mol%) were all added to a 100 mL round bottom flask with a reflux condenser. The mixture was cooked for a very long period in an oil bath at a temperature of 8 oC. Pour the filtered ice water into the container after it is finished.

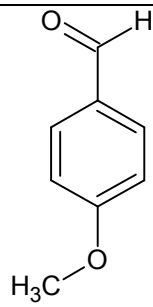
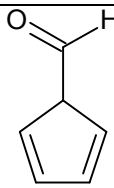
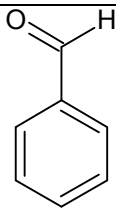
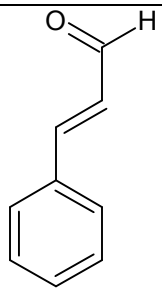
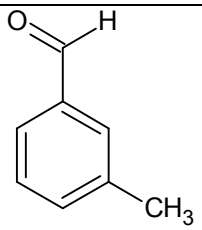
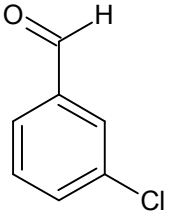
Reaction



Observation table1(Microwave Reaction)

Sr. No	Aldehyde	Reaction Time in sec.	Yield	Melting Point 0C
1		50	98	202
2		60	90	206
3		45	92	211

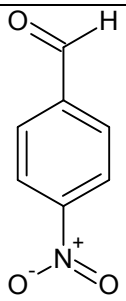
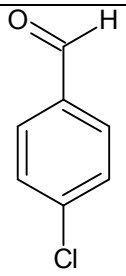
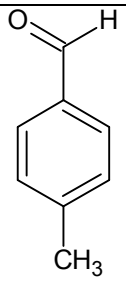
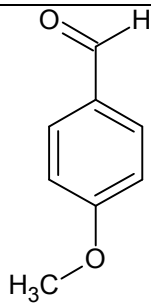
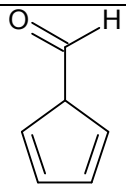
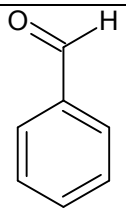
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4		70	94	195
5		55	88	196
6		70	85	187
7		55	80	227
8		88	90	242
9		65	85	216

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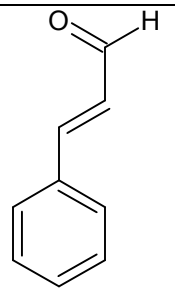
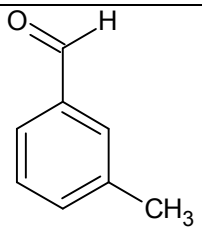
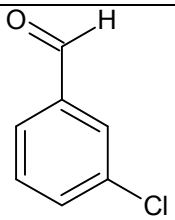
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Observation table2 (Conventional Reaction)

Sr. No	Aldehyde	Reaction Time in sec.	Yield	Melting Point 0C
1		90	77	208
2		95	66	207
3		98	78	211
4		100	78	196
5		95	87	196
6		98	55	188

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7		98	67	226
8		95	56	246
9		97	67	219

III. DISCUSSION

Aldehydes, ethyl acetate, urea, or thiourea, and waste aluminum foil are compared in a one-pot procedure to generate dihydropyrimidine. The reaction time was dramatically shortened from hours to a few seconds in a solvent-free, microwave-assisted reaction at 80 oC with ethyl alcohol as the solvent. The spectral and physical properties of known compounds match those written about in the literature. A wide variety of aromatic and heterocyclic aldehydes with various structural makeups were used in this condensation. Acid-sensitive heterocyclic aldehydes formed dihydropyrimidine in high yields, whereas unsaturated aldehydes react with the aldehyde functional group in a selective manner.

IV. CONCLUSION

Smaller response instances, excellent yields, and simple experimental workup procedures are just a few advantages that using Zinc oxide nano from waste cabage as a catalyst during microwave assisted dihydropyrimidine synthesis has over conventional heating methods. Also, this solvent-free method isn't polluting and doesn't use any dangerous components, which classifies it as a novice method in Biginelli'sdefence. The safety, environmental friendliness, and occasional-fee nature of microwave assisted synthesis should be specifically expanded in accordance with the tenderness of the method jointly pleasantly of operation for the three factor Biginelli response.

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Effect of Salt Stress on Seed Germination of Wild Seed *Trigonella foenum-graecum* L

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Abstract: *Fenugreek or commonly known as Methi (Trigonella foenum-graecum L.), plant is widely distributed throughout the world and which belongs to the family Fabacecae. It is very used for medicinal purpose. It has been commonly used as a seed traditional food and medicine. In the present investigation check the effect of salt on fenugreek seed germination, root length and shoot length. In our result shows that salt concentration increase at that time decrease the seed germination as well as shoot and root length also. Increasing of stress levels lead to reduction of germination.*

Keywords: *Trigonella foenum-graecum L, Salt stress, Fenugreek, germination*

I. INTRODUCTION

Fenugreek (*Trigonella foenum-graecum* L.) is an annual crop belonging to the legume family. This crop is very important and native to an area extending from Iran to northern India, but is now widely cultivated in China, north and east Africa, Ukraine and Greece (Acharya, S., *et al.*2006). Fenugreek plant leaves and seeds have been used extensively to prepare powders for medicinal uses (Basch *et al*., 2003). The Fenugreek seed is produced as a spice, as forage for cattle, and also contain different type's substances like volatile oils, fixed oil, proteins, sugar, mucilage, alkaloids and saponins, which are commercially useful as raw material for steroid hormone synthesis.

Germination is regarded as sensitive stage in growth cycle of plant, because of it major role in final compression. However, it has been observed that plants show relative resistance to salinity in different vegetative growth stages (Javan *et al*., 1997). In respect to growing some medicinal plants in tropical region and salty regions, understanding and extending approach for increase salinity resistance in plants is important for human. The aim of this study was to evaluate the effect of salinity stress on fenugreek germination and some growth indices.

II. MATERIAL AND METHODS

The experiment was conducted Department of Botany, Dada Patil Mahavidyalaya karjat in the summer of 2022. To create salinity stress, sodium chloride (NaCl) at the levels of 0 (as control), 0.05mM, 0.1mM, 0.15mM and 0.2mM were used. The seeds of fenugreek were surface sterilized with 0.1% mercuric chloride for 30 s and rinsed several times with distilled water in glass Petri dishes of approximately 9 cm, Whatman No.1 and other instruments sterilized in autoclave for 2 h at 120°C and rinsed several times with distilled water. Each replication contains 10 fenugreek seeds. After labeling the Petri dishes, seeds were established between two Whatman No.1 in Petri dishes. Irrigation with different concentration of salinity was carried by pipet between treatments in same as water after absorption by Whatman No.1 were not translocated with bent Petri dishes, along one or two drops of water stay in dishes. The dishes covered with news paper and placed in incubator (23 ± 1°C temperature). Germination counts were recorded at 2 days intervals for 12 days after sowing and the seedlings were allowed to grow. The germination percentages of the seeds were finally determined for each of the treatments. After 20 days, the experiment was terminated, and the growth parameters estimated after uprooting seedlings. The root and shoot lengths were measured in centimeter.

2.1 Plant Material

Trigonella foenum-graecum L. was collected from local area.

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2.2 Salt concentration

Sr. No.	NaCl Solution (M)	Number of Seed in Petri plate
1.	Control (Only Water)	10
2.	0.05 M	10
3.	0.1 M	10
4.	0.15 M	10
5.	0.2 M	10

Table 1: Different Salt concentration

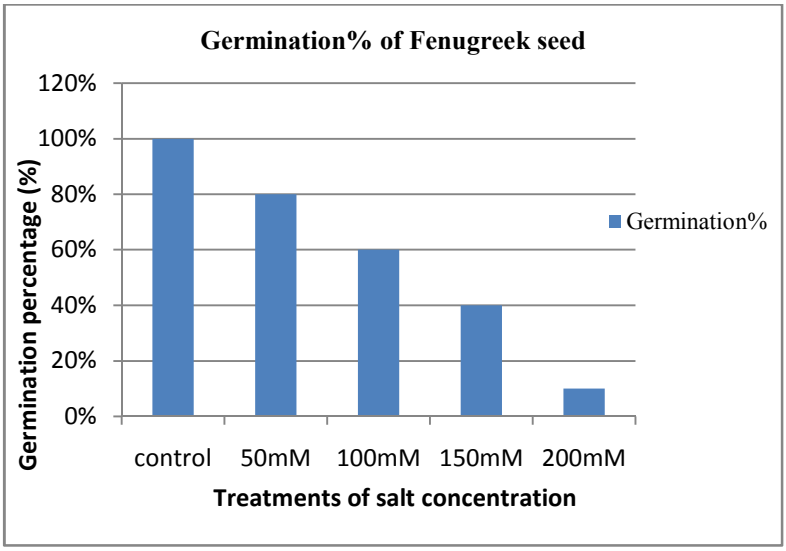
Calculation of Germination Percentage:

$$\text{Germinated Percentage} = \frac{Germinating\ Seeds}{Total\ seeds} \text{ X } 100$$

Results:

Variety	Control	50mM	100mM	150mM	200mM
Local Fenugreek germination%	100%	80%	60%	40%	10%

Table 2. Effect of Salt on Seed germination of Fenugreek



Graph 1 Effect of Salt on Seed germination of Fenugreek

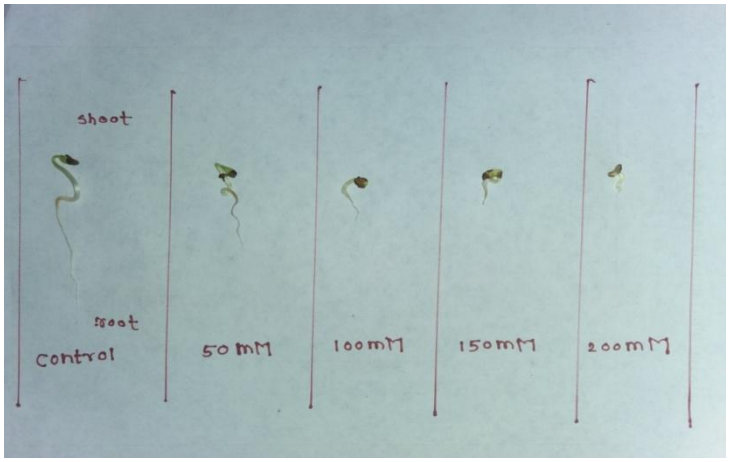


Photo 1. Effect of salt concentration on root and shoot length of fenugreek

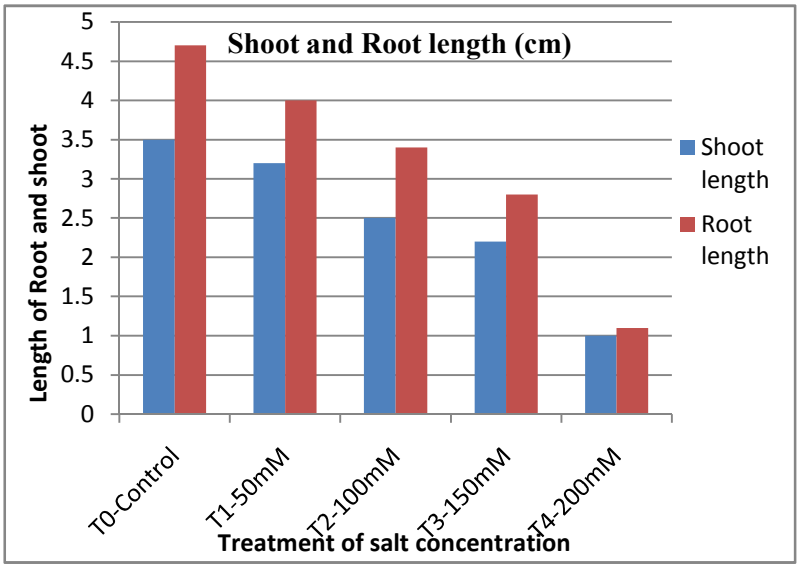
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Sr. No	Salt Stress	Shoot length (cm)	Root length(cm)
T0	Control	3.5	4.7
T1	50mM	3.2	4.0
T2	100mM	2.5	3.4
T3	150mM	2.2	2.8
T4	200mM	1.0	1.1

Table No. 3. Effect of salt concentration on root and shoot length of fenugreek



Graph No.2. Effect of salt concentration on root and shoot length of fenugreek

III. CONCLUSION

Salinity is a biotic (non living) stress that affects seed germination (Misra and Dwivedi, 2004) and created many problems for plant growth and development. In the experiment, the effect of salinity on plant can be as a result of reducing seed germination as well as root and shoots length of *Trigonella foenum-graecum* L. In this work prove that salt (NaCl) shows negative effect of seed germination as well as growth of shoot and root length. Maximum growth was observed in control Petri plate and minimum 0.2mM (T4) Salt Petri plate (Graph no. 1 and 2).

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Implementation of RSA Algorithm for Encryption and Decryption Recent Technology Trends in Computer Technology

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Abstract: *Cryptographic technique is one of the principal means to protect information security. Not only has it to ensure the information confidential, but also provides digital signature, authentication, secret sub-storage, system security and other functions. Therefore, the encryption and decryption solution can ensure the confidentiality of the information, as well as the integrity of information and certainty, to prevent information from tampering, forgery and counterfeiting. Encryption and decryption algorithm's security depends on the algorithm while the internal structure of the rigor of mathematics, it also depends on the key confidentiality. Key in the encryption algorithm has a pivotal position, once the key was leaked, it means that anyone can be in the encryption system to encrypt and decrypt information, it means the encryption algorithm is useless. Therefore, what kind of data you choose to be a key, how to distribute the private key, and how to save both data transmission keys are very important issues in the encryption and decryption algorithm. This paper proposed an implementation of a complete and practical RSA encrypt/decrypt solution based on the study of RSA public key algorithm. In addition, the encrypt procedure and code implementation is provided in details.*

Keywords: Cryptographic technique, Encryption and decryption

I. INTRODUCTION

NETWORKS are a must for any company to achieve competitive advantage; however, all communication over any network, mainly the Internet needs to be secure to prevent breach of confidential and sensitive data. An IBM sponsored benchmark study carried out by Ponemon Institute for the past 11 years highlights the alarming boost (see Fig. 1) in the average cost of data breach globally (ACoDBG) each year with 2016 being $4 million, a 29 percent increase since 2013.

Networks aren't just used by businesses but also by home users. Hence, network security is of utmost importance. This brings in cryptography, as a major component enabling secure communications over networks. Cryptography looks at methods of hiding the actual message from unintended recipients by scrambling the data via an algorithm. The first proven use of cryptography dates back to 1900 B.C, Ancient Egypt, when a document writer used irregular hieroglyphs (writing system using a combination of graphics, symbols and alphabet) while copying a document. Modern cryptography algorithms offer more security than the ancient ones and can be divided into 3 categories, namely secret key, public key and hash functions. The focus of this paper is public key cryptography (PKC) algorithm.

II. METHODOLOGIES

RSA PUBLIC KEY CRYPTOGRAPHY Known also as asymmetric encryption, PKC works on the concept of dual keys. While the recipients' public key is used to encrypt the message, the private key is used for decryption, so there is no need to share a secret key as required in secret key (symmetric) cryptography. PKC is largely used for authentication, non-repudiation, and key exchange. The most widely used PKC algorithm in the world today, Rivest, Shamir, and Adleman algorithm (RSA) is considered superlative in comparison with algorithms such as the symmetric key Advanced Encryption Standard (AES) (Ponemon 2014). and the asymmetric Goldwasser and Micali (GM) algorithms. Officially launched in 1977 and named with the surname initials of inventors Ron Rivest, Adi Shamir, and

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Leonard Adleman, RSA is actually a set of two algorithms; key generation, the most complex part used to produce the public and private keys, and RSA function evaluation which looks at encrypting and decrypting (Ponemon 2013). Fig. 2 explains how the public and private key is generated. Fig. 4 shows the methods of encrypting plaintext and decrypting a ciphertext using the two keys.

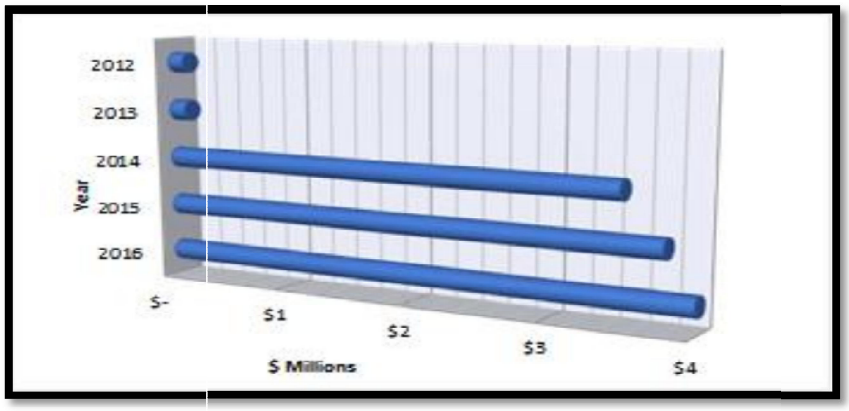


Fig 1: Global average cost of data breach from years 2012 to2016. Data from Ponemon Institute reports for the years 2012,2013,2014, 2015 and 2016

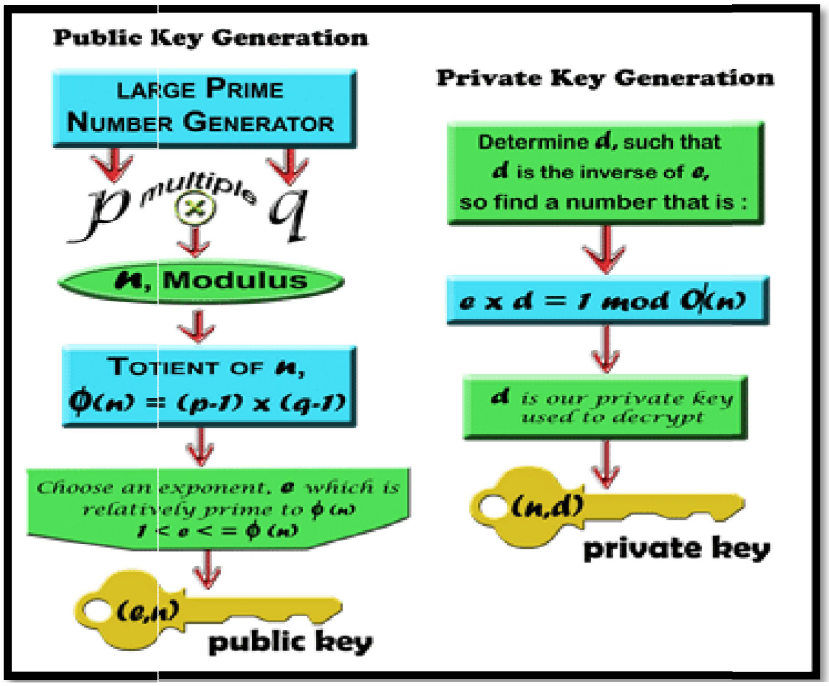


Fig 2: RSA Public Key and Private Key Generation Method

RSA Security Inc. had a 17 year hold on RSA algorithm patent from 1983 till its expiry in 2000, however, the company surprisingly released its claim on the patent two weeks before the expiry date, making RSA available to the public domain, prompting a major competitor, Baltimore Technologies into free giveaway of a version of its Key tools developer tool kit which uses RSA algorithm and had cost developers $10,000 to $20,000 until now (Balakrishnan *et al.,* 2016). The patent years saw more than 800 licensed customers and development of over 1,000 applications, including the likes of Microsoft Windows, Netscape Navigator, Intuit Quicken, Lotus Notes, PGP, Cisco Systems Inc., routers, credit cards, iPhone text messaging, making web connections, and hundreds of other products/services to protect trillions of transactions (Ponemon 2015).

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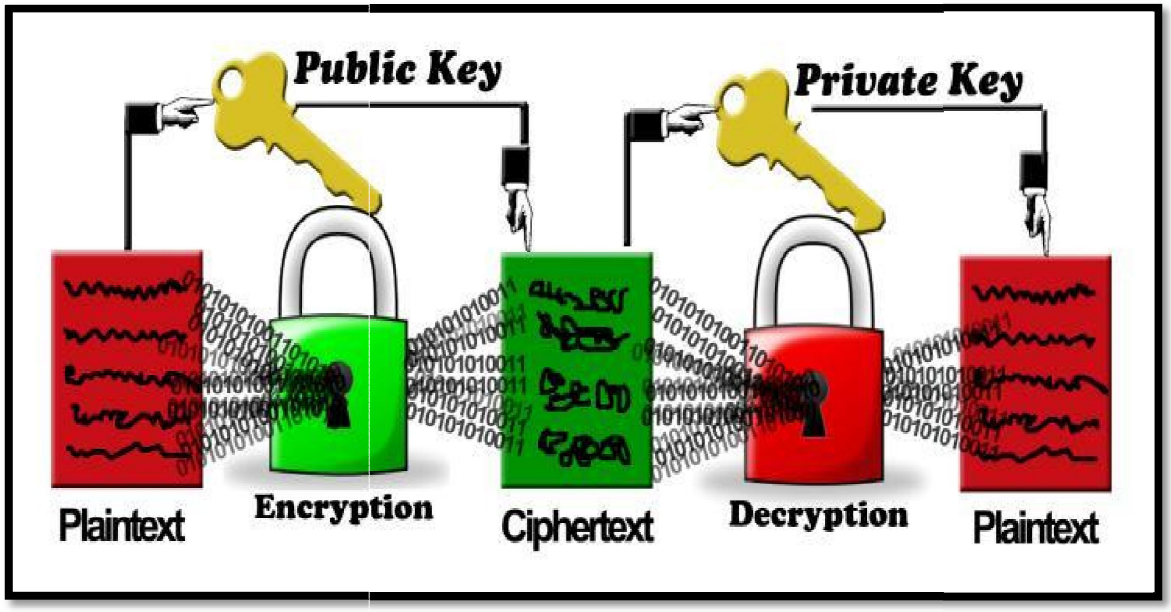


Fig 3: RSA Encryption and Decryption Methods

III. LITERATURE REVIEW

Looking at where RSA is being used today, let's take the example of Pretty Good Privacy in short PGP, a freeware created by Phil Zimmerman, providing encryption and authentication for e-mail and file storage applications across multiple platforms and it uses RSA algorithm for its key transportation. Many cloud service providers also use PKC for authentication. One example is Googles G Suite, a brand of cloud based services that has been rated as excellent on PGMags review in February 2017, has about 3 million paid customers including large companies such as Whirlpool and PiceWaterhouseCoopers taking advantage of a collaborationready office suite, a website, shared calendars, mail services, chat, video conferences, social media, real-time document collaborations, and many more. This service has encryption at numerous stages and is enabled by default for all customers.

Firstly, data access is enabled through Hypertext Transfer Protocol Secure (HTTPS) encrypted tunnels, then it uses Perfect Forward Secrecy (PFS), for which Google made headlines in 2011 for being the first to enable this feature (Ponemon 2016) which scrambles data as it moves between their and other companies servers and it uses SSL (Secure Sockets Layer)/TLS (Transport Layer Security) for connectivity where the 256-bit TLS looks at the encryption enforcement policy which rejects all inbound and outbound mail from other mail servers if they don't use TLS . A common operation in IT is RSA signature verification and many protocols such as SSH, OpenPGP, S/MIME and SSL/TLS rely on it. SSL certificates are used to protect the online users' private and sensitive data. In its bids to up defenses against the growth in cryptanalysis, Google has upgraded the length of all its SSL certificates RSA encryption keys from 1024 to 2048 bits for validation and key exchange in 2013. SSL, initially developed by Netscape, delivers data security incrusted between internet-based communications protocol TCP/IP and application protocols such as HTTP, Telnet, Network News Transfer Protocol (NNTP), or File Transfer Protocol (FTP) by establishing an RSA key exchange during the SSL handshake between client and server to authenticate each end of the connection (Ponemon 2013). Moreover, RSA is used for employee verification in many organizations. Chip based smart cards use cryptographic algorithms to ensure security by checking the PIN code.

Some of these cards use RSA algorithms in combination with other algorithms. For instance, IDPrime MD 3811 smart cards, a single chip based dual-interface (contact and contactless ISO14443 interface) smart card developed by Gemalto is also compatible with the NFC standard already widely used by mobile devises today and is secured with both RSA and elliptic curves algorithms. Another example of Gemalto's cards is the IDPrime PIV (personal identity verification) card v1.55 that looks at improved identification and authentication of US Federal employees and contractors to access Federal amenities and was published as FIPS PUB – 201.

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Another product that uses RSA is the RSA SecurID, a two-factor authentication technology used in high-security environments to protect network resources and can be hardware authenticator (a USB token, smart card, software application residing on your smartphone or key fob) and RSA authentication manager software based tokens. The authenticator generates passcodes/pin tokens which resets itself every 60 seconds making the previous token worthless. When trying to access a protected resource, users enter the passcode together with their username which are intercepted by the RSA authentication Agent and presented to the RSA SecureID system on the RSA authentication server which validates the pass code by running the same algorithm that was used to generate the passcode to check if their 8-digit output matches the one entered by the user along with the username before granting access to the remote server.

IV. RESULT AND DISCUSSION

One of the reason RSA has become most widely used is because it allows either of the two keys to encrypt a message and the opposite key to decrypt it, thus promising confidentiality, integrity, authenticity and non-reputability of data and electronic communications. It's important to note that a weak key generation will make RSA very vulnerable to attacks therefore care must be taken to ensure that two large random prime numbers are used to calculate the modulus, n, which will become the public key and the private key will consist of those two primes themselves. The effectiveness of RSA algorithm comes from the fact that it's difficult to computationally factor large integers into primes. Multiplying the two primes is easy but performing the reverse in the form of factoring is actually hard and gets even harder as the values of p and q gets bigger (J Jeba *et al.,* 2022).

Take for instance, the RSA Factoring Challenge enacted by RSA Laboratories in 1991, has many moduli still pending to be factored. On 12 December 2009, a 768-bit RSA modulus containing a 232 decimal digit number was factored by a total of 13 researchers over a span of two years using hundreds of parallel computers, a task equivalent to approximately 2000 years of computing on a single-core 2.2 GHz AMD processor. The larger the key length of the modulus, the more time it takes to be factored. The Federal Information Processing Standards Publication (FIPS PUB) 186-4 specifies three choices for the length of the modulus, n, to be 1024, 2048 and 3072 bits. RSA's strength lies in its key size, since it's not easy to factor large primes, however encrypting with larger modulus has certain negatives associated with it, particularly when dealing with mobile devices as it requires more computing power and battery resource usage for key generation thus impairing device performance (IBM 2020).

Most hardware and software in compliance with FIOS PUB 186-4 are moving from the first choice of key length to the second and are having a minimum of 2048 bits as being secure but with increase in computing power, more efficient factoring algorithms and advances in cryptanalysis techniques, the ability to crack these keys also increases. A major hurdle to RSA cryptosystems is the enabling company's inability to accept that a problem does exist in the key length and the unwillingness of upgrading to keep up with the computing power of the current and possible future devices. An example from the past highlights this negligence (McAfee 2019 and Verizon 2021).

Chosen in 1980s, and broken in 2000, a 320-bit RSA modulus for Carte Bleue, is surely a mark of severe ineffectiveness on the part of the organization that oversaw security for 33 million French credit cards. After 2 years of failed attempts to convince the company of the serious flaws, Serge Humpich, a 36-year-old engineer purchased some metro tickets with fake cards and sent prove to the credit card company in attempts to sell his idea, however he was convicted to 10 months suspended sentence. The use of acoustic cryptanalysis is another challenge looming over the security offered by cryptography. A team of researchers, including Adi Shamir, a co-inventor of RSA, carried out an acoustic cryptanalysis attack on the popular GnuPG software which is a complete and free implementation of the OpenPGP standards and have successfully determined a 4096-bit RSA key within an hour, using the sound generated by the computer during the decryption of some chosen cipher texts (Cybersecurity 2021).

V. CONCLUSION

Even though RSA is the most used cryptography algorithm today, it has certain limitations which need to be taken into consideration for RSA to continue to be the best and research has to be done into making RSA quantum resistant. There is a need now more than ever for studies to be conducted in the area of quantum encryption methods resistant to quantum computers as it will soon replace the current encryption systems. Development of qCrypt isn't enough, but it's a start. However, we need more research into quantum resistant encryption systems.

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Floral Dye as Alternative to Synthetic Dyes

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Abstract: *India has a rich plant biodiversity which is biggest biodiversity in the world. It has approximately 490,000 plant species which is the plant kingdom is a treasure-house of diverse. Floral dyes from floral sources have been given much more interest in recent years due to the harmful effects and problems raised by synthetic dyes. In India a large amount of flowers are cultivated. These flowers are used as decoration purposes or for offering to God and wasted everyday which are thrown in water or dumped which also creates environmental pollution. These wasted flowers can be used in preparation of dye so we can get wealth from waste materials.*

Keywords: Biodiversity, dye, floral dye, environmental pollution

I. INTRODUCTION

Dye, substance used to impart colour to textiles, paper, leather, and other materials such that the colouring is not readily altered by washing, heat, light, or other factors to which the material is likely to be exposed. Herbal dyes however produced from floral extracts are economical and solve the above problems. These herbal dyes are not toxic, no allergic to human health, easily available and more economical. Some natural sources for dye produce truly exquisite shades and economical to purchase than chemical dyes. Up to now most of the natural dyed textiles are imported from Third World Countries and India is still a major producer of it. Flowers of Mari-gold, China rose, Butterfly Pea, Bougainvillea, Cineraria, Alkanet etc have been extensively used for dyeing fabric.

II. RESEARCH METHODOLOGY

The present study will be mainly based on primary and secondary sources of data. Primary data will be field based study and survey method where data will be collected through structured questionnaire.
The study was conducted by survey and visiting the temples.

Preliminary Work/Survey:
There was discussion with Pujari of temples about post treatment of flowers which are offered to God. Their answers influenced to choose this topic for research work.

Secondary Work/Method:
Dye extraction:
The collected flowers were used for dye extraction and it a aqueous extract of flowers. The dye is extracted from flowers by preparing an aqueous solution of flowers and the extraction was carried out at a 89-90°C for a hour. After these filtration is carried out and flowers were separated from the aqueous solution.

Dyeing procedure:
For dyeing purpose, cloth were treated with 10%NaOH to remove starch from it. After 15 minutes cloth washed with distilled water. After drying cloth was transferred into vinegar as a fixative for 20-30 minutes. Then cloth was transferred into the extracted dye and leave it for 1-2 hour.

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III. LITERATURE REVIEW

In recent years, there has been a trend to revive the art of natural dyeing. This is mainly become in some aspects natural colorations are advantageous against synthetic dyes.

Hibiscus is a major source material for natural dyeing. It belongs to the family Malvaceae. Aqueous extracts of these flowers have shown good fastness properties according to the study conducted by Shanker and Vankar. The dye has been found to have a good scope in the commercial dyeing of cotton, silk for garment industry and wool yarn for carpet industry. A study of natural eco-friendly dye extracted from *Plumeria rubra* is carried out by Vettumperumal et al.

Shukla et al. has reported dyeing of woollen textiles with extract of *Acacia pennata* plants. The colour was extracted from barks of the said plant and applied on wool.

An attempt Is made by Onial et al. on utilization of *Terminalia chebula* Retz. Fruits pericarp as a source of natural dye for textile applications.

BH Patel and et al (2014) studied the changes in cotton treated with choline chloride. The main purpose of this study is to improve the dyeability of the cationised cotton towards anionic dyes particularly reactive and direct dyes. Verma C., &Venkatachalam V., (2002) studied the effect of mordants on mango (bark) dye for dyeing of jute/cotton union fabric.

IV. RESULT AND DISCUSSION

- By using natural dye instead of chemical dye so that environmental pollution due to chemical dye can be restricted.
- Floral dyes which are extracted from floral material are economical and are not toxic, no allergic to human health, easily available
- Biodegradable.
- Eco-friendly.
- To help the Flower cultivator & village below poverty people who can earn using these technology.



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V. CONCLUSION

The main purpose of extracting dyes from floral material is to avoid the environmental pollution. Using natural dye instead of chemical dye so that environmental pollution due to chemical dye can be restricted. One of the challenge with floral dyes is their availability. It can be difficult to produce because the availability of raw materials can vary from season to season, place to place, and species to species.

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Smart Computing

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Abstract: *Following the well-known concepts of computerization and informatization, a rising technology of cyberization, which is considered a reformation of the existing bodily, social and intellectual worlds, has become a hotly mentioned fashion within the new cyber global. Cyberization refers to using conversation and pc technology to interconnect computers and various electronic terminal devices allotted in extraordinary locations. It permits customers to share software, hardware, and statistics resources consistent with positive network protocols. Cyberization has substantially advanced the sensible application of computers and has been broadly applied in transportation, finance, commercial enterprise management, schooling, telecommunications, commerce, and so on in our day-by-day life.*

Keywords: Introduction, Methodology, Review, Privacy, Security, Behavior and influence analytics in social computing, Results & Discussion, Conclusion, Acknowledgement, and References

I. INTRODUCTION

Throughout the cyberization manner, a massive quantity of actual matters will conjugatively map to various sorts and stages of cyber lifestyles in cyber global. It is stated that cyberization has already taken region in a selection of fields together with the development of numerous emerging computing paradigms and records verbal exchange technology, along with ubiquitous/ pervasive computing, social computing and networking, wearable technologies, and so forth. In particular, with the rapid growth of the internet of factors and cognitive cyber-physical systems, increasingly more virtual matters or cyber entities, are engaged or generated inside the included cyber global. Rising technology in clever environments, which include clever computing and smart items, become very large, promising, and enabling troubles in cyberization, to decorate.

The efficiency of sensing, processing, and conversation within the conjugations of physical, social, and intellectual worlds. As a consequence, the cyber generation is playing a crucial position in growing powerful techniques of useful resource management, information acquisition, and pattern recognition across cyber-associated structures and packages. All these offer us opportunities to explore clever computing methodologies and computational intelligence algorithms, to be able to facilitate the cyberization system in cyber international.

This unique trouble pursues to document exquisite research on the latest progress in the diverse regions related to smart Computing and the Cyber era for Cyberization. We aim to shed mild on more than one factor concerned with cyberization, encompassing algorithms, techniques, packages, enabling technology, and platforms, except security troubles. A total of 36 papers had been submitted from all around the world. After a carefully evaluate manner completed by reviewers selected through the visitor Editors, 18 papers had been normally addressing topics that have been categorized within the following classes: (i) infrastructure and systems for intelligent structures, (ii) clever sensors and ad-hoc wireless networks, (iii) behavior and impact analytics in social computing, (iv) gadget gaining knowledge of and clever packages, and (v) privacy and security in clever computing. The precise contributions of every paper are summarized in the next phase (Abbasi et al., 2007).

Infrastructure and platforms for intelligent systems

A crucial thing within the cyberization technique is the computational intelligence techniques and techniques which might be in the middle of cyber global permitting tactics. Recently there has been extraordinary strength in the fields of system learning (ML) and artificial intelligence (AI). However, a lot of this strength has centered on algorithms and their programs. Plenty less emphasis has been given to the underlying infrastructure of those wise systems. Presently, the mainstream in ML/AI consists of paintings being done in my opinion using specialists inside the subject, following

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ad-hoc methods that make collaboration hard, and with little aid from abstractions and tooling to facilitate the deployment of clever systems at scale. Ultimately, that is especially because of a postponement in infrastructure evolution, which has so far been some distance outweighed by way of innovation in system learning techniques. You will say that the systems and equipment that helped usher in the gift technology of fingers-on system gaining knowledge are not appropriate to feed destiny generations of the intelligent applications they've generated. Therefore, it is vital to strengthen not longer handiest the algorithms, but also the infrastructure and computing systems that permit the effective and efficient execution of such algorithms (Abbasi et al., 2007).

Inside the context of ubiquitous/pervasive intelligent systems, in addition to inside cyber-bodily systems (CPSs), cloud computing has been the most prevailing version and platform for information processing and garage. Because of the richness of sources traditional cloud structures, cloud-based totally CPSs and cloud-assisted IoT make bigger and augment the computing potential of CPSs to behavior resource-hungry packages. The Cloud computing model is eager to use centralized shared sources and addresses the raising recognition of clever apps with the aid of integrating one-of-a-kind resources and the statistics acquired from them.

On the way to provision the bodily resources dynamically, virtualized generation is extensively used for resource management within the cloud structures, which gives an effective manner to improve the aid efficiency of the cloud-based CPSs. Jogging packages on the virtual machines (VMs) makes it viable for high aid utilization and occasional energy Intake. Even though virtualization strategies have been drastically studied inside the cloud computing subject, there are still numerous open troubles concerned with the allocation and migration of VMs to meet the best-of-the-carrier (QoS) demands of cloud-based CPSs. A key challenge entails considering the advantages of migrating VMs to provide better QoS to the consumer while contemplating migration prices, as an example in phrases of transmission delays. In addition, electricity consumption in cloud-based total structures is likewise a more and more relevant challenge to bear in mind. To satisfy the growing demand for brand new situations which includes CPSs and IoT, the abilities of cloud facts centers have grown steadily. Such growth affects the increasing power intake of these facts facilities. In instances of strength crisis and with the developing demand for greener and extra sustainable era solutions, decreasing energy intake in facts centers has emerged as a key purpose (M. Satyanarayanan).

The authors of the paper "A QoS-aware digital device Scheduling technique for strength Conservation in Cloud-based totally Cyber-bodily Systems" purpose to address the aforementioned challenges. Their goal is to discover the choicest VM scheduling method in cloud-primarily-based CPSs with QoS enhancement. For such, they endorse a QoS-aware VM scheduling technique for energy conservation, named QVMS. By using offloading several programs to different physical machines (PMs), the workloads on a few under-load physical servers are migrated out, and those servers might be set to idle mode for strength saving. In the paper, they first outline some primary principles and present the system model. Then, they formalize the goal feature and gift the limitations assumed to model the solution. Non-dominated Sorting Genetic set of rules (NSGA-III) is adopted to locate the most reliable VM scheduling strategies and acquire the aim of QoS enhancement together with energy consumption, downtime, and useful resource usage. Besides, saw (simple Additive Weighting) and MCDM (more than one criteria decision Making) are adopted to pick out the most effective scheduling method. They achieved sizeable experimental evaluations to confirm the effectiveness of their proposed VM scheduling method (S. Ahmed 2020)..

But, notwithstanding the popularity of cloud computing as a backend of clever ubiquitous structures and CPSs, newly rising applications and facts technology are very disturbing to the latency and bandwidth. Their requirements for the optimized shipping community and processing of information done as close to the give-up gadgets as viable are likewise rapidly growing. Some of the drawbacks of cloud systems such as latency and jitter outcomes, distance to the server, records protection and privacy, and assistance of mobility cannot be solved with the aid of the adoption of hyper-scale cloud computing technology. To conquer several such boundaries, the brink Computing paradigm has lately emerged as an answer for handing over statistics and real-time facts processing in the direction of the information source. The aggregate of side computing with ML/AI gave upward thrust to a brand new paradigm known as aspect intelligence (EI). EI comprises aspect computing this is supported by machine-studying algorithms and superior networking abilities. The implication is that some records era and operational era industries are gravitating to the edge of the network. The result is that problems together with cybersecurity, self-gaining knowledge of, real-time networks, and tailor-made connectivity can all be appropriately treated. In their previous work, the authors of the paper "A light-

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weight and value effective part Intelligence architecture primarily based on Containerization era" proposed the concept to build and integrate Docker packing containers within the facet and pinpoint the edge Intelligence's capacity in the vertical-particular eventualities of use. Their modern-day take a look at, protected in this special difficulty, extends this concept similarly and specializes in the utilization of Docker generation into the popularity of human interest. They count on their offered structure to offer significantly shorter delays in communique and decision-making in addition to lower the costs associated with these tactics way to the adoption of a lightweight and not pricey platform.

Since the proposed structure is the usage of ML algorithms and removing any useless communique with the cloud, it may provide extra effective and short selection-making. Undesirable delays are decreased thanks to avoiding unreasonable roundtrips. As some other contribution of their thought, decreased use of public extensive place networks at the side of the adoption of local algorithms and caching bring about much less highly-priced verbal exchange. In addition, they sell an awesome stability of utility's, communities, and person's requests a few of the facets and core infrastructure. Eventually, the proposed computing version can make use of decisions associated with the pre-processed records and adopt alarms traded among numerous edge gadgets (J. Gubbi et al., 2013).

Also leveraging the computational resources at the threshold of the community, the paper "LW- CoEdge: A light-weight virtualization model and collaborative manner for edge Computing" proposes a novel dispensed and lightweight virtualization model focused on the edge tier. Besides a novel virtualization version tailor-made to the threshold tier and assembly of the particular necessities of IoT packages, their suggestion encompasses a fixed of heuristic algorithms in conjunction with a P2P collaboration process to perform upon the virtualization model. The algorithms carry out (i) an allotted aid control procedure, and (ii) statistics sharing among neighboring digital nodes (VNs, deployed at facet nodes). The disbursed resource management technique affords every side node with selection-making functionality, enticing neighboring area nodes to allocate or provision on-demand VNs. Thus, the disbursed useful resource control improves the device's overall performance, serving extra requests and coping with part node geographical distribution. In the meantime, information sharing reduces the statistics transmissions between cease gadgets and facet nodes, saving energy and lowering facts traffic for IoT- area infrastructures.

Many of the present CPSs, manufacturing, and employer applications are one essential driver of superior and shrewd networked structures following the trend of the enterprise. Massive records are generated in an allotted style and cross-area statistics want to be shared and analyzed efficiently to comprehend an effective supply chain control. Consequently, grasp information control (MDM) that manages how information is saved in a distributed system performs a vital function for corporation facts warehousing and analyses. The paper "master statistics management for production massive records: a way of evaluation for facts network".

Proposes a multi-layer grasp statistics control architecture and investigates the usage of Set Pair analysis (SAP) to model the disbursed information community. The proposed technique has validated the usage of aviation company facts and has established the capacity to assist well-timed updates, reactions, and distribution of facts at every degree of the supply chain.

II. METHODOLOGIES

Smart sensors and ad-hoc wireless networks

CPSs depend on a sturdy synergy among computational and physical additives. A CPS is the combination of abstract computations and bodily methods wherein sensors, actuators, and embedded gadgets are networked to experience, screen, and control the physical global. Consequently, clever sensors and wireless sensor networks are essential additives of CPSs. Wi-fi sensor networks (WSNs) are composed of tiny devices geared up with sensing, processing, storage, and wireless conversation capabilities. Each node of the community can commonly have numerous sensing units, capable of performing measurements of physical variables, inclusive of temperature, luminosity, humidity, and vibration, consequently being the main components to create a perception of the bodily world. WSN nodes operate collaboratively, extracting environmental information, appearing same (regularly) simple processing, after which transmits them to outside systems, via sink nodes, to be analyzed and similarly processed.

Sensor nodes are critically confined regarding reminiscence, energy, and processing capabilities. Therefore, several approaches had been proposed to reduce the energy intake of those nodes with the purpose to make bigger the overall life of the device. When you consider that radio verbal exchange is the dominant aspect of strength consumption in

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maximum WSN (except for the hungry devices of multimedia sensor networks), an effective method is the discount of facts transmission among the sink and the sensing nodes. One of the most typically used methods to reduce radio verbal exchange is the dual prediction mechanism and numerous proposals are pronounced inside the literature.

However, even as all existing methods have been proven to be very effective in decreasing the amount of data said to the sink, their efficiency is countered by using a boom in complexity. Moreover, they may be very touchy to facts loss which renders the dual prediction mechanism out of date. In the paper "Fault Tolerant records Transmission Reduction technique in wireless Sensor Networks", the authors gift an alternative approach that has as a main gain to be simple but robust and greater effective in phrases of prediction accuracy and records reduction. Their approach exploits the truth that sensor information adjusts easily over time, therefore they leverage the prediction model proposed to forecast future readings. They coupled this technique with a facts reconstruction algorithm that exploits each temporal smoothness and spatial correlation among specific sensed capabilities that allows you to estimate lacking values (J. Gubbi et al. 2013).

Vehicular ad hoc networks (VANETs) are a subclass of mobile advert hoc networks (MANETs), and a promising technique for future shrewd transportation structures (ITS). A VANET commonly helps conversation models, namely automobile to the car (V2V) and vehicle to Infrastructure (V2I). Currently, most VANET programs depend upon V2V communications seeing that they do not require luxurious infrastructure. But, as VANET is a dynamic community, information needs to be exchanged between cellular cars efficiently through warding off as way as feasible the printed hurricane hassle, that occurs on every occasion a big variety of automobiles broadcast messages at the equal time as a consequence main to a community saturation, packet delay, and collision problems. In this context, information aggregation is an appealing method allowing to the integration of numerous records about comparable activities to generate a summary (aka mixture) and accordingly potentially reduce the community traffic. There are several proposals for information aggregation in VANETs already suggested in the literature. But, the noticeably complicated city and motorway networks produce awesome traffic facts information that calls for green choice standards and smart filtering before the aggregation procedure. The design of a green statistics aggregation method that mixes correlated visitors statistics or Floating car data (FCD) remains a difficult trouble. The authors of the paper "in the direction of a smarter Directional information Aggregation in VANETs" introduce a brand new records aggregation protocol, referred to as clever Directional facts Aggregation (SDDA), to choose the maximum suitable FCD messages that should be aggregated.

Based totally on the aforementioned research works, it is clear that the future CPSs and intelligent packages heavily depend on the presence and vastity of bodily sensors and WSNs. To make certain the functionality of an application, which includes intruder detection, it is of vital significance to assure the insurance and availability of wi-fi sensors at some stage in deployment. As such, barrier coverage is an essential problem for wireless sensor deployment for lots of business and army applications, wherein each wi-fi sensor can sense inside its variety and a set of wi-fi sensors may be deployed to cowl the whole range of a barrier. Over the past decade, one-of-a-kind barrier insurance algorithms were set up for one-of-a-kind varieties of sensors which include seismic and acoustic sensors, even as in recent years, more studies efforts are committed to radar sensor systems. In "gold standard Placement of Barrier coverage in
Heterogeneous Bistatic Radar Sensor Networks", authors check out the barrier insurance trouble for bistatic radar sensor systems. Specific to the traditional passive sensing version, the Cassini oval sensing model is investigated and an optimal placement approach for heterogeneous transmitters and receivers has been proposed to reap maximum barrier period insurance. The proposed set of rules has been verified through theoretical simulations to demonstrate the most suitable coverage (A. Botta et al., 2016).

Cyber-social networks have considerably progressed social relationships amongst cell users across device-to-tool communications. Within the paper "a detailed review of D2D Cache in Helper choice", the authors gift a survey work that makes a specialty of D2D helper choice techniques in accordance to 3 simple categories, which include the community frame, computing approach, and social-aware characteristic. Differing from different surveys which in particular do not forget the electricity consumption and latency minimization in D2D networks, they speak the choice of D2D helper based totally on different network architectures, which include content distribution networks, peer-to-peer networks, named statistics networks, mobile networks, and vehicular ad-hoc internet- works. Particularly, a selection of

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computing paradigms is taken into account to classify D2D helper choice techniques, along with mobile cloud computing, fog computing, and cell aspect computing.

III. REVIEW

Behavior and influence analytics in social computing

In recent years, the advice device has nicely evolved and is playing a vital role throughout social media. In the paper "ICFR: An effective Incremental Collaborative Filtering based totally recommendation architecture for personalized web sites", the consumer- primarily based collaborative filtering algorithm is carried out in an incremental advice implementation approach, wherein three essential factors: consumer, item, and rating, are redefined, and relationships among user choices and recommended content material are applied to enhance the person-based collaborative filtering set of rules. Furthermore, customers' surfing behaviors are extracted primarily based on the evaluation of net logs from customized websites, which could facilitate the update of customers' historic choices within the design of an incremental algorithm. Experiments demonstrate the excessive overall performance of the proposed approach evaluating traditional updating strategies (A. V. Dastjerdi and R. Buyya 2016).

Following the fast improvement of cellular social networks, the paper "From Crowdsourcing to Crowd mining: the use of Implicit Human Intelligence for better know-how of Crowdsourced information" discusses the concept of crowd mining and affords an everyday version for the improvement of crowd mining systems. The simple concept is to find out and higher make use of the implicit human intelligence hidden in man or woman behavior patterns and crowd-item interaction patterns underneath a certain network context. The authors introduce a simple body-work to recognize the crowdsourced statistics with a formal description and discuss its usage in several trendy obligations in phrases of statistics mining such as type, filtering, and grouping. Based on those, they describe case research, particularly the crowd event and crowd trip, which make use of the strength of implicit human intelligence to facilitate event sharing and experience planning respectively. Particular scenario applications are presented, and the test evaluation displays the effectiveness of the proposed method in occasion localization and detection, and journey course generation through the use of online/offline crowdsourced facts.

Behavioral analysis has drawn an increasing number of attention for mobile computing software in massive records environments. To cope with the special problem of affect maximization in social networks, the paper "three-hop speed Attenuation Propagation model for affect Maximization in Social Networks" proposes a 3-hop speed attenuation propagation model, primarily based on which the author's layout an algorithm for the most of impact considering the grasping set of rules with a heuristic set of rules. Within the constructed community version, the sum of changed ranges of the active nodes is hired to degree the effect of a node. In one of these manners, the effect of a single node can be effectively modeled and represented, and the shortage of diffused impact resulting from the 3-hop simulation may be further made up. Two different datasets gathered from DBLP and fb are used to conduct the propagation simulations, and the experiment outcomes display the high performance of the proposed approach comparing the conventional greedy algorithms.

IV. RESULTS

Machine Learning and Intelligent Applications

Sensors and WSNs play an essential position inside the CPSs and sensible applications by offering essential infrastructure and information resources. But, how to method facts to guide decision-making and provide "intelligence" in systems and programs remains a large mission. In recent years, ML has proven first-rate ability to many applications in client electronics, commercial, and protection and surveillance applications. On this special difficulty, several particular studies works are supplied on numerous novel ML techniques and sensible applications (H. Han et al., 2020).

As networked systems are becoming more and more complicated, computerized operations and protection have become enormously critical to ensure efficient and dependable device operations. As the technologies evolved, the focus of advanced technologies also shifted to offer more intelligent and extra "personalized" offerings to cease users. This trend may be found in patron electronics to even production organizations to have customized products and services. Consequently, advanced technology for figuring out the person has become a very crucial topic to ensure the transport of secure and comfortable non-public offerings. Whilst there are numerous uni-model private identification strategies

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consisting of password, facial, voice, and fingerprint, each modality has weaknesses that make the overall gadget vulnerable. In the paper "A correct Multi-Modal Biometric identity system for man or woman identity through Fusion of Face and Finger Print", a multi-modal man or woman identity.

The approach is proposed with the aid of fusing facial and fingerprint statistics. The proposed approach has been tested with four distinct datasets and has finished with a promising popularity accuracy of ninety-nine. 59%.

Special to conventional synthetic intelligence (or gadget intelligence), research efforts are also dedicated to mimicking unique human traits, behaviors, and personalities. In addition, to offer intelligence, researchers are in search of approaches to seize and represent the distinctiveness of people in reaching human-like (or even man or woman-like) artifacts which includes digital avatars and humanoid robots. But, there's yet a complete model to systematically describe human trends and personalities. The paper "From have an effect on, Behavior, and Cognition to character: An included personal individual model for the character- intelligent Artifacts" offers a huge overview of the present non-public man or woman fashions (PCMs) from one-of-a-kind research arenas and views which include psychology and computational intelligence. A singular PCM is proposed to seize comprehensively personal influences, behaviors, cognition, and the intra- and inter-relationships between those personal traits. The feasibility of the proposed PCM model has been verified by extracting representative personal characteristics via various private facts, including wearable gadgets and cognitive assessments (Abbasi et al., 2007).

V. DISCUSSION

Privacy and security in smart computing

Certainly one of the largest issues in the cyber world is safety. Via delegating management of physical strategies to virtual entities, often accessed via wireless networks, several vulnerabilities arise. Without solving protection issues, it isn't feasible to leverage the paradigms linked to cyber-physical structures. As cyber-attacks grow to be greater frequent, the studies community has offered several techniques (e.g. Heuristic techniques) to locate and examine malicious pro- grams (also referred to as malware). However, designing effective and green malware detection processes poses numerous demanding situations and nonetheless has open troubles, for instance, due to counter-malware detection efforts via malware authors and cybercriminals. There are three main approaches for reading malware: static, dynamic, and hybrid, each of them with its execs and cons. Looking to mitigate a number of the drawbacks of cutting-edge static, dynamic, and hybrid malware detection tactics, multi-view mastering is a promising solution. Multi-view data are very commonplace in actual global applications, in which statistics are often gathered from unique sources, using distinctive measuring strategies. Specific information assets shape one-of-a-kind characteristic units, and every set is known as a view. Any particular unmarried-view records can't comprehensively describe the phenomenon under commentary. Influenced by using this, multi-view getting to know is an emerging direction in machine gaining knowledge which considers mastering with more than one perspective to enhance the generalization overall performance.

To conform multi-view mastering for malware hazard looking, the authors of the paper "A Multiview learning approach for Malware danger hunting: home windows, IoT and Android as Case research" leverage the ability of the usage of executable files for both malware and good ware (i.E. Non-malware) as the source for multi-view records extraction. The venture they tackle in this context is to determine what algorithm may be used to successfully extract functions from executable documents. Current procedures normally use unmarried view facts for malware detection or a combination of some views within the form of a single view. In their paper, the authors recommend an efficient ensemble multi-view getting-to-know approach, which automatically assigns optimized weights to specific perspectives. The proposed method is a huge margin classifier that improves the generalization of the use of a worldwide most desirable hypothesis. To demonstrate the adaptability of the proposed. The approach in detecting malware on one-of-a-kind platforms, they examine their device with datasets comprising internet of factors (IoT), windows, and Android malware (J, Jeba et al., 2023).

Further to the demanding situations of coping with cyber-attacks, which arise in a variety of situations and application domain names, cyberization poses numerous security and private demanding situations in the specific situation of IoT structures. Given its relatively dynamic and heterogeneous scenario, besides the opportunistic and ad-hoc nature of interactions, in an IoT gadget, it's far hard to carry out identification control, guarantee the trustworthiness of records,

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detect abnormal behaviors, and manipulate access to numerous data. Information provenance can resolve some of the aforementioned troubles in IoT via recording statistics approximately statistics origins, data operations, and processing records from its supply to the modern kingdom. As a result, it turns possible to song the resources or origins of several varieties of troubles associated with abnormal behavior, trustworthiness, and statistics to get admission to IoT. Even though long followed in data structures and information mining techniques, for the cause of identifying the owner of an item/data or its origin, creator, and the way the data became communicated or processed, investigations of statistics provenance within the context of IoT have handiest currently begun. The authors designed a conceptual model as a common structure of data provenance in IoT. Since this first painting, increasingly researchers started to pay attention to facts provenance in IoT, and some provenance control schemes were proposed and applied in various sensible IoT services.

However, the literature nevertheless lacked a comprehensive survey on records provenance in IoT. To be able to fulfill this gap, the paper "A Survey on statistics Provenance in IoT" reports the findings of a complete survey on present works associated with this discipline. As main contributions, the authors (i) advocate uniform standards on information provenance in IoT by way of analyzing IoT allotted structure and reviewing facts provenance techniques and packages, (ii) review existing works on facts provenance in IoT and analyze their professionals and cons consistent with our proposed criteria and protection requirements, and (iii) point out several open issues based totally at the thorough survey and try to offer guidance for destiny research inside the subject of statistics provenance in IoT with the aid of evaluating its recent enhance.

VI. CONCLUSION

This unique problem aims to promote the development of cyber-associated information and communication technologies in clever computing. Particularly, a spread of essential subjects are addressed on this unique trouble, such as: information Modeling and management for Cyberization, statistics Sharing and Dissemination in clever Computing, clever manage and tracking for Cyberization, Cognitive bodily-Social Networks, content analysis and Mining in Cyber-Social Networks, Behavioral Analytics throughout smart Networks, Deep studying in Cyberization, aid management in heterogeneous Networks, intelligent Transportation structures the usage of smart Networks, smart internet of things, Cyber-bodily-Social statistics Processing and Intelligence Mining, smart data Streaming and actual-Time Processing, smart Sensors and advert-Hoc wireless Networks, facts garage and Integration in our on-line world, Semantic web Mining in clever Computing, Infrastructure and Platform for smart community structures, Wearable technology in smart Environments, mobile Computing with clever Sensors, smart electricity control and Sustainability, privacy and safety in smart Computing, and so forth.

The prevalent papers have attracted researchers (corresponding authors) across trans-disciplinary research fields from 11 distinctive countries, inclusive of Australia, Brazil, China, Finland, France, Japan, Saudi Arabia, Singapore, the united kingdom, the US, and Tunisia. Consequently, this unique difficulty may have a remarkable significance and impact on: i) studying cyber and cyber-conjugated matters for the cyber-enabled new worlds; ii) organizing the body of expertise in cyber-related research and programs with complete frameworks in inter-, trans- and multi-field fields; iii) improving cyber technologies no longer best in fundamental research works, but also in application gadget development.

ACKNOWLEDGMENT

The paper consists of information related to smart computing. It focuses on the following elements and values introduction methodologies, privacy, security, behavior and influence analytics in social computing, results, and discussion followed by conclusion and references. I hereby declare that all the information provided in the respected paper is authenticated, authorized, and hence reliable. I would like to thank all the viewers and readers of this paper for their precious time.

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Eucalyptol as a Sustainable Solvent for Synthesis of Heterocycles

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Abstract: *Eucalyptus is a species of plant that has affected researchers and preservationists' observations across the globe since it is a rapidly expanding source of tree wood and a source of oil used for a variety of applications. Eucalyptol is the primary and most important oil component. This viewpoint summarises the literature that indicated the need for eucalyptol therapy for disorder. The recycling of eucalyptus oil as a catalyst for the synthesis of O, S, and N-heterocycles was another effort we described. A crucial component of the ecological performance of processes in commercial and theoretical laboratories is the catalyst employed in chemical synthesis. It is impossible to ignore their impact on prices, protection, and health. Green chemicals, like biogenic systems, have a significant advantage in that they can lessen the negative effects of organic synthesis on the environment. The first section lays out the steps that eventually led to the discovery of an unrivalled catalyst and its acquisition in the initial reactions. This section continues with a discussion of its characteristics and reuse, as described in the many managed studies. The employment of eucalyptol in a series of reactions that produce O,S,N-heterocycles is another high point of the segment. As we outline the development procedure used to create the ideal circumstance. We also demonstrate that eucalyptol can function admirably as a replacement to produce heterocycles containing O, S, and N. These studies enabled us to assess the viability and potential of the bio catalyst.*

Keywords: eucalyptol, 1,8-cineole, green synthesis, heterocyclic chemistry, bio-based solvent. O,S, N-heterocycles

I. INTRODUCTION

The catalyst used in chemistry reaction are a basic element of the ecological production of action in industrial and academic laboratories. Their influence on value, security, and health cannot be considered. Even if catalyst -free reactions are viable to a certain extent, they are not relevant to a large spectrum of chemical reactions and initial materials, and they may damage overall percentage and product purity. evenly important, multiphasic reactions involving solid catalysts and gaseous and/or liquid solvent, which are usual practice in the natural gas and refining industry, are not simply capable to pharmaceutical active ingredient or in synthesis.

Solvents are the most ample element of chemical transformations, so acting thereon and restore standard catalyst with safer alternatives may have a fantastic environmental impact. Nitrogen heterocyclic compounds suggested an major class of compounds in the pharmaceutical industry. That's why, it is important to supply new technique and greener approaches for chemical synthesis.Ensuing our objective of growing new practices in the different types of synthesis of heterocycles containing oxygen, sulfur, and nitrogen, we survey the potential of eucalyptolas catalyst in Hiyama coupling, cyanation, and multicomponent reaction.

1.8-cineole is a saturated oxygenated terpene that is mostly issued in some plants and their essential oil fractions, and counting on the species, it carry up to 90% in eucalyptus' essential oils remote from fresh foliage. Its use as a catalyst is also very interesting from an ecological point of view, since in calculation to the fact that this solvent is reuse by easy distillation, it achieved from the left over paper and wood industry.Discharge of these types of molecules take an important role in aeronautical chemistry via reactions with O,, Oll or NO. They can also have remarkable insecticidal , her bicidall, anti-microbial, and therapeutic properties . A basic awareness of the physical chemistry of these molecules is crucial in understanding the complex interconnection in atmospheric and biotic environments. In this work we describe the microwave spectra of two structurally related monoterpenes': 1,8-cineole and 1.4-cineole . The structures

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of 1,8 cincole, hereafter eucalyptol, and 1,4-cincole are atypical of most monoterpenoids as they are completely saturated, bicyclic ethers. A three dimensional presentation of each molecules is shown.

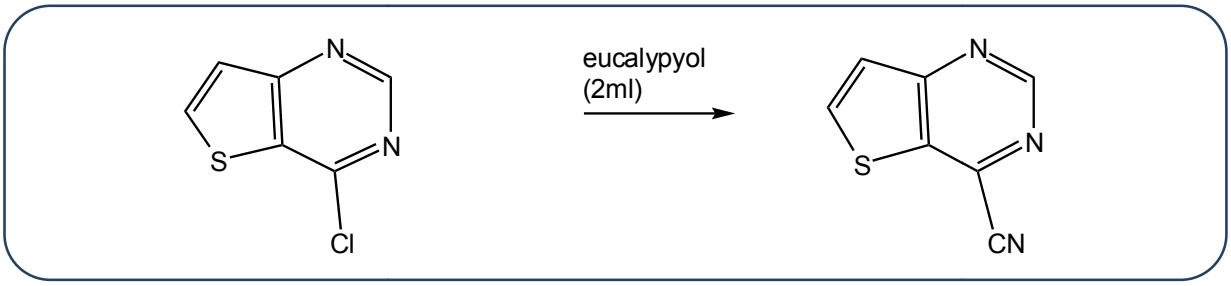
Eucalyptol is mostly used in the beauty product industry and has known herblcidal and insecticidal properties . Due to the deficiency of most reactive functional groups the atmospheric lifetime of eucalyptol is on the order of one day. Notably longer than most monoterpenes with classic lifetimes on the or der of hours.

Terpenes are a various class of Biogenic evaporative Organic Compounds that are manufactured via the addition of building block units of isoprene (2-methyl- 1,3-butadiene). Monoterpenoids carry two units and an additional functional groups (e.g. alcohol or ketone) and can take on a excellent diversity of structure.

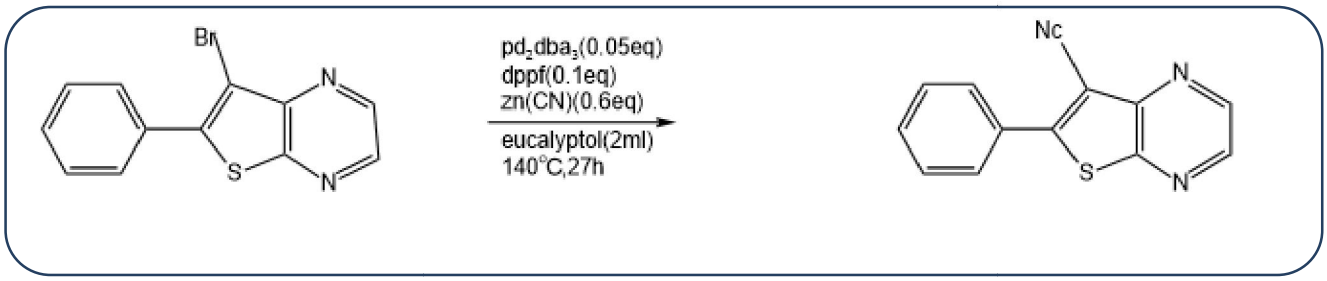
As we describe here the first examine of the use of eucalyptol as a new catalyst for organic synthesis. Heterocycles containing oxygen, sulfur and nitrogen were selected as targets or as initial materials for widely used palladium-catalysed cross-coupling reactions, i.e. Suzuki–Miyaura and Sonogashira–Hagihara reactions. Eucalyptol proved to be a workable sustainable alternative to mostly used solvents.

Synthesis by using eucalyptol

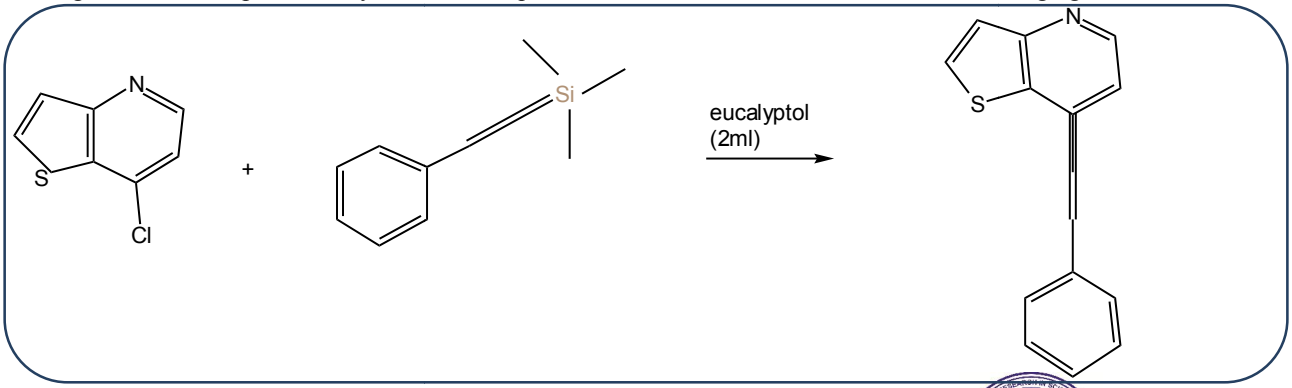
Starting from 7-chlorothieno[3,2-b]pyridine and based on our results with 4-Chlorothieno[3,2-d]pyrimidine, we looked for the conditions that wouldResult in the highest yield.



Eucalyptol as solvent with Pad(dba), (5 mol%), dppf (10 mol%). Zn(CN): (60 mol%), Zn (20 mol%) at 170°C for 26 h.The desired product 13 was obtained in good yield using eucalyptol as solvent at 140 °C for 27 h with Pds (dba)s/dppt as catalytic system and Zn(CN), as cyanide source.



Hiyama coupling is a palladium catalyzed CC bond formation between aryl, alkenyl, or alkyl halides or pseudohalides and organosilanes. Its particularity lies in the requirement for a fluoride ion or a base as activating agent.

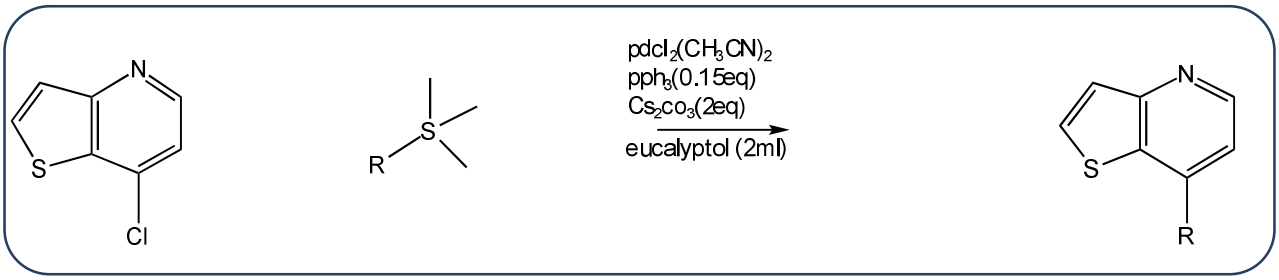


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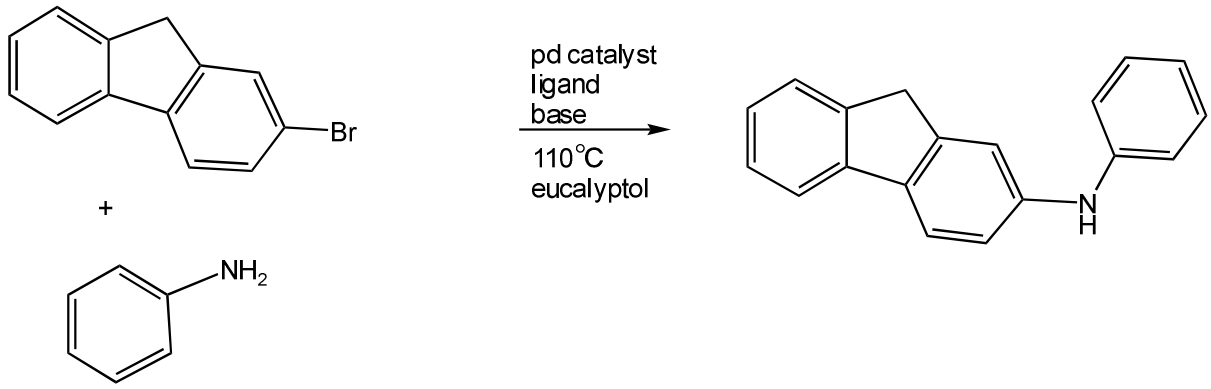
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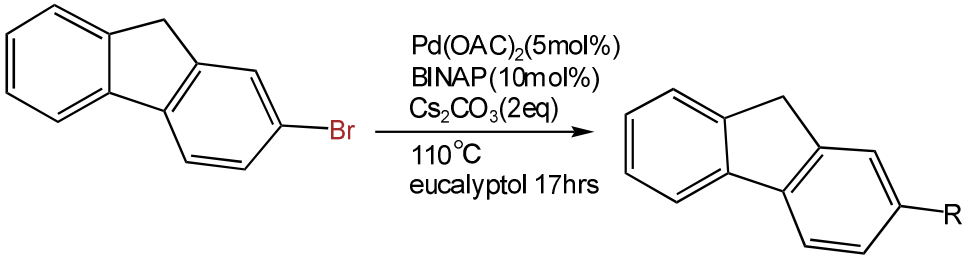
Eucalyptol as bio-based solvent application to himaya coupling, cyanation of multi components reaction in which 7-chlorothieno 3 2-b pyridine gives the product in the presence of pdcl2(Ch3CN)2, pph3 (0.15eq), Cs2Co3 (eq) and the green solvent eucalyptol.



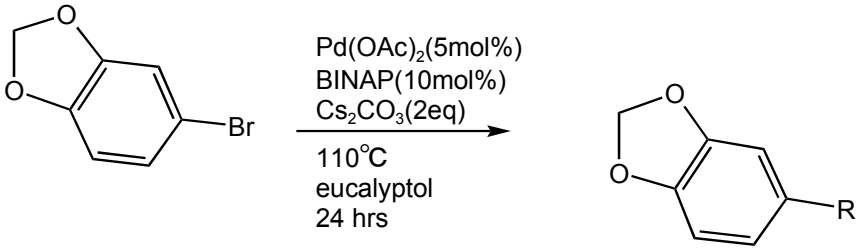
For the starting material, we used the 2-hromofluorene as the brominated derivatives and choseAniline as the amine reagent in presence of pd catalyst, Eucalyptol and the temperature is 110°C (Scheme 4)The stoichiometry has been chosen from the literature and experience from our previous work on the synthesis of O,S, N-heterocycles.



The commercially available 2-Bromofluorene was then reacted with various amines in eucalyptol It's the solvent at 110° C for 17 hrs the product is formed by reacting with pd(OAC)2(5mol%) , BINAP (10mol%) and Cs2Co3.



The average yield for the Buchwald Hartwig, reaction of 4-Bromo-1,2-methylenedioxybenzene using Eucalyptol as the solvent was 72%. Similarly, the toluene showed slightly higher yield; however, this slight increase in yield does not justify its use since toluene is classified as problematic [Likewise, our new solvent is an excellent opportunity to reduce the environmental impact of this chemical transformation.



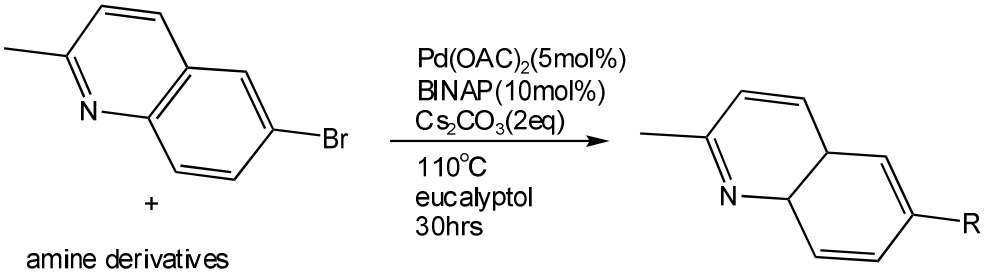
The commercially available 6-Bromo-2-methylline was reacted with the same mine reagents ply to the same condone, to lead to expected Buchwald-Hartwig coupling porn g yold (61%-99%) (Figure, Supplementary Materials). The

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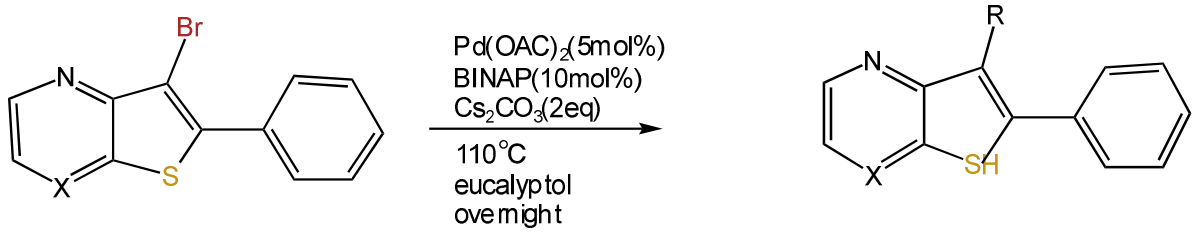
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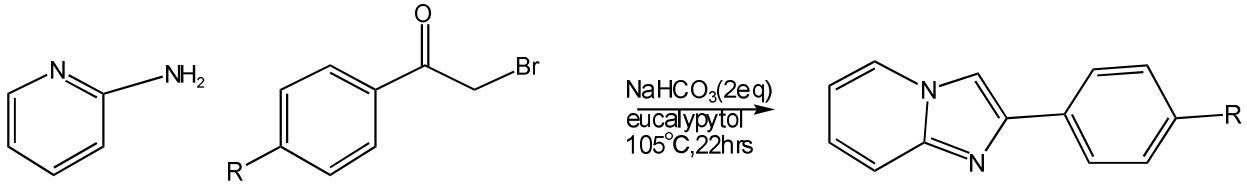
average yield for the Buchwald-Hartwig wwrtion of emo-3-methylgunoline neng encalyptal se the solvents The yields chestned eucalyptol www better when compared to results already reported with common solvents.



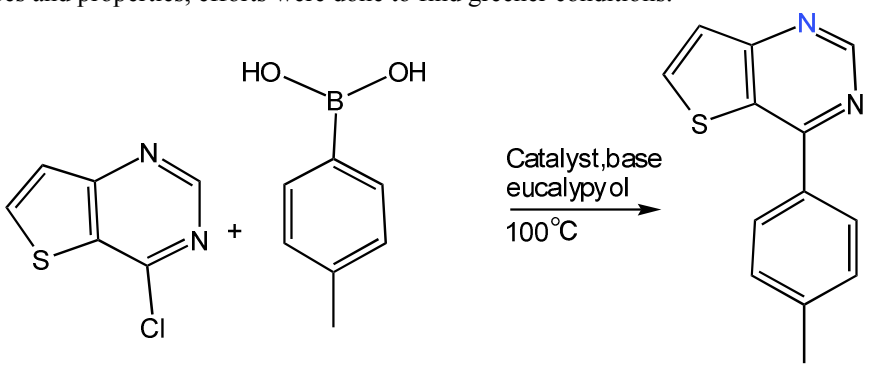
starting from 2-Bromo-6-phenylthieno[2,3-b]pyrazine and Bromo-2-phenylthieno[3,2-pyridine using the previous conditions, even though the reactivity of se heterocycles was often reported as reduced (Figure 6) We were pleasantly surprised to find that e results obtained with our conditions were particularly good or excellent since they ranged from to 99% for the synthesis of desired compounds.



2-phenylimidazo[1,2-a]pyridine 3a was obtained in good yield after 22 h at 105°C in the presence of NaHCO3. both in limonene and eucalyptol whereas the use of k2CO3, gave better results with limonene as solvent.



The Suzuki-Miyaura reaction belongs to the most powerful and most applicable group of reactions for formation of C-C bonds. Its use is effective for a wide range of substrates, which makes this cross coupling reaction a versatile tool. Due to all of these features and properties, efforts were done to find greener conditions.



II. CONCLUSION

In conclusion, the synthesis of eucalyptol, also known as 1,8-cineole, has been the subject of extensive research due to its wide range of industrial and medicinal applications. Several synthetic routes have been developed over the years, including the oxidation of terpenes, the reduction of α-terpineol, and the epoxidation of α-pinene.The choice of synthesis route depends on various factors such as cost, availability of starting materials, efficiency, and environmental impact. The oxidation of terpenes using various oxidants is the most commonly used method for the industrial

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production of eucalyptol. However, this method is associated with several drawbacks, including the formation of undesirable by-products and the use of toxic and hazardous reagents.The reduction of α-terpineol and epoxidation of α-pinene are promising alternatives to the oxidation of terpenes. The reduction of α-terpineol offers a cost-effective and environmentally friendly route to eucalyptol, while the epoxidation of α-pinene provides a high yield of eucalyptol with a high degree of purity.In summary, the synthesis of eucalyptol is a complex process that requires careful consideration of various factors. The development of more efficient and environmentally friendly methods for the synthesis of eucalyptol is an ongoing area of research that has the potential to make a significant impact on the industry and the environment.

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Smart Home Technology

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Abstract: *Smart house is rising technology growing unendingly currently. It integrates of the many new technologies through home networking for rising human's quality of living, thus there have several comes researching in various technologies to use to the good home system. consequently, this paper reviews varied topics on good home technologies from measuring for good home analysis comes. The topics is predicated on the definition of good home and therefore the details of good home components together with good home networks which will be classified into 2 main sorts, that square measure wiring system and wireless system, good home controllers that use for managing system, the appliances or the good devices and therefore the challenges of good home. This paper conjointly offers several attention-grabbing comes summarily, thus it are often concepts for whoever wish to be told this technology.*

Keywords: smart home, smart home network, smart home appliances

I. INTRODUCTION

GENERALLY, once the electrical instrumentation is blocked in however it's not in use, there still has the flow of electricity. which means we are going to lose the electricity concerning 5 to 10 % of often usage, so wastes cash for no reason. Moreover, which will even be reason behind several accident like the fire from electrical contact. Therefore, many folks United Nations agency continually forget to undo the device need to inform themselves on every occasion they're going out. On the opposite hand, if they're going out with forgetting to undo, they have to return to drag the plug resolute avoid the damaging things, thus it's a waste of most time. so as to resolve these issues, sensible home technology are needed. With the advance of technology, several analysis comes concerning sensible home are developed so as to facilitate human and improve their quality of living. A home, that is sensible, is that the technology wont to create all equipment round the home act "smart" or "intelligenat" or additional sensible, is that the technology wont to create all electronic around the home act "smart" or "intelligent" or additional machine-controlled that's to mention sensible home has extremely advanced automatic systems for lighting, temperature management, security and many alternative functions.

A smart device is a standard appliance with a complicated laptop put in to administer it additional practicality which will monitor such a big amount of aspects of daily routines. a sensible house is helpful for everybody and might even be wont to enhance the existence reception. consequently, sensible home consists of 3 elements, that square measure network, dominant devices and residential automation. [2, 3] The network is employed for connecting the automation to the dominant devices and it may be wire and wireless. The dominant devices square measure used for managing the systems. and therefore the home automation square measure device that management the physical atmosphere. However, we are going to discuss of these 3 elements thoroughly within the following section

II. SMART HOME TECHNOLOGY

2.1 Smart Home Network

Smart home network technology is classified into 2 main varieties, that ar wiring system and wireless system.

In wiring system, the instrumentality are connected into the most power provide directly, therefore the information are sent to the devices to activate or deactivate them. There ar many sorts of wires that folks might want to put in in-wall. several home-automations ar connected through wiring system like new wire (twisted try, optical fiber), Powerline, Busline, etc. Associate in Nursing example of outstanding technology is X10, that is open normal for home automation. X10 transmits binary information victimisation the AM (AM) technique. And X10 controllers send signals over

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existing AC wiring to receiver modules. alternative technologies ar HomePlug, client physics Bus (CEBus), European Installation Bus, etc.

In the wireless system, there should have 2 main components that ar sender and receiver. several new appliances use wireless technology to speak with alternative devices. the instance of wireless communication system ar microwaves, Infrared (IR), oftenness (RF), Wi -Fi, Bluetooth, IEEE 802.11, and so on. moreover, a number of sensible home network normal will work victimisation each wiring system and wireless system. Associate in Nursing example of wireless communication system for sensible house is Z-wave, that may be a reliable and reasonable wireless home automation resolution. Z-wave may be a wireless RF-based technique for fast device of appliances.

B. Smart Home Controller

Smart home dominant devices ar used for managing the systems by causing knowledge or signal to regulate the actuators. The samples of the controllers aren't solely the remote, however they'll even be smartphones, tablets (iPad, Galaxy tab), net browsers and Short Message Service (SMS) . Moreover, a number of systems could have laptop that works as center of the surroundings perception or the analysis unit.



C. Home Automation

1) In Kitchen

The most detected regarding good technologies ar that of the room. associate example appliances that ar good ar refrigerators, microwaves, low manufacturers, and dishwashers.

The Internet white goods applies the technology of good home to create several works a lot of easier. there's net enabled and permits for users to speak with it via the web, thus it's ready to transfer recipes so show them on its liquid crystal display screen. Moreover, the white goods conjointly takes associate automatic inventory of things within it and it will alert the users to what's there. What's additional, microwaves also are good. Microwaves will communicate with good white goodss and counsel recipes supported the food things obtainable within the refrigerator. The microwave will even be set to start out at bound times whereas users ar faraway from home.

2) In living room

Stepping faraway from the room, one a part of the house that has good home technology adoption resides space. good devices like televisions and stereos can utilize this technology to boost the diversion experiences. The good TV can have several functions like desktop notebook computer thus this results in interactive TV and additional interactive content can become obtainable.

Furthermore, lighting management systems is accustomed management social unit electrical lights by victimisation of motion detectors to mechanically extinguish the lights during a space when individuals have left and switch on the lights if individuals enter an area.

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3) In Bedroom

The room has good climate management that the users will set the scene in chamber with single-touch heating and may select a novel night-time temperature and lighting profile for every chamber. The bed is additionally equipped with device that may monitor movement of someone in bed for police work health condition relating to sleeping in typical routine of someone.

Moreover, the good devices is employed in several aspects, for example,

Welfare - Health watching, personal trainer, remote designation

Entertainment - tv, video, games, good theater, Multi-Room Audio, HD Video Distribution

Environment - device of lighting and heating and air-con. Energy usage and price.

Security - good Security, simulated occupancy, property watching and protection, detection of fireplace, gas leaks and water leaks, teleassistance.

Communication - Video phone, home calendar, reminders and communication within and outdoors the house

Green - cut back Electricity and heating fuel consumption. Less Carbon Output.

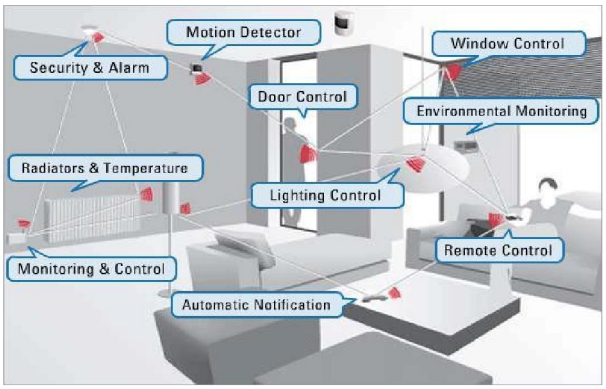


Fig 2. Examples of the smart devices.

III. SMART HOME PROJECTS

New several sensible home technologies are explored and developed. because the cloud computing is present, there's one project named a Framework for Cloud-based sensible home. during this project, they merge sensible home into sensible -home-oriented cloud that straightforward protractile and suitable future demands. additionally, the cloud give net services and therefore the characteristic of sensible home with six main applications, that area unit environmental, security, recreation, domestic appliances, data and communication and health. Another project referred to as the software system computer code for sensible home device supported cloud computing service project,

helps designer choose sensible home device and build a wise elbow room. This project offers visual simulation by applying the interface to construct a true sensible home. What's additional, the operation of sensible home devices has four sensible mode as well as passive, responsive, active and interactive. Therefore, it's useful in budgeting and quotes.

In Egypt, there's a project referred to as Energy saving through sensible home, aims to use the sensors to attenuate the domestic energy waste in keeping with human habits and therefore the projected situation will be reportable of daily routine. Another project by Kongju national university, sensible home energy management system exploitation IEEE802.15.4 and ZigBee developed sensible home system supported Energy savings and user happiness that area unit 2 main style concerns. during this system, they take away the wires from the lighting controls so provides further advantages, as well as larger and vital savings in installation by avoiding the expense and disruption of wiring. Moreover, there's adaptation of the sensible technology in alternative aspects like a project referred to as a Calendar bound services for sensible home. This project is that the development of service model supported home calendar to support close intelligence in home, therefore the service can contemplate the family activities designing and supply additional intelligence, or additional sensible vision of the sensible home.

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IV. SMART HOME CHALLENGES

1) Challenges one: Security

Smart home conjointly comes with some security issues. as an example, hackers will access the network system. they need the power to manage all sensible devices particularly the protection appliances.

2) Challenges two: Adaption to New setting

Owning a sensible home suggests that having to find out a way to use your home that needs you to adapt to several innovations around you like security systems and lots of sensors that continually observe your movement. consequently, it'll take reading manuals and learning concerning how-to of your home.

3) High price of Intelligence

Although sensible homes have several properties that produces human's lives convenient, these sensible properties area unit during a higher tag. the value of AN intelligent house is high as a result of a number of the technology is comparatively new. However, principally of home automations area unit simply some advances that area unit

V. CONCLUSION

This paper supported the that means of sensible home and also the details of sensible home parts. and also the main objective of this paper is to administer a survey for these sensible home researches and summarily describe the small print regarding sensible home. because the development of technologies grows, several analysis comes have conjointly been developed. currently sensible house is quite simply a home controlled by the central analysis unit like laptop. With sensible homes, the means folks live can clearly become a lot of economical and cozy. All the time, our home may be saved from home automation, therefore we'll have a lot of time to figure on alternative pursuits. However, sensible home technology may be a sensible choice for people that care regarding security and luxury however energy saving furthermore. Smart homes are going to become a lot of present as a result of new technologies can be explored a lot of and a lot of. In future work, we tend to decide to build Associate in Nursing application on pill or sensible phone victimisation mechanical man software system for dominant the sensible devices for easier and a lot of convenient living.

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Assessment of Minerals in Some Wild Green Leafy Vegetables of Raigad District

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Abstract: *In the present study, microelements (Na, K, Ca, Mg and P) and trace elements (Fe, Zn) content of fresh vegetables of ten one wild vegetables traditionally consumed in Raigad district, Maharashtra were examined. All the examined vegetables are found to be rich source of microelements as well as trace minerals. Calcium is the most abundant microelement ranging from 133.7 mg/100g to 548.2 mg/100g. Iron is the most abundant microelement in the examined vegetables.*

Keywords: Green Leafy Vegetables, Macro elements, Trace elements

I. INTRODUCTION

Nutrient deficiency is of major concern for many developing countries. Micronutrient deficiency affects over two billion people worldwide, resulting in poor health, low worker productivity, high rate of mortality and morbidity [1]. Anaemia is one of the important worldwide health problems affecting nearly thirty percent of the world's population due to iron deficiency. As vegetables are the excellent sources of vitamin C, beta–carotene, and mineral constituents in human health. Various minerals are involved in numerous biochemical processes so adequate intake of essential mineral is necessary for healthy life.

Vegetables constitute a major part of daily food intakes by human population all over the world. Vegetables are important role in well- balanced diet. Diets reach in vegetables and fruits are link to reduce the risk of diseases like diabetes, cancer, coronary heart disease, neurodegenerative ailment [2]. About thirty elements are recognized as being indispensable to some form of life. Due to their high-water content leafy vegetables are believed to occupy a modest place as a source of trace elements. Essential minerals can be divided into two groups, major minerals (Na, K, Mg, Ca, P, S) which are required in amounts greater than100 mg per day and they represent 1% or less of body weight while the other are considered as trace minerals (Fe, Zn, Cu, I, Si, Mn, F, I, Cr) which are required in an amount less than 100 mg per day and they represent less than 0.01 % of body weight. Due to malnutrition increasing prevalence of chronic degenerative diseases worldwide, the need of exploration of underutilized food is significant to overcome the nutritional disorder [3].

As the green leafy vegetables are excellent sources of micronutrients, consumption of green leafy vegetables may play an important role to overcome the micronutrient deficiencies as well as to prevent the degenerative diseases. Raigad district is rich in plant biodiversity. The people of this region are traditionally using different types of wild plants as food from a long time. However, there is a very little information on the mineral composition of these wild vegetables. This study was therefore undertaken to assess the mineral composition of 10 wild leafy vegetables consumed in Raigad region.

II. MATERIAL AND METHOD

10 wild species of leafy vegetables (Table 1) were collected from Mahad, Murud, Alibag of raigad district Maharashtra, and were identified by a taxonomist. Fresh vegetables were cleaned and external moistures were blotted dry with tissue paper and non-edible portions separated and discarded. Edible portions were cut into small pieces. Weighted quantity of fresh vegetable was dried at temperature below 65 °C. The dried samples were used to analysis.

For analysis of Ca, P, Na, K, Mg, Zn weighted quantity of each dried sample was subjected to preparation of ash by incineration in a muffle furnace at 550 °C. 1g of the calcined ash of each sample was digested with triple acid mixture (1: 2: 4) HCl-HNO3-H2SO4 to dryness. The residue was dissolved in 2N HNO3, the insoluble portion was filtered out

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with Whatman 42 filter paper; the filtrate was made up to 50 ml and was preserved for analysis of the metals. The concentration of Na, K, P, Mg, Ca, Fe and Zn was measured by Atomic Absorption Spectrophotometer (Perkin Elmer Analyst 200).

Table 1. List of selected wild green leafy vegetables

Scientific name	Family	Local name
Colocasia esculenta	Araceae	Dhopa
Oxalis corniculata	Oxalidaceae	Ambuti
Smithiaconferta	Fabaceae	Kaula
Cleorodendrumserratum	Lamiaceae	Bharangi
Amaranthus viridis	Amaranthaceae	Chaulayi Bhaji
Hibiscus Sabdariffa	Malvaceae	Ambadi
Chlorophytum tuberosum	Asparagaceae	Kulee
Cassia tora	Caesalpinaceae	Tarota
Celosia argentea	Amaranthaceae	Kurudu
Impatiens balsamina	Balsaminaceae	Terda
Amaranthus spinosus	Amaranthaceae	Matbhaji
Boerthaviadiffusa	Nyctaginaceae	Khaperkhuti
Commelinabenghalensis	Commelinaceae	Kena Leaf

III. RESULT AND DISCUSSION

The results of the analysis for macro-mineral content of the green leafy vegetables are presented in the Table 2. The sodium concentration of the raw vegetables ranged between 2.7 mg/100g (*Celosia argentea*) to 30.7 mg/100g (*Impatiens balsamina*). The potassium content of the raw vegetables was found to be higher than that of the sodium content. In the raw samples potassium content ranged between 108.8 mg/100g (*Smithiaconferta*) to 490.4 mg/100g (*Hibiscus Sabdariffa*). Consumption of too much Na and less amount of K contributes high prevalence of hypertension [5]. The Na/K ratio in our body is of great concern to prevent high blood pressure and the ratio should be less than one [6]. Calcium and phosphorous are important for growth and healthy maintenance of bones, teeth, muscles and blood can be made.

Table 3. Mineral content of the raw green leafy vegetables (mg/100g of edible portion)

Sample	Na	K	Ca	Mg	P	Fe	Zn
Colocasia esculenta	6.9 ± 0.4	170.4 ± 10.1	548.2 ± 31.4	85.7 ± 3.4	43.8 ± 2.6	12.16 ± 0.43	0.82 ± 0.10
Oxalis corniculata	8.4 ± 0.6	146.9 ± 10.2	243.3 ± 21.3	116.3 ± 4.1	58.3 ± 5.7	12.71 ± 0.57	0.80 ± 0.11
Smithiaconferta	4.1 ± 0.7	108.8 ± 12.5	476.7 ± 31.1	87.3 ± 5.2	42.8 ± 3.1	12.12 ± 0.21	0.46 ± 0.04
Cleorodendrumserratum	2.7 ± 0.2	114.3 ± 12.3	483.6 ± 27.9	112.9 ± 8.5	58.7 ± 3.1	12.70 ± 0.78	0.47 ± 0.03
Amaranthus viridis	8.5 ± 1.1	138.8 ± 7.7	321.5 ± 14.4	201.2 ± 10.5	43.2 ± 3.2	16.97 ± 1.54	0.83 ± 0.07
Hibiscus Sabdariffa	5.2 ± 0.7	490.4 ± 37.8	243.7 ± 24.4	118.2 ± 8.2	37.7 ± 2.1	16.76 ± 1.12	0.84 ± 0.09
Chlorophytum tuberosum	9.9 ± 0.4	210.4 ± 25.3	276.6 ± 12.3	57.4 ± 5.2	57.7 ± 6.4	12.19 ± 0.91	0.93 ± 0.11
Cassia tora	10.1± 0.8	139.3 ± 16.9	158.7 ± 16.3	87.8 ± 7.7	54.8 ±6.7	12.71 ± 0.98	0.91 ± 0.08
Celosia argentea	17.7 ± 1.8	361.1 ± 23.2	147.5 ± 14.6	116.9 ± 5.6	43.7 ± 3.1	8.46 ± 0.44	0.25 ± 0.02

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Impatiens balsamina	30.7 ± 2.2	393.6 ± 33.1	151.4± 12.2	111.6 ± 5.7	48.9 ± 2.7	9.78 ± 0.51	0.31 ± 0.04
Amaranthus spinosus	16.3 ± 1.4	260.3 ± 18.6	136.2 ± 12.3	142.4 ± 8.7	45.8 ± 3.8	9.68 ± 0.51	0.29 ± 0.03
Boerthaviadiffusa	12.1± 0.8	160.3 ± 18.6	133.2 ± 12.3	148.4 ± 8.7	46.3 ± 3.8	9.38 ± 0.51	0.27 ± 0.02
Commelinabenghalensis	9.1± 0.8	360.3 ± 18.6	142.4 ± 8.7	139.4 ± 8.7	46.2 ± 3.8	9.00 ± 0.51	0.22 ± 0.02

All data are the means ± SD

Ca is the most abundant macro-minerals of the studied vegetables, ranged from 133.2 mg/100g (*Boerthaviadiffusa*) to 543.2 mg/100g (*Colocasia esculenta*).The value for magnesium in these vegetables ranged from 57.4 mg/100g (*Chlorophytum tuberosum*) to 201.2 mg/100g (*Amaranthus viridis*). Mg involved in bone mineralization, protein synthesis, enzyme action, normal muscular contraction, nerve transmission. Dietary deficiency of magnesium which is linked with ischemic heart disease [7] could be prevented by the regular consumption of these vegetables as all these vegetables are good source of magnesium. The levels of phosphorous in the vegetables ranged between 37.7 mg/100g (*Hibiscus Sabdariffa*) to 58.7 mg/100g (*Cleorodendrumserratum*).

Values for iron in these vegetables ranged from 8.46 mg/100g (*Celosia argentea*) to 16.9 mg/100g (*Amaranthus viridis*) which compares favourably to most values reported for green leafy vegetables in literatures [4]. Regular consumption of these vegetables can prevent the iron deficiency anemia. The level of zinc of these vegetables ranged between 0.22mg/100g (*Commelinabenghalensis*) to 0.93 mg/100g (*Chlorophytum tuberosum*). The level of zinc studied in these vegetables compares favourably with the value reported in some green leafy vegetables [5]. Zinc is essential for the functioning of over 300 enzymes and takes part in enormous numbers of biological process. Zinc deficiency is associated with impaired gastrointestinal and immune function.

IV. CONCLUSION

In present study wild green leafy vegetables revealed that they are good sources for macro- and micro-minerals. Majority of the leafy vegetables are rich source of calcium, potassium, magnesium, phosphorous, iron and zinc. So, it can be concluded that regular consumption of these green leafy vegetables can meet the nutritional requirement to overcome the nutrient deficiency.

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Review of Natural Dyes Preparation Methods

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Abstract: *Synthetic Colorings and all the processing used in general dyeing is dangerous to our health. Color from natural sources can reduce the threat of synthetic colorings. As indigo has been used for thousands of times for the achromatism of fabrics as a natural source. This review is aimed at a discussion of different raw accoutrements used for the birth of natural colorings, the birth process for different natural colorings, and the parcels of fabric be painted by those colorings. Utmost of the natural colorings showed a veritably good fastness property in inquiries. The colorings can be uprooted from trees, dinghy, leaves, flowers, and numerous further sources. Utmost of the natural colorings parade special parcels like anti-microbial, lower toxin, lower allergenic, UV protection.*

Keywords: Synthetic Colorings, Toxin, UV Protection

I. INTRODUCTION

The processing of cloth is one of the utmost contaminating events on earth. Making just a T- shirt needs around 250 gallons of water from raw to end position. The waste from dyeing carries thousands of adulterants and chemicals ditched onto gutters and conduits hard. That's why we should step forward foreco-friendly processing and use Eco-friendly chemicals as well. Using natural colorings in the achromatism process of cloth can be a step towards a new period of lower contaminating processing of cloth. All new trend for fashion and cloth is green and Eco-friendly cloth. All fashion brands are now stepping forward for making the world less weakened and more inhabitable. From the veritably first of the 21st century, the world is going towards safer, less dangerous, recyclable technology. Therefore the use of terrain friendly, biodegradable,non-toxic, less- contaminating natural color is adding day by day in colorful sectors. The UV immersion property of utmost of the natural colorings makes it safer from dangerous UV of sun. Foods, medicines, Cosmetics, and fabrics are the main request for natural colorings. Some downsides of using natural color may present as poor fastness property, exploration is going on to get relieve of this. Some of the most habituated natural factors from which colorings are uprooted are prickly pear fruit, Henna splint, Turmeric, Turkish red pine, Saffron, Indigo, Pomegranate, Red Onion Peel, Eucalyptus Tree, and Marigold Flower. Natural colorings are known to be used since major times for coloring food substrate, leather, as well as common cloth filaments like cotton, hair and silk. Still due to the arrival of synthetic colorings and their good fastness parcels in comparison to natural colorings, the use of natural colorings have suffered drastically. In the present script there has been a rise in concern of Eco-friendliness and sustainability of the products used by the consumers for which natural colorings are again starting to witness slight rise in fashionability. A study has been conducted by Samanta and Agarwal(1) which reports the characterization as well as chemical/ biochemical analysis of colorful natural colorings available, the different types of mordants as well as different mordanting ways, the different conventional andnon-conventional system of natural dyeing of fabrics. The different natural colorings used for the study are madder, henna, held, indigo and others similar as annatto pulp, Rubia tinctorum. Different styles of birth are employed similar as waterless birth,non-aqueous system as well as by acid and alkali. Different types of caustic and system of mordanting significantly affect the rate of fading. For cotton the stylish caustic combinations used in this study are harda and tartaric acid, followed by tannic acid and harda. Double mordanting is employed by using harda and aluminum sulphate. The colorful process variables to be considered for dyeing with and birth of natural colorings are attention of color source material, birth time, dyeing time, caustic attention, pH and attention of swab used.

Another study conducted by Daberao etal.(2) gives us a conception about dyeing with palash or tesu flower petal(Butea monosperma) as natural color sources. The colorings were uprooted from Butea monosperma or in other terms honey of the timber and they were applied on 100 cotton. A different system of birth by boiling was employed and alum

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was used as caustic. The fabric was also tested for all color fastness tests. The cotton sample was trolled and blanched for better color uptake. The washing fastness results were observed where the natural color having not too important affinity with the fiber but by the operation of caustic could repel at least five wetlands. Also wet rubbing fastness of the color was set up to be poorer in the experimental results. Still it was observed that Butea monosperma has good perspiration fastness since it's unreactive to acidic and alkaline perspiration. The use of natural colorings has further started to be increased mainly over the current times for its slow but growing reanimation phase at present, due to people's concern over reducing environmental pollution and hence to avoid chemically more dangerous synthetic colorings and interceders. Day by day in import request, demands for natural dyed natural fabrics are being increased. Different institutions associations andGovt. Have started multiplex reanimation strategies for adding the use of natural colorings as not only as an employment occasion for several NGOs, embroiderer and dyestuff society, contrivers, diligence, small scale cabin diligence, etc. But substantially for espousing green technology dyeing. The handcraft assiduity in India uses original bents to color yarns and fabrics with natural composites, where several products are notorious worldwide like Kalamkari print. Different countries other than India like Turkey, Korea, Mexico, several countries of Africa have embraced the uses of natural colorings. A study has been conducted by Gulrajni(3) to understand the compass of natural colorings and its present status in the world in addition to different operation ways, birth of different natural colorings as well as varying mordanting ways. Different problems associated with similar natural dyeing are also stressed there. The Tharu lines of the Devipatan(4) division have set up a new source of natural dyeing from the original leaves and stems of Jatropha curcas L. The colorings are uprooted by simple boiling the leaves in water and also sinking the excerpt to blankness. The excerpt attained is of unheroic olive thick color and when applied to the cotton fabrics the different tones of tan and brown color are attained. Another state in our country, Manipur has been considered to be a source of a natural color videlicet excerpts from Strobilanthus flaccidifolius for uses in crafts, handlooms, fine trades, etc. Other lines of Manipur like the Meitei community have been using species like Parkia javanica, Melastoma malabathricum, Pasania pachyphylla, Solanum incidum, Bixa orellana, Tectona grandis, etc. These shops are combined with other shops for birth and also be paint Is prepared by indigenous sources. This study is a report by Potsangbam etal.(5) of the colorings uprooted from the below sources, the system of birth as well as their operation. Now from the timber of Chhattisgarh, different color yielding shops have been linked and collected. A study was conducted by Tiwari and Bharat(6) on the diversity of color- yielding shops of Chhattisgarh, the indigenous system of color birth and ethnical uses of colorings. These colors are being used by ethnical folks of this region for different purposes similar as decoration, cosmetics, decorating houses and coloring home implements made up of slush. From the state of Goa(7) natural color- yielding shops like Cassia fistula, Garcinia indica, Tectona grandis are attained and studied where Goa is said to house more than 3000 different species of unfolding shops. Natural colorings were uprooted from colorful corridor of factory like fruits, seeds, dinghy, flowers, roots, etc. The birth processes are studied and colorings of different tones are attained. This study can also encourage the small scale diligence to use natural colorings from these sources to be applied on cotton and silk fabrics. A report by Gaur(8) shows the expansive description of check, collection of botanical information and review of applicable literature on the vegetable color yielding coffers of Uttarakhand Himalayas. Of which, veritably little given color yielding shops are considered like Acacia nilotica, Agrimonia pilosa, Careya arboraea, Averrhoa carambola, etc. Different birth processes for each factory are carried out and latterly dyeing is done by using different mordants. Some of these shops also have high medicinal values and has no toxin

II. METHODS OF DYEING

Bale Dyeing

This is a low cost system to be paint cotton cloth. The material is transferred without combing or searing, through a cold water bath where the sized underpinning has affinity for the color. Reproduction chambray and similar fabrics are frequently be painted this way.

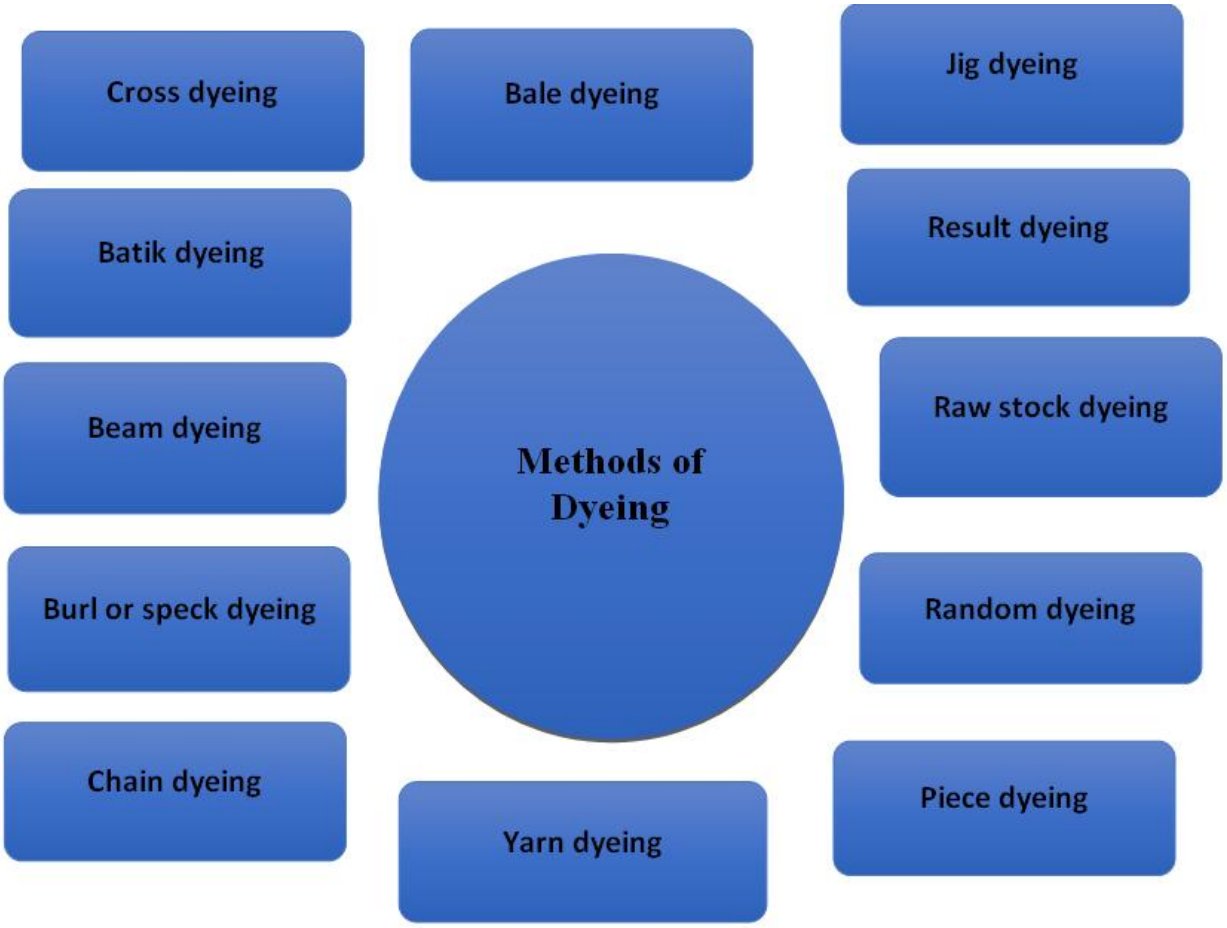
Batik Dyeing

This is one of the oldest forms known to man. It began in Java. Portions of the fabric are carpeted with wax so that onlyun-waxed areas will take on the color matter. The operation may be repeated several times and several colors may used for the crazy goods. Motifs show a mlange, mottled or barred effect, imitated in machine printing.

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Beam Dyeing

In this system the underpinning is be painted Previous to weaving. It's wound onto a perforated ray and the color is forced through the perforations thereby drenching the yarn with color.

Burl or speck Dyeing

This is done substantially on woolens or worsteds, colored specks and mars are covered by the use of special multi-coloured links which come in numerous colors and tones. It's a hand operation.

Chain Dyeing

This is used when yarns and cloth are low in tensile strength. Several cuts or pieces of cloth are turned end- to- end and run through in a nonstop chain in the color. This system affords high product.

Cross Dyeing

This is a veritably popular system in which varied color goods are attained in the one color bath for a cloth which contains filaments with varying affections for the color used. For illustration, a blue dye might give nylon 6 a dark blue shade, nylon 6, 6 a light blue shade, and have no affinity for polyester area unscathed or white.

Jig Dyeing

This is done in a ploy, kier, handbasket, beck or vessel in an open conformation of the goods. The fabric goes from one comber to another through a deep color bath until the asked shade is achieved.

Piece Dyeing

The dyeing of fabrics in the cut, bolt or piece form is called piece dyeing. It follows the weaving of the goods and provides a single color for the material, similar as blue serge, a green organdy.

Random Dyeing

It is coloring only certain designated portions of the yarn. There are three ways of doing this type of coloring Skeins may be tightly Be painted In two or further places and be painted at one side of the color with one color and at the other

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side with another bone.Color may be published onto the skeins which are spread out on the mask fabric of the printing machine. Cones or packages of yarn on concave spindles may be arranged t Piece o form channels through which the yarn, by means of air- operated punch, and the dye are drawn through these holes by suction. The yarn in the immediate area of the punch absorbs the color and the arbitrary goods are thereby attained.

Raw Stock Dyeing

It is fiber stock precedes spinning of the yarn. Dyeing follows the degreasing of hair filaments and drying of the stock.

Result Dyeing

This is also called tip dyeing or spun dyeing; the color is clicked- in in the result and is picked up as the fibers are being formed in the liquor. Cellulosic and non-cellulosic filaments are be painted To perfection by this system. The colors are bright, clear, clean and fast.

Yarn dyed

Yarn which has been be painted Previous to the weaving of the goods; follows spinning of the yarn. It may be done in either partial absorption or total absorption of the yarn.

Sources of natural dyes

Natural Colorings are principally rudiments of natural coffers, and these colorings are generally classified as factory, beast, mineral, and microbial colorings grounded on their source of origin, although shops are the major sources of natural colorings. Natural colorings are sustainable as they're renewable and biodegradable.

Natural dyes can be classified in following group on the basis of sources

Shops Roots, leaves, fruits, flowers and dinghies can be used as a source of natural colorings. Different colors can be attained from each part similar as Sappan- wood tree capsules give red, dinghies give brown and root gives unheroic color. Numerous by- products of shops can also be used to form colorings. Creatures colorings can be attained from dried body of insects for illustration, Lac, Cochineal and Kermes. Cochineal is a brilliant red color produced from insects living on Cactus shops. Carmine and Tyrian grandiloquent color deduced from cochineal, shellfish(Murexspp.) independently. Minerals Mineral colorings include iron buff, iron dark, manganese bistre, chrome unheroic, and Prussian blue. Microorganisms Natural color can be uprooted from fungi, bacteria and algae that are fast growing and have the eventuality of being formalized commercially. Chitosan, Serratiaspp., Trichoderma virens and Alternaria alternata were used to attained colorings. Natural Red color is produced by fungus Echinodotium tinctorium and also form Monascus anka. Phycocyanin is blue color uprooted from Spirulina plarensis algae.

Properties of natural dyes

Natural Colorings are organic and are deduced or uprooted from coffers set up in nature. Natural colorings are substantially Eco-friendly, biodegradable, less poisonous, and lower allergenic as compared to synthetic colorings. Still, studies have shown that certain natural colorings may have sensible mutagenic goodse.g., elderberry color and safflower unheroic; others, like carmine, can beget asthma by nonstop inhalation. Natural colorings are safer from synthetic colorings and since it doesn't contain dangerous chemicals there's a veritably low possibility for causing skin disinclinations. Substantially all factory colorings are safe to be worn. Natural colorings arebio-degradable; thus, it doesn't harm the water ecosystem when drained into water bodies. Natural color tends to fade fluently, so for making the colorings stick to the fabric color fixative are used, this can be in the form of bounce, seaweed, Alum(doused double sulfate swab), table swab, ginger. Fabrics be paintedWith natural color are more delicate and have to be handled with care, it shouldn't be dried directly in sun.

Types of Natural dyes:

Natural colorings were classified in numerous ways at different time ages by experimenters on the base of chemical constitution and system of operation on the base of their chemical constitution

1. Indigoid colorings This group includes Indigo and Tyrian grandiloquent color. Indigo is uprooted from Indigofera tinctoria and considered the most primitive color. Wood factory(Isatis tinctoria) also has indigo as the principal blue dyeing element.

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2. Anthraquinone colorings utmost of the red natural colorings from both factory and mineral origin are grounded on the anthraquinoid structure. Madder, Lacs, Cochineal are some exemplifications of this group. Purpurin are the main chromophores in Rubia tinctorum.
3. Nascence naphthoquinones Lawsone(henna) is a most important member of this class. Another color is juglone, insulated from the shells of callow walnuts.
4. Flavonoids unheroic colorings attained from this group and can be classified under flavones, isoflavones, aurones and chalcones. These yellows are set up in a variety of shops, including Persian berries(Rhamnusspp.), youthful fustic(Cotinus coggygria), old fustic(Chlorophora tinctoria) and unheroic wood(Solidago virgaurea).
5. Di- hydropyrans In chemical structure, di- hydropyrans are analogous to the flavones. These natural colorings give dark tones on cotton, hair and silk. Logwood and Sappan- wood are the most common exemplifications.
6. Anthocyanidins Orange be paint Carajurin attained from leaves of Bignonia chica. .
7. Carotenoids The class name carotene is deduced from the orange color set up in carrots. The color is presence of long conjugated double bonds. Generally, red, orange and unheroic colors come in this order and can be attained from different shops,e.g. unheroic, orange color in sunflower.

B. Classification based on preparation

1. Direct colorings Direct color answerable in water can be taken up directly by the material. Direct color also called substantial colorings because of their excellent substantively for cellulosic material like cotton and viscose rayon. Turmeric andCherubic myrobalan used in direct colorings.
2. Handbasket colorings As the name suggests that the color is prepared in a large vessel for storing and mixing liquids or rustic vessels generally known as ‘ Handbasket ’. This is a primitive system of color medication.
3. Caustic colorings caustic colorings are attached to cloth filaments by a fixing agent “ caustic ” which can be organic or inorganic substance. Since chromium is used considerably hence, caustic colorings are occasionally called chrome colorings.
4. Acid colorings These colorings performed in acidic medium. Sulfonic or Carboxylic groups of color motes can form electrovalent bonds with amino groups of hair and silk.
5. Basic colorings These colorings form an electrovalent bond with the carboxylic group of hair and silk. Berberine has been classified as introductory color.
6. Disperse colorings Disperse color have low waterless solubility and low molecular weight. These colorings bear post mordanting treatment with chromium, bobbyOr drum swab.

Availability of natural dyes:

The use of natural colorings in fabrics was excluded since synthetic colorings give variety of reproducible tones and colors. Natural colorings have limited vacuity. They’re subject to the growing seasons of the shops or the lifecycles of the insects from which they’re deduced. Yields are low in relation to the ground used, and there may be competition with foodstuff product. There’s just not enough natural color product to support marketable demands on a large scale. Synthetic colorings, still, are produced continually on demand. Natural colorings are used in small- scale craft diligence, where the volume of colorings needed is low. Because of the limitations of producing these colorings on a marketable scale, anyhow of any specialized conditions, they won’t replace synthetic colorings for the global mass product of dyed fabrics.

Production of natural dyes:

Natural Colorings are attained from vegetable, beast and mineral sources. Product inflow map of natural colorings are described below.

Flow for production of natural dyes:

Raw Material
↓
Size Reduction
↓
Batch Extraction

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↓
Phase Separation
↓
Fine Filtration
↓
Evaporation
↓
Spray Drying
↓
Finishing
↓
Packing

The raw material for the product of natural color is substantially vegetable matter similar as seeds, leaves, roots, dinghy, heart wood,etc., of the shops. The most important part of the product of natural colorings is the sourcing of the raw material. The raw material named for the birth of the coloring matter should be fluently available at reasonable price and in large volume throughout the time. For the procurement of the raw accoutrements , proper specifications in terms of humidity content, ash content, water or alkali, extractable matter, and the immersion gamuts must be specified so as to insure reproducible results. Size reduction The raw accoutrements are needed to be base to greasepaint form so as to grease the birth. The greasepaint should have a fine and invariant flyspeck size distribution. If the flyspeck size becomes veritably fine also there are chances of swelling and lump conformation. Hence for the proper birth, optimum size between 50 and 100 mesh is needed to be acclimated for each raw material depending on its swelling characteristics. Redundant heating of the raw material during grinding should be avoided since these raw accoutrements are sensitive to heat. Bach birth The batch birth of the coloring element must be carried out in noncorrosive pristine sword(SS) vessel. The coloring element can form essence complexes with the material of construction of the extractor. Depending on the batch size and the material to liquor rate, suitable brume jacketed vessel with low speed stutter is recommended to be used for birth of the coloring matter. It's important that the water used for birth should be free from metallic contaminations. Hence, soft water with lower the 50 ppm hardness is recommended for the birth of the coloring matter. Other important factors for the proper and reproducible results are the time, temperature, and pH of the water used for birth. This varies from color to color. Phase separation After birth, the solids and the liquor are needed to be separated. This can be done in colorful ways similar as, by nonstop decanting, nonstop centrifugation, etc. During this process, the solid waste generated after birth is separated and disposed off. Fine filtration For removing the fine flyspeck,> 5 microns, a sparker sludge with a now- woven sludge cloth is recommended. One also uses the rear osmosis system for barring the fine suspended patches.

Rush/ attention/ drying The rush of the color from the excerpt is brought about with change in pH from alkaline to acidic pH. The rained color is filtered through the sludge press or separated from the liquor by centrifugation. The rained color is dried under vacuum at the low temperature. In some cases, the color liquor is concentrated under vacuum to a solid content of roughly 30, and spot dried. The color greasepaint therefore attained is ground to 200 mesh flyspeck size and formulated to get the standardized natural color. Characterization Every lot of the color must be characterized in terms of water answerable matter, ash content, humidity, pH and gamuts intensity as well as the strength of the color(by the dyeing trial).

Benefits or Advantages of Natural Dyes:

Natural colorings are recommended to be applied on cloth accoutrements . The natural colorings have several advantages similar as these colorings need no special care, awful and rich in tones, act as health cure, have no disposal problems, have no carcinogenic effect, fluently biodegradable, bear simple color house to apply on matrix and mild responses conditions are involved in their birth and operation. Following points support the use of natural colorings on a large scale. Eco-friendly Natural colorings are uprooted from natural sources thus they're terrain safe. Biodegradable These colorings are able of being perished

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By microorganisms. Renewable Replaced by the new material attained from nature. No health hazard/Non-toxic Natural origin of these colorings makes them inoffensive. Variety of tones kinds of color, tones and tinges present in nature itself. Soothing, soft and lustrous color Natural colorings are soft and comforting. Application of waste material numerous husbandry waste products can be used in the dyeing process. Antibacterial/ UV Defensive Naturally dyed fabrics get special parcels like antibacterial and UV protection. Faults or Disadvantages of Natural colorings There are some limitations of natural colorings which includes, lower vacuity of colors, poor color yield, complex dyeing processing, poor fastness parcels and difficulty in blending colorings. As there are numerous advantages in using natural color but they also have some . Precious Natural colorings are precious due to being limited in source. Faded fluently occasionally their poor attachment on fabric makes them fade fluently. Delicate to produce collect Collection is kindlyDelicate in large quantities. Time consuming The complete process like collection of color takes long time. Reproducibility of tones is delicate to control These colorings produced by secondary metabolic conditioning of shops or by veritably special processes in other creatures, which depend on climate conditions, age and seasonal variations. Therefore, one particular shade can not be achieved again and again by a single color. Besides, the water undoable natural color can produce problems during their operation, leading to harsh and uneven dyeing.

III. CONCLUSION

Therefore, still there are numerous gaps in homogenizing dyeing conditions for specific fiber- caustic- color combinations and there's still need of needed scientific and artificial exploration on the goods of different eco-friendly chemical mordants and memoir mordants(tannin grounded natural composites) and mordanting sidekicks(gallic acid or chebulinic acid grounded natural composites) for eventually standardization/ optimization of dyeing process variables for carrying livery and repetition of tones to produce with natural colors. Another side of exercising antibacterial/ antifungal and UV defensive action or deodourizing action of picky natural colorings by detailed scientific study of the goods of different after- treating composites antibacterial/ UV absorbers composites for perfecting its uses as high valued fabrics. Also study of different natural and eco-friendly chemical color fixatives for perfecting color fastness to Washing and goods of UV absorber composites on exposure of similar natural be paintedFabrics to the exposure to sun- light/ UV light can be bettered by suitable after- treatment with UV absorbers. For perfecting rubbing fastness of similar natural be painted Fabrics, after treatment with natural binders or different natural reactive thickeners and eco-friendly synthetic list agents are needed, besides approaches to ameliorate antimicrobial and UV protection exertion of similar natural be paintedFabrics. It's also important to know and understand well the exact fiber- caustic color commerce and part of different pre and post treatments on promoting color yield(in terms of K/ S values), uniformity of color yield(measurable by CV of K/ S values) as well as standing for antimicrobial and UV protection factor for different fiber- caustic-natural color combination as applicable particularly to cotton, silk, hair and jute filaments when be painted with waterless excerpt of any named natural color. Hence operation of natural colorings on high value vesture and functional fabrics are gaining worldwide interest for its lower poisonous nature, better biocompatibility, biodegradability, producing elegant tinges and largely functional value- added fabrics as terrain friendly oeko- tech/ eco-friendly fabrics for gaining fashionability for natural dyed and finished as high valued fabrics of hereafter, if its reanimation strategies are well created and executed with utmost care with back over of sufficient scientific study with time bound growth plan and correct reanimation strategy. Some of the reanimation strategies include(i) vacuity of commercially standardized process and standard marketable shade cards for developing asked tones with respectable repetition and perceptible color fastness results(ii) vacuity of standardized test styles for relating and assuring guests for proving a dyed fabrics is really 100 dyed with natural color(s) without any synthetic colorings used as contaminant/ beating to match shade;(iii) marketable process variables need to be formalized for different colorings for asked tones at provident minimal cost;(iv) to train and educate concern dyestuff and needlewomen and any big or large cloth assiduity sector for successful birth and dyeing with natural colorings and eventually(v) future creation of a natural color mark instrument system by suitable public and transnational bodies for consumer assurance service like khadi mark, silk mark,etc.

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Correlation of Aquatic Entomofauna, Order Hemiptera and Water Properties of Akkalpada Dam: Site Chinchkheda, in North Maharashtra, India

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Abstract: *During the present study a total of 09 of aquatic Hemipteran insect s species were collected so far, they are belonging to 09 genera and08 families. The correlation of distribution of these insect species with water parameter is analyzed. It is found that the correlation of different aquatic bugs found in said water is variable according to their abundance and size of insect. The study indicates that aquatic insect diversity varies across study sites and habitat. The result shows that at a large landscape level, there is high variation in diversity and abundance in accordance with local micro scale environmental conditions. These variations need to be considered while designing bio monitoring protocols for the region. The whole community scale analysis of aquatic insects is recommended for biodiversity and bio monitoring studies.*

Keywords: Aquatic entomofauna, correlation coefficient, Akkalpada dam, water properties, Dhule

I. INTRODUCTION

Aquatic insects are extremely important in ecological systems for many reasons and are the primary bioindicators of water bodies and rivers [1]. They serve various purposes such as food of fishes and other invertebrates, as vectors of pathogens to both humans and animals [2]. The distributions of aquatic organisms were influenced by physical environment, chemical quality and biological interaction. Changes in quality of water kill many aquatic animals each year by a wide variety of different sources of pollution like municipal, industrial waste., agricultural waste (fertilizers and pesticides), toxic substances kill them, and low oxygen concentration enhances the toxicity of most poisons. The greatest importance of biological data is that organisms integrate all the stresses to which they are exposed and respond to them collectively. Gradually as the stress increases, more and more members of the population are affected. Thus, any effects caused due to construction, destruction, and habituation, pollutants on other species are early symptoms that something was amiss in the ecosystem and that humans may well be the next to be affected.

The present study was undertaken because Lower Panzara Reservoir at Akkalpada is a newly constructed water body on river Panzara, and harbors a number of aquatic and semiaquatic insects, where several new species await formal scientific description. Akkalpada is located in the north eastern part of the Dhule, Maharashtra state, India and lies between 20°56'33" North latitude and 74°27'22 East latitude. The MSL height of Akkalpada dam is 33.28m and. Its water volume is about 1114 $Km^{3,}$ whereas its water holding capacity is 36990 $Km^{3.}$ It spread around 3123 sq. km.

The distribution of aquatic organisms was influenced by the physical environment, chemical quality and biological interactions, changes in quality of water kill many aquatic animals each year by a wide variety of different sources of pollution like municipal and industrial wastes [3]. Toxic substances kill them, and low oxygen concentration enhances the toxicity of most poisons [4].

The diversity of the insects mainly depends upon the biotic and abiotic factors and type of the ecosystem, age of the water body, mean depth, water level fluctuations, morphometric features and bottom have great implications. The hydro-biological features of the water body also play a major role in maintaining the number of insects to a greater extent

A change in the physicochemical aspect of a water body brings about a corresponding change in the relative composition and abundance of the organisms in that water [5].Aquatic bugs can be found in almost every freshwater

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biotope. They have morphological adaptations to their aquatic environment, making them excellent subjects for ecological and biogeography studies [6]. Assemblages of water bugs are generally poorer in species than those of water beetles and seem to be more resilient to environmental changes [7].

II. MATERIAL AND METHODS

Initially insects were identified by local name. The scientific identification and classification of insects species were made by using standard book and keys:

Imms Entomology by O.W.Richards, R. G.Davis

Aquatic Insects Identification key By K.A.Subramanian and K.G. Sivaramakrishnan,

Insects Identification key by John H Epler,

Common Freshwater Insects by Kuldip Kumar and Kuldip Mishra,

Global Biodiversity Information Facility (GBIF) Database, Denmark.

Zip code Zoo website.

Paul Hebert Centre for DNA barcoding and biodiversity studies. BAMU Aurangabad,

All specimens were also identified and confirmed by the Zoological Survey of India (ZSI) Pune.

Physico-chemical analysis of Water:

During the present work, all five different sites of the water body were visited to collect water samples for analysis of plastic containers of two literscapacity. Surface water samples were collected from all five different sites of the water body. Water was collected in containers and labeled station wise and brought to the laboratory for analysis. Standard procedures (APHA 2005) were used for the analysis of the physico-chemical parameters of water samples.

For the study of aquatic insect diversity, one study stations were selected namely Site 1-Chinchkheda, from Akkalpada dam. The study station was visited thrice in the season of summer, monsoon and winter Insects were sampled with a nylon pond D-net (mesh size 250 mm, diameter 30 cm; depth 60 cm). The sample was collected by submerging the net and sweeping it through a water column.

Correlation of Physico-chemical factors with Insect abundance and diversity:

Carl Pearson Correlation analysis is done by using Analysis Tool pack of MS Excel 2019. Two variables are subjected, namely, ecological parameters of water and insect abundance; for two-way ANOVA analysis. Level of significance was tested at p = 0.01 and 0.05

Plate 01: Showing Insect Collection Sites Chinchkheda at Lower Panzara (Akkalpada Project) in Dhule district, Maharashtra (India) lies between 20°56'33" North latitude and 74°27'22 East latitude



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III. RESULTS AND DISCUSSION

Table 1. List of Hemipteran Insect species found at Chinchkheda Study Stations of Akkalpada dam

Order	Family	Genus	Species
Hemiptera	Gerridae	*Aquarius*	*paludum*
		Gerris	*fabrius*
	Tetranychidae	*Diplonychus*	*rusticus*
	Notonectidae	*Notonecta*	*reuteri*
	Lygaeidae	*Acroleucus*	*brevicollis*
	coxidae	*Micronecta*	*scutellaris*
	Nepidae	*Laccotrephes*	*griseus*
	Pyrrhocoridae	*Dysdercus*	*cingulatus*
	Reduviidae	*Reduvius*	*personatus*

Table 2. Quantitative obervation of Aquatic Entomofauna of order Hempitera of Chichkheda study station of Akkalpada dam in North Maharastra,India

Elements	Amount (mg/L)	Name of the Insect	No. of insect
	site 1		Site no.1
Calcium	40.13	*Aquarius paludum*	67
Magnecium	4087	*Diplonychus rusticus*	12
Sodium	23	*Notonecta reuteri*	23
Pottasium	12.11	*Acroleucus brevicollis*	9
Fluoride	0.14	*Micronecta scutellaris*	31
Nitrate	58	*Laccotrephes griseus*	47
Sulphate	13.81	*Dysdercus cingulatus*	91
Chlorides	29.11	*Gerris fabrius*	59
Water Temp.	26.85 ^{0}C	*Reduviius personatus*	18
Air Temp.	32.06 ^{0}C		
Light Intensity	1370.83 Lux		
Rainfall	10.8 cm		
Dissolve CO2	10.07		
Dissolve O2	6.83		
Ele. Conductivity	0.57		
TDS	363.33ppm		
Ph	6.93		
Hardness	125.67		
Bicarbonate	160		
carbonate	11.89		

Correlation analysis of physicochemical parameters with insect abundance: Correlation analysis of physicochemical parameters with insect abundance was done for sampling station. The correlation analysis is done to know the relation of each ecological parameter on individual insect species abundance and effect there of

Site: (Chinchkheda)

*Aquarius paludum*was showing a strong positive correlation with sodium, nitrate, dissolve CO_2, electrical conductivity while weak positive correlation with bicarbonate, carbonate, and negative correlation with calcium, magnesium, potassium, fluoride, sulphate, free CO_2, water temperature, air temperature. Intensity of light, rainfall, TDS, pH, hardness.

*Diplonychusrusticus*was showing a strong positive correlation with magnesium, potassium, fluoride, light ,intensity, rainfall, TDS, pH, while weak positive correlation with calcium, sulphate, free CO_2, water temperature, air temperature,

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hardness, and negative correlation with sodium, nitrate, chloride, dissolve O_2, electrical conductivity, bicarbonate, carbonate.

*Notonectareuteri*was showing a strong positive correlation with sodium, nitrate, chlorides, dissolved O_2, electrical conductivity, and carbonate. weak positive correlation with bicarbonate, and negative correlation with calcium, magnesium, potassium, fluoride, sulphate, free CO_2 water temperature, air temperature, light intensity, rainfall, TDS, pH, hardness.

*Acroleucusbrevicollis*was showing a strong positive correlation with chloride, sodium, nitrate, electrical conductivity, while weak positive correlation with bicarbonate, carbonate. and negative correlation with calcium, magnesium, potassium, fluoride, sulphate, free CO_2, dissolve O_2 water temperature, air temperature, light intensity, rainfall, TDS, pH, and hardness.

*Micronectascutellaris*was showing a strong positive correlation with sodium, nitrate ,chloride, dissolve O_2 electrical conductivity , carbonate, while weak positive correlation with bicarbonate. and negative correlation with calcium, magnesium, potassium, chloride, sulphate, free CO_2, water temperature, air temperature, light intensity, rainfall, TDS, pH, and hardness.

Laccotrephes griseus was showing a strong positive correlation with sodium, nitrate, chloride, dissolved O_2,while weak positive correlation with bicarbonate, carbonate, and negative correlation with calcium, magnesium, potassium, fluoride, sulphate, free CO_2 , water temperature, air temperature, light intensity rainfall TDS, pH, hardness.

*Dysdercuscingulatus*was showing a strong positive correlation with sodium, nitrate, chloride, dissolved O_2, electrical conductivity, while weak positive correlation with bicarbonate, carbonate and negative correlation with calcium magnesium potassium chloride sulphate free CO_2 water temperature, air temperature light intensity, rainfall, TDS, pH and hardness

*Gerrisfabrius*was showing a strong positive correlation with sodium, nitrate, chloride, dissolved O_2, electrical conductivity, weak positive correlation with bicarbonate, and negative correlation with calcium, magnesium, potassium, fluoride, sulphate, free CO_2, water temperature, air temperature, light intensity, rainfall, TDS, hardness and pH.

Reduviiuspersonatus was showing a strong positive correlation with sodium, nitrate, chloride, free CO_2 ,electrical conductivity, weak positive related with carbonate, bicarbonate, and negative correlation with calcium, magnesium, potassium, fluoride, sulphate, dissolve O_2, water temperature, air temperature, light intensity, rainfall, TDS, pH, hardness.

Table 3. Correlation of Salts with insects belonging to Order Hemiptera at Site: Chinchkheda

	Calcium	Magnecium	Sodium	Pottasium	Fluoride	Nitrate	Sulphate	Chlorides	Aquarius paludum	Diplonychus rusticus	Notonecta reuteri	Acroleucus brevicollis	Micronecta scutellaris	Laccotrephes griseus	Dysdercus cingulatus	Gerris fabrius	Reduviius personatus
Calcium	1.000																
Magnecium	0.838	1.000															
Sodium	-0.415	-0.844	1.000														
Pottasium	0.582	0.932	-0.981	1.000													
Fluoride	-0.282	0.287	-0.756	0.616	1.000												
Nitrate	-0.651	-0.960	0.961	-0.996	-0.545	1.000											
Sulphate	0.984	0.729	-0.248	0.430	-0.447	-0.507	1.000										
Chlorides	-0.129	-0.649	0.956	-0.881	-0.915	0.837	0.048	1.000									
Aquarius paludum	-0.326	-0.789	0.995	-0.958	-0.815	0.930	-0.154	0.980	1.000								
Diplonychus rusticus	0.415	0.844	-1.000	0.981	0.756	-0.961	0.248	-0.956	-0.995	1.000							
Notonecta reuteri	-0.579	-0.930	0.982	-1.000	-0.619	0.996	-0.427	0.883	0.959	-0.982	1.000						
Acroleucus brevicollis	-0.308	-0.777	0.993	-0.953	-0.826	0.923	-0.135	0.983	1.000	-0.993	0.954	1.000					
Micronecta scutellaris	-0.557	-0.920	0.987	-1.000	-0.639	0.993	-0.403	0.895	0.967	-0.987	1.000	0.961	1.000				
Laccotrephes griseus	-0.326	-0.789	0.995	-0.958	-0.815	0.930	-0.154	0.980	1.000	-0.995	0.959	1.000	0.967	1.000			
Dysdercus cingulatus	-0.440	-0.859	1.000	-0.986	-0.738	0.968	-0.275	0.947	0.992	-1.000	0.987	0.990	0.991	0.992	1.000		
Gerris fabrius	-0.339	-0.797	0.997	-0.962	-0.807	0.935	-0.168	0.977	1.000	-0.997	0.963	0.999	0.970	1.000	0.994	1.000	
Reduviius personatus	-0.415	-0.844	1.000	-0.981	-0.756	0.961	-0.248	0.956	0.995	-1.000	0.982	0.993	0.987	0.995	1.000	0.997	1.000

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Graph: 1 Correlation of Salts with insects belonging to Order Hemiptera at Site: Chinchkheda

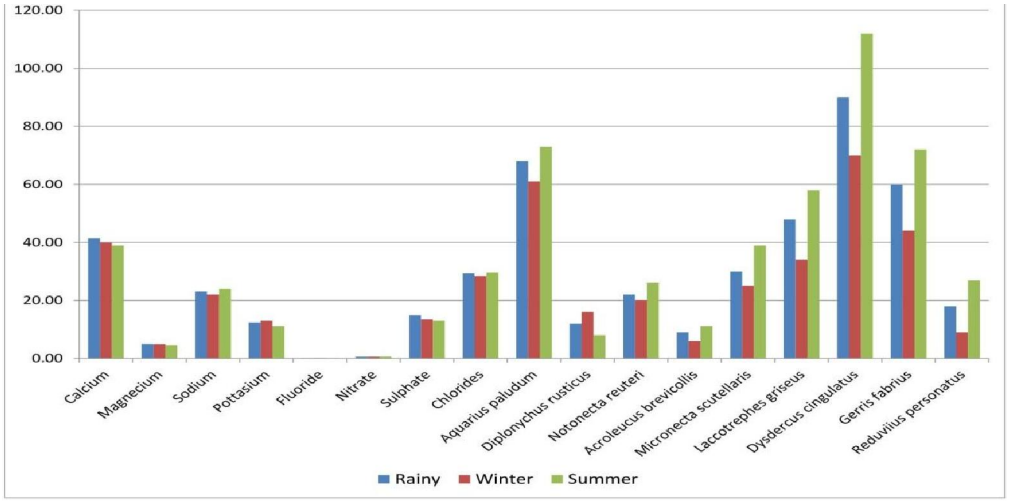
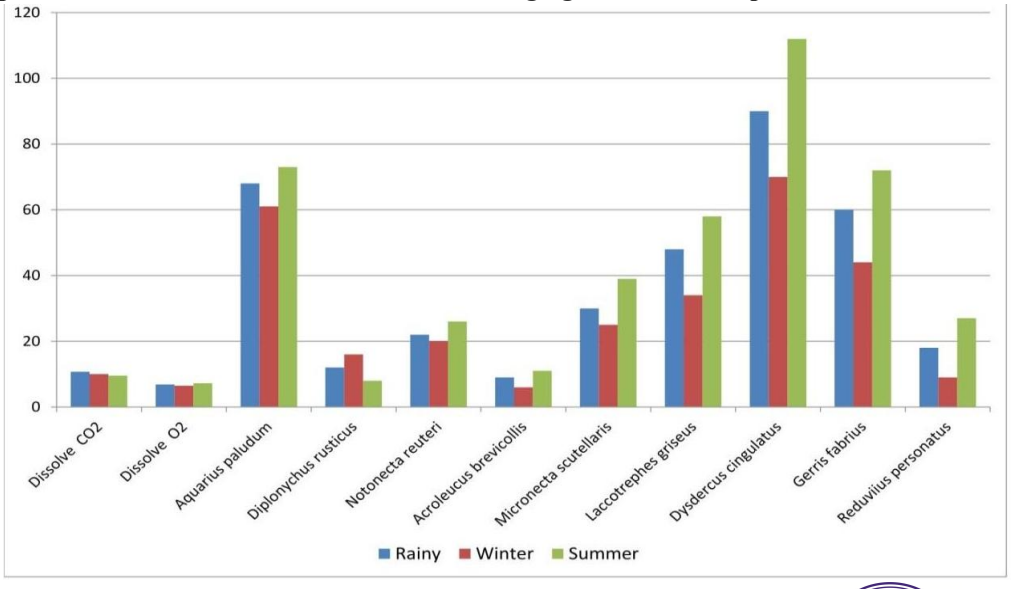


Table: 4 Correlation of O_2.CO_2 with insects belonging to Order Hemiptera at Site: Chinchkheda

	Dissolve CO2	Dissolve O2	*Aquarius paludum*	*Diplonychus rusticus*	*Notonecta reuteri*	*Acroleucus brevicollis*	*Micronecta scutellaris*	*Laccotrephes griseus*	*Dysdercus cingulatus*	*Gerris fabrius*	*Reduviius personatus*
Dissolve CO2	1.000										
Dissolve O2	-0.415	1.000									
Aquarius paludum	-0.326	0.995	1.000								
Diplonychus rusticus	0.415	-1.000	-0.995	1.000							
Notonecta reuteri	-0.579	0.982	0.959	-0.982	1.000						
Acroleucus brevicollis	-0.308	0.993	1.000	-0.993	0.954	1.000					
Micronecta scutellaris	-0.557	0.987	0.967	-0.987	1.000	0.961	1.000				
Laccotrephes griseus	-0.326	0.995	1.000	-0.995	0.959	1.000	0.967	1.000			
Dysdercus cingulatus	-0.440	1.000	0.992	-1.000	0.987	0.990	0.991	0.992	1.000		
Gerris fabrius	-0.339	0.997	1.000	-0.997	0.963	0.999	0.970	1.000	0.994	1.000	
Reduviius personatus	-0.415	1.000	0.995	-1.000	0.982	0.993	0.987	0.995	1.000	0.997	1.000

Graph: 2 Correlation of O_2.CO_2 with insects belonging to Order Hemiptera at Site: Chinchkheda



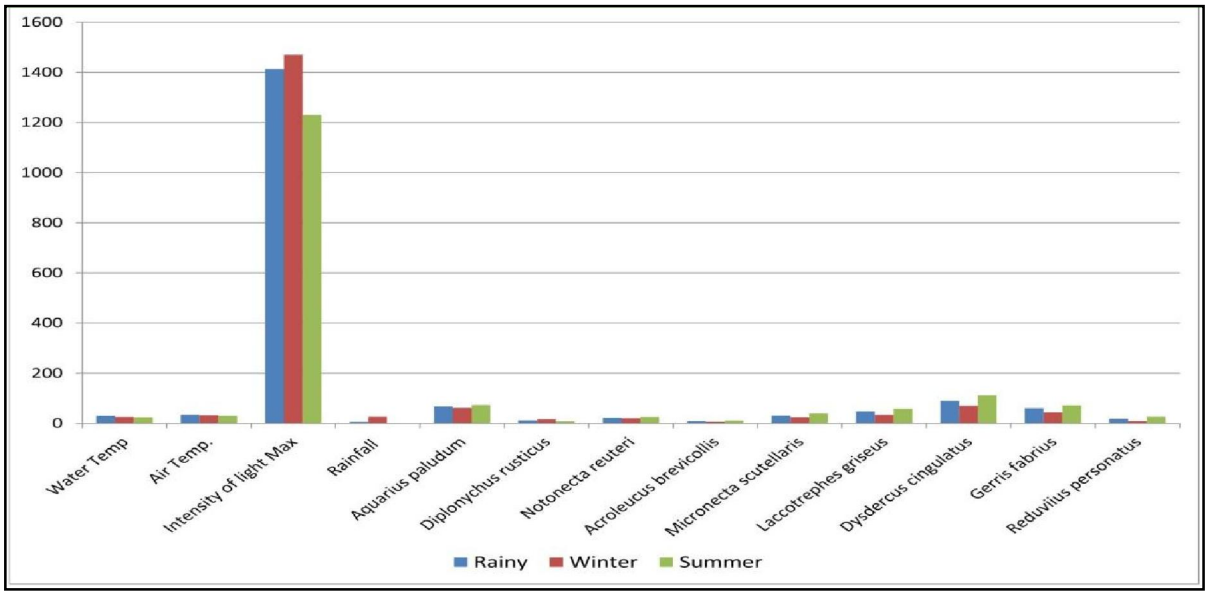
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Table: 5 Correlation of Temp. Rainfall with insects belonging to Order Hemiptera at Site: Chinchkheda

	Water Temp	Air Temp.	Intensity of light Max	Rainfall	*Aquarius paludum*	*Diplonychus rusticus*	*Notonecta reuteri*	*Acroleucus brevicollis*	*Micronecta scutellaris*	*Laccotrephes griseus*	*Dysdercus cingulatus*	*Gerris fabrius*	*Reduviius personatus*
Water Temp	1.000												
Air Temp.	0.981	1.000											
Intensity of light Max	0.564	0.714	1.000										
Rainfall	-0.060	0.135	0.790	1.000									
Aquarius paludum	-0.210	-0.396	-0.926	-0.963	1.000								
Diplonychus rusticus	0.303	0.482	0.958	0.933	-0.995	1.000							
Notonecta reuteri	-0.478	-0.639	-0.995	-0.848	0.959	-0.982	1.000						
Acroleucus brevicollis	-0.192	-0.378	-0.918	-0.968	1.000	-0.993	0.954	1.000					
Micronecta scutellaris	-0.454	-0.618	-0.992	-0.862	0.967	-0.987	1.000	0.961	1.000				
Laccotrephes griseus	-0.210	-0.396	-0.926	-0.963	1.000	-0.995	0.959	1.000	0.967	1.000			
Dysdercus cingulatus	-0.329	-0.506	-0.965	-0.923	0.992	-1.000	0.987	0.990	0.991	0.992	1.000		
Gerris fabrius	-0.224	-0.408	-0.931	-0.960	1.000	-0.997	0.963	0.999	0.970	1.000	0.994	1.000	
Reduviius personatus	-0.303	-0.482	-0.958	-0.933	0.995	-1.000	0.982	0.993	0.987	0.995	1.000	0.997	1.000

Graph: 3 Correlation of Temp. Rainfall with insects belonging to Order Hemiptera at Site: Chinchkheda

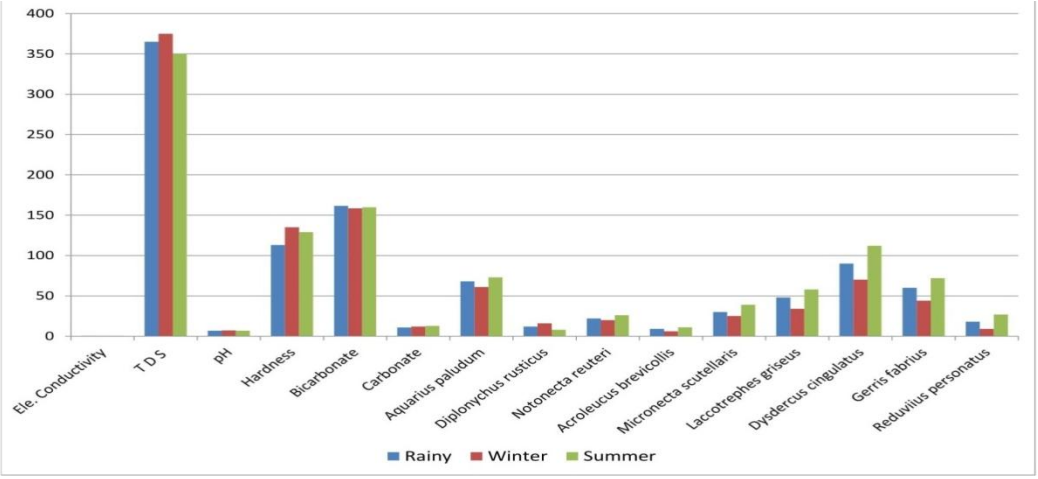


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Table: 6 Correlation of TDS, PH. Hardness with insects belonging to Order Hemiptera. at Site: Chinchkheda

	Ele. Conductivity	*T D S*	*pH*	*Hardness*	*Bicarbonate*	*Carbonate*	*Aquarius paludum*	*Diplonychus rusticus*	*Notonecta reuteri*	*Acroleucus brevicoll*	*Micronecta scutellar*	*Laccotrephes griseu*	*Dysdercus cingulatu*	*Gerris fabrius*	*Reduviius personatu*
Ele. Conductivity	1.000														
T D S	-0.803	1.000													
pH	-0.945	0.954	1.000												
Hardness	-0.711	0.151	0.441	1.000											
Bicarbonate	0.803	-0.289	-0.564	-0.990	1.000										
Carbonate	-0.101	-0.512	-0.231	0.771	-0.674	1.000									
Aquarius paludum	0.910	-0.978	-0.996	-0.355	0.483	0.321	1.000								
Diplonychus rusticus	-0.866	0.993	0.982	0.264	-0.397	-0.410	-0.995	1.000							
Notonecta reuteri	0.756	-0.997	-0.929	-0.077	0.217	0.575	0.959	-0.982	1.000						
Acroleucus brevicollis	0.918	-0.974	-0.997	-0.373	0.500	0.303	1.000	-0.993	0.954	1.000					
Micronecta scutellaris	0.773	-0.999	-0.938	-0.103	0.243	0.553	0.967	-0.987	1.000	0.961	1.000				
Laccotrephes griseus	0.910	-0.978	-0.996	-0.355	0.483	0.321	1.000	-0.995	0.959	1.000	0.967	1.000			
Dysdercus cingulatus	0.852	-0.996	-0.976	-0.237	0.372	0.435	0.992	-1.000	0.987	0.990	0.991	0.992	1.000		
Gerris fabrius	0.904	-0.981	-0.994	-0.342	0.471	0.334	1.000	-0.997	0.963	0.999	0.970	1.000	0.994	1.000	
Reduviius personatus	0.866	-0.993	-0.982	-0.264	0.397	0.410	0.995	-1.000	0.982	0.993	0.987	0.995	1.000	0.997	1.000

Graph: 4 Correlation of TDS, PH. Hardness with insects belonging to Order Hemiptera. at Site: Chinchkheda



Panzara riverine system in North Khandesh, Dhule, Maharashtra has a diverse aquatic and semi-aquatic fauna. During the present study a total of 09 examples of aquatic insects collected so far, of which 09 species belonging to 09 genera and 08 families are identified. Identification keys to the family, subfamily, genus and species are provided for all the 09 species.

It is to be noted that with the increase in the abundance and diversity of species of aquatic insects with decrease in temperature. The study demonstrates that in the study area of North Khandesh, Dhule, Lower Panzara reservoir aquatic and semi-aquatic insect diversity within a habitat is determined by the interaction between the habitat and the extrinsic environmental parameters. At the scale of habitat, species vary in abundance and diversity. The true aquatic bugs of the family *Gerridae, Tetranychidae, Notonectidae, Lygaeidae, Corixidae, Nepidae, Pyrrhocoridae* and *Reduviidae* are mostly restricted to the riffles to the stagnant ecosystems. The species diversity across microhabitats shows highest diversity and richness of family, genera and species in the water surface as the Gerridae fauna is mostly confined to the water surface and its diversity was highest [8].

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Correlation studies on the physicochemical parameters and insect abundance reveals that a clear pattern emerges from the analysis of taxa turnover across reservoirs at study sites, land use, habitat and microhabitat zones. Most of the aquatic insects show a strong correlation with nonmetal ion salts, free CO_2, pH, whereas; weakly correlated with Temperature, hardness, electrical conductivity, fluorides and bicarbonates. While they are negatively correlated with the carbonate nitrates, chlorides and DO. The semi-aquatic insects, the frequent visitors of water bodies show a strong positive correlation with Ca, Mg, Sulphates, while a negative correlation with nonmetal ion salts, free CO_2, hardness and carbonates. This indicates the dependability of insects to ecological parameters of a given ecosystem. The positive correlation of insect with insect showed that there is less competition for food and habitat, whereas the negative correlation is indicative of more stringent behavior towards food, habitat and physico-chemical necessities in water [6]. The taxa turnover across land use patterns shows that the water reservoir has interesting and unique fauna which is quite different from other water reservoir patterns. The pattern is due to developing ecosystems showing sustaining their existence in this type of abode. The water in the reservoir is mostly stagnant in winter and summer season; and in the rainy season, the water shows a turbulence which causes the fluctuation in abundance of aquatic and semi-aquatic insects. The stagnant habitats have similarity in species composition. Further, Hemiptera, diversity and abundance is not strongly correlated with other aquatic insect diversity and abundance. These results show that at a large landscape level, there is high variation in diversity and abundance in accordance with local micro scale environmental conditions. These variations need to be considered while designing bio-monitoring protocols for the region. The whole community scale analysis of aquatic insects is recommended for biodiversity and bio monitoring studies [9].

The result showed that the Lower Panzara reservoir is newly constructed on the river Panzara (completed in 2016) at Akkalpada and the running water stored in the reservoir. It showed the developing stagnant water ecosystem from the running water ecosystem. Though, the population of aquatic insects was low in number, if the physicochemical conditions stabilizes, it will flourish the aquatic insect fauna in Lower Panzara reservoir at Akkalpada.

IV. CONCLUSION

The Akkalpada dam reservoir is a newly constructed water body on the Lower Panzara river, Dhule. The ecosystem is developing from lotic to lentic water ecosystem. The aim of the research is to study the development of ecosystems through the study of diversity and abundance of aquatic insects. In selected study sites chinchkheda of Akkalpada dam reservoir, A positive significant correlation between air and water temperature was observed. Increasing water temperature leading to decrease in oxygen retention capacity of water and increase in the respiratory consumption of oxygen due to increased metabolic rate.The presence of free CO_2 in the present study might be attributed to values of pH (weakly acidic or below 8.5) and temperature, and might be related to lower rates of photosynthesis and higher rates of decomposition of organic matter. Fluctuations in total alkalinity mainly due to the seasonal effects, planktonic populations, bottom deposits and water currents and entry of sewage from the catchment area. Lower values of magnesium might be attributed to higher sedimentation rate leading to settlement in the bottom and utilization by plankton. Higher values during summer months were related to higher evaporation rate, and decomposition of organic matter.Hemiptera formed the most abundant group of insect fauna. The high or low abundance of Hemiptera in present study can be related to presence of macro- vegetation /macrophytes in the Akkalpada reservoir. Aquatic Hemiptera holds a key place in the ecology of freshwater ecosystems. Hemipterans are exceedingly important in relation to fish production. They are the primary food for many wild and cultivable fishes, which make them valuable predators, and are also occasional pests in the manmade nursery ponds for fish culture where they feed on young fish. Certain families of bugs may be utilized in the biological control of mosquito larvae.

V. ACKNOWLEDGEMENT

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Physico-Chemical and Microbiological Analysis of Curd-Whey Beverage

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Abstract: *Whey is a rich source of several nutrients and needs utilization rather than disposal. The present research work was undertaken for the utilization of curd-whey in the manufacture of beverage by using lactic acid bacteria. Produced beverage can be distributed in general public for consumption. It is prepared by different dilutions and found that there was not much difference in microbiological quality of curd-whey beverage prepared from both the dilution of whey which was 75% and 50% and with the addition and without addition of artificial essence. The prepared beverage was microbiologically analyzed and noticed that there was no other microorganisms than inoculated when microscopically examination was carried out. It was furher observed that absence of spores and haemolytic count. Therefore it is concluded that whey beverage were found safe for human consumption.*

Keywords: Whey, beverage, lactic acid bacteria, dilution, dilution, safe

I. INTRODUCTION

Whey is the liquid fraction that remains following manufacture of cheese, chhana, paneer casein.and other fermented milk products. The world production of whey is estimated at about 165 million tones. Of which cheese whey contributes about 95 %. In India, the major source of whey is from the production of chhana and paneer. In the absence of systematic survey/statistics the estimated production of whey is about 5 million tons per annum (Gupta, 2008). The utilization was 75% in Europe and probably less than 50% in the rest of the world and as a result a very large amount of material with potential value as a food or feed is wasted (Aneja et al., 2002). Whey is a serious pollutant as it imposes a very high BOD of 30,000- 50,000 mg/lit and chemical oxygen demand of 60,000-80,000 mg/lit. Discarding of whey also constitutes a significant loss of potential nutrients and energy and has been looked upon seriously by the environmentalists and technologists due to its potent polluting strength. In addition the dairy industry suffers from an economic blow due to several treatment costs that are incurred in proper disposal of whey. Although several possibilities of cheese whey utilization have been explored, a major portion of the world cheese whey production is discarded as effluent. Its disposal as waste poses serious pollution problems for the surrounding environment (Marwaha & Kennedy, 1988; GonzalezSiso, 1996).

Types and Composition of Whey

Whey may be defined broadly as the serum or watery part of milk remaining after separation of the curd, which results from the coagulation of milk proteins by acid or proteolytic enzymes(Silviya,et al.2016). The type and composition of whey at dairy plants mainly depends upon the processing techniques used for casein removal from liquid milk.One is sweet whey having approximately pH 6.5.T(Table 1). The second type of whey, acid whey (pH < 5), results from processes using fermentation or addition of organic or mineral acids to coagulate the casein, as in the manufacture of fresh cheese or most industrial casein (Jelen, 2003). The classification of whey based on acidity and pH is given in Table 2.

Whey Proteins

Research has been unequivocally established the excellent nutritional and functional properties of whey solids, especially the whey proteins (Jelen, 1992, Patel et al., 1992). As a first class protein, whey protein is next only to the

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egg protein in terms of nutritive value, the biological value, protein efficiency ratio (PER) and net protein utilization of egg protein and whey protein being 104 & 100, 3.6 & 3.8 and 92 & 94 respectively. Whey proteins are rich in essential amino acids such as lysine, methionine and cystine (Renner, 1990).
Whey protein has potential as a functional food component to contribute to the regulation of body weight by providing satiety signals that affect both short-term and long-term food intake regulation (Khamrui and Rajorhia, 1998).

Lactose

Lactose, the major component of whey, is probably the least valuable component and most difficult to utilize. Lactose comprises about 70% of the total solids of whey (Jelen, 1992). Minerals Whey is a good source of electrolytes including sodium and potassium, which are required during recovering from diarrhea. Minerals such as calcium, magnesium, and phosphorus are present in solution and also partly bound to proteins. Zinc is present in trace amounts (Zadow, 1992). Lactose also promotes absorption of Mg and Zinc ions, which even in trace amount helps in better diarrheal management (Ziegler and Fomon, 1983).

Vitamins

During the manufacturing process, the water-soluble vitamins are transferred into whey in a varying extent: 40-70% of vitamin B12; 55-75% of vitamin B6 and pantothenic acid; 70-80% of riboflavin and biotin; 80- 90% of thiamine, nicotinic acid, folic acid and ascorbic acid. In the case of vitamin B12, more of it was transferred into the whey when a rennet coagulation rather than acid coagulation was used (Zadow, 1992)

Utilization of whey

In Maharashtra and Gujarat Chakka is used as base product sweet like Shrikhand. In the process of manufacture of Chakka from curd more than 50% whey is obtained which have all components (Table 1). The proper utilization of whey can serve nutritious constituents which have high biological value in the diet of malnourished segmentsof human population of developing countries like India.
Utilization of whey for the benefit of common people, for providing dietary constituents from it, may be possible either by evaporating the water or producing beverages from it. The former is very expensive as the constituents received are in very small quantity. The latter is cheaper, easier and inexpensive. Curd-whey beverage by addition of certain essence, sugar and then fermentation by alcohol producing yeast may give pleasant taste and as refreshing drink.Microbiological quality of the product on storage for certain period has to be judged from the view point of public health. Therefore keeping this fact, the present research work was undertaken to judge the microbiological quality of the curd- whey beverage on storage upto one month.

II. MATERIALS METHODS

The present research work was carried out in the Department of Microbiology, Sir Sayyed College, Aurangabad during the year 2022-23. Methods used to carry out the experiments are mentioned below.

Outline of the work

During the experiment period, 6 treatments were studied with three replications under refrigeration temperature. Treatments studied in the experiment were
T1 (Curd-whey diluted with 50% water i.e. 50 parts of curd whey + 50 parts of water),
T2 (Curd-whey diluted with 75% water i.e. 25 parts of whey + 75 parts of water),
T3 (50% diluted whey beverage with essence),
T4 (50% diluted whey beverage without essence),
T5 (75% diluted whey beverage with essence),
T6 (75% diluted whey beverage without essence),
Cow milk was used for conducting the investigation. The morning milk in bulk quantities were purchased from local market and collected in sterilized class flask. The milk first strained through muslin cloth and was subjected to heat

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treatment at 100 C for 10 min. Then cooled to 40 C. The following pure cultures propagated in sterilized skim milk were used for curd and beverage production.

For curd production

Streptococcus lactis

Streptococcus diacetilactis

For beverage production

Saccharomyces cerevisae

Streptococcus lactis

Streptococcus diacetilactis

Active inoculum used was at the rate of 0.1 percent. *Saccharomyces cerevisae* and *Streptococcus lactis* was propagated as mixed culture for its growth as per procedure laid down by Mahant(1962).

The curd was transferred on muscline cloth and was hanged in refrigerator to obtain the whey. The whey was restrained through muscline cloth. The above whey dilutions were prepared by adding distilled water.

Cane sugar was added as sweetening agent in the diluted whey at the rate of 10% adopting the procedure laid down by Manzon (1978) and was subjected to heat treatment at 90 C for 10 min.and cooled to room temperature. It was incubated for 8 hrs at room temperature and again heat treated to 90 C for 10 min. and cooled to room temperature..The whey was inoculated by a mixed cultures of beverage production and liquid orange essence of Brand Tiger , lemon yellow Brand Farmown was added at the rate 2 ml/L and 1 ma/ L respectively.

Aseptically inoculated whey was filled in sterilized bottles and then sealed. These bottles were kept for incubation at room temperature.

Microbiological analysis of whey

Microscopic examination was carried out by adopting procedure laid down by Peltier, et al.(1962) where as standard plate count, spore count and haemolytic count were determined by adapting procedure described by Indian Institution in its standard number IS 1479 (Part III) 1962. Yeast count was determined as per procedure laid down by Indian Standards Institution in its standard No. IS 3507 (1966).

III. RESULTS AND DISCUSSION

The data obtained in respective various attributes of physico-chemical analysis was tabulated and presented in Table.1 and types of whey based on acidity and pH expressed in Table.2.

Observations on Standard plate count (SPC) in curd-whey beverage were recorded in Table.3. It is noted from the Table.3 that SPC ranges from 130 in beverage prepared by using 50% diluted whey to 3250000 per ml in the beverage prepare from 75% diluted whey from 0 to 28 days storage period. There was no more difference noticed in maximum SPC of all Treatments i.e. T1, T2, T3, T4, T5 and T6.

The curd-whey beverages were also subjected to spore count. The results are tabulated and presented in Table.4. From Table.4, it is seen that there were no spore bearing organisms present in all the Treatments (T1 to T6). It can be shown that the beverage is fit for human consumption. Results on haemolytic Streptococci count of curd-whey beverage were recorded in Table.5, from which it could be revealed that no haemolytic Streptococci were found in the curd-whey beverage of all dilutions and with and without addition of essence. Yeast count of curd-whey beverage was presented and tabulated in Table.6. It is noted from this table that yeast count ranged from 1100 in T1 to 10400000 per ml in T2 for storage period from 0 to 28 days. It could also be noticed that yeast count followed the normal growth curve.

The curd-whey beverage was examined microscopically, during storage period upto 4 weeks from 0 to 28 days, to detect presence of microorganisms other than inoculums content. Results were presented and tabulated in Table7. From the Table 7, it is seen that no microorganisms other than inoculated one were reported in the curd-whey beverage. Further, no difference in microorganisms present in both treatments i.e. T1 and T2. It proved that the product was not contaminated and good for t public health as far as microflora was concerned.

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IV. CONCLUSION

Whey is a very interesting product due to its components. Its properties and functions make whey a great base for the creation of a series of new products of an ideal alternative compound to more traditional ones. In terms of whey utilization there are so many things that can be done instead of treating whey as a waste.

The process of preparation of curd-whey beverage was meticulously developed with the addition of starter culture in the form of bacteria and yeast. The prepared product of beverage was stored up to 28 days at refrigerated temperature. Physico-chemical and microbiological analysis was carried out. It is concluded from the results that a good quality of whey beverage can be prepared from waste of Chakka in the form of whey. It is further concluded that it can be manufactured on large scale as refreshing microbial drink.

Table.1 Typical composition of whey

Components	Sweet whey	Acid whey
Total solids	7.0	7.0
Fat	0.3	0.1
Protein	0.9	1.0
Lactose	4.9	5.1
Ash	0.6	0.7
(Gupta, 2000)		

Table. 2 Types of whey based on acidity and pH

Types of whey	Titratable acidity (%)	pH
Sweet whey	0.1 – 0.20	5.8 – 6.6
Medium acid whey	0.20 – 0.40	5.0 – 5.8
Acid whey	0.40 – 0.60	4.0 – 5.0
(Bund and Pandit,2005)		

Table.3. Standard plate count of whey beverage (1000/ml)

Shelf life in Days	T1		T2	
	T3	T4	T5	T6
0	0.15	0.13	0.10	0.11
4	85.00	55.00	.69.00	0.32
8	220.00	315.00	295.00	49.00
12	315.00	295.00	325.00	312.00
16	290.00	260.00	280.00	335
20	40.00	195.00	176.00	76.00
24	25.00	61.00	38.00	42.00
28	0.45	14.00	1.60	36.00

Table. 4. Spore count in the whey beverage

Shelf life in days	T1		T2	
	T3	T4	T5	T6
0	-	-	-	-
4	-	-	-	-
8	-	-	-	-
12	-	-	-	-
16	-	-	-	-
20	-	-	-	-
24	-	-	-	-
28	-	-	-	-

Legend, - denoted as spore bearing microbes absent.

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Table.5. Haemolytic Streptococci count of curd – whey beverage.

Shelf life in days	T1		T2	
	T3	T4	T5	T6
0	-	-	-	-
4	-	-	-	-
8	-	-	-	-
12	-	-	-	-
16	-	-	-	-
20	-	-	-	-
24	-	-	-	-
28	-	-	-	-

Legend, - denoted as Haemolytic Streptococci absent.

Table.6. Yeast count of curd-whey beverage (1000/ml)

Shelf life in days	T1		T2	
	T3	T4	T5	T6
0	1.1	3.8	1.4	9
4	550	1610	450	1590
8	4100	4800	4200	7600
12	4200	6600	8800	10400
16	6300	6500	8500	9500
20	3300	3900	8000	5500
24	520	1200	4600	2650
28	400	320	850	2300

Table.7. Microscopic examination of curd whey beverage

Shelf life in days	Microflora in curd-whey beverage									
	T1									
	T2					T3				
	Cocci	Bacilli	Spore bearing bacilli	Yeast	Mould	Cocci	Bacili	Spore bearing bacilli	Yeast	Mould
	1	2	3	4	5	1	2	3	4	5
0	+	-	-	+	-	+	-	-	+	-
4	+	-	-	+	-	+	-	-	+	-
8	+	-	-	+	-	+	-	-	+	-
12	+	-	-	+	-	+	-	-	+	-
16	+	-	-	+	-	+	-	-	+	-
20	+	-	-	+	-	+	-	-	+	-
24	+	-	-	+	-	+	-	-	+	-
28	+	-	-	+	-	+	-	-	+	-
T2										
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
0	+	-	-	+	-	+	-	-	+	-
4	+	-	-	+	-	+	-	-	+	-
8	+	-	-	+	-	+	-	-	+	-
12	+	-	-	+	-	+	-	-	+	-
16	+	-	-	+	-	+	-	-	+	-
20	+	-	-	+	-	+	-	-	+	-

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24	+	-	-	+	-	+	-	-	+	-
28	+	-	-	+	-	+	-	-	+	-

Legends, (+) denoted as organism present (-) denoted as organism absent

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