



Founder



Karmaveer Bhausaheb Hiray

Mahatma Gandhi Vidyamandir's

Loknete Vyankatrao Hiray Arts, Science & Commerce College

Affiliated to S.P.P. Uni., Pune Id. No. PU/NS/ASC/018 [1971]

Website : www.lvhcollege.com e-mail : lvhcollege@gmail.com

Re-Accredited by NAAC with 'A' Grade
Best College Award 2017 (S.P. Pune University)

Criterion-3: Research, Innovations and Extension

3.3- Research Publication and Awards

**3.3.1. Number of research papers published per teacher in the Journals
notified on UGC care list during the last five years**

LIST OF RESEARCH PAPERS PUBLISHED

ACADEMIC YEAR 2021-22

Sr. No.	Title of the Paper	Name of the Author	Subject	Name of the Journal	ISSN No.
1.	Green Approach for the Synthesis of Chalcone: Review of Methods	Bapu Sonu Jagdale	Chemistry	Asian Journal of Organic& Medicinal Chemistry	2456-8937
2.	Combined Experimental and Computational Exploration of 4-(4-Bromophenyl)-6-(3,4-dimethoxyphenyl)-5,6-dihydropyrimidin-2(1H)-one	Bapu Sonu Jagdale	Chemistry	Asian Journal of Organic& Medicinal Chemistry	2456-8937
3.	Synthesis and DFT Insights on Molecular Structure, FMO's, MESP and Chemical Reactivity of the 2,4-Diphenylthiazole	Bapu Sonu Jagdale	Chemistry	Asian Journal of Organic& Medicinal Chemistry	2456-8937
4.	PEG-400 mediated synthesis, computational, antibacterial, and antifungal studies of fluorinated pyrazolines	Bapu Sonu Jagdale	Chemistry	Current Research in Green and Sustainable Chemistry	2666-0865
5.	Synthesis, Computational, Antibacterial and Antifungal Investigation of Two Tri-Fluorinated Chalcones of 1-(2,3-Dihydrobenzo[b][1,4]dioxin-6-yl)ethan-1-one	Bapu Sonu Jagdale	Chemistry	Polycyclic Aromatic Compounds	1040-6638

6.	Transition metals Fe ³⁺ , Ni ²⁺ modified titanium dioxide (TiO ₂) film sensors fabricated by CPT method to sense some toxic environmental pollutant gases	Bapu Sonu Jagdale	Chemistry	Journal of the Indian Chemical Society	0019-4522
7.	Spectroscopic (FTIR and UV), quantum Chemical, antifungal and antioxidant investigations of (E)-7-(4-(trifluoromethyl)benzylidene)-1,2,6,7-tetrahydro-8H-indeno[5,4-b]furan-8-one: A combined experimental and theoretical study	Bapu Sonu Jagdale	Chemistry	Vietnam Journal of Chemistry	0866-7144
8.	Antimicrobial and computational investigation of two 2,3-dihydro-1H-inden-1-one derived fluorinated chalcone motifs	Bapu Sonu Jagdale	Chemistry	Vietnam Journal of Chemistry	0866-7144
9.	Designing of LaCrO ₃ – TiO ₂ nanocomposites p: n heterojunction-based sensor material for the selective detection of volatile petrol vapors (PV) and CO ₂ gas vapors	Prof.Dr.K.H.Kapadnis	Chemistry	Journal of the Indian Chemical Society	0019-4522
10.	“Interpretation of Viscometric, Thermodynamic and Acoustic Properties of Maltose in Aqueous Sodium Fluoride”	Prof.Dr.K.H.Kapadnis	Chemistry	Asian Journal of Organic& Medicinal Chemistry	2456-8937
11.	“Study of Molecular Interactions present in Binary Liquid Mixtures of Di-ethyl ether,Isopropyl Ether and n-Di-butyl Ether with 2-Pentanol at Different Temperatures”	Prof.Dr.K.H.Kapadnis	Chemistry	Asian Journal of Organic& Medicinal Chemistry	2456-8937
12.	“Screen printing strategy for investigation of spectrophotometric properties of modified thick film of zirconium oxide and tin oxide composites”	Prof.Dr.K.H.Kapadnis	Chemistry	Oriental journal of chemistry	2231-5039

13.	Photocatalytic Applications of Doped Fe ₃ O ₄ Nanoparticles for Degradation of Methyl Orange and Methylene Blue Dyes: A Review	Thansing Bhavsing Pawar	Chemistry	Asian Journal of organic and medicinal chemistry	2456-8937
14.	Synthesis, spectroscopic and dft based quantum chemical study of (2E)-1-(4-chlorophenyl)-3-[4-(propan-2-yl)phenyl] prop-2-en-1-one	Mrs.N. V.Sadgir	Chemistry	Journal of Chemical, Biological and Physical Sciences	2249-1929
15.	One Pot Synthesis, Spectroscopic Characterization, and Computational Studies of Benzo[d][1,3]dioxol-5-yl(3-(4-isopropylphenyl)oxiran-2-yl)methanone and Benzo[d][1,3]dioxol-5-yl(3-(4-chlorophenyl)oxiran-2-yl)methanone	Mrs.N. V.Sadgir	Chemistry	Asian Journal of Organic& Medicinal Chemistry	2456-8937
16.	Women Health Problems Concern with Maternity in India	Mrs.N. V.Sadgir	Chemistry	International Journal of Advanced Research in Science, Communication and Technology (2021)	2581-9429
17.	1, 5-Benzothiazepine Derivatives: Green Synthesis, In Silico and In Vitro Evaluation as Anticancer Agents.	Dr. Chobe Santosh S.	Chemistry	Molecules	1420-3049
18.	Polyethylene glycol-400 Prompted An Efficient Synthesis of Thienyl Pyrazolo [1, 5-a] pyrimidines as Microbial Inhibitors	Dr. Chobe Santosh S.	Chemistry	Current organic synthesis	1875-6271
19.	A Systematic Review: Use Of Chloroquine And Hydroxychloroquine In Covid-19	Satish A. Ahire	Chemistry	WORLD JOURNAL OF PHARMACEUTICAL RESEARCH	2277– 7105

20.	Green Synthesis of Ceria Nanoparticles using Azadirachta Indica Plant Extract: Characterization, Gas Sensing and Antibacterial Studies	Satish A. Ahire	Chemistry	Material Science Research India (MSRI)	0973-3469
21.	An Eco-friendly Method for the Synthesis of Solvent-Free Reaction of Oxazine Derivatives	Satish A. Ahire	Chemistry	Asian Journal of Organic& Medicinal Chemistry	2456-8938
22.	Nano 5% Fe–ZnO: A highly efficient and recyclable heterogeneous solid nano catalyst for the Biginelli reaction	Vishnu Ashok Adole	Chemistry	<i>Journal of the Indian Chemical Society</i>	0019-4522
23.	Fe ³⁺ modified zinc oxide nanomaterial as an efficient, multifaceted material for photocatalytic degradation of MB dye and ethanol gas sensor	Vishnu Ashok Adole	Chemistry	<i>Inorganic Chemistry Communications</i>	1387-7003
24.	Photocatalytic degradation of methylene blue, rhodamine B, methyl orange and Eriochrome black T dyes by modified ZnO nanocatalysts: A concise review	Vishnu Ashok Adole	Chemistry	<i>Inorganic Chemistry Communications</i>	1387-7003
25.	Computational Chemistry: Sulfamic Acid Catalyzed PEG400 Mediated Synthesis, Molecular Structure, HOMO–LUMO, UV-visible, Vibrational, and Reactivity Descriptors Analysis of 2-(Furan-2-yl)-1Hbenzo[d]imidazole	Vishnu Ashok Adole	Chemistry	<i>Orbital</i>	1984-6428
26.	Synthesis techniques and applications of rare earth metal oxides semiconductors: A review	Vishnu Ashok Adole	Chemistry	Chemical Physics Letters	0009-2614

27.	Synthesis, molecular structure, electronic, spectroscopic, NLO and antimicrobial study of <i>N</i> -benzyl-2-(5-aryl-1,3,4-oxadiazol-2-yl)aniline derivatives	Mr.S.L.Dhonnar	Chemistry	Journal of Molecular Structure	0022-2860
28.	Synthesis, spectral analysis, antibacterial, antifungal, antioxidant and hemolytic activity studies of some new 2,5-disubstituted-1,3,4-oxadiazoles	Mr.S.L.Dhonnar	Chemistry	Journal of Molecular Structure	0022-2860
29.	"Synthesis, Characterization and Antimicrobial Activity of para-Toluidine and ortho-Toluidine Schiff Base and its Cu(II) and Ni(II) Complexes"	Dr.S.P.Jadhav	Chemistry	Asian Journal of Organic & Medicinal Chemistry	2456-8937
30.	Leaf Morphometric Studies in Some Ipomoea Species of Convolvulaceae Family	Mr. Balasaheb Kale	Botany	Asian Plant Research Journal	2581-9992
31.	Electric Current Effect on Plant Growth of Withania Somnifera (L) Dunal (Ashwaganda)	Mr. Balasaheb Kale	Botany	International Journal of pharmacy and Biological Sciences	2230-7605
32.	In Vitro antimicrobial activity of Fagonia schweinfurthii Hadidi from Northern- western Ghat, India	Mr. Suresh G. Sabale	Botany	Journal of pharmacognosy and Phytochemistry	2349-8234
33.	Dyes from Plants: North East region from Nashik District, Maharashtra	Mr. Atul Wagh and Dr. N.B. Pawar	Botany	International Journal of Advanced and Research and Development	2455-4030

34.	Medicinal Plants Used against Covid-19 (SARC-CoV-2) Disease by Tribal of North- East Region from Nashik District, Maharashtra	Mr. Atul Wagh and Dr. N.B. Pawar	Botany	International Journal of Advanced and Research and Development	2455-4030
35.	Ethnobotanical Studies of North- East Region from Nashik Dist. Maharashtra	Mr. Atul Wagh and Dr. N.B. Pawar	Botany	Plantae Scientia- An International Research Journals In Botany	2581-589x
36.	SOLVING FUZZY CAPUTO – FABRIZIO FRACTIONAL ONE DIMENSIONAL HEAT EQUATION BY ITERATIVE FUZZY LAPLACE TRANSFORM METHOD USING MATHEMATICA	Dr. Vasant R. Nikam	Mathematics	JXU	1001-2400
37.	The Double Fuzzy Elzaki Transform For Solving Fuzzy Partial Differential Equations	Dr. Vasant R. Nikam	Mathematics	Journal of The Chungcheong Mathematical Society	2383 - 6245
38.	A new Algebraic method for the initial basic feasible Solution of transportation problem and comparison with low cost method	Shrinath Dilip Manjarekar , Bhadane Ashok Parasharam	Mathematics	Global Journal for Research Analysis	2277 - 8160
39.	Prevalence and Histopathological Studies on Intestinal Cestode Parasite of Avian Host <i>Gallus Domesticus</i> (L) From Nashik Region, Maharashtra State, India	Dr Sunil D. Patil and Miss. Komal Jagtap	Zoology	International Journal for Research in Applied Science & Engineering Technology (IJRASET)	2321-9653
40.	“ The world war against covid -19”	Dr. Anita P. Patil	Zoology	Asian journal of organic and medicinal chemistry	2456-8937

41.	Influence of Annealing on Physical, Physiological and Electric Properties of Mono Nickel oxide Thick Films Prepared by using Screen-Printing Technique.	Dr. Ugalal Pandit Shinde	Electronics	SAMRIDDHI ,200-206 Volume 14, Special Issue 1, 2022 Print ISSN : 2229-7111 Online ISSN : 2454-5767	2454-5767
42.	Investigation of Structural and Optical Properties of Graphene Derivatives as a Route for Optical Sensing	Mr. Anil Bhimarao Patil	Electronics	Materials Today: Proceeding – Elsevier journal	2214-7853
43.	Infrared Sensor For Measurement Of Forward Travel Speed	Dr. Ugalal Pandit Shinde	Electronics	Stochastic Modeling & Applications,,Vol. 26 No. 3 (January - June, Special Issue 2022 Part - 4) 270-273 Special Issue on Recent Research on Management, Applied Sciences and Technology.	0972-3641
44.	Preparation and Nano Structural Investigation of Screen Printed Cobalt oxide (Co ₃ O ₄) Thick Film with Annealing Temperature	Dr. Ugalal Pandit Shinde	Electronics	Asian Journal of Organic & Medicinal Chemistry, 20-28	2456-8937
45.	Influence of annealing on electrical and optical properties of NiO thick film Sensors developed by screen printing technique	Dr. Ugalal Pandit Shinde	Electronics	International Journal of Scientific Development and Research (IJS DR)	2455-2631

46.	Thermally Evaporated Mgo-Nio Nanocomposite Thin Films For Ethanol Gas Sensor.	Dr. Ugalal Pandit Shinde	Electronics	International Journal of Recent Advances in Multidisciplinary Research	2250-0743
47.	Study Of Electrical And Gas Sensing Properties Of Thermally Evaporated Nickel Oxide Thin Films	Dr. Ugalal Pandit Shinde	Electronics	Journal of Emerging Technologies and Innovative Research (JETIR)	2349-5162
48.	Patient Health Monitoring System Using Iot	Dr. Ugalal Pandit Shinde	Electronics	International Journal Of Scientific Research & Engineering Trends Volume	2395-566X
49.	PCB Design Plotter Using CNC Shield And Arduino	Dr. Ugalal Pandit Shinde	Electronics	International Journal Of Research Publication And Reviews	2582-7421
50.	Development Of Ethanol Gas Sensors Using Ternary Metal Oxide Thick Films	Dr. Ugalal Pandit Shinde	Electronics	International Journal of Agricultural Science and Research (IJASR)	2321-0087
51.	Influence of Annealing Temperature on Structural and Electrical Properties of Screen Printed Lanthanum Oxide Thick Films	Mr. Anil Bhimarao Patil	Electronics	Iranian Journal of Materials Science and Engineering, Vol. 19, Number 4	2383-3882
52.	Potentiometric Study and Statistical Analysis of Human Urine Samples Using Reduced Graphene Oxide Screen Printed Electrodes	Mr. Anil Bhimarao Patil	Electronics	Asian Journal of Organic & Medicinal Chemistry	2456-8937

53.	Research Study of Structural, Morphological and Optical Properties of Screen-Printed thick Films of Titanium Oxide with Tin Oxide Composition	Kaveri B Bhamare, Aditi N Ahirrao, Rohit M Nikam	Physics	Asian Journal of Organic & Medicinal Chemistry	2456-8937
54.	Preparation and Characterization of WO ₃ Thick Film Resistors using Screen Printing Technique	S. J. Patil	Physics	Asian Journal of Organic & Medicinal Chemistry	2456-8937
55.	Comparative studies of electrical and gas sensing properties of undoped and tin oxide doped with antimony and cadmium	S. J. Patil	Physics	Asian Journal of Organic & Medicinal Chemistry	2456-8937
56.	ATTITUDE TOWARDS ONLINE EXAMINATION AMONG PROFESSIONAL AND CONVENTIONAL COLLEGE STUDENTS DURING THE SECOND WAVE OF COVID-19 PANDEMIC	Dr. M.A. Bhardwaj	Psychology	International Research Journal of Management Sociology & Humanities	2277-9809
57.	Specific Phobia During The Covid-19 Pandemic First Wave In Maharashtra	Dr. M.A. Bhardwaj	Psychology	The International Journal of Indian Psychology	2348-5396
58.	Dalit sriyanchi Atmkathanatil sanskrutik sangharsh	Prof. Vidya Surve	Marathi	sanshodhan	2394:5990
59.	antaryami drushtui valavanare lekhan	Prof. Vidya Surve	Marathi	Reaserch journey	2348:7143

60.	samajkalin samajvastav	Prof. Vidya Surve	Marathi	Abhisaran	2229-4856
61.	google apps v google apps chya vividh seva	Dr. Prakash Shewale	Marathi	Reaserch journy	2348:7143
62.	Pudhalya Vata	Dr. Prakash Shewale	Marathi	Akshar Vadmay	-
63.	Religious Tourism in Maharashtra: problems and Prospects	Mr.G.U.Harkar	Geography	IRJMETs International journal of modernization in engineering technology and science	2582-5208
64.	A Study of Communication in Report Writing	Dr. Kishore R. Nikam	English	Journal of Education	0972-7175
65.	Depiction of the Marginalized in 'The God of Small Things'	Dr. Sandeep Wagh	English	Vi. Ka. Rajwade's 'Sanshodhak'	2394-5990
66.	The Myth of Yavakari in Girish Karnad's 'The Fire and the Rain'	Dr. Sandeep Wagh	English	Research Journey: Multidisciplinary International E-Research Peer Reviewed Journal	2348-7143.

67.	The Study of Identity Crisis in 'The God of Small Things'	Smt. Sarala Sanap	English	Research Journey	2348-7143
68.	The Analysis of Multiple Dimentions of Identity Crisis in Anurag Mathur's 'The Inscrutable Americans.'	Smt. Sarala Sanap	English	Journal of Education: Rabindra Bharati University	0972-7175
69.	Recent Trends And Development In Digital Revolution Through Online Marketing	Dr. Arti C. Lokhande	Commerce	Journal of Research and Development A Multidisciplinary International Level Referred and Peer Reviewed Journal	2230-9578
70.	Rise of Digital Wallet in Pandemic	Dr. Arti C. Lokhande	Commerce	Atishay Kalit UGC Care Listed Referred International Bilingual Research Journal of Humanities, Social Science & Fine Arts	2277-419X
71.	A Study on HRM practices in small and medium enterprise	Dr. Arti C. Lokhande	Commerce	World Journal of Management & Economics- Indexed in Australian Business Deans Council (ABDC)	1819-8643
72.	Goat Farming: History& Importance of the Era of Globalization	Dr. Pragati B. Marakwar	History	Bohal Shodh Manjusha	2395-7115

73.	Satvahan kalin Leni Sthapatyacha Avishkar	Dr. Pragati B. Marakwar	History	Tifan	2231-573X
74.	Srisantancha Varasa: San Janabai	Dr. Pragati B. Marakwar	History	Juni Khyat	2278-4632
75.	Swatantrya Chalvalit Nashik Jilyatil Sriyanche Yogdan	Dr. Pragati B. Marakwar	History	Juni Khyat	2278-4632
76.	Bhartiy Swatantry Sangramat Marathi Vruttpратанчи Bhumika	Dr. Pragati B. Marakwar	History	Vidyavarta Muldicilinary Referred Journal	23199318
77.	Kille Ramshejvaril Jalvyasthapan	Mr. Gorakh S.Shewale	History	Tifan	2231-573X
78.	Mughal Sthapatya Kala: Fatehpur Sikkrichya veshesh Sandarbhasah	Miss. Ruchira V. Dandgaval	History	Tifan	2231-573X
79.	Nahpan Vihar: Satvahankalin Jagtikikaranache Pratik	Mrs. Kirti V. Varma	History	Tifan	2231-573X

80.	Jahanjirkalin Mughal Chitrakala	Mrs. Kirti V. Varma	History	Itihas Sanshodhan Patrika, Marathwada Itihas Parishad	0976-5425
81.	Sthapatya Kalatmak Navachar: Akabarkal	Mrs. Kirti V. Varma	History	Itihas Sanshodhan Patrika, Marathwada Itihas Parishad	0976-5425
82.	हिंदी उपन्यासों में किसान विमर्श	Dr.Yogita A. Hiray	Hindi	Worldwide International Interdisciplinary research journal	2454-7905
83.	Toxicity of Monocrotophos in Freshwater Bivalve, <i>Lamellidens marginalis</i> , Using Different Markers	Mr. Lalit Tank & Dr. Sunil D. Patil	Zoology	International Journal for Research in Applied Science & Engineering Technology (IJRASET)	2321-9653;
84.	HISTOPATHOLOGICAL MANIFESTATION IN GALLUS GALLUS DOMESTICUS INFECTED WITH CESTODE PARASITE	Ziayurrahman Z. Husain ¹ , Sunil D.Patil ²	Zoology	IJFANS International Journal of Food and Nutritional Sciences	e 2320 –7876
85.	Online learning usage and acceptability	Dr.Rupali M.Deore	Economics	Ajanta	2277- 5730
86.	Challenges and Opportunities in Indian Economy.	Dr.Rupali M.Deore	Economics	Journal of Research and Development	2230-9578

87.	Modernization of industrialization -Make in India	Dr.Rupali M.Deore	Economics	shodhsanhita	2277-7539
88.	Study of Human Progress in Maharashtra	Dr.Rupali M.Deore	Economics	Excel's International journal of social science & Humanities	2277-7539
89.	Strategy to increase agriculture production in India	Dr.Rupali M.Deore	Economics	Worldwild International inter Disciplinary Research journal	2454-7905
90.	Sustainable Agriculture and modern technology	Dr.Rupali M.Deore	Economics	Ideal	2319- 359X
91.	Women Empowerment Global and Indian policies	Dr.Rupali M.Deore	Economics	Changing Global Scenario : Strategies for Sustainability	-
92.	Effects of Globalization on Indian Agriculture	Dr. N. N. Gadhe	Economics	Ajanta	2277-5730
93.	A Study of Marketing Functions and Marketing Methods of Agricultural Produce in Maharashtra	Dr. N. N. Gadhe	Economics	Worldwide International Inter Disciplinary Research Journal	2454 7905

94.	A Study of Impact of Russia- Ukrain War on India	Dr. N. N. Gadhe	Economics	Research Journey	2348-7143
95.	Bhartatil Aarogya sewa Wastav : Ek Drushtikon	Dr. A . S .Patil	Economics	Ij :NDEX	2277-7539
96.	Crypto Currency - Ek Abhyas	Prof. S. V. Aher	Economics	Peer Reviewed	2454-7905
97.	A Study of Gopinath Mohanty's Novel <i>Paraja</i> as a Subaltern Novel	Dr. Kishore R. Nikam	English	The Journal of Oriental Research, Madras	0022-3301
98.	राष्ट्रकवि डॉ ब्रिजेश सिंह की गज़लों में जल पर्यावरण संरक्षण	Dr.Yogita A. Hiray	Hindi	Research Journey	2348-7143

Green Approach for the Synthesis of Chalcone: Review of Methods

B.B. Waghmare^{1,*}, B.S. Jagdale² and N.V. Sadgir²

¹Department of Chemistry, M.S.G. Arts, Science and Commerce College, Malegaon, Nashik, India

²Department of Chemistry, L.V.H. Arts, Science and Commerce College, Panchavati, Nashik, India

ABSTRACT

A method for synthesizing chalcones that is simple, fast, efficient, and environmentally friendly has been developed. Using green methods reduces or eliminates the risk of chemicals entering the environment and causing harm to human health, which is an absolute necessity. In this review, we discuss the various methods for synthesizing chalcone, such as microwave-assisted, ultrasound-assisted, green solar power, grinding, and more, to make products more environmentally friendly.

KEYWORDS: environment, microwave-assisted, ultrasound-assisted, green solar power, grinding.

INTRODUCTION

Chalcone is one-of-a-kind α , β -unsaturated carbonyl with biologically active properties, and it is a precursor of various heterocyclic compounds found in plants, like flavonoids. Chalcones are thought to play a fundamental role in the synthesis of various therapeutic compounds. Chalcones have piqued the interest of scientists around the world for decades due to their wide and varied pharmaceutical properties and easy preparation¹. Different synthetic methods for the preparation of chalcone are nowadays being reported due to their remarkable biological applications. Claisen-Schmidt condensation is the most familiar reaction in the synthesis of chalcones through condensation reactions using acid or base catalysis. Due to its simplicity and better yields when compared to other conventional methods, it is the most frequently used procedure for the synthesis of chalcones². The main disadvantages of this technique are the slow reaction rates and the possibility of by-products; it normally requires more reaction time and in some cases, unused starting materials³. The development of processes for the sustainable production of chemicals and materials is referred to as the "green synthetic protocol"⁴. Energy-efficient and environmentally sustainable processes such as microwave-assisted, ultrasound-assisted, green solar-assisted, and grinding are used in the synthesis of different biologically active compounds. The green approach to chalcone synthesis is described below.

Green synthetic approaches: Green chemistry approaches for carrying out various chemical reactions include microwave irradiation (MWI), ultrasonication, green solar-assisted and grinding. By using these technologies organic reactions become more efficient and cost-effective by increasing the rate of the reaction with reduced reaction time and high product yield and reducing the chances of by-products⁵.

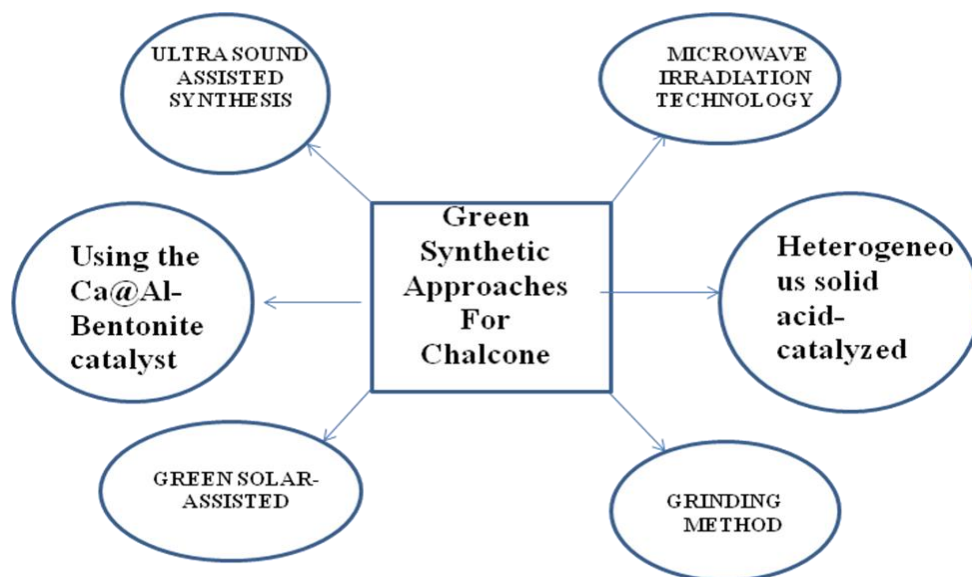


Fig.1 Green Synthetic Approaches For Chalcone

**Combined Experimental and Computational Exploration of
4-(4-Bromophenyl)-6-(3,4-dimethoxyphenyl)-5,6-dihydropyrimidin-2(1H)-one**

Sandip S. Pathade^{1,*} and Babu S. Jagdale²

¹Department of Chemistry, Mahatma Gandhi Vidyamandir's Maharaja Sayajirao Gaikwad Arts, Science and Commerce College (Affiliated to Savitribai Phule Pune University, Pune), Malegaon, Nashik-423105, India

²Department of Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati (Affiliated to Savitribai Phule Pune University, Pune), Nashik-422003, India

ABSTRACT

This work deals with the synthesis of 4-(4-bromophenyl)-6-(3,4-dimethoxyphenyl)-5,6-dihydropyrimidin-2(1H)-one by condensation of 1-(4-bromophenyl)-3-(3,4-dimethoxyphenyl)prop-2-en-1-one with urea. The structure of the synthesized compound was established by FT-IR, ¹H NMR, ¹³C NMR and HRMS spectral techniques. For the synthesized compound the density functional theory (DFT) calculations at the B3LYP level were performed using Gaussian 03(W) package. The optimized geometrical parameters, frontier molecular energies, electronic parameters and global chemical reactivity descriptors have been calculated by the DFT/B3LYP/6-311++G(d,p) level. The structure was characterized as a minimum in the potential energy surface using DFT. The molecular electrostatic potential (MEP) and thermodynamic properties were also investigated using the same level of theory. In addition, the vibrational wavenumbers of the title compound were calculated and the scaled values were compared with the experimental FT-IR spectrum. The result shows a good correlation between computed and experimental frequencies. The effect of different solvents on electronic parameters and global chemical reactivity descriptors were also examined. In solvents, no significant change was observed on the energy gap and global reactivity descriptors of the title molecule.

KEYWORDS: FT-IR, NMR, DFT, B3LYP, MEP.

INTRODUCTION

Heterocyclic compounds are abundant in nature and are important for survival because structural subunits of heterocycles can be found in many natural products including vitamins, proteins, and antibiotics. In synthetic organic chemistry, a feasible approach for the synthesis of such molecules is of great significance. Pyrimidine is a well-known heterocyclic compound possessing two nitrogen atoms in positions 1 and 3 of a six-member ring. Pyrimidine derivatives have a significant therapeutic noticeability as compared to other heterocycles and has far genetic and therapeutic implications. Pyrimidine derivatives have a wide spectrum of biological and pharmacological properties which include antimicrobial ^{1,2}, antiviral ³, antihypertensive ⁴, anticancer ⁵⁻⁷, anti-inflammatory ⁸⁻¹⁰, antitubercular ^{11,12}, and antihypertensive ^{13,14} activities. Due to their intriguing biological activity and medicinal potential, these compounds have received a lot of attention recently.

In recent years DFT-based theoretical computations have been used to determine several structural parameters of synthetically and pharmacologically significant organic compounds. The bond lengths, bond angles, dihedral angles, UV-visible spectra, IR and Raman frequencies, FMO energies, molecular electrostatic potential, and other properties of molecules can be predicted using DFT calculations ¹⁵⁻²⁸.

In the current investigation, we report the synthesis as well as various structural and quantum chemical properties of the title compound i.e., 4-(4-bromophenyl)-6-(3,4-dimethoxyphenyl)-5,6-dihydropyrimidin-2(1H)-one.

EXPERIMENTAL

All the chemicals needed for synthesis were obtained from a commercial source (AR grade with purity >99%) and used without further purification. Melting points were determined in an open capillary tube and were uncorrected. FT-IR spectra were recorded on Shimadzu FT-IR spectrometer using potassium bromide pellets. ¹H NMR and ¹³C NMR spectral analysis was carried on Bruker Avance II 500 MHz spectrometer using CDCl₃ as solvent and TMS as internal standard. The reaction was monitored by thin layer chromatography (TLC, Merck) using aluminium sheets coated with silica gel using n-hexane and ethyl acetate as an eluent.

Synthesis and DFT Insights on Molecular Structure, FMO's, MESP and Chemical Reactivity of the 2,4-Diphenylthiazole

A.R. Bukane^{1,*} and B.S. Jagdale²

¹PG Department of Chemistry, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College (Affiliated to Savitribai Phule Pune University, Pune), Manmad, Taluka-Nandgaon, District-Nashik-423104, India

²PG Department of Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray, Arts, Science and Commerce College (Affiliated to Savitribai Phule Pune University, Pune), Panchavati, District-Nashik-422003, India

ABSTRACT

The current study focuses on the synthesis and density functional theory (DFT) analysis of a 2,4-diphenylthiazole. The reaction of benzothioamide and 2-bromo-1-phenylethan-1-one in ethanol at 70-80°C under stirring resulted in the creation of a 2,4-diphenylthiazole (2,4-DPT). ¹H NMR and ¹³C NMR spectrum techniques were used to confirm the structure of a synthetic thiazole. The geometry of the 2,4-diphenylthiazole was optimised using the DFT approach with the 6-311G++(d,p) basis set at the B3LYP functional. Geometrical characteristics such as bond length and bond angles were optimised, examined, and debated. The parameters of quantum chemistry have been determined and investigated. Surface plot analysis of the Molecular Electrostatic Potential (MEP) has been performed at the same theoretical level. The current study also discusses the Mulliken atomic charge investigation of the titled compound.

KEYWORDS: Thiazole, DFT, B3LYP, 6-311G++(d,p).

INTRODUCTION

The five-membered heterocyclic molecule thiazole is well-known. In recent decades, much research has focused on the thiazole ring in order to discover new compounds that act as antioxidants¹, analgesics², anti-inflammatory³, antimicrobial⁴, antifungal⁵, antiviral⁶, diuretic⁷, anticonvulsant⁸, neuroprotective⁹, and antitumor¹⁰ or cytotoxic drugs with fewer side effects. Thiazoles and their derivatives have been used in the creation of drugs for the treatment of allergies¹¹, Hypertension¹², schizophrenia¹³, bacterial infections¹⁴, HIV infections¹⁵, hypnotics¹⁶ and more recently for the treatment of pain¹⁷, as fibrinogen receptor antagonists with antithrombotic activity¹⁸ and as novel inhibitors of bacterial DNA gyrase B¹⁹. Thiazole nucleus is also a component of all known penicillins, which have revolutionised bacterial disease treatment²⁰. Several thiazole containing drugs are available such as; nizatidine is a histamine H₂-receptor antagonist that inhibits stomach acid production, and commonly used in the treatment of peptic ulcer disease (PUD) and gastroesophageal reflux disease (GERD), niridazole as schistosomicidal, sulfathiazole as antibiotic, fanetizole as anti-inflammatory, combendazole as fungicidal²¹. Theoretical chemistry calculations are based on quantum chemistry and physicochemical calculations. Density functional theory (DFT) can be used to predict many molecular properties²²⁻²⁷. Spectroscopic experiments include UV/vis spectra²⁸⁻²⁹, IR and Raman frequencies and intensities³⁰⁻³¹, NMR chemical shifts³², and spin-spin coupling constants³³. DFT computations can estimate HOMO-LUMO energies³⁴⁻³⁸, bond lengths and angles³⁹, and absorption energies⁴⁰⁻⁴². A lot of knowledge is gained by comparing theoretical calculations to experimental data. Using computing data, it is now possible to arrive at a reaction mechanistic route. The current research looked at molecule structure, bond length, bond angle, and Mulliken atomic charges using DFT analysis. Important characteristics like as total energy, HOMO-LUMO energies, and charge distribution are also investigated using the DFT method. In light of the foregoing, I'd like to present in this paper a density functional theory analysis of previously synthesised 2,4-diphenylthiazole compounds.

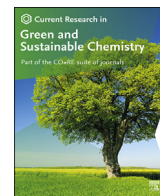
Methodology

General remarks: The chemicals with high purity were purchased from Virion Enterprises. The chemicals were used as received without any further purification. The melting point was determined in open capillary and uncorrected. ¹H NMR and ¹³C NMR spectra were recorded on a sophisticated multinuclear FT NMR Spectrometer model Advance-II (Bruker) with ¹H frequency 500 MHz and ¹³C frequency 126 MHz using CDCl₃ as a solvent, the reaction was monitored by thin-layer chromatography using aluminium sheets with silica gel 60 F254 (Merck).



Contents lists available at ScienceDirect

Current Research in Green and Sustainable Chemistry

journal homepage: [www.elsevier.com/journals/
current-research-in-green-and-sustainable-chemistry/2666-0865](http://www.elsevier.com/journals/current-research-in-green-and-sustainable-chemistry/2666-0865)

PEG-400 mediated synthesis, computational, antibacterial and antifungal studies of fluorinated pyrazolines

Sandip S. Pathade^a, Vishnu A. Adole^{b,*}, Babu S. Jagdale^c^a Department of Chemistry, Mahatma Gandhi Vidyamandir's Maharaja Sayajirao Gaikwad Arts, Science and Commerce College, Malegaon, (Affiliated to Savitribai Phule Pune University, Pune), Nashik, Maharashtra, 423105, India^b Department of Chemistry, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College, Manmad, (Affiliated to Savitribai Phule Pune University, Pune), Nashik, Maharashtra, 423104, India^c Department of Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College, Panchavati, (Affiliated to Savitribai Phule Pune University, Pune), Nashik, Maharashtra, 422003, India

ARTICLE INFO

Keywords:

Pyrazolines
PEG-400
Computational
Antibacterial
Antifungal

ABSTRACT

The present study explores a detailed comprehensive study on the computational, antibacterial and antifungal studies of pyrazoline derivatives. Four chalcones and corresponding 5-aryl-3-(4-fluorophenyl)-1-phenyl-4,5-dihydro-1H-pyrazoles were synthesized in PEG-400 and the structure of the pyrazolines were affirmed by IR, ¹H NMR, and ¹³C NMR spectral techniques. The PEG-400 mediated synthesis of pyrazoline derivatives is effective, eco-friendly, and straightforward. The molecular structure, optimized geometrical parameters, UV and vibrational assignments were established by the density functional theory (DFT); the Becke-3-Lee-Yang-Parr (B3LYP) functional with 6-311++G(d,p) basis set. The absorption energies, excitation energy, oscillator strength, and transitions of four pyrazolines were computed using time-dependent density functional theory (TD-DFT) at B3LYP/6-311++G(d,p) level of theory for B3LYP/6-311++G(d,p) optimized geometries. The FMO study affirms that the molecule FPMP has the lowest bandgap with maximum charge transfer. A good correlation between theoretical and experimental UV and vibrational findings was obtained. Various global descriptors like were electronegativity, absolute hardness, global softness, global electrophilicity, chemical potential, and the maximum number of electrons transferred (Nmax) were calculated. The phenyl ring attached to nitrogen is likely to react with electrophiles, as shown in a molecular electrostatic potential surface analysis. The antibacterial screening was performed against two Gram-positive bacterial strains namely *S. aureus* and *B. subtilis* and two Gram-negative bacterial strains namely *E. coli* and *P. vulgaris*. On the other hand, the antifungal evaluation of the synthesized pyrazoline derivatives was carried out against two fungal strains namely *A. niger* and *C. albicans*.

1. Introduction

Pyrazolines are nitrogen-containing five-membered heterocyclic compounds that are notable and important. Pyrazoline is an essential synthon in medicinal chemistry, and it has been influential in the synthesis of heterocyclic compounds. Many pyrazoline scaffolds have been reported to have a wide range of biological properties, which has sparked a lot of interest in recent years [1,2]. They serve as a structural basis for the development of a variety of biologically active compounds. A reaction of chalcones with hydrazine/hydrazine derivatives is one of the simplest ways to synthesize pyrazolines [3,4]. Chalcones and related compounds exhibit wide spectrum of biological activities [5–8]. The outstanding pharmacological profile of pyrazole hybrids includes

anticancer [9], antimicrobial [10,11], anticonvulsant [12], antimycobacterial [13], analgesic [14], anti-inflammatory [15], antidepressant [16], and antiamoebic activities [17]. The chalcones and pyrazoline derivatives have been investigated in the past for the exploration like photophysical characteristics, selective fluorescent chemosensor applications, optical properties, DFT study, etc. [18–24]. Some notable examples of pyrazolines as pharmacological agents are depicted in Fig. 1. The pyrazoline derivative 1 and 5 are reported to show excellent anti-inflammatory activity in disease treatments. Compound 2 has been linked to a very good analgesic property. On the other hand, pyrazolines 4 and 5 are fantastic anticonvulsant and antidepressant candidates respectively.

DFT calculations are reliable and useful for determining the structural

* Corresponding author.

E-mail address: vishnuadole86@gmail.com (V.A. Adole).<https://doi.org/10.1016/j.crgsc.2021.100172>

Received 6 August 2021; Received in revised form 6 September 2021; Accepted 18 September 2021

Available online 2 October 2021

2666-0865/© 2021 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).



Synthesis, Computational, Antibacterial and Antifungal Investigation of Two Tri-Fluorinated Chalcones of 1-(2,3-Dihydrobenzo[*b*][1,4]dioxin-6-yl)ethan-1-one

Rahul A. Shinde^a, Vishnu A. Adole^a , and Babu S. Jagdale^b

^aDepartment of Chemistry, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College, Manmad (Affiliated to Savitribai Phule Pune University, Pune), Nashik, MS, India; ^bDepartment of Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati (Affiliated to Savitribai Phule Pune University, Pune), Nashik, MS, India

ABSTRACT

In the present study, we report the combined experimental and computational study along with antimicrobial screening of two tri-fluorinated chalcones from 1-(2,3-dihydrobenzo[*b*][1,4]dioxin-6-yl)ethan-1-one. The (*E*)-1-(2,3-dihydrobenzo[*b*][1,4]dioxin-6-yl)-3-(4-(trifluoromethyl)phenyl)prop-2-en-1-one (DBTFP-1) and (*E*)-1-(2,3-dihydrobenzo[*b*][1,4]dioxin-6-yl)-3-(4-(trifluoromethoxy)phenyl)prop-2-en-1-one (DBTFP-2) were synthesized by the famous Claisen-Schmidt condensation reaction. The computational investigation of optimized molecular structures, bond lengths and bond angles were performed by using density functional theory (DFT) with a B3LYP functional and 6-31G(d,p) basis set. The electronic properties were computed using Time-Dependent density functional theory (TD-DFT) with a B3LYP functional and 6-31G(d,p) basis set for the optimized geometries. The lower band gap in DBTFP-1 demonstrated the inevitable intramolecular charge transfer. The UV-Visible simulations were performed in the gas phase and dichloromethane (DCM) solvent. The experimental UV-Visible analysis was performed in DCM solvent. The first singlet excited state was attributed to the $n-\pi^*$ and second singlet excited state to the $\pi-\pi^*$ electronic transition. The scaled vibrational bands of titled compounds were compared with experimental observations and correct vibrational assignments were made. Various global reactivity parameters were analyzed and discussed to apprehend the chemical behavior of the synthesized chalcones. MESP and contour surfaces revealed negative potentials near the oxygen atoms and positive potentials over the hydrogen atoms. Mulliken charge study revealed that C17 and C33 are the most negative and positive carbon atoms in DBTFP-1, respectively, whereas C17 and C35 are the most negative and positive carbon atoms in DBTFP-2. The antibacterial activity was performed against *P. vulgaris* and *S. aureus* and antifungal activity against *A. niger* and *C. albicans*. The antimicrobial activity for these two compounds was correlated with LUMO and band gap energy. The magnificent antimicrobial activity of DBTFP-1 was attributed to its more stabilized LUMO and lower band gap than DBTFP-2.

ARTICLE HISTORY

Received 25 January 2021
Accepted 29 August 2021

KEYWORDS

Density functional theory; chalcones; frontier molecular orbitals; global descriptors; antimicrobial activity



Transition metals Fe^{3+} , Ni^{2+} modified titanium dioxide (TiO_2) film sensors fabricated by CPT method to sense some toxic environmental pollutant gases

Ravindra Haribhau Waghchaure^a, Prashant Bhimrao Koli^b, Vishnu Ashok Adole^{c,*},
Thansing Bhavsing Pawar^d, Bapu Sonu Jagdale^d

^a Department of Chemistry, Mahant Jamanadas Maharaj Arts, Commerce and Science College, Karanjali, Taluka-Peth, District- Nashik, 422 208, India

^b Department of Chemistry, Maratha Vidyaprasarak Samaj Karmveer Abasaheb Alias N.M. Sonawane Arts, Commerce and Science College, Satana, Taluka-Baglan, District- Nashik, 423301, MH, India

^c Department of Chemistry, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College, Manmad, Taluka-Nandgaon, District- Nashik, 423104, MH, India

^d Research Centre in Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati, Nashik, 422003, MH, India

ARTICLE INFO

Keywords:

Modified TiO_2 sensor
 SO_2 sensing
 TEM
 XPS
 BET

ABSTRACT

The present investigation deals synthesis of undoped TiO_2 , Ni^{2+} doped TiO_2 , and Fe^{3+} doped TiO_2 nanoparticles by low-cost co-precipitation (CPT) method. The thick film sensors of all the fabricated modified TiO_2 nanoparticles were designed by a screen printing strategy. The prepared thick film sensors were characterized by various sophisticated techniques. The structural parameters of undoped TiO_2 and modified TiO_2 film sensors were characterized by X-Ray Diffraction (XRD) which confirmed anatase phase of TiO_2 lattice. The surface morphological properties of all the prepared materials were confirmed by means of scanning electron microscope (SEM). The energy dispersive spectroscopy (EDS) confirms the elemental composition of all the prepared materials. High-Resolution Transmission Electron Microscopy (HR-TEM) was utilized to investigate the crystal lattice of fabricated TiO_2 material. The HR-TEM results revealed the anatase phase crystal morphology of prepared material. The prepared TiO_2 materials were also characterized by means of X-Ray photoelectron spectroscopy (XPS) to confirm the surface doping, specific binding energies, chemical states and elemental composition of modified TiO_2 materials. The Brunauer–Emmett–Teller (BET) study was carried to investigate the specific surface area of all the prepared sensors. The Fe^{3+} doped TiO_2 sensor found with enhanced surface area ($83.10 \text{ m}^2/\text{g}$) in comparison to Ni^{2+} doped TiO_2 and bare TiO_2 ($67.34 \text{ m}^2/\text{g}$). All the prepared materials were investigated for gas sensing characteristics. The NO_2 , SO_2 , and CO_2 gases were investigated for all the prepared sensors. The reusability test confirms that the Fe^{3+} doped TiO_2 is reproducible and stable sensor for long time repeated sensing of SO_2 and NO_2 vapors. Importantly, Fe^{3+} doped TiO_2 sensor showed rapid response and recovery towards SO_2 and NO_2 vapors.

1. Introduction

The twenty-first century is known as the “Invention Century.” In the fields of science and technology, the most significant inventions are made. Material technology is at the core of these innovative research applications. Material science has contributed a great deal to the world in the form of several advancements. The enormous research work in technological fields has changed mankind's life in many respects, and this extraordinary work in material science has inspired researchers to pursue more enticing work in technological fields such as engineering [1],

biosensors [2] ceramics technology [3], supramolecular chemistry [4], computational chemistry of nanomaterials [5], sensors and transducers [6,7], advanced oxidation processes [8], mussel chemistry [9,10], automotive technology [11], molecular nanotechnology [12], nano-medicines and therapeutics [13,14], etc. As noted previously, there is a booming demand for nanomaterials-based materials in a variety of fields of technology. With the help of material science-based technology, the inventors are bringing their resources to work on a variety of technological advancements.

* Corresponding author.

E-mail address: vishnuadole86@gmail.com (V.A. Adole).

<https://doi.org/10.1016/j.jics.2021.100126>

Received 18 July 2021; Received in revised form 8 August 2021; Accepted 9 August 2021
 0019-4522/© 2021 Indian Chemical Society. Published by Elsevier B.V. All rights reserved.

Spectroscopic (FTIR and UV), quantum Chemical, antifungal and antioxidant investigations of (*E*)-7-(4-(trifluoromethyl)benzylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one: A combined experimental and theoretical study

Vishnu Ashok Adole^{1*}, Rahul Ashokrao More², Rahul Ashok Shinde¹, Sunil Laxman Dhonnar³,
Bapu Sonu Jagdale³, Sachin Girdhar Shinde⁴, Arun Vitthal Patil⁵, Thansing Bhavsing Pawar³

¹Department of Chemistry, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College, Manmad, Nashik-423 104, India (Affiliated to SP Pune University, Pune)

²Department of Microbiology, Dayanand Science College, Latur-413512, India (Affiliated to Swami Ramanand Teerth Marathwada University, Nanded)

³Department of Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati Nashik-422 003, India (Affiliated to SP Pune University, Pune)

⁴Department of Chemistry, K. V. N. Naik Shikshan Prasarak Sanstha's Arts, Commerce and Science College Nashik-422 002, India (Affiliated to SP Pune University, Pune)

⁵Department of Physics, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College, Manmad, Nashik-423 104, India (Affiliated to SP Pune University, Pune)

Received April 14, 2021; Revised May 28&31, 2021; Accepted June 1, 2021

Abstract

In the current study, we report the antifungal, antioxidant, and computational study of (*E*)-7-(4-(trifluoromethyl)benzylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one (FMBIF). The structure of the **FMBIF** was confirmed using spectroscopic techniques such as UV-Vis, FT-IR, ¹H NMR, ¹³C NMR, and HRMS. Antifungal activity of the **FMBIF** was evaluated against four fungal strains namely *Rhizopus oryzae*, *Mucor mucido*, *Aspergillus niger*, and *Candida albicans*. The **FMBIF** was found to exhibit a good spectrum of antifungal activity against all the tested fungal strains. Additionally, it was also revealed to show good antioxidant potential. The Gaussian-03 package was used to perform the density functional theory (DFT) calculations. The structural, chemical, UV-Vis, and vibrational characteristics were evaluated using the DFT/B3LYP approach with a 6-311++G(d,p) basis set. Using optimized molecular structure, the absorption wavelength, excitation energy, force strength, and electronic transitions were calculated using the TD-DFT method with the CAM-B3LYP functional and 6-311++G(d,p) basis set. Mulliken atomic charges and molecular electrostatic potential surfaces are explored to investigate the electron density distribution in the titled compound. The DFT investigation's spectroscopic results were in good concurrence with experimental data.

Keywords. DFT, Vibrational, UV-Vis, antifungal, antioxidant.

1. INTRODUCTION

With expanding need towards more encouraging therapeutic specialists, researchers are persistently working for the development of new medicinal agents having more potent biological action.^[1,2] Over the span of years, the problem of antimicrobial resistance is increasing at an extremely quick rate.^[3-5] The bacterial and fungal agents are experiencing changes and adjustments to battle conventional antimicrobial agents. Currently, the advancement of antimicrobials having an altered structure is the

requirement for the present as well as the future.^[6-8] The fluorinated and sulphur-containing compounds have been accounted for strong therapeutic agents for the treatment of various kinds of diseases.^[9-13] Some fantastic examples are depicted in figure 1. The 2-arylidene indanone framework and related structures have also crucial importance in the field of medicinal chemistry.^[14-18] The various biological aspects of 2-arylidene indanone moiety incited many researchers to work with it. Similar to antimicrobial resistance; the problem of radical damage has also increased to a large extent leading to the oxidative

Antimicrobial and computational investigation of two 2,3-dihydro-1*H*-inden-1-one derived fluorinated chalcone motifs

Rahul Ashok Shinde^{1*}, Vishnu Ashok Adole¹, Bapu Sonu Jagdale²

¹Department of Chemistry, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College (Affiliated to Savitribai Phule Pune University, Pune) Manmad-423104, Nashik, Maharashtra, India

²Department of Chemistry, Loknete Vyankatrao Hiray Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College (Affiliated to Savitribai Phule Pune University, Pune) Panchavati-422003, Nashik, Maharashtra, India

Received January 14, 2021; Revised July 31 & Aug 18, 2021; Accepted September 19, 2021

Abstract

In this work, we report the anti-microbial and computational study of two 2,3-dihydro-1*H*-inden-1-one derived fluorinated chalcone scaffolds. The (*E*)-2-(4-(trifluoromethyl)benzylidene)-2,3-dihydro-1*H*-inden-1-one (TFMBD-1) and (*E*)-2-(4-(trifluoromethoxy)benzylidene)-2,3-dihydro-1*H*-inden-1-one (TFMBD-2) were synthesized by Claisen-Schmidt reaction. The in-depth structural analysis of optimized molecular structures, bond lengths and bond angles has been discussed by using density functional theory (DFT) with B3LYP/6-311++G(d,p) basis set. The geometrical parameters, frontier molecular orbitals, global reactivity parameters, and MESP surfaces were all predicted using the same basis set on completely optimized geometries. Ionization potential, electron affinity, electronegativity, chemical hardness, global softness, global electrophilicity, and chemical potential were calculated using HOMO and LUMO energy values. Besides, the synthesized compounds were screened for their *in-vitro* antibacterial and antifungal study. Antibacterial activity was screened against two Gram-negative bacteria, *E. coli* and *P. vulgaris*, as well as against two Gram-positive bacteria, *S. aureus* and *B. subtilis*, and antifungal activity was evaluated against *A. niger* and *C. albicans*. The TFMBD-1 was revealed to be a more effective antibacterial and antifungal agent than TFMBD-2.

Keywords. 2,3-Dihydro-1*H*-inden-1-one, chalcone, DFT, antimicrobial, global descriptors.

1. INTRODUCTION

Chalcones and their derivatives are high captivating organic compounds due to their wide range of pharmacological applications. In the biosynthesis of flavonoids and isoflavonoids, chalcones are the vitally important intermediates^[1-5] and display various biological functions such as anticancer,^[6] antibacterial,^[7] antituberculosis,^[8] anti-inflammatory,^[9] antimalarial,^[10] antiviral,^[11] antifungal,^[12] antidiabetic,^[13] antioxidant,^[14] activities. Chalcones are an enticing building block for integrating a conjugated motif into possible drugs or monomers.^[15] Chalcone scaffolds in conjugation with heterocyclic nucleus, such as thiadiazole,^[16] pyrazole,^[17] isoxazole,^[18] benzoxazepine,^[19] pyrimidine,^[20] and other serve as an encouraging template for the development of pharmacologically active compounds. There is an exigent demand to recognize new antimicrobials with a novel system that battles antibiotic-resistant bacteria.^[21] Accordingly, the alteration in chemical

frameworks for the preparation of building blocks containing the chalcone frameworks is of importance in drug disclosure and materials chemistry. Remarkably, the substituted chalcone is found in many investigational and marketed medications as well as other biologically potent compounds.

A miscellany of strategies is available for the synthesis of chalcones. The established technique which is being utilized to a great extent for the synthesis of the chalcone scaffold is the Claisen-Schmidt reaction,^[22] which includes the reaction of an equimolar amount of aromatic aldehydes and aromatic ketone in the presence of sodium hydroxide solution. In like way, chalcones containing indanone moiety are perhaps the most contemplated molecules in therapeutic science because of their expansive range of pharmacologically exercises.^[23] The pharmacological properties of biologically active compounds are additionally enhanced by the inclusion of fluorine in its chemical structure.^[24] As a result, considerable efforts being spent for





ScienceDirect®

Journal of the Indian Chemical Society

Volume 99, Issue 3, March 2022, 100367

Designing of LaCrO₃ – TiO₂ nanocomposites p: n heterojunction-based sensor material for the selective detection of volatile petrol vapors (PV) and CO₂ gas vapors

Vrushali Shyamrao Shinde^{a b}, Kailas Haribhau Kapadnis^{c b}, Anita Parashram Patil^{d b}, Prashant Bhimrao Koli^{b e}  

Show more ▼

☰ Outline | 🔗 Share 🗒 Cite

<https://doi.org/10.1016/j.jics.2022.100367> ↗

Get rights and content ↗

Research Highlights

- Sol-gel synthesis of TiO₂ modified LaCrO₃ by citrate method.

- LaCrO₃:TiO₂ heterojunction nanocomposite thick films preparation by screen printing strategy.
- The TiO₂ concentrations from 0.1 M %, to 0.7 M % investigated for gas sensing study.
- Excellent gas response and selectivity for 0.3 M % TiO₂ – LaCrO₃ sensor for PV.
- Rapid response and recovery for 0.3 M % TiO₂ –LaCrO₃ sensor for PV.

Abstract

In the present research TiO₂ modified LaCrO₃ nanostructure has been designed by simple sol-gel method. The thick films of TiO₂ with different concentrations with LaCrO₃ were fabricated by using screen printing methodology. In present study, the structural properties of TiO₂ doped LaCrO₃ were confirm by using X-ray diffractometer (XRD). While the morphological properties and surface characteristics of fabricated material analyzed using scanning electron microscopy (SEM). The energy dispersive spectroscopy (EDS) was utilized for chemical composition of the prepared material. Transmission electron microscopy (TEM) confirms the orthorhombic crystal lattice structure and morphology of Ti-doped LaCrO₃. While, Fourier transform infrared (FT-IR) spectroscopy was used to investigate the M–O bonding vibrational stretching frequencies of LaCrO₃ and TiO₂ materials. The zeta potential was recorded for stability of all Ti doped LaCrO₃ nanostructures. The Brunauer-Emmett-Teller (BET) was analyzed for surface area and pore diameter parameters of the fabricated materials. The fabricated materials were checked for application as a sensor for different pollutant gases like Ethanol, CO₂, NO₂, and petrol vapors. The sensor demonstrates the sensitivity for petrol vapors at 150°C for 0.3M% TiO₂ doped LaCrO₃. And exceptionally 0.5M% TiO₂ doped LaCrO₃ sensor showed better response for CO₂. The reproducibility confirms the stability of 0.3M % TiO₂ doped LaCrO₃ sensor and 0.5M % TiO₂ doped LaCrO₃ sensor. The rapid response and recovery were recorded for both the sensors viz. 0.3M % and 0.5M % TiO₂ doped LaCrO₃.

Graphical abstract

Interpretation of Viscometric, Thermodynamic and Acoustic Properties of Maltose in Aqueous Sodium Fluoride

Raghunath K. Sonawane^{1,*}, Kailas. H. Kapadnis¹, Arun B. Nikumbh²,
Anita Patil¹, Vishnu A. Adole¹ and Kailaspati K. Jadhav³

¹Research Centre in Chemistry, M.G. Vidyamandir's L.V.H. College, Nashik-422003, India

²A.A. College, Manchar, Pune-410503, India

³Swami Muktanand College of Science, Yeola, Dist. Nashik, India

ABSTRACT

In the present work, interpretations of viscosity, density and ultrasonic velocity of sodium fluoride in aqueous solutions of maltose at different concentrations were taken at molarities and temperatures. The nature and magnitudes of solute-solute and solute-solvent interactions have been reported in the of apparent molar volume (ϕ_v), slope (S_v) and coefficients of Jones-Dole and modified Jones-Dole equation, adiabatic compressibility (β_{ad}), limiting apparent molar compressibility (ϕ_k^0), apparent molar compressibility (ϕ_k), specific acoustic impedance (Z), relative association (RA). The plots also support the interpreted results.

KEYWORDS: Solute-solute, solute-solvent interactions, alkyl halide solution, dextrose, Jones- Dole equation.

INTRODUCTION

The role played by saccharides and their derivatives seems to be very significant in many biological systems. In the past few years, the hydration characteristics of saccharides and their interactions with electrolytes and nonelectrolytes in aqueous media have developed an interest on account of their vital importance in several fields. The fields include biology, catalysis, pharmaceutical industry and biochemistry¹⁻⁷. Fluoride has been playing a significant role in improvement of oral and dental health during the past five decades. Our knowledge of dental caries and its mechanism, and the role of fluoride in this process have evolved during recent years. The use of fluoride mouthwash was recommended for children receiving orthodontics or radiotherapy⁸⁻¹⁰. It is well known that most of the biochemical processes take place in aqueous medium consequently investigation on thermodynamic and acoustic properties of sodium fluoride in ternary system seems to be very crucial for the interpretation of ion-ion, ion-solvent, and solute-solvent interaction in mixed solvent system. Being of a great practical importance in many industrial process, density, viscosity and ultrasonic velocity and some derived parameters of aqueous sodium fluoride with maltose with different molarities at temperatures 298.15 301.15, 304.15 and 307.15K have been taken into account.

EXPERIMENTAL

Sodium fluoride (Sigma Chemicals with 99.9 % purity) used was vacuum dried. Maltose (99 %purity) was also obtained from Sigma Chemicals. All chemicals were used as received from manufacturer without further purification. The solutions of different molarities of maltose were prepared by dissolving accurately weighed maltose in (0.1M, 0.2M, 0.4M and 0.6M) aqueous solutions of sodium fluoride.

Double armed pycnometer having capacity 18 cm³ was used to determine the densities of all solutions. Calibration of pycnometer was carried out by using triply distilled water at temperatures 298.15K, 303.15K, 308.15K and 313.15K with densities 0.9970, 0.9956, 0.9940 and 0.9922 g.cm⁻³ respectively. The pycnometer filled with air bubble free experimental liquids was kept in a transparent walled water bath of thermal stability ± 0.01 K for 10-15 minutes to obtain thermal equilibrium. The liquid levels in the two arms were recorded with the help of a travelling microscope that could be read to ± 0.1 mm. The estimated accuracy of density measurements of solutions was ± 0.00005 g.cm⁻³.

The viscosity measurements were made using a commercial Ubbelohde viscometer. Lee et al.¹¹ and Nikam et.al.¹²⁻¹³ have made use of this type of viscometer earlier. Viscometer was calibrated with triply distilled water with 0.890, 0.797, 0.719, and 0.652 mPa.s as its viscosities at 298.15K, 303.15K, 308.15K and 313.15K respectively. A thoroughly cleaned and perfectly dried viscometer filled with experimental liquid was placed vertically in a thermostat. After attaining thermal equilibrium, the efflux times of flow of liquids were recorded

Study of Molecular Interactions present in Binary Liquid Mixtures of Di-ethyl ether, Isopropyl Ether and n-Di-butyl Ether with 2-Pentanol at Different Temperatures

**Kailaspati Jadhav¹, Kailas. Kapadnis², Anita Patil²,
Pankaj Pawar³, Ujjain Kadam³ and Raghunath Sonawane²**

¹Swami Muktanand College of Science, (Affiliated to S. P. Pune University, Pune), Yeola, Dist-Nashik, India

²Research Centre in Chemistry, M.G. Vidyamandir's L.V.H. College (Affiliated to S.P. Pune University, Pune) Nashik-422003, India

³M.S.G. College (Affiliated to S. P. Pune University, Pune), Malegaon, Dist- Nashik, India

ABSTRACT

The aim of present work is to concentrate on the interpretations of viscosity, density and ultrasonic velocity and their deviation of binary liquid mixtures of Di-ethyl ether, Isopropyl Ether and Di-butyl Ether with 2 Pentanol at temperature 298.15K and 303.15K. The composition of liquid mixtures is taken in terms of mole fraction from 0.1 to 1.0. From these data, excess molar volume, deviation in viscosity and isentropic compressibility have been calculated. These calculated values have been used in Redlich-Kister equation to get the coefficients and standard errors. These parameters for the given liquid mixtures have been used to study the molecular interactions.

KEYWORDS: Excess molar volume, Deviation in viscosity, Molecular interactions, Isentropic compressibility and Mole fraction.

INTRODUCTION

Ethers find an extensive applications in various fields. Di-isopropyl ether, being a crucial additives of fuel, many researchers have directed their attention to the ethers.¹⁻⁴ They are non-toxic and non-polluting chemicals and widely used octane enhancing additives in gasoline production process to improve combustion and reducing emissions and contaminant agents of automobile catalysts and alternative oxygenated stabilizers in unleaded gasoline.⁵⁻⁶ Wypych et al.⁷ disclosed that Di-n-butyl ether (DBE) is an important solvent and an excellent extracting agent for the use with aqueous system due to its very low solubility in water. Calculations of density, viscosity and ultrasonic velocity find an extensive applications in making characterization the thermodynamic and physico- chemical aspects of binary liquid mixtures. The molecular size and shape play a crucial role in determining the thermodynamic behaviour of the mixture. Focus on thermodynamic and transport properties of binary liquid mixtures give an important information on the kind of interactions in the constituent binaries. Literature provides an extensive data on density, viscosity and ultrasonic velocities of liquid mixtures but a collective study of density, viscosity and IR is quite scarce. The effect of molecular size, shape, chain length and chain branching of ethers on solute-solvent interactions has been predicted.

EXPERIMENTAL

The solvent used was 2-Pentanol and imported from Sigma Germany having purity 99%. The solutes are Di-isopropyl Ether (Qualigens) and Di-n-Butyl Ether (Acros Organics) having purity 99% were used after first distillation.

Experimental values of density, viscosity and ultrasonic velocities of pure liquids are compared at 308.15K, 313.15K, and these values are showing good agreement with literature values published in journals.⁸⁻¹⁶ Specially designed stoppered bottles were used to prepare mixtures in terms of mole fractions. All the mixtures were used on same day for the measurements of above said parameters. Electronic balance of Adair Dutt with an accuracy of 0.0001 mg. was used to prepare the mixtures. Digital densitometer model number DMA 35-84138 manufactured by Anton Par with an accuracy of 0.001 gm/cm³, reproducibility of 0.0007 gm/cm³ having capacity 2 ml, was used to measure the densities of pure liquids and their binary mixtures. Digital viscometer model number LVDVII+Pro manufactured by Brookfield Engineering Laboratories, Middleboro INC [USA], calibrated with triple distilled water with an accuracy $\pm 1\%$ of full scale of range and viscosity repeatability $\pm 2\%$ was used to measure the viscosities of pure liquid and their binary liquid mixtures. Variable path single crystal interferometer from Mittal Enterprises F-05(SI No.1415071) model, New Delhi having frequency 2



Oriental Journal of Chemistry

An International Research Journal of Pure & Applied Chemistry

[Home](#)[About Us](#)[Editorial Board](#)[Indexed in](#)[Current Issue](#)[Coming Issue](#)[Archives](#)[Submission](#)[Contact Us](#)

Screen Printing Strategy for Investigation of Spectrophotometric Properties of Modified Thick Films of Zirconium Oxide (ZrO₂): Tin Oxide (SnO₂) Composites

Volume 37, Number 5

R. M. Nikam^{1*} , A. P. Patil², K. H. Kapadnis³, A. D. Ahirrao⁴ and R.Y.Borse⁵

¹Department of Chemistry, M. J. M. A.C.S College, Karanjali, Tal- Peth, Dist-Nashik-422 208.

²Department of Zoology, L. V. H. A.C.S College, Panchavati, Dist-Nashik-422 003.

³Department of Chemistry, L. V. H. A.C.S College, Panchavati, Dist-Nashik-422 003.

⁴Department of Physics, K. T. H. M A.C.S College, Dist-Nashik-422 003.

⁵Department of Physics, M. J. M. A.C.S College, Karanjali, Tal- Peth, Dist-Nashik-422 208.

Corresponding Author E-mail: rohitnikam9@rediffmail.com

DOI : <http://dx.doi.org/10.13005/ojc/370515>



A New Edition of Web of Science

Journal is Indexed in
CABELLS
SCHOLARLY ANALYTICS
Cabells Whitelist



National Academy of
Agricultural Sciences, India
2022 NAAS Score: 5.25

Photocatalytic Applications of Doped Fe₃O₄ Nanoparticles for Degradation of Methyl Orange and Methylene Blue Dyes: A Review

Rohit S. Shinde^{1,*}, Vishnu A. Adole¹, Rahul A. Shinde¹, Bhatu S. Desale¹,
Archana B. Dhongade², Mansi H. Magar³ and Thansing B. Pawar⁴

¹Department of Chemistry, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College (Affiliated to Savitribai Phule Pune University, Pune), Manmad, Nashik-423104, India

²Department of Chemistry, Maratha Vidyaprasarak Samaj's K.P.G. Arts, Commerce and Science College (Affiliated to Savitribai Phule Pune University, Pune), Igatpuri, Nashik-422403, India

³Department of Chemistry, Maratha Vidyaprasarak Samaj's G.M.D. Arts, B.W. Commerce and Science College (Affiliated to Savitribai Phule Pune University, Pune), Sinnar, Nashik-422103, India

⁴Department of Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College (Affiliated to Savitribai Phule Pune University, Pune), Panchavati, Nashik-422003, India

ABSTRACT

In the present paper, we report the review of the photocatalytic application of Fe₃O₄ Nanoparticles (NPs). Methyl orange and methylene blue dyes can be efficiently degraded with the use of pure, doped nanoparticles of Fe₃O₄. Doped Fe₃O₄ Nanocomposites are advantageous over another iron oxide NPs because the characteristics such as have good magnetic characteristics, are non-toxic, and are cost-effective. Fe₃O₄ NPs have a high surface area per unit volume based on particle size, which, combined with their aptitude for surface chemical alteration, indicates higher capability for removal of heavy metals in water treatment techniques. Nanostructures of metal-modified magnetite materials offer tremendous promise in terms of cost and efficiency. Methyl orange, methylene blue dyes under the sunlight or UV light irradiation can be degraded effectively with doped nanoparticles of Fe₃O₄ nanocomposites. The goal of this study is to look at various photocatalytic degradation of dyes using Fe₃O₄-based photocatalysts.

KEYWORDS: Fe₃O₄ Nanoparticles, Dyes, Photocatalysis.

INTRODUCTION

Many environmental challenges have arisen recently as a result of the impact of various natural and anthropogenic forces on the earth's crust. Environmental pollution is defined as any unneeded and unacceptable alteration in the environment caused by human activity. Changes in the biological, chemical and physical features of natural water streams can harm both humans and aquatic ecosystems.¹⁻⁴ There are a variety of factors that contribute to the pollution of natural water sources, including population growth, urbanization, and fast industrialization. Particularly the textile, food processing, dyeing, paper, and dye production industries, are the largest sources of water pollution among all the variables. Different types of dyes and organic contaminants can be found in the wastewater of such enterprises. Organic dye contamination is thought to be a major source of pollution in aquatic habitats.⁵⁻⁷ During the various procedures, around 10%–15% of the entire world's dye production is lost to the effluent. The colors in wastewater prevent sunlight from penetrating the water stream, reducing photosynthetic reactions. Some dyes are deadly and even cause malignant neoplastic illness, posing a serious health risk to humans and animals. The presence of crystal violet, methyl orange, eosine blue, carbol fuschin, Methylene blue and rhodamine B dyes in industrial wastewater is a major source of concern, since it demonstrates the negative impact on both types of ecosystems.⁸⁻¹¹ Because of the growing scarcity of water and increased awareness of the dangers posed by industrial effluents, international environmental standards are becoming more stringent around the world, resulting in the development of innovative frameworks and techniques to remove dyes and other organic pollutants from the effluent before discharge. Nanotechnology has earned a tremendous boost in recent years in this fast evolving technology era by generating a plethora of scientific concepts to meet the daily difficulties of evolving technology.¹²⁻¹⁵ Nanomaterials have piqued the curiosity of a wide range of scientists and technologists due to their numerous applications and unique features. These qualities are provided as a result of their size, shape, and surface area. Magnetite (Fe₃O₄) stands out as a promising material because, in addition to having great magnetic characteristics, it has a narrow Energy gap, needing low energies to activate as a photocatalyst.¹⁶⁻²⁶ Lattice alteration approaches such as doping are widely investigated to optimize photocatalytic characteristics. Doping modifies the fundamental features of the catalyst by changing the number of charge carriers present.²⁷⁻²⁹ The goal of this study is to look at how operating

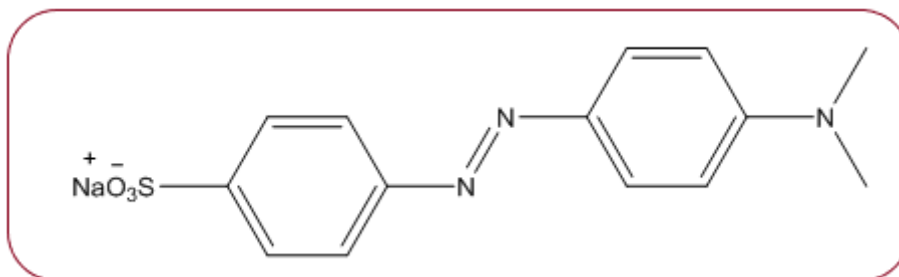
parameters affect the photocatalytic degradation of textile colours using Fe₃O₄-based photocatalysts. A brief overview of photocatalyst preparation methods will also be presented.

Background: Waste Iron-based recyclable composites have been identified as possible absorbents and photocatalysts for removing pharmaceuticals, personal care products, and industrial pollutants from contaminated water by adsorption and accelerated oxidation. These are the most common causes of pathogenic bacteria developing antibiotic resistance, making water disinfection and purification more difficult.³⁰⁻³³ It also causes chronic toxicity in humans and aquatic microorganisms, as well as endocrine disorders. As a result, its removal is both necessary and a significant issue for the scholarly community.³⁴⁻³⁵ PPCPs can be removed using UV-based advanced oxidation processes, as well as selective oxidation using Ozone, chlorine, chlorine dioxide, and activated carbon adsorption. All of these procedures, however, have significant treatment costs and considerable energy usage.³⁶⁻³⁸ As a result, more energy-efficient and cost-effective technologies are needed to effectively reduce PPCPs. So far, there have been a lot of reviews based on magnetite photocatalysts. Recent breakthroughs in the utilization of magnetite-based adsorbents for the removal of radionuclides, as well as current directions for the synthesis, surface functionalization, and bio application of magnetite, are all covered in the published literature.³⁹ Nanotechnology has been intensively researched for biological and environmental applications that need good control of the crystal structure, size, and surface characteristics of magnetite. The environmental impact of engineered magnetite nanoparticles as recyclable visible light active photocatalysts for organic pollutant degradation, as well as promising applications in protein immobilization, biomedical & bioengineering, environmental treatment, bioseparation, and food analysis, are well discussed in the literature.^{20,40} Magnetite can also be used to make electrochemical, magnetic, and chemical biosensors. Magnetite nanoparticles have also been used in multi-terabit magnetic storage systems and iron oxide nanomaterials for wastewater remediation.⁴¹

Photocatalysis: Various dyes can be efficiently degraded with the use of pure, doped nanoparticles of Fe₃O₄. Semiconducting materials play a key role in heterogeneous photocatalysis. A good visible light semiconductor photocatalyst should have the following characteristics: (a) the rate of e⁻/h⁺ recombination must be slower than the rates of these redox reactions, and (b) a visible-light active band gap. (c) a band gap that is larger than the energy required for the reaction taking place, (d) the position of CB and VB (redox potentials of the e⁻ and h⁺) that is suitable for inducing redox processes. Fe₃O₄ can be both n- and p-type when used as a semiconductor photocatalyst. Both the n- and p-type Fermi levels are in a minimal spin-polarised 3d band.

Fe₃O₄ NPs are advantageous over another iron oxide NPs because of the following characteristics: Fe₃O₄ NPs have good magnetic characteristics, are non-toxic, and are cost-effective. Fe₃O₄ NPs have a high surface area per unit volume based on particle size, which, combined with their aptitude for surface chemical alteration, indicates higher capability for removal of heavy metals in water treatment techniques. Not only do Fe₃O₄ materials have a highly active site for the adsorption/immobilization of metals and ligands, but they can also inhibit metal NPs from aggregating. Additionally, nanocatalysts are simple to make and reuse because of magnetic separation.⁴² For waste-water treatment and water purification, heterogeneous photocatalytic destruction of hazardous organic contaminants is a potential technology. Complete mineralization and excellent degradation efficiency in handling most organic compounds at low concentrations are two of the inherent advantages of Fe₃O₄ doped nanocomposites.⁴³

Degradation of methyl orange (MO):



From the literature, it is revealed that the photocatalytic degradation rate of the MO pollutant depends on the MO concentration as well as the dose and type of the photocatalyst.

Mamo Gebrezgiabher *et al.* effectively synthesized C-TiO₂/Fe₃O₄ nanocomposite using a simple sol-gel process, and the photocatalytic activity of the pristine and nanocomposite catalysts for MO degradation was studied under natural sunlight irradiation⁴². At a fixed catalyst dose (20 mg/100 mL), they discovered that as the

concentration of MO grew from 5 to 25 mg/L, degradation efficiency dropped. They studied the influence of photocatalyst loading on degradation efficiency by using a constant MO concentration (100mL, 5mg/L). According to their findings, the degradation efficiency improved when the photocatalyst loading was raised from 10 to 20 mg. The degradation efficiency decreased when the catalyst dose grew from 20 to 50 mg. As a result, they concluded that a photocatalyst dose of 20 mg/L was optimal. The photocatalytic activity of TiO₂, C-TiO₂, and C-TiO₂/Fe₃O₄ materials for MO degradation under solar light irradiation was examined after optimizing the MO concentration (5 mg/L) and catalyst dose (20 mg/L). The photocatalytic activity of the C-TiO₂/Fe₃O₄ nanocomposite was higher than that of TiO₂ and C-TiO₂ samples. Within 150 minutes, the C-TiO₂/Fe₃O₄ nanocomposite degraded 99.68 % of the MO pollutant, while TiO₂ and C-TiO₂ degraded 55.41 percent and 70 %, respectively. This could be due to the nanocomposite's faster electron-hole separation and a lower rate of photogenerated electron-hole recombination than TiO₂ and C-TiO₂ samples.

The photocatalytic activity of the binary Fe₃O₄/TiO₂ and ternary Fe₃O₄/TiO₂/CuO comparatively was investigated by *Mahdieh Rafieezadeh and Ali Hossein Kianfar*.⁴³ They photocatalytically degraded an aqueous solution of MO (10 ppm) in the presence of Fe₃O₄/TiO₂/CuO and Fe₃O₄/TiO₂ in the presence of sunshine at room temperature. Within 25 minutes, the Fe₃O₄/TiO₂/CuO nanocomposite decomposed 96.9% of MO contaminants, according to the researchers. They discovered that the ternary Fe₃O₄/TiO₂/CuO had greater photocatalytic activity. They came up with two explanations: first, because the band gap in Fe₃O₄/TiO₂/CuO is less than in Fe₃O₄/TiO₂, the chance of producing electrons/holes under sunlight radiation is higher than in Fe₃O₄/TiO₂. Second, reducing photo-generated electron and hole recombination could extend the lifetime of electron/hole pairs. These two factors could be responsible for the increased creation of •OH due to increased electron and hole concentrations.

Alvaro de Jesús Ruíz-Baltazar performed the green synthesis of Au/Fe₃O₄ nanoparticles by Piper auritum extract and sonochemical activation method.⁴⁴ He employed the Au/Fe₃O₄ nanoparticles in sonocatalytic degradation of MO pollutant and evaluated comparatively with various catalysts for different pollutants including MO pollutant. It is important to mention that by the sonocatalytic process (160 W/42 kHz) he achieved a 91.2% removal of MO within 15 min, also the result obtained was highly competitive concerning those reported in the literature. Considering the simplification and economy of the catalyst synthesis route, as well as the low power of the ultrasound equipment and mainly the short period in which the sonocatalytic degradation was carried out. In this sense is possible to affirm, in conclusive form, that the proposed methodology offers the possibility to obtain Au/Fe₃O₄ nanoparticles with notable magnetic and catalytic properties and consequently, with potential applications in dye degradation.

Gaurav Sharma *et al.* designed a highly visible light efficient photocatalyst; ferric Fe₃O₄/ZnO/Si₃N₄ nanocomposite and studied it for photocatalytic degradation of methyl orange from aqueous solution.⁴⁵ For the photocatalytic elimination from an aqueous solution they used dye solutions of concentration 50 mg/L mixed with 20 mg Fe₃O₄/ZnO/Si₃N₄ in a photocatalytic reactor having visible light (Xenon lamp). In the control degradation experiment, they observed that a decrease in absorbance over time signifies the decrease in residual dye concentration in solution signifying the dye degradation. The maximum degradation rate determined for methyl orange was 96% within 80 minutes indicates the high degradation efficiency of Fe₃O₄/ZnO/Si₃N₄ nanocomposite as compared to others reported in the literature.

Adil Raza *et al.* prepared ternary Fe₃O₄/TiO₂/g-C₃N₄ nanocomposite by a novel, facile, and in-situ growth mechanism based on a hydrothermal route using melamine, tetrabutyl titanate (TBT), and as-prepared magnetic Fe₃O₄ nanoparticles.⁴⁶ The photocatalytic efficiency of the composite was investigated by them through the discoloration of Methylene orange (MO) under visible-light illumination by a 500W Xenon Lamp with cut-off filter ($\lambda < 420$ nm). A 40 mg of catalyst was suspended in 40 ml liquefied solution (20 mg L⁻¹) of organic pollutant within a photocatalytic reactor, surrounded by a continuously circulating cool water system in the experimental part. The photocatalytic performance of the prepared samples was investigated by them and found that the prepared composite achieved MO degradation rate of about 90% in and 120 minutes under the visible light. The ternary Fe₃O₄/TiO₂/g-C₃N₄ nanocomposite revealed good photocatalytic performance after 4 cycles illustrating the high photocatalyst durability and is very likely advantageous for treating biorecalcitrant pollutants in wastewater.

Congming Xiao *et al.* prepared poly(vinyl alcohol) (PVA)-based microgels that contained TiO₂/Fe₃O₄ by an inverse emulsion radical reaction, and the obtained microgels were applied to catalyze the degradation of methyl orange.⁴⁷ They mixed dried 0.16 g microgels and 40 mL MO solution (10 mg/mL, pH 3) in a watch glass and kept 10 cm below a 30 W ultraviolet lamp. At timed intervals, 2 mL sample solutions were removed

to record absorbency with a UV2450 UV–visible spectrophotometer (Shimadzu Co., Japan) at 463 nm. The sample solution was merged with the mother liquor, irradiated, and analyzed again. The photocatalytic degradation percentage of MO was calculated. As expected, the PVA/TiO₂/Fe₃O₄ microgels exhibit photocatalytic activity for the degradation of MO. Furthermore, the photocatalytic activity of the microgels increases with increasing the CDBP of PVAM as well as overtime. The degradation percentages of MO after photocatalysis with PVA/TiO₂/Fe₃O₄ were obtained 76.3%. The photocatalytic activity of PVA/TiO₂/Fe₃O₄ microgels is slightly lower, but the incorporation of magnetic particles makes the composite microgels much easier to be removed when an external magnet is applied. Moreover, separating magnetic composite microgels require less energy compared with the traditional method for the removal of the nano-sized catalyst, which includes centrifugation and filtration.

Qi Feng *et al.* evaluated the photocatalytic activity of Fe₃O₄/ZnO-GO nanocomposite material by the degradation of methyl orange (1.0 × 10⁻⁵ M, 100 mL) under a 300 W Xe lamp with 420 nm light filter (custom-made) and monitored via UV-Vis spectrophotometer⁴⁸. Particularly, 20 mg Fe₃O₄/ZnO-GO nanocomposite material was dispersed in the methyl orange dye solution with stirring in the dark for 1 h to allow absorption-desorption equilibrium before light irradiation. Then the dye solution containing the dispersed catalyst was illuminated by the custom-made Xe lamp. The photocatalytic effectiveness of various photocatalysts was measured through the photodegradation performance of methyl orange (MO) under visible illumination. The photocatalytic reactivity of the Fe₃O₄/ZnO-GO nanocomposite structure reaches 92.8% efficiency on the first run and was at 75% efficiency after the fourth recovery. Thus, this enhanced photoelectron chemical performance could make this Fe₃O₄/ZnO-GO nanocomposite material a promising candidate for the removal of organic materials from wastewater.

Debabrata Mishra *et al.* investigated the photocatalytic activity of CoFe₂O₄-Fe₃O₄ magnetic nanocomposites (MNCs) synthesized by hydrothermal process. Photocatalytic activity of prepared MNCs was evaluated by photocatalytic decomposition of MO in aqueous solution at ambient temperature.⁴⁹ In the experimental procedure, they placed CoFe₂O₄-Fe₃O₄ MNC (0.02 g) into the tubular quartz vessel containing 100mL of 1×10⁻⁵M MO aqueous solutions and mixed by ultrasonication for 10 min. Subsequently, the mixture was stirred in dark to obtain adsorption/desorption equilibrium until the concentration of MO was constant and then illuminated with a UV lamp. They observed the degradation percentage of MO by MNC is 93% in 5 h of UV irradiation at a pH range of 5 to 6, and concluded this can be attributed due to the high bandgap energy (2.8 eV) for the MNCs as the photocatalytic effect depends on the enhancement in electron-hole separation and small particle size which is associated with high surface area.

Tarek A. Gad-Allah *et al.* synthesized TiO₂/SiO₂/Fe₃O₄ composite by sol-gel technique for silica and titania coatings on magnetite core to facilitate catalyst recovery using magnetism.⁵⁰

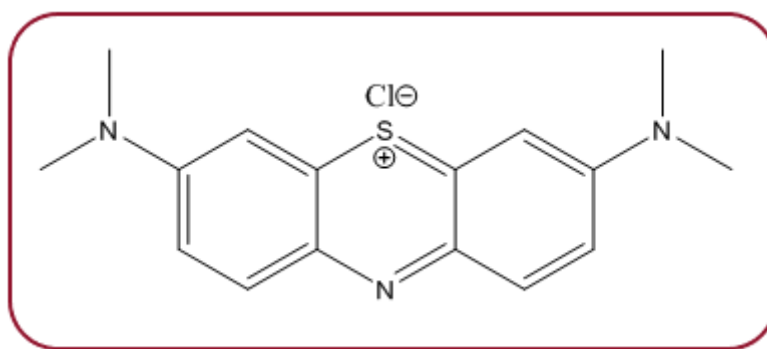
They were evaluated photocatalytic activities of the samples by decomposition of MO in a batch mode in a 200ml photo-reactor (UVL-100HA, Riko Company) equipped with 100W high-pressure mercury lamp (λ_{max} ≈ 365 nm) was used. After definite irradiation times, suitable volumes of solution were sampled, then filtered to separate the photocatalyst. They observed the degradation percentage of MO by TiO₂/SiO₂/Fe₃O₄ composite was 99% in 100 minutes with dye concentration 20 ppm and catalyst dose 1 g/L.

Shi-Kuo Li *et al.* synthesized magnetic Fe₃O₄@C@Cu₂O composites with a bean-like core/shell nanostructure successfully by a self-assembly approach and studied for a visible-light-photocatalytic activity for the degradation of methyl orange (MO) pollutant.⁵¹ In their experiment they carried out the photocatalytic activity of the Fe₃O₄@C@Cu₂O in a 100 ml beaker that contained the 50 ml aqueous slurry of MO pollutant (10⁻⁴ M) which were stirred in the dark for 30 min to ensure that the MO pollutant was adsorbed to saturation on the catalysts. To provide visible light irradiation a 20 A 500W Xe lamp equipped with a 420 nm cut-off filter was used. They observed the degradation percentage of MO by Fe₃O₄@C@Cu₂O composite was 100% in 180 minutes with dye concentration 1 ppm and catalyst dose 0.05 g/L. In their recycling experiments, they separated Fe₃O₄@C@Cu₂O composites from the solution by an external magnetic field, and then washed them with ethanol and deionized water before being redispersed in the dye solution.

We have addressed different strategies of designing Fe₃O₄ based composite photocatalysts and modification with various metal nanoparticles. In this review, we concluded that Fe₃O₄ based composite showed enhanced photocatalytic activity against the different organic pollutants, and importantly they have fast magnetic separability. Reviewing the recent significant advances on this topic may provide new opportunities for designing highly efficient, low-cost nanostructured materials for the photodegradation of organic pollutants.

Entry	Nanomaterial used	Dye Concentration (ppm)	Catalyst Dose (g/L)	Time (Min)	% Degradation	Reference
1.	C-TiO ₂ /Fe ₃ O ₄	5	0.2	150	99.86	[42]
2.	Fe ₃ O ₄ /TiO ₂ /CuO	10	0.05	25	96.90	[43]
3.	Au/ Fe ₃ O ₄	20	0.075	15	91.20	[44]
4.	Fe ₃ O ₄ /ZnO/Si ₃ N ₄	20	0.05	90	96	[45]
5.	Fe ₃ O ₄ /TiO ₂ /g-C ₃ N ₄	40	20	120	90	[46]
6.	TiO ₂ /Fe ₃ O ₄	10	0.16	92	76.3	[47]
7.	Fe ₃ O ₄ /ZnO-GO	1	0.02	90	75	[48]
8.	CoFe ₂ O ₄ -Fe ₃ O ₄	0.1	0.02	300	93	[49]
9.	TiO ₂ /SiO ₂ /Fe ₃ O ₄	20	1	100	99	[50]
10.	Fe ₃ O ₄ @C@Cu ₂ O	1	0.05	180	100	[51]

Degradation of methylene blue:



According to the literature, the photocatalytic degradation rate of the MB dye is dependent on its concentration, as well as the dose and photocatalyst type.

Using an ultrasonication-assisted technique, *Mahdieh Rafieezadeh and Ali Hossein Kianfar* successfully prepared Fe₃O₄/TiO₂/CuO magnetic submicrocubes, and the photocatalytic impact of the Fe₃O₄/TiO₂/CuO on the degradation of methylene blue (MB) was examined by exposing the Fe₃O₄/TiO₂/CuO to sunlight irradiation⁴³. Under solar irradiation at ambient temperature, photocatalytic degradation of MB (10 ppm) aqueous solution in the presence of Fe₃O₄/TiO₂/CuO was performed. In a typical experiment, 0.05g of the photocatalyst was introduced to 50 mL of MB and magnetically swirled for 30 minutes in the dark to achieve dye adsorption/desorption equilibrium. 50 µL of H₂O₂ (30 %) were combined with the aforesaid suspension to start the reaction. The suspension was then stirred while exposed to sunlight irradiation. Fe₃O₄/TiO₂/CuO degraded 100% of the MB pollutant in 20 minutes, according to the findings. The hydroxyl radical appeared to play a significant role in the photocatalytic degradation of MB with Fe₃O₄/TiO₂/CuO under sunlight irradiation, according to the scavenger test results.

In this study, *Seyedehmaryam Moosavi et al.* prepared nanocatalyst as, activated carbon (AC) from coconut shell which is widely available agricultural waste, was produced in a simple one-step procedure and used to produce a magnetic Fe₃O₄/AC/TiO₂ nano-catalyst for the degradation of methylene blue (MB) dye under UV light.⁵² The photo-degradation experiment used a 1000-W UV lamp that emitted light with a wavelength of 664 nm to study the UV-assisted degradation of the MB solution by synthesising AC, Fe₃O₄/AC /TiO₂, Fe₃O₄/AC, and TiO₂ at room temperature. All of the reactions took place in magnetically stirred glass vessels that were open at the top and 5 cm away from the UV lamp. Following that, 100 ppm MB dye (100 mg/L, pH 11) was added to 0.1 g of the catalyst, which was then sonicated in a water bath for 30 minutes to achieve MB adsorption equilibrium on the catalyst surface (120 rpm in the dark place). The solution was irradiated to degrade MB in the dark to prevent the impact of the outer light. Under UV light, all of the synthesised materials degraded more efficiently than commercial TiO₂, with Fe₃O₄/AC/TiO₂ (1:2) having the greatest degradation rate of 98 % in 60 minutes. The magnetic separation efficiency of the produced magnetic photocatalysts was high, making recovery and reusability economical and easy.

Muhammad Saeed *et al.* employed a green synthesis technique to make 5% Ag-Fe₃O₄ for immobilisation of Ag nanoparticles on Fe₃O₄ using *Calotropis gigantea* plant leaves extract⁵³. In the degradation of methylene blue, the produced Fe₃O₄ and 5% Ag-Fe₃O₄ were used as catalysts. They discovered that at a dye concentration of 0.0188M and a catalyst dose of 0.1g, 73 % of the photodegradation of methylene blue occurs in 120min. The photodegradation of methylene blue was increased by immobilising Ag on Fe₃O₄ from 40 to 72 % at 40 °C, indicating that 5% Ag-Fe₃O₄ is an efficient catalyst for the treatment of dye-contaminated water. Doping Fe₃O₄ with Ag nanoparticles significantly increased its photocatalytic activity.

Khatereh Pakzad *et al.* synthesized Ni/Fe₃O₄ magnetic NPs, using *Euphorbia maculata* aqueous extract. They used a variety of techniques to characterise green produced nanoparticles. The degradation of MB dyes under UV light was used to assess the photocatalytic activity of produced CuO-NPs and Ni-Fe₃O₄ NPs⁵⁴. To investigate the photocatalytic activity of NPs, 0.05 g of photocatalyst and 50 mL of 10 mg/mL dye solution were swirled in the dark for 30 minutes to achieve adsorption-desorption equilibrium, then exposed to UV light with steady stirring. After the adsorbent was separated, the adsorbed dye was assessed using UV-Vis spectrophotometry at various time intervals. At 665nm, maximal absorption bands corresponding to MB aqueous solutions were identified, which is related with the n→π* transition. The findings show that pH 6.0 is the best pH for MB adsorption onto green produced NPs. The MB solution performed best under ideal conditions of 10 mg/mL initial dye concentration, 0.05 g photocatalyst dose, pH 2.00, and 60 minutes. Up to 89 % of the colour was removed. CuO NPs had a stronger photocatalytic activity than Ni-Fe₃O₄/plant extract, according to the findings.

Shashi B. Atla *et al.* fabricated three core-shell magnetite ZnO catalysts viz. Fe₃O₄/ZnO, Fe₃O₄/SiO₂/ZnO, Fe₃O₄/SiO₂-APTS/ZnO and tested for their photocatalysis in the degradation of methylene blue (MB) dye under sunlight irradiation.⁵⁵ In their experiment they carried out a photocatalytic activity where a 5 ppm solution of MB dye was placed in a glass cylindrical reactor and the 0.5g of nanocatalyst was added. To achieve a homogeneous suspension in the glass tube, the resulting reaction mixture was magnetically swirled. After four hours of dark storage, the solution had reached equilibrium between adsorption and desorption. The photochemical reactor was then filled with all of the glass reactors holding the various photocatalysts, which were then exposed to sunlight. A Q-sun solar test chamber was used to irradiate the suspension with light. Using a pipette, aliquots were extracted from the reactor at regular intervals, centrifuged, and evaluated for methylene blue decolorization percentage using only a Jasco UV-vis spectrophotometer (Thermospectronic, 390 nm) with the a calibration curve. During irradiation, the suspension was stirred. They observed that, at catalyst loading of 500mg, methylene blue was completely removed by Fe₃O₄/SiO₂/ZnO in 60 minutes. Among all the three nanoparticles silica-coated magnetite ZnO nanoparticles showed superior catalytic activity. The synergistic effect of both adsorption, as well as ZnO catalysis, facilitates the faster degradation of MB. The magnetite core-shell Fe₃O₄/silica/ZnO demonstrates bifunctional catalytic/magnetic property.

Gheffar Kheraldeem Kara and Mahboubah Rabbani synthesized magnetite/nickel oxide mixed metal oxide nanoparticles Fe₃O₄/NiO (FNMMO NPs) with stoichiometric ratio (1:1) by ultrasonic-assisted co-precipitation method and used as a novel adsorbent to dispose of dye effluent⁵⁶. In their experiment they carried out photocatalytic degradation of 10 ppm methylene blue dye with catalyst dose 0.05g over pH range 4-12. The Fe₃O₄/NiO nanoparticles were able to achieve 92% removal of methylene blue at pH 4. They found that the adsorbent dose affected colour removal proportionally, and that the extent of colour removal decreased as the initial dye concentration increased. As a result of the current study, an efficient, stable, cost-effective, and eco friendly adsorbent can be used to treat dye water.

Silvia Villa *et al.* have synthesized successfully titanium dioxide in the presence of magnetite nanoparticles (Fe₃O₄@TiO₂) with various ml of Fe₃O₄ viz. 0.71, 0.35, 0.18, and 0. They have named four kinds of Fe₃O₄ doped TiO₂ as A, B, C, and D respectively.⁵⁷ They have tested photocatalytic activity for each sample, using 12.5 mg in 25 mL of an aqueous methylene blue solution (0.04 g/L). These suspensions were held in the dark for 20 minutes before being irradiated to produce an adsorption-desorption equilibrium between both the nanoparticles and the dye. The suspensions were then subjected for 2 hours at room temperature to a solar spectra lamp 300W Ultra-Vitalux kept at a distance of 20 cm. Before irradiation (t₀), and every 20 minutes until the end of the experiment, aliquots of samples (1.5 mL) were obtained. The obtained samples were centrifuged for 5 minutes at 13,200 rpm in an Eppendorf Centrifuge 5410 (Hamburg, Germany) to separate the NPs from the solution, which was then examined using a UV-VIS spectrophotometer. MB concentration was determined by monitoring the absorbance at 664 nm. They found that the B system among Fe₃O₄@TiO₂ showed 95% degradation of methylene blue dye. The photocatalytic activity of sample B (Fe₃O₄@TiO₂) is enhanced by the combination of greater crystallinity grade and surface area.

Reza Taheri-Ledari *et al.* synthesized ZnO/Fe₃O₄@pumice nanocomposite. They performed photocatalytic degradation of methylene blue using prepared nanocomposites, during the process 50 mg of the magnetic nanocatalyst was used for degradation of 10 ppm concentration of methylene blue dye under LED light (7W, 526nm) irradiation.⁵⁸ They discovered that using 50 mg of ZnO/Fe₃O₄@pumice nano photocatalyst under green LED light (7 W) for 60 minutes resulted in the highest photocatalytic efficiency (85.5 %). Under green light irradiation, a viable photocatalytic mechanism for methylene blue degradation by the generated nano photocatalytic system has been proposed in this study.

N.F. Andrade Neto *et al.* fabricated Ce⁴⁺, Co²⁺, Mn²⁺ and Ni²⁺ doped Fe₃O₄ nanoparticles were obtained by the co-precipitation method at 70°C. Under UV-Vis radiation, the photocatalytic capabilities of powders were investigated against methylene blue (MB) dye at pH 5. About 0.05 g of powder was added in a beaker containing 50 mL of MB (1 x 10⁻⁵ mol L⁻¹) and stirred constantly under UVC illumination (TUV Philips, 15W, with a maximum intensity of 254 nm). A 2 mL sample was taken every 20 minutes and the absorbance spectrum fluctuation was evaluated using a Shimadzu spectrometer (model UV-2600). The dye concentration fluctuation was determined by these values and the test time (80 min).²⁵ According to the findings, the sample 4% Ce (Fe₃O₄:4 % Ce) had the greatest outcome among the four doped nanoparticles, lowering the methylene blue (MB) dye concentration by roughly 74% after 80 minutes of testing. This decrease is mostly due to a decrease in adsorption; because no treatment is applied between cycles, molecules from previous cycles are adsorbed to a particle surface.

C.H. Prasad *et al.* used Ridge gourd peels (RG) extract was used as a reducing and capping agent in the effective preparation of simple iron oxide magnetic nanoparticles (Fe₃O₄ MNPs). UV-vis spectroscopy was used to investigate the catalytic characteristics of RG-FeMNPs in the degradation of Methylene blue (MB) dye in an aqueous solution. RG-Fe MNPs were used to perform photocatalytic degradation of methylene blue. 30 mL of methylene blue solution (120 mg L⁻¹) was put to a glass beaker containing 0.2 g L⁻¹ of catalysts in a typical experiment. The glass beaker was held in a thermostat with magnetic stirring at room temperature after 10 minutes of sonic oscillation. The reaction mixture was then suddenly supplied with 15 mL of NaBH₄ aqueous solution (2.7 g L⁻¹) via a microsyringe.⁵⁹ The discolouration of the mixture was monitored using UV-vis absorption spectroscopy. After thirty min in the presence of NaBH₄ and RG-FeMNPs sample could remove 96% of total methylene blue from the solution at room temperature, they observed characteristic absorption of methylene blue at 650 nm, which was chosen as the monitoring value to investigate the efficiency of adsorption on RG-FeMNPs.

Entry	Nanomaterial used	Dye Concentration (ppm)	Catalyst Dose (g/L)	Time (Min)	% Degradation	Reference
11.	Fe ₃ O ₄ /TiO ₂ /CuO	10	0.05	20	100	[43]
12.	Fe ₃ O ₄ /AC/TiO ₂ (1:2)	100	0.1	60	98.3	[52]
13.	Ag-Fe ₃ O ₄	18.8	0.1	120	73	[53]
14.	Ni-Fe ₃ O ₄	10000	0.05	60	89	[54]
15.	Fe ₃ O ₄ /silica/ZnO	5	0.5	60	99	[55]
16.	Fe ₃ O ₄ /NiO	10	0.05	180	92	[56]
17.	TiO ₂ /Fe ₃ O ₄	12.5	0.04	120	95	[57]
18.	ZnO/Fe ₃ O ₄ /pumice	10	0.05	60	85.5	[58]
19.	Fe ₃ O ₄ :4%Ce	0.1	0.05	80	74	[25]
20.	RG-Fe ₃ O ₄ MNPs	120	0.2	30	96	[59]

Abbreviations

Entry	Nanomaterial used	Full form	Reference
1.	C-TiO ₂ /Fe ₃ O ₄	C-doped TiO ₂ /Fe ₃ O ₄	[42]
2.	Fe ₃ O ₄ /TiO ₂ /g-C ₃ N ₄	g-C ₃ N ₄ - Graphitic carbon nitride	[46]
3.	Fe ₃ O ₄ /ZnO-GO	GO- Graphene oxide	[48]
4.	Fe ₃ O ₄ /AC/TiO ₂ (1:2)	AC- activated carbon	[52]
5.	RG-Fe ₃ O ₄ MNPs	RG- Ridge gourd peel extract MNPs- Magnetic Nano particles	[59]

CONCLUSION

Photocatalysis has evolved as a promising wastewater treatment technology, and it has become an integrated part of the degradation process. Photocatalysis in the presence of Fe₃O₄ based composites with UV, Vis, or solar light may effectively degrade a variety of organic dyes belonging to various chemical groups. It is also observed as an eco-friendly pathway because of its benign approach. From the literature study, it is revealed that the kinetics of photocatalytic degradation was influenced by several parameters, including dye concentration, catalyst dosage, wavelength, etc. In this review, we study the photocatalytic degradation of methyl orange and methylene blue dyes with various Fe₃O₄ based composites. From our study, it is revealed that among the various Fe₃O₄ based composites the C-TiO₂/Fe₃O₄, Fe₃O₄/TiO₂/CuO, Fe₃O₄@C@Cu₂O, and TiO₂/SiO₂/Fe₃O₄ composites were found to be more effective for the degradation of methyl orange dye. While Fe₃O₄/TiO₂/CuO, Fe₃O₄/AC/TiO₂(1:2), Fe₃O₄/silica/ZnO composites were found to be more effective for the degradation of methylene blue dye. With the Fe₃O₄@C@Cu₂O and C-TiO₂/Fe₃O₄ composites degradation of methyl orange dye was reported nearly 100% with a smaller variation of catalyst dose but required more time. Fe₃O₄/TiO₂/CuO composite methylene blue dye was degraded 100% in 20 minutes, so it's the best material for degradation of the same dye while Ag-Fe₃O₄ is the least effective among all studied nanocomposites. On the other hand, Fe₃O₄/TiO₂/CuO composite nearly 97% dye degradation was observed within only 25 minutes, hence it can be considered as the most effective nanocomposite for degradation of methyl orange dye. The TiO₂/Fe₃O₄ composite showed the least efficiency among all studied composites for the degradation of methyl orange dye. Lots of work has to be done also in the design and fabrication of an effective photocatalyst. A better understanding of the photocatalytic process and the operative conditions could give great opportunities for its application for the degradation of environmental organic contaminants.

REFERENCES

1. S. Peppoloni, G. Di Capua, *Geol Soc Spec Publ.*, **508**, 13 (2021).
2. H. Zhang, J. Fan, W. Cao, W. Harris, Y. Li, W. Chi, S. Wang, *Sci. Total Environ.*, **639**, 1038 (2018).
3. DL. Danielopol, C. Griebler, A. Gunatilaka, J. Notenboom, *Environ. Conserv.*, **30**, 104 (2003).
4. M. Cantonati, S. Poikane, CM Pringle, LE Stevens, E. Turak, J. Heino, JS Richardson, R. Bolpagni, A. Borriani, N. Cid, M. Čtvrtilíková, *Water.*, **12**, 260 (2020).
5. R. S. Gowri, R. Vijayaraghavan, P. Meenambigai, *Int. j. curr. microbiol. appl. Sci.*, **3**, 421 (2014).
6. R.S. Rajput, S. Pandey, S. Bhadauria, *Rev. Environ. Health.*, **32**, 245 (2017).
7. R.D. Saini, *Int J Chem Eng Res.*, **9**, 121 (2017).
8. R.D. Saini, *Asian j. res. chem.*, **11**, 206 (2018).
9. Green Chemistry for Sustainable Textiles, K. Singha, P. Pandit, S. Maity, SR. Sharma, Woodhead Publishing p. 153-164 (2021).
10. M. Fatima, R. Farooq, R.W. Lindström, M. Saeed, *J. Mol. Liq.*, **246** 275 (2017).
11. M.A. Hanjra, J. Blackwell, G. Carr, F. Zhang, T.M. Jackson, *Int J Hyg Environ Health.* **215** 255 (2012).
12. R.B. Stewart. *Calif. L. Rev.*, **69** 1256 (1981).
13. T. Schellenberg, V. Subramanian, G. Ganeshan, D. Tompkins, R. Pradeep, *Front. environ. sci.*, **8**, 30 (2020).
14. X.S. Yap, B. Truffer, *Res. Policy*, **48**, 1030 (2019).
15. P. Mishra P, A. Behera, D. Kandi, S. Ratha, K. Parida, *Inorg. Chem.*, **59**, 4255 (2020).
16. M.J. Jacinto, L.F. Ferreira, V.C. Silva, *J Solgel Sci Technol.*, **96**, 1 (2020).
17. J. Ma, N. Sun N, C. Wang, J. Xue, L. Qiang, *J. Alloys Compd.*, **743**, 456 (2018).
18. Spinel Ferrite Nanostructures for Energy Storage Devices, S.F. Shaikh, M. Ubaidullah, RS Mane, AM Al-Enizi, Elsevier, 2020, p. 51 (2020).
19. R. Hassandoost, S. R. Pouran, A. Khataee, Y. Orooji, S.W. Joo, *J. Hazard. Mater.* **376**, 200 (2019).
20. P. Mishra, S. Patnaik, K. Parida, *Catalysis Science & Technology*, **9**, 916 (2019).
21. K. Talukdar, B. M. Jun, Y. Yoon, Y. Kim, A. Fayyaz, C.M. Park, *J. Hazard. Mater.*, **398**, 123025 (2020).
22. Z.Q. Li, H.L. Wang, L.Y. Zi, J.J. Zhang, Y.S. Zhang. *Ceram. Int.*, **41**, 10634 (2015).
23. S. Bagheri, N. M. Julkapli, *Rev. Inorg. Chem.*, **36**, 135 (2016).
24. L. Zhu, X. Kong, C. Yang, B. Ren, Q. Tang, *J. Hazard. Mater.*, **381**, 120910 (2020).
25. N.A. Neto, L.E. Nascimento, M. Correa, F. Bohn, M. R. Bomio, F.V. Motta, *Mater. Chem. Phys.*, **242**, 122489 (2020).

Journal of Chemical, Biological and Physical Sciences



An International Peer Review E-3 Journal of Sciences

Available online at www.jcbps.org

Section A: Chemical Sciences

CODEN (USA): JCBPAT

Research Article

Synthesis, spectroscopic and dft based quantum chemical study of (2E)-1-(4-chlorophenyl)-3-[4-(propan-2-yl) phenyl] prop-2-en-1-one

Nutan V. Sadgir ^{1*}, Sunil L. Dhonnar ¹, Babu Jagdale¹ and Bhagyashri Waghmare²

^{1*}Department of Chemistry, L.V.H. Arts, Science, and Commerce College, Panchavati, Nashik (M.S) India.

²Department of Chemistry M.S.G. Arts, Science and Commerce College, Malegaon, Nashik (M.S.) India

Received: 03 September 2021; **Revised:** 23 September 2021; **Accepted:** 03 October 2021

Abstract: The (2E)-1-(4-chlorophenyl)-3-[4-(propan-2-yl) phenyl] prop-2-en-1-one was synthesized by condensation reaction between 4-isopropyl benzaldehyde and 4-chloroacetophenone in ethanol as solvent. The synthesized compound was characterized by FT-IR and Proton NMR techniques. The optimized molecular geometry, bond length, Mulliken atomic charges, bond angles, vibrational frequencies, the dipole moment of title compound have been computed by density functional theory (DFT) using a standard B3LYP method with 6-311++G (d, p) basis set by using Gaussian-03 (W) package. The various thermochemical properties, global chemical reactivity descriptors, FMO analysis and molecular electrostatic potential (MEP) were also investigated at the same level of theory.

Keywords: DFT, B3LYP, HOMO-LUMO, MESP

1. INTRODUCTION

Chalcone is a common name for the, α - β unsaturated ketones that are made by condensing an aromatic aldehyde with substituted acetophenone in the presence of a base ^[1]. Kestanecki coined the term "chalcones," and Tambor's other chalcone names are benzalacetophenone and phenyl styryl ketone. Chalcones are chemically 1, 3-diaryl-2-propene-1-ones, which have two aromatic rings

**One Pot Synthesis, Spectroscopic Characterization, and Computational Studies of
Benzo[d][1,3]dioxol-5-yl(3-(4-isopropylphenyl)oxiran-2-yl)methanone and
Benzo[d][1,3]dioxol-5-yl(3-(4-chlorophenyl)oxiran-2-yl)methanone**

N.V. Sadgir^{1*}, S.L. Dhonnar¹, B.S. Jagdale¹, B.B. Waghmare², S.P. Jadhav¹ and S.A. Ahire¹

¹Department of Chemistry, L.V.H. Arts, Science and Commerce College, Panchavati, Nashik, India

²Department of Chemistry M.S.G. Arts, Science and Commerce College, Malegaon, Nashik, India

ABSTRACT

One pot synthesis of two benzo[d][1,3]dioxol-5-yl(oxiran-2-yl) methanone derivatives involve two stages first one chalcone synthesis followed by epoxide synthesis. The synthesized product were characterized by ¹H NMR, ¹³C NMR and HRMS spectroscopic technique. The density functional theory calculations were performed using B3LYP/6-31+G (d, p) basis set for the optimization of molecular geometries. In addition to this The optimized molecular geometry, quantum and structural entities such as bond length, total energy, electron density distribution in highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO), charge distribution, electronegativity, absolute hardness, softness, electrophilicity, chemical potential, charge transfer in molecules have been computed. All the calculations have been computed in the gas phase.

KEYWORDS: One pot synthesis, FMO, benzo[d][1,3]dioxol-5-yl(oxiran-2-yl) methanone.

INTRODUCTION

Chalcone possess a broad spectrum of biological activity, due to the presence of the alpha beta unsaturated system. Chalcones are act as precursor for synthesis of different intermediates like pyrazoline, isooxazole, pyrimidine, benzodiazepines [1-2] etc. The development of heterocyclic compounds with epoxide groups has piqued researchers' interest. Epoxide, sometimes known as epoxy, is just a three-membered cyclic ether. Two carbon atoms, one oxygen atom. Epoxide is extensively used as a precursor in the production of a variety of chemicals. The Weitz-Scheffer reaction, which uses hydrogen peroxide under alkaline circumstances to oxidise a chalcone to an epoxychalcone, is a good example of green chemistry [3-4]. Epoxychalcone is an intermediary and a precursor to a wide range of chiral chemicals and natural products [5-7] and has outstanding biological and pharmacological active ingredients [8-10]. In addition, life-threatening infections caused by pathogenic bacteria and fungi, which are becoming more common, as well as ubiquitous epidemics around the world, have prompted many research groups from all over the world working on novel antibacterial and antifungal agents in order to avoid the rise of various infectious diseases and the rise of multi drug resistance microbial organisms [11-14].

In defining the structural and electrical properties of atoms and molecules, Density Functional Theory has become increasingly popular. The major goal of this research is to synthesize the title molecule and investigate its molecular structure, vibrational spectra, and electronic properties using experimental and computational methods. We present the one pot synthesis of benzo[d][1,3]dioxol-5-yl(3-(4-isopropylphenyl)oxiran-2-yl)methanone and benzo[d][1,3]dioxol-5-yl(3-(4-chlorophenyl)oxiran-2-yl)methanone, which involves two stages, first one chalcone synthesis followed by epoxide and an analysis of their molecular structure, as well as a DFT investigation at the B3LYP/6-31+G(d,p) level. In addition to FMOs, a 6-31+G (d, p) basis set was used to investigate ionisation potential, electronegativity, global Electrophilicity index, and chemical potential.

EXPERIMENTAL

Table 1 Abbreviations for Synthesized compounds

Sr.No.	Name of compound	Abbreviations
1	benzo[d][1,3]dioxol-5-yl(3-(4-isopropylphenyl)oxiran-2-yl)methanone	BDIOM
2	benzo[d][1,3]dioxol-5-yl(3-(4-chlorophenyl)oxiran-2-yl)methanone	BDCOM

Women Health Problems Concern with Maternity in India

Nutan. V. Sadgir

Department of Chemistry

MGV'S L. V. H. Arts, Science and Commerce College, Panchvati, Nashik, Maharashtra, India

Abstract: *Women play important role in maintaining health of families, so more efforts are required to maintain women health. Women having health problem like anaemia, reproductive health, infection etc. Government of India introduced lot women health care policy and schemes to tackle the problem of women health improvement in India. But we are far behind in achieving Millennium Development Goal (MDG) of women's health, till date and therefore Women need a special care.*

Keywords: Health, Anaemia, Maternity, Infection

I. INTRODUCTION

Women, who are important in maintaining healthy families, access the health system more than men, both for themselves and on behalf of their children[1]. Most become pregnant and give birth, a significant health event, then typically become their child's primary caregiver, a role that greatly influences household's health overall[2]. Elder and long-term care issues affect women more often because they live longer; have higher rates of disability and chronic health problems; and lower incomes than men on average, which puts them at greater need for state and community resources, such as Medicaid[3].

In the population policy and reproductive rights area, women's perspective has been ignored. Planners have had little understanding of women's mixed responses to family planning [4]. According to the Gender Inequality Index (GII) 2020 India rank 131 out of the 189 countries. The report noted that the labour force participation rate of the women in the country was 20.5%, while it was 76.1% for men and only 13.5% women held seats in parliament. The report also noted that differences in parent's response to the girls and boys has led leading to malnutrition among the girl's leads to women's health problem in India.

II. WOMEN HEALTH PROBLEMS FACING IN INDIA

Anaemia (Low Haemoglobin) -Anaemia is a shortage of iron, folate, or vitamin B12 in the diet. According to National family and health survey 2005/06 for a sample of 81000 women aged 15-49 estimated that 52% women are suffering from anaemia that leads to very high mortality rate [5]. According to WHO Global health risk report 400000 deaths occur due to anaemia and India is major contributor to that report [6].

Reproductive health -Women's health during the reproductive or fertile years (between the ages of 15 and 49 years) is relevant not only to women themselves, but also has an impact on the health and development of the next generation [7]. Many of the health challenges during this period are the ones that only young girls and women face [8]. For example, complications of pregnancy and childbirth are the leading cause of death in young women aged between 15 and 19 years old in India mostly due to child age marriage in states like Rajasthan. These results in unwanted pregnancies, unsafe abortions, complications of pregnancy and childbirth, and sexually transmitted infections including HIV. Violence is an additional significant risk to women's sexual and reproductive health and can also result in mental ill-health and other chronic health problems [9]. According to report mortality rate during childbirth in India is 210 which is very higher as comparing to the developing countries. And only 59% of women give birth in institutional place or hospital

Article

1,5-Benzothiazepine Derivatives: Green Synthesis, In Silico and In Vitro Evaluation as Anticancer Agents

Michelyne Haroun ^{1,*}, Santosh S. Chobe ², Rajasekhar Reddy Alavala ^{3,*}, Savita M. Mathure ⁴, Risy Namratha Jamullamudi ⁵, Charushila K. Nerkar ⁶, Vijay Kumar Gugulothu ⁷, Christophe Tratratt ¹, Mohammed Monirul Islam ⁸, Katharigatta N. Venugopala ^{1,9}, Mohammed Habeebuddin ¹⁰, Mallikarjun Telsang ¹¹, Nagaraja Sreeharsha ^{1,12,*} and Md. Khalid Anwer ¹³

- ¹ Department of Pharmaceutical Sciences, College of Clinical Pharmacy, King Faisal University, Al-Hofuf 31982, Al-Ahsa, Saudi Arabia; ctratratt@kfu.edu.sa (C.T.); kvenugopala@kfu.edu.sa (K.N.V.)
- ² MGV's L.V.H. Arts, Science and Commerce College, Panchavati, Nashik 422009, India; chobess222@gmail.com
- ³ Shobhaben Pratapbhai Patel School of Pharmacy & Technology Management, SVKM's NMIMS, V.L. Mehta Road, Vile Parle (W), Mumbai 400056, India
- ⁴ MGV's M. S. G. Arts, Science and Commerce College, Malegaon-Camp, Tal-Malegaon, Nashik 423203, India; savita1190@gmail.com
- ⁵ Koneru Lakshmaiah Education Foundation, K. L. College of Pharmacy, Guntur 522502, India; r.namratha747@gmail.com
- ⁶ MGV's Arts, Science and Commerce College, Manmad 422009, India; cknerkar@gmail.com
- ⁷ Janagoan Institute of Pharmaceutical Sciences, Janagoan 506167, India; vkugulothu@gmail.com
- ⁸ Department of Biomedical Sciences, College of Clinical Pharmacy, King Faisal University, Al-Hofuf 31982, Al-Ahsa, Saudi Arabia; mislam@kfu.edu.sa
- ⁹ Department of Biotechnology and Food Science, Faculty of Applied Sciences, Durban University of Technology, Durban 4000, South Africa
- ¹⁰ Department of Biomedical Sciences, College of Medicine, King Faisal University, Al-Hofuf 31982, Al-Ahsa, Saudi Arabia; hmohammed@kfu.edu.sa
- ¹¹ Department of Surgery, College of Medicine, King Faisal University, Al-Hofuf 31982, Al-Ahsa, Saudi Arabia; mvtelsang@kfu.edu.sa
- ¹² Department of Pharmaceutics, Vidya Siri College of Pharmacy, Off Sarjapura Road, Bangalore 560035, India
- ¹³ Department of Pharmaceutics, College of Pharmacy, Prince Sattam Bin Abdulaziz University, Al-Alkharj 11942, Saudi Arabia; m.anwer@psau.edu.sa
- * Correspondence: mharoun@kfu.edu.sa (M.H.); sekhar7.pharm@gmail.com (R.R.A.); sharsa@kfu.edu.sa (S.N.)



Citation: Haroun, M.; Chobe, S.S.; Alavala, R.R.; Mathure, S.M.; Jamullamudi, R.N.; Nerkar, C.K.; Gugulothu, V.K.; Tratratt, C.; Islam, M.M.; Venugopala, K.N.; et al. 1,5-Benzothiazepine Derivatives: Green Synthesis, In Silico and In Vitro Evaluation as Anticancer

<https://doi.org/10.3390/molecules27123757>

Academic Editor: Carlotta Granchi

Received: 9 May 2022

Accepted: 8 June 2022

Published: 10 June 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Abstract: Considering the importance of benzothiazepine pharmacophore, an attempt was carried out to synthesize novel 1,5-benzothiazepine derivatives using polyethylene glycol-400 (PEG-400)-mediated pathways. Initially, different chalcones were synthesized and then subjected to a cyclization step with benzothiazepine in the presence of bleaching clay and PEG-400. PEG-400-mediated synthesis resulted in a yield of more than 95% in less than an hour of reaction time. Synthesized compounds 2a–2j were investigated for their in vitro cytotoxic activity. Moreover, the same compounds were subjected to systematic in silico screening for the identification of target proteins such as human adenosine kinase, glycogen synthase kinase-3 β , and human mitogen-activated protein kinase 1. The compounds showed promising results in cytotoxicity assays; among the tested compounds, 2c showed the most potent cytotoxic activity in the liver cancer cell line Hep G-2, with an IC₅₀ of 3.29 \pm 0.15 μ M, whereas the standard drug IC₅₀ was 4.68 \pm 0.17 μ M. In the prostate cancer cell line DU-145, the compounds displayed IC₅₀ ranges of 15.42 \pm 0.16 to 41.34 \pm 0.12 μ M, while the standard drug had an IC₅₀ of 21.96 \pm 0.15 μ M. In terms of structural insights, the halogenated phenyl substitution on the second position of benzothiazepine was found to significantly improve the biological activity. This characteristic feature is supported by the binding patterns on the selected target proteins in docking simulations. In this study, 1,5-benzothiazepines have been identified as potential anticancer agents which can be further exploited for the development of more potent derivatives.

Keywords: 1,5-benzothiazepines; PEG-400; molecular docking; cytotoxicity; anticancer



Current Organic Synthesis






Editor-in-Chief >

ISSN (Print): 1570-1794
ISSN (Online): 1875-6271

Back Journal ▾ Subscribe

Letter Article

Polyethylene Glycol-400 Prompted an Efficient Synthesis of Thienyl Pyrazolo[1,5-a] Pyrimidines as Microbial Inhibitors

Author(s): [Shankaraiah G. Konda*](#) , [Santosh S. Chobe](#) , [Amit Kumar N. Gosar](#) , [Baliram S. Hote](#) , and [Gajanan G. Mandawad*](#) 

Volume 19, Issue 6, 2022

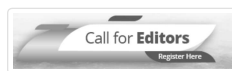
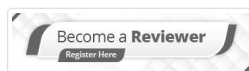
Published on: 20 May, 2022

Page: [693 - 701]

Pages: 9

DOI: [10.2174/1570179419666220304160938](https://doi.org/10.2174/1570179419666220304160938)

Price: \$65

Purchase
PDF


Abstract

Aims: The aim of this present work was to design and establish an efficient synthesis of new thienyl pyrazolo[1,5-a] pyrimidines using an environmentally friendly reaction solvent. Further, the newly synthesized compounds were evaluated for antimicrobial activity.

Materials and Methods: A series of thienyl pyrazolo[1,5-a] pyrimidines have been synthesized by the condensation reaction of 4-(4'-chloro-phenylazo)-5-amino pyrazole with α , β -unsaturated carbonyl composites (chalcones) using NaOH in polyethylene glycol- 400 as a green reaction solvent. The dissemination technique recommended by the National Clinical Laboratory Standards Committee was used to study the antimicrobial activities of synthesized compounds.

Results and Discussion: Polyethylene glycol-400 prompting an efficient synthesis of thienyl pyrazolo[1,5-a] pyrimidines have been discussed. Excellent yields of the products were obtained in a shorter reaction time using PEG 400 as a green reaction solvent. The reaction solvent was recovered and reused without the loss of its activity. The synthesized compounds have shown interesting antibacterial activity. Hydroxyl and halo substitution with thienyl moiety emerged as an active antibacterial and antifungal study.

Conclusion: The advantage of this methodology is that it incorporates the green method, has excellent yields, easy workup, avoids toxic solvents, and an expensive catalyst. The new dimension pyrazolo[1,5-a] pyrimidine derivatives with thienyl moiety exhibit promising antimicrobial activity.

Keywords: [Green synthesis](#), [polyethylene glycol-400](#), [chalcones](#), [5-amino pyrazole](#), [pyrazolo \[1,5-a\]pyrimidines](#), [antimicrobial activity](#).

« Previous

Next »

Graphical Abstract

Article
Metrics


PDF

23



HTML

1

FIND YOUR INSTITUTION

Journal Information

- > About Journal
- > Editorial Board
- > Current Issue
- > Volumes/Issues

For Authors

For Editors

For Reviewers

Explore Articles

Open Access

For Visitors

Related Articles

Morphological and Molecular Changes of the Myocardium After Left Ventricular Mechanical Support
Current Cardiology Reviews

Vaccination and Antiviral Treatment of Neglected Diseases Caused by

**A SYSTEMATIC REVIEW: USE OF CHLOROQUINE AND
HYDROXYCHLOROQUINE IN COVID-19**

**Ashwini A. Bachhav^{*1}, Satish A. Ahire², Amruta M. Amritkar³, Rajendra K. Pawar⁴,
Dr. Nitin N. Hire¹**

¹MVPS's Institute of Pharmaceutical Science, Nashik, India.

²MGV'S L. V. H. Arts, Science and Commerce College, Panchavati, Nashik, India.

³SVKM's Institute of Pharmacy, Dhule, India.

⁴MGV's M.S.G. Arts, Science and Commerce College, Malegaon, Nashik, India.

Article Received on
30 Dec. 2021,

Revised on 20 Jan. 2022,
Accepted on 10 Feb. 2022

DOI: 10.20959/wjpr20223-23232

***Corresponding Author**

Ashwini A. Bachhav

MVPS's Institute of
Pharmaceutical Science,
Nashik, India.

ABSTRACT

Chloroquine and Hydroxychloroquine have been used in the treatment of various diseases like lupus erythematosus, rheumatoid arthritis, malaria, amebiasis that is occurring outside the intestines, rheumatoid arthritis, and lupus erythematosus for more than 70 years. On 11 of march in the afternoon World Health Organization (WHO) declared that covid-19 was a pandemic disease and they also declared that already the number of cases outside China was increased 13-fold, and the number of affected countries has tripled. But at that time no such medical treatments were available for covid-19. So, in this emergency, the only option available the use of existing medications. This

systematic review aims to summarize the chemical structure, mechanism of action, pharmacokinetics, and available evidence regarding the role of chloroquine and hydroxychloroquine in treating coronavirus infection. In this review, we discuss the available evidence for the use of chloroquine (CQ) and hydroxychloroquine (HCQ) against COVID-19. Chloroquine and hydroxychloroquine both have unusual pharmacokinetic properties with enormous apparent volumes of distribution (chloroquine > hydroxychloroquine) and very slow elimination from the body. There is theoretical, experimental, preclinical, and clinical evidence of the effectiveness of chloroquine in patients affected with COVID-19. There is adequate evidence of drug safety from the long-time clinical use of chloroquine and hydroxychloroquine in covid-19.



Green Synthesis of Ceria Nanoparticles Using Azadirachta Indica Plant Extract: Characterization, Gas Sensing and Antibacterial Studies

**SATISH ARVIND AHIRE¹, ASHWINI ASHOK BACHHAV²,
THANSINGH BHAVSING PAWAR¹, ARUN VITTHAL PATIL³,
SWAPNIL SAMPATRAO SHENDGE⁴ and PRASHANT BHIMRAO KOLI^{5*}**

¹Department of Chemistry, L.V.H. Arts, Science and Commerce College, Panchavati, Nashik,
Affiliated to Savitribai Phule Pune University, Pune, Maharashtra, India.

²Maratha Vidyaprasarak Samaj, Institute of Pharmaceutical Science, Nashik.
Affiliated to Savitribai Phule Pune University, Pune, Maharashtra, India.

³Department of Physics, Arts, Science and Commerce College, Manmad, District-Nashik,
Affiliated to Savitribai Phule Pune University, Pune, Maharashtra, India.

⁴Department of Physics, Karmaveer Abasaheb and N.M. Sonawane Arts Commerce and
Science College, Satana, Taluka-Baglan, District- Nashik. Affiliated to Savitribai
Phule Pune University, Pune, Maharashtra, India.

⁵Department of chemistry, Karmaveer Abasaheb and N.M. Sonawane Arts Commerce and Science
College, Satana, Taluka-Baglan, District- Nashik. Affiliated to Savitribai Phule
Pune University, Pune, Maharashtra, India.

Abstract

In the present investigation we have fabricated the cerium dioxide (CeO_2) nanoparticles by green route. While preparing the cerium dioxide nanoparticles by co-precipitation method, Neem leaf extract mixed into the precursor of cerium. The synthesized nanoparticles of CeO_2 were used for the preparation of thick film sensor by using screen printing strategy. The fabricated CeO_2 sensor was characterized by XRD, SEM, EDS and TEM techniques. The structural characteristics investigated by x-ray diffraction technique (XRD). XRD confirms the formation of cubic lattice of CeO_2 material. The surface, texture, porosity characteristics were investigated from SEM analysis, while chemical composition of the material was analysed by EDS technique. The transmission electron microscopy (TEM) confirms the formation cubic lattice of the cerium dioxide material. The thickness of the films was calculated from



Article History

Received: 13 December
2021

Accepted: 30 December
2021

Keywords

Antibacterial Study;
 CeO_2 Sensor; Lpg;
Petrol Vapors Sensor;
Tem.

CONTACT Prashant Bhimrao Koli ✉ prashantkoli005@gmail.com 📍 Department of chemistry, Karmaveer Abasaheb and N.M. Sonawane Arts Commerce and Science College, Satana, Taluka-Baglan, District- Nashik, Affiliated to Savitribai Phule Pune University, Pune, Maharashtra, India.



© 2021 The Author(s). Published by Enviro Research Publishers.

This is an Open Access article licensed under a Creative Commons license: Attribution 4.0 International (CC-BY).

Doi: <http://dx.doi.org/10.13005/msri/180304>

An Eco-friendly Method for the Synthesis of Solvent-Free Reaction of Oxazine Derivatives

S.A. Shaikh^{1*}, S.R. Labhade², R.R. Kale², C.K. Nerkar³, S.B. Ghoderao⁴, S. S. Chobe⁵ and S.A. Ahire⁵

¹Chemistry, KVN Naik Arts, Commerce and Science College (Affiliated to S.P. Pune University, Pune), Nashik, India

²Chemistry, K.R.T. Arts, B.H. Commerce & A.M. Science College (Affiliated to S.P. Pune University, Pune), Nashik, India

³MGV's Arts, Science and Commerce College (Affiliated to S.P. Pune University, Pune), Manmad, Nashik, India

⁴RNC Arts, JDB Commerce and NSC Science College (Affiliated to S.P. Pune University, Pune), Nashik Road, Nashik, India

⁵Chemistry, L.V.H. Arts, Science and Commerce College (Affiliated to S.P. Pune University, Pune), Nashik, India

ABSTRACT

A new solvent-free method is being developed for the environmentally friendly synthesis of the 2,3-dihydro-1,3-diphenyl derivative-1H-naphtho [1,2-e] [1,3] Oxazine, which is being developed due to the numerous advantages of solvent-free reactions. An oxazine derivative may have a single or dual affinity marker. In a preferred embodiment, the oxazine ring is linked to a linker compound to facilitate its adsorption on the target material. As oxazine molecule can be labelled with any measurable detection marker. In this case, the oxazine ring is preferably used as a fluorescence or trivalent labelled fraction. This three-component approach is efficient, clean, experimentally simple, convenient, safe, and environmentally sound. It is also simple to implement. The spectral analysis confirmed the structures of the synthesized compounds. Additionally, antimicrobial activity was determined In vitro for these newly synthesized products.

KEYWORDS: Green chemistry, Solvent-free, Oxazine derivative, In vitro activity.

INTRODUCTION

Green chemistry is the useful design of chemical products which reduces or eliminates the use of hazardous substances. Green chemistry is applied throughout the life cycle of a chemical product. All synthetic processes involve the use of various solvents. Green chemistry provides "Green" pathways for different synthetic routes using non-hazardous solvents, solvent-free reactions, and environmentally friendly chemicals. Solvent-free synthesis has several advantages over the classical synthesis method ¹. Green chemistry is useful in preventing molecular-level emission ², a concept that refers to all fields of chemistry but not a particular discipline in chemistry ³. It gives solutions to prevalent environmental problems throughout the world ⁴⁻⁶. It decreases the risk of hazardous chemical substances generated during the process to yield the products. Green chemistry also helps in sustaining health and the environment ⁷. Hence the invention of a new procedure is a necessity to reduce the intrinsic hazards of the products manufactured in the chemical industries ⁸.

In a classical approach, an oxazine derivative is added by a condensation reaction between the derivatives of aldehyde, beta naphthol, and ammonium acetate. Naphthol-oxazines are synthetically important compounds used to synthesize a number of compounds that act as drugs, dyes, polymers and are used as a feed in many reactions ⁹.

There are many benefits to solvent-free synthesis over the classical synthesis process. The following are some of the major advantages - a. Waste/by-products prevention. b. safer reactions. c. maximum penetration into the final products of the reactant (starting material & reagents). d. hazardous substance avoidance or minimization. e. the goods obtained are biodegradable for the most part. f. the requirement for energy for such synthesis is minimal. g. prevention of harsh conditions for reactions. h. elevated commodity yields. i. shorter time for reactions. j. in several of the reactions, strong selectivity. k. prevention of the use of solvents that are toxic ¹⁻⁹

Oxazines are heterocyclic compounds containing, in a doubly unsaturated six-membered ring, one oxygen, and one nitrogen atom. Depending on the relative location of the heteroatoms and the relative position of the double bonds, isomers exist (Figure. 1) ¹⁰.



Contents lists available at ScienceDirect

Journal of the Indian Chemical Society

journal homepage: www.journals.elsevier.com/journal-of-the-indian-chemical-society

Nano 5% Fe–ZnO: A highly efficient and recyclable heterogeneous solid nano catalyst for the Biginelli reaction

Ravindra Haribhau Waghchaure^{a,b}, Bapu Sonu Jagdale^a, Prashant Bhimrao Koli^c, Vishnu Ashok Adole^{a,*}

^a Research Centre in Chemistry, MG's Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati, Affiliated to Savitribai Phule Pune University, Nashik, 422003, Pune, MH, India

^b Department of Chemistry, MJM Arts, Commerce and Science College, Affiliated to Savitribai Phule Pune University, Karanjali, Taluka-Peth, District- Nashik, Pune, MH, 422 208, India

^c Department of Chemistry, MVP's Karnveer Abasaheb alias N.M. Sonawane Arts Commerce and Science College, Affiliated to Savitribai Phule Pune University, Satana, Taluka-Baglan, District- Nashik, 422101, Pune, MH, India

ARTICLE INFO

Keywords:

5% Fe–ZnO nanocatalyst
Biginelli reaction
Green chemistry
BET

ABSTRACT

In this paper, we report the synthesis and catalytic application of 5% Fe–ZnO nanocatalyst for the synthesis of 3,4-dihydropyrimidin-2-one derivatives as a highly efficient heterogeneous nanocatalyst. The structural and morphological features of the synthesized nanocatalysts were investigated by X-ray diffraction (XRD) and scanning electron microscopy (SEM). Using Debye-Scherrer's formula, the average particle size for undoped ZnO was calculated to be 24.55 nm, while the average particle size for 5% Fe–ZnO was calculated to be 22.37 nm. The high resolution transmission electron microscopy (HR-TEM) revealed a hexagonal crystal lattice type. The Brunauer–Emmett–Teller (BET) surface area of ZnO and 5% Fe–ZnO was found to be 56.50 m²/g and 72.65 m²/g, respectively. Energy Dispersive X-Ray Analysis (EDX) confirmed the elemental composition of undoped ZnO and doped 5% Fe–ZnO nanocatalysts. Biginelli products were produced using a one-pot three-component reaction of urea, β -dicarbonyl compound, and various aromatic aldehydes using 5% Fe–ZnO under clean conditions. It was found that a 5% Fe–ZnO nanocatalyst is a highly efficient heterogeneous nanocatalyst for the synthesis of 3,4-dihydropyrimidinones. ¹H NMR and ¹³C NMR analysis was used to confirm the structure of the synthesized Biginelli adducts. This synthetic protocol offers several advantages, including a short reaction time and purity of the synthesized, reusability and ease of catalyst separation, and a clean and quick workup.

1. Introduction

Paul T. Anastas and John Warner [1] initially announced the twelve Green Chemistry principles, and since then, countless scientific disclosures and discoveries have ascended through "Green Chemistry." The twelve green chemistry principles have provided an exceptional stepping stone for the development of new green chemistry research [2]. The application of green chemistry has a great impact on chemical synthesis [3–6]. The uses of green solvents [7], sustainable catalysts [8], and microwave and ultrasound methods have changed the perspective of organic synthesis [9,10]. In the last few years, eco-friendly approaches have been accounted for the synthesis of heterocyclic compounds of pharmacological importance in order to improve the reaction conditions [11–15]. The metal oxide nanoparticles have been efficiently used in the

various fields of materials science [16]. The remarkable properties like acidic and basic surface sites, redox potentials, and high surface area make them worthy to use as catalysts for various applications. Furthermore, modifying the metal oxides by appropriate dopants enhances their catalytic properties [17]. Various methods have been adopted for the synthesis of a wide range of metal oxide nanoparticles, i.e. sol-gel, co-precipitation, hydrothermal, ultrasound, microwave, wet impregnation, etc. The metal oxide nanoparticles in the field of organic synthesis have gained great attention in last decade [18–20]. The substantial surface area and the recyclable properties have made them superior to many traditional methods. In this view, metal oxide nanoparticles have been used for the synthesis of a variety of organic compounds, especially heterocyclic compounds.

Chemical synthesis generates a lot of waste every day [21]. Using

* Corresponding author.

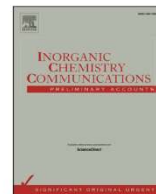
E-mail address: vishnuadole86@gmail.com (V.A. Adole).

<https://doi.org/10.1016/j.jics.2022.100468>

Received 19 February 2022; Received in revised form 6 April 2022; Accepted 8 April 2022

Available online 12 April 2022

0019-4522/© 2022 Indian Chemical Society. Published by Elsevier B.V. All rights reserved.



Short communication

“Fe³⁺ modified zinc oxide nanomaterial as an efficient, multifaceted material for photocatalytic degradation of MB dye and ethanol gas sensor as part of environmental rectification”

Ravindra Haribhau Waghchaure^{a,b}, Vishnu Ashok Adole^a, Bapu Sonu Jagdale^a, Prashant Bhimrao Koli^{c,*}

^a Research Centre in Chemistry, Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati, Nashik 422003, India¹

^b Department of Chemistry, Mahant Jamanadas Maharaj Arts, Commerce and Science College, Karanjali, Taluka-Peth, District- Nashik 422 208, India²

^c Department of Chemistry, Karmaveer Abasaheb alias Narayan Mansaram Sonawane Arts Commerce and Science College, Satana, Taluka-Baglan, District- Nashik 423301, India¹

ARTICLE INFO

Keywords:

5% Fe/ZnO nanocatalyst

MB degradation

Ethanol sensor

Humidity sensor

ABSTRACT

In the present investigation, we report the preparation of 5% Fe³⁺ doped zinc oxide (5% Fe/ZnO) nanocatalyst for organic transformations, gas sensing, and organic pollutant elimination applications via the CPT method. A broad range of analytical techniques was applied to attribute the successful modification of the nanocatalyst and to evaluate the structural and morphological properties, surface area, and chemical compositions by the x-ray diffraction, scanning electron microscopy, high resolution-transmission electron microscopy, Brunauer-Emmett-Teller, and energy dispersive spectroscopy techniques. The photocatalytic degradation of methylene blue (MB) as organic pollutant and gas sensing performance to ethanol were studied thoroughly. Due to enhanced gas sensing performance comparatively at low temperature to ethanol, it is known for ideal sensor, which has high selectivity, rapid response-recovery time, and high stability. It also showed the enhanced photocatalytic performance in the degradation of MB dye in the aqueous heterogeneous suspension. The efficiency of the semiconductor photocatalyst is found higher at the small amount of catalyst dose (0.8 g/L) and at the contact time of 100 min and pH 8.0 as operating parameters. Further, the organic transformation mechanism, enhanced gas sensing and, photodegradation mechanism were explained as the synergic effect of the ZnO and Fe doping. The results revealed that 5% Fe/ZnO nanocatalyst is promising approach to aim the goal of achieving a superior heterogeneous catalyst for the elimination of organic pollutant (MB) at optimum conditions and gas sensing performance for the detection of ethanol.

1. Introduction

Recently the dense population of people worldwide has resulted in contamination of air and water because of the growth of industrial units. The significant source of this contamination is different gases like NO₂, CO₂, SO₂, volatile organic gases like ethanol, methanol, and formaldehyde [1-4], etc., different organic dyes due to their toxic and non-degradable nature, further, the chemical waste from inefficient organic reactions also contribute to the contamination [5,6]. To decrease the damage caused by pollutant gases, organic dyes, and

chemical waste from less efficient organic reactions, investigations have been focused on efficient gas sensors to detect harmful gases, photocatalysts to convert organic dyes to less hazardous chemicals, and heterogeneous catalysts to enhance the catalytic performance and reduce the reaction waste [4,7-11]. The utilization of metal oxide semiconductor nanomaterials like ZnO, TiO₂, and, SnO₂ as gas sensors, photocatalysts, and heterogeneous catalyst has drawn much attention because of the ability of these nanomaterials to detect pollutant gases at comparatively low temperature, to degrade the organic pollutant under UV radiation, and catalysed the variety of organic reactions [12-15].

* Corresponding author at: MVPS, Karmaveer Abasaheb Alias Narayan Mansaram Sonawane Arts, Commerce and Science College, Satana, Taluka-Baglan, District-Nashik-423301 (Maharashtra).

E-mail address: prashantkoli005@gmail.com (P. Bhimrao Koli).

¹ Affiliated to Savitribai Phule Pune University, Pune (MH), India.

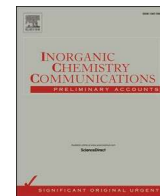
² Affiliated to Savitribai Phule Pune University, Pune (MH), India.

<https://doi.org/10.1016/j.inoche.2022.109450>

Received 22 February 2022; Received in revised form 2 April 2022; Accepted 4 April 2022

Available online 5 April 2022

1387-7003/© 2022 Elsevier B.V. All rights reserved.



Photocatalytic degradation of methylene blue, rhodamine B, methyl orange and Eriochrome black T dyes by modified ZnO nanocatalysts: A concise review

Ravindra H. Waghchaure^{a,*}, Vishnu A. Adole^b, Bapu S. Jagdale^b

^a Department of Chemistry, MJM Arts, Commerce and Science College, Karanjali, Dist-Nashik, MS 422208, India

^b Research Centre in Chemistry, MGV's Loknete Vyanaktrao Hiray Arts, Science and Commerce College, Panchavati, Dist-Nashik, MS 422003, India

ARTICLE INFO

Keywords:

Modified ZnO nanocatalysts
Methylene blue
Rhodamine B
Methyl orange
Eriochrome black T

ABSTRACT

One of the issues receiving global attention is the prevalence of dyes in wastewater and water resources. These chemicals' persistence, toxicity, and carcinogenic potential have a significant influence on aquatics and humans, making their removal prior to discharge into the environment necessary. Semiconducting metal oxide and modified metal oxide-mediated photocatalysis has emerged as a superior wastewater treatment process to tackle the major challenges faced by traditional technologies. The multifunctional ZnO nanomaterial due to its inexpensive nature, eco-friendly, structure-dependent properties, and complete mineralization of pollutants make them more efficient semiconducting photocatalysts than other materials. It has been seen that ZnO nanomaterials can show high performance in photo-induced degradation of cationic and anionic dyes and for the treatment of industrial effluent due to its high efficiency under ultraviolet light, with a 3.37 eV the bandgap. Taking account of all these crucial aspects, this paper presents a review of recent achievements in the degradation of methylene blue, and rhodamine B as a cationic dye, and methyl orange and Eriochrome black T as an anionic dye, by studying the operating parameters like reaction time, pH, initial dye concentration, and catalyst concentration, etc.

1. Introduction

Pure water for drinking and irrigation purposes is a global need. The preventive measurement of environmental pollution and saving of water in the desert area is to recycle and purification of water. The continuous destruction of our natural resources is because of fast-growing industrialization [1]. As a result of the lack of effective wastewater treatment, various hazardous chemical matters are continuously introduced into the natural water resources, out of which synthetic dyes gain remarkable attention [2]. According to the literature worldwide, 280,000 tons of synthetic dyes have been wasted through industrial discharge into the environment per annum [3,4]. These dyes are quite stable and usually resist biodegradation and are difficult to deteriorate in water [5]. These dyes are waste from the garment [6], textile [7,8], and pharmaceuticals [9], plastic [10], leather, ink, paper industries [11–13]. These dyes hazardous to human health cause carcinogenic, mutagenic, and genotoxic disorders and also affect aquatic life [14–17]. The presence of these dyes in water declines the penetration of sunlight thereby influencing

the photosynthesis process, and affecting the aquatic flora-fauna [18]. Synthetic dyes like methylene blue (MB), rhodamine B (RhB) as a cationic, methyl orange (MO), and Eriochrome Black T (EBT) as an anionic dye cause several diseases like skin disease, respiratory tract infections, eyes irritation, hence their destruction and decolorization from water resources are very important [19–22]. Because their introduction into the water resources affects the aquatic flora and fauna, thereby disturbing the ecosystem. These dyes resist biodegradation and last long in the water, so their conversion into simple molecules is needed, which was brought by the photoinduced degradation of these dyes, catalyzed by several photocatalysts [23,24]. There are mainly three types of dye removal methodologies: chemical, physical, and biological. Adsorption, ion exchange, and filtration/coagulation methods are physical methods for removing dyes whereas chemical methods include ozonization, photocatalytic reactions, and Fenton's reagent. On the other hand, biological methods include aerobic and anaerobic degradation, biosorption, etc. [25,26]. Among the various methods, photocatalysis of dyes has several advantages, including the

* Corresponding author.

E-mail address: waghchaure Ravindra86@gmail.com (R.H. Waghchaure).

<https://doi.org/10.1016/j.inoche.2022.109764>

Received 2 May 2022; Received in revised form 24 June 2022; Accepted 11 July 2022

Available online 14 July 2022

1387-7003/© 2022 Elsevier B.V. All rights reserved.

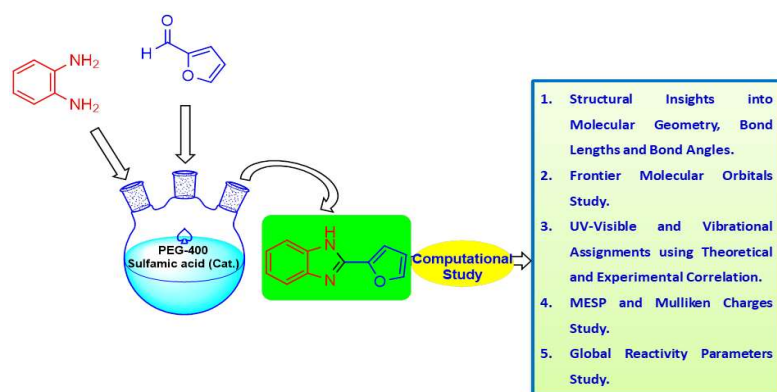
Full Paper | <http://dx.doi.org/10.17807/orbital.v13i5.1625>

Computational Chemistry: Sulfamic Acid Catalyzed PEG-400 Mediated Synthesis, Molecular Structure, HOMO-LUMO, UV-visible, Vibrational, and Reactivity Descriptors Analysis of 2-(Furan-2-yl)-1H-benzo[d]imidazole

Vishnu A. Adole * ^a, Bapu S. Jagdale ^a, and Ravindra H. Waghchaure ^b

2-(Furan-2-yl)-1H-benzo[d]imidazole (2-FBI) is synthesized and investigated using computational chemistry in the present analysis. PEG-400 and catalytic amount of sulfamic acid presents green protocol for the synthesis of 2-FBI. FT-IR, ¹H NMR, and ¹³C NMR spectroscopic methods were used to characterize the structure of 2-FBI. The density functional theory (DFT) approach was used to perform the theoretical calculations, with a basis set of 6-311++G(d,p). Theoretical and experimental UV-Visible investigation is correlated to obtain better insights into the absorption spectral studies. The experimental vibrational frequencies were compared with the scaled vibrational frequencies for the assignment of vibrational bands. Molecular electrostatic surface potential and Mulliken atomic charges are employed for the determination of charge density and reactive sites. In addition, the more precise computation of Mulliken atomic charges is done by comparing 6-311++G(d,p) and 6-311G(d,p) basis sets.

Graphical abstract



Keywords

DFT
2-(Furan-2-yl)-1H-benzo[d]imidazole
HOMO-LUMO
Molecular electrostatic surface potential

Article history

Received 03 May 2021
Revised 30 Aug 2021
Accepted 12 Nov 2021
Available online day month year

Handling Editor: Arlan Gonçalves

1. Introduction

Different molecular properties can be estimated using density functional theory (DFT). DFT is a computational quantum

mechanical tool for studying the electronic structure of molecules that is used in chemistry and material science.

^a Department of Chemistry, Mahatma Gandhi Vidyamandir's LVH Arts, Science and Commerce College, Panchavati, District- Nashik, India-422 003. (Affiliated to Savitribai Phule Pune University, Pune (MH), India). ^b Department of Chemistry, Mahant Jamanadas Maharaj Arts, Commerce and Science College, Karanjali, Taluka-Peth, District- Nashik, India-422 208. (Affiliated to Savitribai Phule Pune University, Pune (MH), India). Corresponding author. E-mail: vishnuadole86@gmail.com



Synthesis techniques and applications of rare earth metal oxides semiconductors: A review

Amol S. Patil^a, Arun V. Patil^b, Chandrakant G. Dighavkar^c, Vishnu A. Adole^d, Umesh J. Tupe^{e,*}

^a Department of Electronics, SSR College, Silvassa 396230, India

^b Department of Physics, MGV's, Arts, Science and Commerce College, Manmad, Dist. Nashik 423104, India

^c Department of Physics, MGV's, Arts, Science and Commerce College, Sargana, Dist. Nashik 422211, India

^d Department of Chemistry, MGV's, Loknete Vyankatrao Hiray Arts, Science and Commerce College, Panchavati, Dist. Nashik 422003, India

^e Department of Electronics, Vidya-Amrut Dnyan Pratishthan's Arts, Science and Commerce College, Shirsondi, Dist. Nashik 423208, India

ARTICLE INFO

Keywords:

Rare earth metal oxides
Lanthanide series
Yttrium Oxide
Semiconductors
High-tech industries

ABSTRACT

Rare earth elements have seen a rise in demand in recent years due to their distinctive properties and diverse applications. Rare earth-based nanomaterials can be synthesized using techniques such as hydrothermal, solvothermal, electrode position, and atomic layer deposition methods. REMOS nanoparticles have found use in trace gas sensors, batteries, magnetic storage devices, photovoltaic cells, catalysts, energy conversion, engineering, medicines, food, agriculture, cosmetics, textiles, and antennas. This review elaborates the various synthetic pathways, applications and future prospects of rare earth metal oxides.

1. Introduction

Rare earth elements (REEs) are the lanthanide series of the periodic table, which includes atomic numbers 57 to 71 and contains lanthanum (La) to lutetium (Lu) along with scandium (Sc), and yttrium (Y). Promethium (Pm) is a radioactive and extremely rare element of the lanthanide family. Nuclear transformations are the most common source of promethium (Pm). The difference between the unpaired and paired electrons in the 4f shell divides rare-earth into light rare earth elements (LREE) and heavy rare earth elements (HREE). Rare earth elements are divided into two categories: heavy rare earth elements and light rare earth elements. The heavy rare earth elements include europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, and yttrium. The light rare earth elements include lanthanum, cerium, praseodymium, neodymium, promethium, and samarium as shown in Fig. 1.

REE's global situation, from their applications in high-tech products to their occurrence in diverse types of economic deposits on land and in the water, their behaviour in various geological systems, state-of-the-art chemical characterization techniques, and recycling. Other topics, such as their usage in agriculture and medicine, as well as their environmental implications, REMOS are very important in technologies like television, wind turbines, LED light bulbs, and cell phones. REE and their alloys have seen a surge in use in a variety of technological devices

in the last three decades, including computer memory, DVDs, rechargeable batteries, autocatalytic converters, super magnets, mobile phones, LED lighting, superconductors, glass additives, fluorescent materials, phosphate binding agents, solar panels, and MRI agents. These elements are crucial components in all high-tech devices. For example, Nd is widely used in super magnets for disc drives, Ce is an important component of autocatalysts, and all REE are used in flat-panel televisions. Several REE compounds may be found in smart-batteries, which are used to power all electric and hybrid vehicles. These elements contribute to various technical advantages, such as lower energy consumption, higher efficiency, downsizing, speed, durability, and thermal stability, due to their unique physical, chemical, magnetic, and luminous properties. Their demand has risen in recent years, especially for energy saving gadgets (green technology) that are faster, lighter, smaller, and more efficient. These technologies are also assisting in the reduction of the size and efficiency of analytical instruments [1].

Environmental consequences such as radioactive potential, acidification, eutrophication, solid waste creation, water use, gross primary energy footprint, toxicity, and any other regional or global impact should all be considered. The majority of REEs, on the other hand, are likely to be utilised in energy conservation, efficiency, and renewable energy technologies. Rare earths with large volumes, low reserves, and significant dispersion are the rare earths most at risk. Rare earth elements are essentially concentrated at extremely low levels in the ground

* Corresponding author.

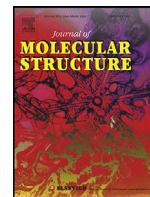
E-mail address: umeshtupe14@gmail.com (U.J. Tupe).

<https://doi.org/10.1016/j.cplett.2022.139555>

Received 25 November 2021; Received in revised form 28 February 2022; Accepted 11 March 2022

Available online 15 March 2022

0009-2614/© 2022 Published by Elsevier B.V.



Synthesis, molecular structure, electronic, spectroscopic, NLO and antimicrobial study of *N*-benzyl-2-(5-aryl-1,3,4-oxadiazol-2-yl)aniline derivatives

Sunil L. Dhonnar^a, Vishnu A. Adole^a, Rahul A. More^b, Nutan V. Sadgir^a, Bapu S. Jagdale^a, Thansing B. Pawar^a, Mohamed I. Elzagheid^c, Lydia Rhyman^{d,e}, Ponnadurai Ramasami^{d,e,*}

^a Department of Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati, Nashik 422 003, India

^b Department of Microbiology, Dayanand Science College, Latur 413512, India

^c Department of Chemical and Process Engineering, Jubail Industrial College, Jubail Industrial City 31961, Saudi Arabia

^d Computational Chemistry Group, Department of Chemistry, Faculty of Science, University of Mauritius, Réduit 80837, Mauritius

^e Centre for Natural Product Research, Department of Chemical Sciences, University of Johannesburg, Doornfontein, Johannesburg 2028, South Africa

ARTICLE INFO

Article history:

Received 10 November 2021

Revised 3 April 2022

Accepted 5 April 2022

Available online 7 April 2022

Keywords:

DFT, UV-Vis

Vibrational

NLO

Antimicrobial

ABSTRACT

The cyclization reaction between two benzohydrazides with 2-(benzylamino)benzoic acid afforded the novel 2,5-disubstituted oxadiazole derivatives; *N*-benzyl-2-(5-phenyl-1,3,4-oxadiazol-2-yl)aniline (NBPOA) and *N*-benzyl-2-(5-(4-chlorophenyl)-1,3,4-oxadiazol-2-yl)aniline (NBCPOA). Theoretical investigation of these newly synthesized oxadiazole derivatives was carried out by density functional theory (DFT) method at the B3LYP/6-311++G(d,p) level of theory. TD-DFT computations were performed to have insights into the three singlet electronic states of the electronic absorption spectra and to assign and correlate with the experimental UV-Vis spectra. The electronic absorption measurements were done in DCM and DMSO solvents. The increase in solvent polarity exerted a blue shift on the first singlet electronic excited state and a red shift on the second and the third electronic excited states suggesting different polarities of the excited states. Vibrational band assignments were scaled and compared with the experimental frequencies. Structural parameters and chemical reactivity such as HOMO and LUMO energies, MESP surfaces, Mulliken charges, and global reactivity descriptors were analyzed. It was observed that NBCPOA has a smaller HOMO-LUMO energy gap and larger global softness than NBPOA. The charge transfer that takes place in NBPOA and NBCPOA is supported by the oscillator strength. These compounds were also screened for their *in vitro* antibacterial activity against two Gram-negative bacterial strains namely *Escherichia coli* and *Salmonella typhi* and two Gram-positive bacterial strains namely *Bacillus subtilis* and *Bacillus megaterium* and antifungal activity against *Aspergillus niger*, *Rhizopus oryzae*, *Penicillium chrysogenum*, and *Candida albicans* fungal strains. The synthesized compounds exhibited moderate antibacterial and antifungal properties.

© 2022 Elsevier B.V. All rights reserved.

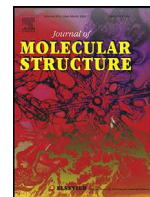
1. Introduction

1,3,4-Oxadiazole derivatives are an important class of five-membered heterocyclic compounds that have attracted attention due to their applications as key intermediates in organic synthesis [1,2]. Since many 1,3,4-oxadiazoles have remarkable biological activity, their synthesis and transformation have been of considerable interest [3]. The 1,3,4-oxadiazole ring is used in several commercially available drugs, including Zibotentan, Furamizole, Ralte-

gravir, and Nesapidil. A review of the literature reveals that heterocyclic compounds containing the 1,3,4-oxadiazole ring have a broad variety of biological activities, including antimicrobial [4,5], anti-tubercular [6], anti-oxidant [7], anti-inflammatory [8], analgesic [9], anti-depressants [10], anti-HIV [11], anti-amotic [12], cathepsin K inhibitor [13], glycogen phosphorylase inhibitors [14], tyrosinase inhibitor [15], 5-HT receptor antagonists [16], monomise oxidase inhibitor [17], and anticonvulsant [18] properties. Since 1,3,4-oxadiazoles are well-known in the scientific community, their non-linear optical (NLO) properties, high photoluminescence quantum strength, resilience and thermal stability are particularly promising for bio-optical applications and optoelectronic applications such

* Corresponding author.

E-mail address: p.ramasami@uom.ac.mu (P. Ramasami).



Synthesis, spectral analysis, antibacterial, antifungal, antioxidant and hemolytic activity studies of some new 2,5-disubstituted-1,3,4-oxadiazoles

Sunil L. Dhonnar^{a,*}, Rahul A. More^b, Vishnu A. Adole^c, Bapu S. Jagdale^a, Nutan V. Sadgir^a, Santosh S. Chobe^a

^a Department of Chemistry, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati (Affiliated to SP Pune University, Pune), Nashik 422003, India

^b Department of Microbiology, Dayanand Science College (Affiliated to Swami Ramanand Teerth Marathwada University, Nanded), Latur 413512, India

^c Department of Chemistry, Mahatma Gandhi Vidyamandir's Arts, Science and Commerce College (Affiliated to SP Pune University, Pune), Manmad, Nashik 423104, India

ARTICLE INFO

Article history:

Received 3 August 2021

Revised 15 November 2021

Accepted 15 December 2021

Available online 18 December 2021

Keywords:

1,3,4-oxadiazole

Antibacterial

Antifungal

Antioxidant

Cytotoxicity

ABSTRACT

Series of 1,3,4-oxadiazole derivatives (**5a–5g** and **5h, 5i**) were synthesized and characterized by FT-IR, ¹H NMR, ¹³C NMR and HR-MS spectral analysis. All the target compounds were screened for their *in vitro* antibacterial activity against two Gram-negative bacterial strains namely *Escherichia coli* (MTCC 405) and *Salmonella typhi* (MTCC 3224) and two Gram-positive bacterial strains namely *Bacillus subtilis* (MTCC 1790) and *Bacillus megaterium* (MTCC 1684) and antifungal activity against *Aspergillus niger* (MTCC 282), *Rhizopus oryzae* (MTCC 262), *Penicillium chrysogenum* (MTCC 974), and *Candida albicans* (MTCC 183) fungal strains. The synthesized compounds exhibited significant antibacterial and antifungal potential. Three compounds (**5e**, **5f** and **5g**) have shown higher antibacterial activity with very low MIC values comparable to streptomycin. According to the SAR study, the antibacterial efficacy can be intensified by substituting fluoro and methyl substituents at the *para* position in acid hydrazide. The synthesized compounds were also screened for % radical scavenging activity by OH and DPPH assay and found to be good antioxidant agents. Besides, the hemolytic study revealed that the synthesized 1,3,4-oxadiazoles possessed negligible cytotoxicity compared with the standard.

© 2021 Elsevier B.V. All rights reserved.

1. Introduction

The detrimental effects of microorganisms have become inevitable in parallel with the accelerated rise of human life. A large variety of microorganisms coexist in a natural balance with the human body and living conditions, however, a rapid and uncontrolled extreme multiplication of microbes may result in catastrophic complications. Many antimicrobials were used to suppress growth or control microbes over the course of several years [1–3]. Many well-known antimicrobial drugs are currently ineffective against microbes due to increased microbial resistance resulting from antibiotic overuse [4–6]. As a result, there is a compelling need to develop new and more active antimicrobial agents [7–9]. Due to the emergence of resistance to typical antibacterial agents, epidemics are caused by a lack of sufficient and effective antimicrobial agents. Similarly, the majority of radical species cause sig-

nificant oxidative damage to biomolecules at higher concentrations in biological systems, leading to the pathogenesis of oxidative stress-related diseases including cancer and aging [10,11]. A proper balance between radical generation and bio-immune system components is needed to prevent diseases caused by oxidative damages in tissues and cells. This can be accomplished by taking antioxidant supplements or taking medicine. As a consequence, antioxidants are thought to protect against diseases caused by oxidative stress. As a result, new organic compounds are urgently needed to prevent microbial infection as well as to prevent, mitigate, and repair radical-induced damage to target biomolecules.

To combat the problem of antimicrobial resistance, a variety of antimicrobial agents have been targeted and designed [12–14]. Organic chemists are working on the development of new antimicrobial agents as well as the synthesis of a variety of potent heterocyclic compounds [15]. In this unique circumstance, the therapeutic potential of 1,3,4-oxadiazoles in treating diseases is promising in the field of pharmaceutical chemistry [16,17]. The 1,3,4-oxadiazoles are an essential class of heterocyclic compound that has intrigued

* Corresponding author.

E-mail address: sunildhonnar@gmail.com (S.L. Dhonnar).

Synthesis, Characterization and Antimicrobial Activity of *para*-Toluidine and *ortho*-Toluidine Schiff Base and its Cu(II) and Ni(II) Complexes

P. Jadhav Sheetal*, H. Kapadnis Kailas¹ and N.V. Sadgir²

¹Chemistry Research Laboratory and PG Department of Chemistry, M.G. Vidyamandir's L.V.H. College, Nashik-422003, India

²Department of Chemistry, L.V.H. Arts, Science and Commerce College, Panchavati, Nashik, India

ABSTRACT

A Schiff base of 2{(E)-4(methyl phenyl) iminomethyl} phenol), 2{(E)-2(methylphenyl)imino methyl} phenol) were prepared from Para toluidine and Orth toluidine with salicylaldehyde. Metal complexes of the Schiff base were prepared from salts of Cu (II) and Ni (II) in ethanol. Spectroscopic analysis confirmed the chemical structures of the Schiff base Ligand and its metal complexes. X-ray diffraction (XRD) analysis confirmed the average particle size of the copper (II) complexes. All of the compounds were evaluated for their antimicrobial against one grampositivebacteria, two gram-negative bacteria. The Schiff base complex of the Cu (II) showed good biological activity against all tested bacteria.

KEYWORDS: Schiff base, Metal complexes, Antimicrobial activity, Particle size.

INTRODUCTION

Schiff bases are well known for their biological applications as antibacterial, antifungal, anticancer, antiviral agents and as herbicides, furthermore; they have industrial applications (1), anti-tubercular activities (2), chelating abilities as chelating ligand in coordination chemistry (3) and widely applied in enantioselective compounds (4). The chemistry of Schiff base compounds has been studied extensively. They have various applications as coordinating ligands, as catalysts, in electrochemistry and medicinal values (5). Schiffbases possess antimicrobial and anti-inflammatory activity (5). It has been discovered that the biological activity of some Schiff base ligands became enhanced upon chelation with metal ions (6). Schiff bases are useful ligands because of their synthetic accessibility, diversity and structural varieties (7). The Schiff base ligands and their metal complexes find paramount applications in the field of biological studies (8), clinical (9), dyes industry (10), and food industry (11).

EXPERIMENTAL

All the chemicals and solvents used were of analytical reagent grade. The Schiff-bases were prepared as in (Scheme 1) by the usual condensation reaction (12), in which salicylaldehyde (SA) (0.08mole) was drop wise added to the amine (p-Toluidine)(PT) (0.08mole) in ethanol with continuous stirring. After complete addition the reaction mixture was heated under reflux for about four hours. After reflux ice was added and yellow solid precipitate was obtained by filtration. Dry it well and recrystallized from ether and dried at room temperature and finally yellow solid of 2{(E)-4-methylphenyl)iminomethyl} phenol) Schiff base ligand is obtained. Crystal collected in a good yield 80% (M.P. 100s°C).



Leaf Morphometric Studies in Some *Ipomoea* Species of Convolvulaceae Family

Balasaheb S. Kale^{a*} and Nikita S. Phadol^b

^a Department of Botany S. V. K. T Arts, Science and Commerce College, Deolali Camp, Nashik (M. S.), India.

^b Department of Botany, Loknete Vyankatrao Hiray Arts, Science & Commerce College, Panchavati, Nashik (M. S.), India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/APRJ/2022/v9i330209

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/89105>

Original Research Article

Received 20 April 2022
Accepted 29 June 2022
Published 02 July 2022

ABSTRACT

Eight species of *Ipomoea* (Convolvulaceae) were morphometrically studied upon their leaf characters, with the help of taxonomical analysis to solve the relationship between these species. On the basis of taxonomical component analysis, among the studied species, it has been disclosed that the numerical characters such as leaf length, petiole length, leaf breadth and lamina length are positively correlated to resolved taxonomical relation of different species of the same genus. Contribute important role in bringing together the species within a genus using principal component analysis results of five quantitative characters based on similarity matrix reveals significantly the correlation between leaf length to leaf breadth, leaf base nerve number, and the ratio of leaf lamina length to petiole length significantly separates the species from each other. Morphometric characters provided justification for the existing classification of the *Ipomoea* genus. It also indicates the component matrix after extraction of the characters that contributed strongly in similarity between the selected *Ipomoea* species. Three characters which include Leaf length, leaf breadth, and the ratio of leaf length to leaf breadth contributed significantly to the delimitation of the species of *Ipomoea* studied. Morphometric analysis of eight species of *Ipomoea quamoclit* L.; *Ipomoea batatas* (L.) Lam.; *Ipomoea cairica* (L.) Sweet; *Ipomoea hederacea* Jacq.; *Ipomoea obscura* (L.) Ker Gawl.; *Ipomoea cordatotriloba* Dennst.; *Ipomoea lacunosa* L. and *Ipomoea hederifolia* L. Using five different quantitative characters provided justification for the existing classification of the *Ipomoea*

*Corresponding author: E-mail: kaleunipune@gmail.com;



Electric Current Effect on Plant Growth of *Withania somnifera* (L) Dunal (Ashwagandha)

*¹Balasaheb S. Kale and ²Sachin M. More

*^{1&2}Department of Botany, Loknete Vyankatrao Hiray Arts, Science & Commerce College, Panchavati, Nashik - 03 (M.S) India.

Received: 26 Jan 2022 / Accepted: 24 March 2022/ Published online: 01 April 2022

*Corresponding Author Email: kaleunipune@gmail.com

Abstract

Withania somnifera (L) Dunal (Ashwagandha) has been used in Ayurveda, Indian system of traditional medicine. Ashwagandha is one of the prime drugs of Ayurveda material medica. The present investigation to find out seeds Germination Percentage and Plant Growth of *W. somnifera*. Plant network of electric signals which help in cellular signaling and co-ordination. Plants show adaptations to their surroundings as and when required, which almost certainly controlled through these regulatory electrical signals, such signals can regulate certain basic metabolic processes in plants and thus have potential in regulating plants growth and function. However, it is theorized that an external supply of mild electric current can influence or imitate the role of natural signals that regulate metabolic processes in plants. Therefore, supplying such electric current would act as signal and would act as lead to enhanced metabolism in plants often lead to rapid and better growth. In this work the effect of such external electric current on plant were evaluated on basis of plant growth parameter and quantitative estimation of secondary metabolites in such plant. Ashwagandha were used as starting material and electric current stimulation (electric current range= 2V, 4V, 6V, 8V and 10V) was perform on imbibes seeds. The result show that electric current has (in the range of 2V to 10V) striking effect of growth of plant. However, for each plant under consideration a optimum current range was identify which promote their growth. Weak currents stimulation used as increase crop production and to speed crop growth.

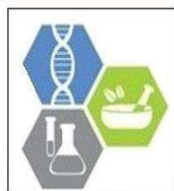
Keywords

Electric stimulation, Promote growth, *Withania somnifera* (L) Dunal.

INTRODUCTION:

Withania somnifera (L) Dunal member of Solanaceae family popularly known as Ashwagandha. Indian winter cherry has been used in Ayurveda, Indian system of traditional medicine. It is a small evergreen shrub that grows to roughly four to five feet tall (Singh et al., 2001; Khare, 2007; Forman & Kerna, 2018). The species name *somnifera* means 'sleep-inducing' in Latin, indicating that to it are attributed sedating properties, but it has been also

used for sexual vitality and as an adaptogen (Langade et al., 2019). Ethno-medicinally, decoction of the roots is used for colds and chills and to increase the tone of uterus after miscarriage. An infusion of the root bark has been used for asthma; a use also common to traditional herbal practices in India. In Ayurvedic medicine, its root is used as an anti-inflammatory drug for swellings, tumors, scrofula and rheumatism and as a sedative and hypnotic in anxiety neurosis. Leaf possesses anti-inflammatory,



E-ISSN: 2278-4136

P-ISSN: 2349-8234

www.phytojournal.com

JPP 2022; 11(3): 283-292

Received: 05-04-2022

Accepted: 13-05-2022

Suresh G Sabale

Department of Botany, Loknete
Vyankatrao Hiray Arts, Science
and Commerce College,
Panchavati, Nashik,
Maharashtra, India

Balasaheb S Kale

Department of Botany, Loknete
Vyankatrao Hiray Arts, Science
and Commerce College,
Panchavati, Nashik,
Maharashtra, India

In vitro antimicrobial activity of *Fagonia schweinfurthii* Hadidi from Northern Western Ghats, India

Suresh G Sabale and Balasaheb S Kale

Abstract

To assess the phytochemical analysis and antimicrobial activities of *F. schweinfurthii* plant were examined against five different gram positive and gram negative bacteria. Traditionally, *Fagonia* has been used to cure diseases such as skin eruptions, heal sores, skin diseases, anti-pyretic, pain relief, ear infection and venereal diseases. The distilled water, methanol, benzene, chloroform, pet ether & toluene extracts of *F. schweinfurthii* investigated individually for antimicrobial activity (antibacterial activity) by agar well diffusion method. These were investigated against selected bacterial species strains of *Escherichia coli*, *Klebsiella pneumonia*, *Bacillus subtilis*, *Staphylococcus aureus* and *Proteus vulgaris* to find the inhibitory activities of the microbes. The methanol extract of *F. schweinfurthii* stem & root showed considerably high activity against *K. pneumonia* and *E. coli* than other extracts.

Keywords: *F. schweinfurthii*, medicinal plant, phytochemistry, antimicrobial zone of inhibition

Introduction

Human ancient history says that humans use a plant for a medicinal purpose. Beginning of human civilization, people have been used whole plant or their particular parts like leaves, stems, fruit, flower, seed, and root used as medicine (Mahmood *et al.*, 2005) [15]. Several plant species have been identified and being used as medicine since ancient history. The major medicinal systems, such as Ayurveda, Siddha, Unani, and Folk (tribal) are being used in India as well as in World (Khare, 2007; Kunwar & Bussmann, 2008) [10, 13]. Around 500 plants, their medicinal uses are recorded in ancient texts, and around 800 medicinal plants used in indigenous systems of medicine (Nayanabhirama, 2016) [18]. Various tribes use these plants for ethnomedicinal purposes (Kumar *et al.*, 2013) [12]. Plants have been used as medicine, food, etc. since ancient times. Tribal people developed their own traditional knowledge using medicinal plants; these are the national treasure and cultural heritage of our nation. In India about 54 million indigenous tribal people of ethnic communities. These indigenous people have won traditional knowledge about herbal medicines and folk medicines to cure various diseases (Khyade *et al.*, 2011; Sony *et al.*, 2017) [11, 26]. In the recent era, medicinal plants more focused because they are useful for society to cure various diseases. In medicinal plants presence of secondary metabolites such as alkaloids, glycosides, volatile oil, saponin, tannin, etc. These valuable secondary metabolites used to therapeutics activities such as antibacterial, antifungal, and antioxidant (Najafi & Deokule, 2010; Doctor & Manuel, 2014; Ganorkar & Malpe, 2019) [17, 2, 4]. In the world, 35000 to 70000 estimated plant species are used for medicinal purposes (Hashim *et al.*, 2014) [5].

The Western Ghats (including Sri Lanka) is one of the biodiversity hotspots in India. The Northern Western Ghats hotspot is also known as the 'Sahyadri range' (Myers *et al.*, 2000) [16]. The region of Western Ghats consist a rich medicinal recourse, and these medicinal plant sources will be used for pharmacognostic and bioprospecting study. Medicinal flora of Western Ghats is quite rich and its carry more than 62.8% are endemic and medicinally significant. Due to its unique biodiversity, it is one of the important areas with very high value considering bioprospecting of the plant (Rao, 2002) [20]. The Western Ghats distribute unique 700 medicinal plants, they are used in traditional and folk medicinal practices (Katole *et al.*, 2018) [8]. In the Western Ghats, Selected ethnomedicinal plant use tribal people as deferent therapeutic propose. By using the hidden, unexplored, valuable knowledge of the tribal people for new drug discovery (Kumar *et al.*, 2013) [12]. *Fagonia* belongs to the family Zygophyllaceae having 25 Genera's and about 285 species, which are distributed in mainly deserts and dry arid regions of the world (El-Aal *et al.*, 2019) [3]. Traditionally, *Fagonia* has been used to cure a diseases such as skin eruptions, in heal sores, skin diseases, anti-pyretic, in

Corresponding Author:**Balasaheb S Kale**

Department of Botany, Loknete
Vyankatrao Hiray Arts, Science
and Commerce College,
Panchavati, Nashik,
Maharashtra, India

Dyes from plants: North east region from Nashik district, Maharashtra

AN Wagh N B¹, Pawar P S Patil², S I Ansari²

¹ Research Centre in Botany, L.V.H College, Panchavati, Nashik, Maharashtra, India

² M.S.G College, Malegaon, Maharashtra, India

Abstract

Total 26 plant species belonging to 18 families discussed in this article. Out of 26 plants 7 herbs, 9 shrubs, 3 climbers and 7 trees are documented which are used by the tribals of the region for festivals, ceremonies and cultural practices. The dyes and colours are used at the time of festivals like Holi, Rangpanchami, Nagpanchami, Navratri, Dussera, Diwali, etc. which are surviving our traditional heritage. The tribals also using these dyes for painting their homes, clothes, wooden furniture, and utensils.

Keywords: festivals, holi, tribal

Introduction

The plants are the ultimate source of each and every thing of human being. Man is totally depending on plants from the ancient days. The role of plant in everyday life is vital. When the human civilization began that time man was only in search of food and he got the methods of cultivation and utilization. As days passed, needs grown and human tried to use the plants for different purposes. When human lived in society he started the celebrations, festivals, ceremonies in the name of the God and Goddess. They made the calendar as per their culture, tradition and religion. When humans came to know regarding the colorful roots, stems, leaves, flowers, fruits, seeds etc. he developed colours for paints on doors, cloths and for few other purposes. When he started to celebrate festivals he made colours by using plants with different plant parts. Currently the tribals are using the methods of colour making for Holi, Rangpanchami, Nagpanchami, Navratri, Dussera, Diwali, etc. and survive our traditional heritage. The tribals also using these dyes for

painting their homes, clothes, wooden furniture, and utensils.

Colours are thrown at the time of Holi and Rangpanchami. Now they are using for cosmetics, drugs, food products. They sold the products too. The organic colours they are using are eco-friendly and healthy with low cost and easy to made at home.

Methodology

The information regarding the dye yielding plants is gathered from the tribals of the region. Their festivals were joined and tried to understand their traditional importance, purpose and methodology. The plants and their parts were documented with preparation methodology. The plants were identified by using Flora of Nashik district by P. Lakshminarasimhan and B. D. Sharma. The plants are arranged according to alphabetically.

Table: Dye yielding plants

Table 1

Sr. No.	Name of the plant	Habit	Plant Part Used	Uses with preparation methodology
1	<i>Acacia catechu</i> (L.f.) Willd. Family – Mimosaceae	Tree	Wood, Bark	1. The wood is soaked overnight in water, boiled on Chulha and the Red extract is used as Katha for pan. 2. The extract is used for painting on door and clothes.
2	<i>Basella alba</i> L. Family – Basellaceae	Climber	Fruits	1. The seeds are soak in water, crushed and used as dye and colour for painting. 2. Colour used in foods.
3	<i>Bixa orellana</i> Linn. Family - Bixaceae	Shrub	Seeds	1. Seeds are very rich in orange colour. The seeds are crushed in water and used as dye for colouration of clothes, homes and utensils. 2. Colour used for Holi and Rangpanchami festival. 3. Paintings are sketch on walls at the time of Nagpanchami, Dussera and Diwali. 3. Colour applied on musical instruments.
4	<i>Bombax ceiba</i> L. Family – Malvaceae	Tree	Flowers	1. The flowers kept overnight in water, boiled and the extract used for decorative purpose of utensils, wall painting, clothing and art and crafts.
5	<i>Butea monosperma</i> (Lam.) Kuntze. Family – Fabaceae	Tree	Flowers	1. The flowers crushed and kept in water for few hours. Colour use for Holi and Rangpanchami. 2. Colour added in food preservatives.
6	<i>Bougainvillea glabra</i> Choisy Family – Nyctagenaceae	Shrub	Flowers	1. The flowers are crushed and soak in lukewarm water and used as colour for Holi, Rangpanchami and to paint utensils as decorative purposes.
7	<i>Calatropis procera</i> (Aiton) W.T.Aiton Family – Apocynaceae	Shrub	Latex	1. Latex is used for wall paintings at the time of Nagpanchmi.

Medicinal plants used against Covid-19 (SARS-CoV-2) disease by Tribal's of North East Region from Nashik District, Maharashtra

Atul N Wagh, Nandu B Pawar

Research Centre in Botany, Loknete Vyankarao Hiray Arts, Science and Commerce College, Panchavati, Nashik, Maharashtra, India

Abstract

The infectious disease like covid – 19 (SARS-CoV-2) is not perfectly treated with actual medicines so the tribals and village peoples using different plants with their own formulations to stop and reduced the infection. At primary level these herbal medicines are perfectly working. The decoction, juice, infusion, poultice is administered by the tribals. This home remedies boost immune power, release cough, reduces fever, stops sneezing and coughing and improves oxygen level in blood. Total 21 species belonging to 19 genera and 12 families of the region are truly helpful to them. Few plants do not grow in the region but their products are available in the market.

Keywords: administered, covid, bhasma, kadha, poultice

Introduction

The human beings using the plants for food, medicine, shelter and other purposes since time immemorial. Initially the plants were only used for food but after getting illness they were trying to used this plants through various ways on trial and error basis to treat the diseases. When civilization began from that time Vaidu, Bhagat, Medicine man, Elderly village people started the practices against various diseases. The root, stem, leaves, Bark, flowers, fruits, seeds, latex, gum, resin etc, were used in different forms. Bhasma (Dry ash), Kadha (Decoction), Powder, Poultice, Infusion, Oil were given to treat diseases on the basis of symptoms of the person. The tribal peoples treat the diseases at home with their traditional knowledge. But the disease like Covid – 19 (SARS-CoV-2) is almost new to the whole world and nobody knows the actual treatment to overcome the pandemic.

On the basis of symptoms like fever, cough, sneezing, dysentery, taste and smell loss, omitting, the tribals of the region started their practices on the basis of their experienced to overcome the disease. They got 90 percent success by using these plants. Generally Kadha (Decoction) is helpful to reduce the throat and chest Infection in early days.

Methodology

The data presented in this work is based on the information obtained from the Vaidu, Bhagat, Elderly Village man, Grandma's and tribal's of the region. Interviews were taken for gathering truthful information on uses of medicinal plants. The plants are arranged in families according to alphabetical manner.

List of plants with administration method

Table 1

Sr. No.	Name of the Plant	Local Name	Family	Plant Part used	Administration method
1	<i>Allium cepa</i> L.	Kanda	Amaryllidaceae	Bulbs, Juice	A cup of onion juice along with pinch salt is given twice or thrice a day for 6-7 days.
2	<i>Allium sativum</i> L.	Lasun	Amaryllidaceae	Bulbs, Juice	A liter of water is kept on fire for 10-15 min. in which 5-6 bulbs are added along with black salt and given to inhaled steam.
3	<i>Aloe vera</i> (L.) Burm.f.	Korpad	Liliaceae	Pulp, Juice	A tablespoon pulp or juice is given in empty stomach for 14 days in the morning and 14 days in the night at the time of sleeping.
4	<i>Azadiracta indica</i> A. Juss.	Nimb	Meliaceae	Leaves	The juice is extracted from leaves and given to drink for 4-5 days early in the infection. Leaves are given to chew for 10 days.
5	<i>Cinnamomum tamala</i> (Buch.-Ham.) Nees & Eberm.	Tejpan	Lauraceae	Leaves	For 4 persons a liter of water is taken in which single leaf is taken for decoction along with Zingiber, Turmeric, Lavang, Tulasi and Miri. 15 -20 gram jaggery is added and reduced the water to ¼. The decoction is given to drink thrice a day for 5 days or if somebody came in the contact of infected person.
6	<i>Citrus limon</i> (L.) Burm.)	Nimbu	Rutaceae	Fruits, Leaves	A glass of water is taken along with sugar or jaggery and 1-2 fruits juice is mixed and stirred and given twice a day to any age group.
7	<i>Citrus limetta</i> (Burm.) Merr.	Santra	Rutaceae	Fruits, Fruit Bark	Dried bark of Santra fruit is made into powder form and taken 1 tablespoon along with 1 tablespoon of Aawala powder and mixed in a glass of lukewarm water and kept overnight and taken whole glass for adults and half to children's early in the morning in empty stomach which increases immune power.
8	<i>Curcuma longa</i> L.	Halad	Zingiberaceae	Rhizome	Pinch of powder is added in lukewarm milk and taken twice day to stop and reduced the infection.



RESEARCH ARTICLE

Ethnobotanical Studies of North–East Region from Nashik District (Maharashtra, India)

¹Wagh A. N. & N. B. Pawar

¹Post Graduate Department of Botany, L. V. H. College, Panchavati, Nashik.

*Corresponding Author: atulwagh62@gmail.com

Manuscript Details

Manuscript Submitted : 09/01/2021
Manuscript Revised : 12/02/2021
Manuscript Accepted : 20/03/2021
Manuscript Published : 22/03/2021

Available On

<https://plantaescientia.com/ojs>

Cite This Article As

Wagh A N & N B Pawar, (2021).
Ethnobotanical studies of north-east region
from Nashik District (Maharashtra, India).
Pla. Sci. 2021; Vol. 04 Iss. 02:125-129.

Copyright



© The Author(s). 2020. Open Access
This article is distributed under the terms
of the Creative Commons Attribution
4.0 International License
<http://creativecommons.org/licenses/by/4.0/>

Indexed In

[CrossRef](#), [Scientific Indexing Services \(SIS\)](#), [Google Scholar](#), [Index Copernicus International \(ICI\)](#), [Directory of Research Journal Indexing \(DRJI\)](#), [CiteFactor](#), [Scientific Journal Impact Factor \(SJIF\)](#), [General Impact Factor](#), [Journal Factor](#), [Cosmos Impact Factor](#), [PKP Index](#), [AJIFACTOR Indexing](#), etc.

ABSTRACT

The present paper deals with 41 ethnobotanical plants with their common names belonging to 18 families from North-East region of Nashik district. The plants were used by local people for food, fodder, medicine, religious ceremonies. The information was gathered from Vaidu, Bhagat, Local peoples, Shepherds. The families like Fabaceae, Euphorbiaceae, Apocynaceae, Combretaceae, Apiaceae, Pteridaceae are dominant families for use as ethnobotanical species.

Keywords: Ethnobotanical Studies, Religious, Vaidu, Bhagat, Nashik

INTRODUCTION

The North –East Region from Nashik District covers three talukas (Satana, Malegaon and Nandgaon) which are very diverse in climate, rainfall, temperature, vegetation and in ecology. The Satana tehsil has good amount of rainfall and rich in vegetation which is bounded on the north by Pimpalner on the east Malegaon, on the south by Kalwan and on the west by Gujrat state. The climate of Nandgaon taluka is dry as compared to Satana and Malegaon. The vegetation is dry deciduous and mixed type, scrub forest is also observed.

Ethnobotany is the study of plants where plants can be used by the peoples of a particular region for food, fodder, medicine, timber, socio-economic, religious, art and craft purposes, agriculture implements and so on. The used of plants by human beings in daily life is since time immemorial. The tribal and local peoples specially Vaidu, Bhagat, Medicine men used these plants as remedy in the form of Decoction, Bhasma, Infusion, Poultice in number of ways to cure different diseases of human beings and their pet animals. Sometimes the plants and their parts are collected on special days such as on *Amavasya*, *Purnima*, *Nakshtra*.

Solving fuzzy Caputo- Fabrizio Fractional one dimensional Heat equations by Iterative Fuzzy Laplace Transform method using MATHEMATICA

Kishor A. Kshirsagar^{1*}, Vasant R. Nikam², Shrikisan B. Gaikwad³ and Shivaji A. Tarate⁴

^{1,3,4}Department of Mathematics, New Arts Commerce and Science Autonomous College, Ahmednagar, Maharashtra, India

² Department of Mathematics, Loknete Vyankatrao Hiray Arts Science and Commerce College, Nashik, Maharashtra, India

Abstract- In this work, we present the Caputo-Fabrizio Iterative Fuzzy Laplace Transform (CFIFLT) method. Using the CFIFLT method, we solve the fuzzy fractional one-dimensional heat equations numerically. The numerical solution of the examples is computed using MATHEMATICA software and shown graphically. The CFIFLT method demonstrates which mathematical tool is best for solving fuzzy fractional differential equations and is the most powerful.

Keywords- Caputo-Fabrizio fractional derivative, fuzzy Laplace transform, Iterative method, fuzzy fractional differential equations.

2010 AMS Subject Classification- 03E72, 44A10, 35R11, 26A33

I. Introduction

The field of fractional calculus has gotten a lot of interest from researchers last twenty years. Due to the multiple applications and realistic outcomes of large number of real-world biological and physical problems. As a result, this field has attract a lot of research articles, books, monographs and other resources have been written about it in various ways [11, 15, 17, 18, 23]. Qualitative theory and numerical analysis have been investigated so far for arbitrarily order differential equations. There are multiple research articles and books available in this area. Other uses and investigations of differential equations can be seen in [2, 3, 16, 20, 21]. Many fields of pure and applied mathematics may benefit from fractional calculus.

The fuzzy set[30] also appears to be the proper tool for modeling the uncertainty highlighted via impreciseness and ambiguity. We apply it to disciplines wherein facts comprise ambiguity, which includes economic, social, environmental, medical, and physical sciences[9, 10, 13, 14]. In the last some decades, integral equations and fuzzy differential have attracted a lot of attention from researchers in the physical sciences. The main concept of fuzzy integral equations was first introduced by Dobius and Prade[8]. Heat transfer equations can be used to derive the differential equation for the preceding physical scenario, which we investigate in this work under uncertainty[23]. In the past, semi-analytical study for the solution of fuzzy Fractional DEs, as well as essential methodologies and schemes, were introduced. The standard integral transforms of Laplace, Sumudu, Natural, Fourier, Z and others [1, 26, 27, 29] are among them. The homotopy and enhanced homotopy technique[5, 28], Adomian polynomial coupled with Adomian decomposition and Laplace Adomian decomposition methods[23, 26]. Series approach likes Taylor's series have been utilised to solve such issues[24]. Jafari and Daftardar-Gejji introduced the iterative method to solve numerically nonlinear functional equations in 2006[7]. Jafari et al. originally used the ILTM[12] to evaluate fractional differential equations. For the given one-dimensional heat equation[19], we computed a approximate solution utilising a mix of iterative method and fuzzy Laplace Transform[4] under the Fuzzy Caputo-Fabrizio derivative concept as follows.

$${}^{CF}\mathcal{D}_t^\omega \tilde{I}(\Omega, t) = \mathcal{D}_\Omega^2 \tilde{I}(\Omega, t) + \tilde{I}(\Omega, t) + \tilde{k}(\alpha) \tilde{\mathcal{F}}(\Omega, t), \quad 0 < \omega \leq 1 \quad (1)$$

$$\tilde{I}(\Omega, 0) = \tilde{k}(\alpha) \tilde{\Lambda}(\Omega)$$

where, ${}^{CF}\mathcal{D}_t^\omega$ denotes the Fuzzy Caputo-Fabrizio Fractional Derivative while $\tilde{\mathcal{F}} \in \mathcal{C}(\mathbb{R}^2, \mathbb{R})$, $\tilde{k}(\alpha)$ parametric form of fuzzy number and $\tilde{\Lambda}(\Omega) \in \mathbb{R}^2$. In general, the Fuzzy BVP's of the one-dimensional fractional heat equation will be used to explain the transmission of temperature in a thin

THE DOUBLE FUZZY ELZAKI TRANSFORM FOR SOLVING FUZZY PARTIAL DIFFERENTIAL EQUATIONS

KISHOR A. KSHIRSAGAR*, VASANT R. NIKAM**, SHRIKISAN B.
GAIKWAD***, AND SHIVAJI A. TARATE****

ABSTRACT. The Elzaki Transform method is fuzzified to fuzzy Elzaki Transform by Rehab Ali Khudair. In this article, we propose a Double fuzzy Elzaki transform (DFET) method to solving fuzzy partial differential equations (FPDEs) and we prove some properties and theorems of DFET, fundamental results of DFET for fuzzy partial derivatives of the n^{th} order, construct the Procedure to find the solution of FPDEs by DFET, provide duality relation of Double Fuzzy Laplace Transform (DFLT) and Double Fuzzy Sumudu Transform (DFST) with proposed Transform. Also we solve the Fuzzy Poisson's equation and fuzzy Telegraph equation to show the DFET method is a powerful mathematical tool for solving FPDEs analytically.

1. Introduction

Fuzzy integral, differential, and integro-differential equations have gotten a lot of attention in recent years. There are important role of the fuzzy theory and play significant act in numerical analysis. Freshly, some fuzzy researchers have examined analytical and numerical solutions to FDEs[1, 2, 3, 4, 5, 6, 7]. Zadeh[8] introduce the theory of fuzzy numbers, fuzzy sets and arithmetical operations. Seikkala[9] defined the concept of fuzzified derivatives, Buckley proposed the main concept of FPDEs in [10]. Many authors have investigated FPDEs[1, 9, 11, 12]. Integral transforms are extremely advantageous for solving partial differential

Received October 08, 2021; Accepted April 20, 2022.

2010 Mathematics Subject Classification: Primary 94D05, 35R13; Secondary 35A22.

Key words and phrases: Fuzzy Laplace Transform, Double fuzzy Elzaki Transform, Fuzzy partial differential equations.

*Correspondence should be addressed to kishorkshirsagar@newartsdcs.ac.in.

A New Algebraic method for the initial basic feasible solution of a Transportation Problem and comparison with Least Cost Method

¹S. D. Manjarekar, ²A. P. Bhadane

^{1,2}L. V. H. Arts, Science and Commerce College, Nashik – 422003, Maharashtra (India)

Abstract:

In this paper, we have developed a new method through algebraic approach for finding out the initial basic feasible solution and compare it with Least Cost Method / minimum cell cost method and shown that the new algebraic method is best as compare to least cost method.

Keywords: Transportation Problem, Field, Prime Number

AMS Subject Classification (2010): 90B06, 05C25, 11A41

1. Introduction:

Though the theory of transportation problems generally evolved during the world war – II but one can think of its roots right from the 400 B. C. or from 3500 B. C. when wheel was invented in the middle east of Asia.

The transportation problem generally considered as a problems of multi – objective (like minimum cost and shortest path) combinatorial approach on the other hand as we know that the transportation problem were first proposed by Hitchcock in 1941.

The standard transportation problems [4] mainly North– West Corner Method (NWCM), Least Cost Method (LCM) and Vogel's Approximation Method having important application in the area of physical distribution i. e. transportation of goods and services from several supply centers to several demand centers.

As we know that, there are some transformations like logarithm which converts multiplication and divisions of large numbers into small scale addition and subtractions respectively. In the similar manner.

We know that Z_n is a commutative ring[3] which becomes a field if and only if n is a prime number. A prime of the form $n = 4K + 1$ can be written as sum of two perfect squares. It is interesting to convert the transportation problem over the field Z_p where ' p ' is of the form $4K + 1$.

The paper mainly consist of three parts. In first part algorithm for proposed method were given. In the second part, alternative method alongwith numerical example were explained. In the third part, we have compared the result with least cost method along with conclusion.

Prevalence and Histopathological Studies on Intestinal Cestode Parasite of Avian Host *Gallus Domesticus* (L) From Nashik Region, Maharashtra State, India

Sunil D. Patil¹, Komal Jagzap²

^{1, 2}Research Centre and P. G. Department of Zoology, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College, Panchavati, Nashik, MS, 422003

Abstract: The lowest infection is recorded in rainy season and highest in summer season, may be due to life cycle stages and intermediate host availability increases in winter and became adult in definitive host in summer. No nematode and trematode parasite were considered and identified during the study period. Cysts were found deep in submucosa, although touches to serosa. The non-penetrative type of worms is *Cotugnia* sp. and *Thaparea* sp.; while the penetrative type of worm is *Raillietina* sp. and *Paruterina* sp. Free gravid segments mostly found in the posterior region of intestine while mature segments are freely suspended from scoleces in the lumen of intestine, only scoleces are attached, either superficially (non-penetrative type) or deep in submucosa (Penetrative type).

Keywords: Cestode, histopathology, prevalence, hold-fast organs, Penetrative scolex

I. ACKNOWLEDGEMENTS

Authors like to express gratitude to Dr. B. S. Jagdale Principal, Mahatma Gandhi Vidyamandir's L.V.H. College, Panchavati Nashik for allowing to work at Research Centre in Zoology and constant encouragement. Also like to thank Prof. Resham Bhalla for kind guidance and cooperation as well as constant help during this work.

II. INTRODUCTION

One of the constrain to farmer's economy is parasitic infections, reducing growth and reproduction of domestic livestock. Mainly the uncontrolled free feeder animals suffer from cestode infection. The GI tract cestode infection is reported by many workers [1]-[4]. Histopathological studies on intestine of *Gallus domesticus* infected with cestode parasites carried out by many workers [1],[5]-[7]; shows that the cestode parasites present in the intestine of the gut region shows the hold-fast organs of attachment in the form of suckers, rostellum, spines, hooks, tentacles etc which destroy the intestinal villi, if numerous may blocks the intestine and interferes with passing of food, resulting in malnutrition of the bird [4]. But till it is necessary to carry out histopathological in relation with their prevalence other parts of country in find out their infections and to follow appropriate control measures. Hence, this work is undertaken to find out the prevalence of gastrointestinal cestode infections and their impact on structure of GI tract in desi fowl *Gallus domesticus* in Nashik district of Maharashtra for 2 years.

III. MATERIAL AND METHODS

Viscera of *Gallus domesticus* collected from slaughterhouses of Nasik region, 10 birds were examined per month. Sum of 240 intestines thoroughly examined and observed to see the degree of infection by cestode parasites only, for the 2 years 2019-20 and 2020-21. The worms which were free in lumen were spread and fixed in 4% formal aldehyde. Stain with Harris haematoxylin and dehydrated, mounted, and identified. The worms which were attached to intestine were kept intact and small pieces of infected and non-infected intestines were fixed in Bouin's fluid fixatives, wash with water. They were dehydrated through graded alcohol, cleared in xylene, and embedded in paraffin wax (M.P. 58-60°C). The transverse and longitudinal sections were cut at 7µ and stained with Harris haematoxylin and eosin as counter stain. Slides were selected and observed under microscope for further studies and conclusions. Month wise record of number of cestode parasites and birds examined are kept for further conclusions.

The World War against “COVID-19”

Anita P. Patil

Department of Zoology, Lokenete Vyankatrao Hiray Art's, Science & Commerce College, Panchavati, Nashik, India

ABSTRACT

India, which has the second-largest population in the world is suffering severely from COVID-19 disease. By May 18th, India investigated ~1 lakh (0.1million) infected cases from COVID-19, and as of 11th July the cases equaled 8 lakhs. Social distancing and lockdown rules were employed in India, which however had an additional impact on the economy, human living, and environment. Where a negative impact was observed for the economy and human life, the environment got a positive one. How India dealt and can potentially deal with these three factors during and post COVID-19 situation has been discussed here.

KEYWORDS: India, COVID-19, Economy, Environment, Human life, Lock down, Social distance.

INTRODUCTION

COVID-19 is the disease caused by a new coronavirus called SARS-cov-2. WHO first learned of this new virus on 31 December 2019, following a report of a cluster of cases of ‘Viral Pneumonia’ in Wuhan, People's Republic of China? Coronaviruses (cov) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-cov) and Severe Acute Respiratory Syndrome (SARS-cov). A Novel Coronavirus (ncov) is a new strain that has not been previously identified in humans. Coronaviruses are zoonotic, meaning they are transmitted between animals and people. Detailed investigations found that SARS-cov was transmitted from civet cats to humans and MERS-cov from dromedary camels to humans. Several known coronaviruses are circulating in animals that have not yet infected humans. Common signs of infection include respiratory symptoms, fever and cough, shortness of breath and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death.

Standard recommendations to prevent infection spread include regular hand washing, covering mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs. Avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing. As the journal Nature reported in 1968, “these viruses are members of a previously unrecognized group which [the virologists] suggest should be called the coronaviruses, to recall the characteristic appearance by which these viruses are identified in the electron microscope.”

The word “corona” has many different meanings. But it was the sun that the virologists had in mind when they chose the name coronaviruses. As they wrote, they compared “the characteristic ‘fringe’ of projections” on the outside of the virus with the solar corona

Structure: Coronaviruses are a group of related RNA viruses that cause diseases in mammals and birds. In humans and birds, they cause respiratory tract infections that can range from mild to lethal. Mild illnesses in humans include some cases of the common cold (which is also caused by other viruses, predominantly rhinoviruses), while more lethal varieties can cause SARS, MERS, and COVID-19. In cows and pigs they cause diarrhea, while in mice they cause hepatitis and encephalomyelitis. Coronaviruses are large, roughly spherical particles with unique surface projections. Their size is highly variable with average diameters of 80 to 120 nm. Extreme sizes are known from 50 to 200 nm in diameter. The total molecular mass is on average 40,000 kDa. They are enclosed in an envelope embedded with a number of protein molecules. The lipid bilayer envelope, membrane proteins, and nucleocapsid protect the virus when it is outside the host cell.

Influence of Annealing on Physical, Physiological and Electric Properties of Mono Nickel oxide Thick Films Prepared by using Screen-Printing Technique

Ujwala M. Pagar^{*1}, U.P. Shinde²

^{1*} Department of Physics HPT Arts and RYK Science College, Nashik, India; e-mail : ujwalapagar7@gmail.com

² Department of Electronics L.V.H. Arts, Sci. and Com. College, Panchavati, Nashik, Maharashtra, India

ABSTRACT

To study changes in physical, physiological and electrical properties of AR grade Nickel monoxide (NiO), thick films of NiO were fabricated on a glass substrate and annealed at 250 °C - 400 °C. Using characterization techniques, such as XRD, SEM-EDS and static gas sensing system, the structure of the film was found to be polycrystalline with a cubic structure and chemical composition study confirmed its non- stoichiometric nature. Half bridge method is used for measurement of D.C. resistance of thick films in air atmosphere at 30 °C to 350 °C. The prepared thick films of NiO nanoparticles were analysed for electrical properties and it ascertained that they are semiconducting in nature. The TCR, activation energy as well as film resistivity were measured at selected annealing temperatures. The D.C electrical conductivity results obtained from electrical properties at room temperature is $0.086 \times 10^{-4} (\Omega m)^{-1}$. The crystallite size changes from 8.20 nm to 8.54 nm for strong predominant orientation (200) with increase in annealing temperature. Study of correlation between annealing temperature and electrical resistivity showed that there is decrease in resistance with increase in temperature.

Keywords: XRD, TCR, Nickel Oxide thick films, D.C electrical conductivity, activation energy.

SAMRIDDHI : A Journal of Physical Sciences, Engineering and Technology, (2022); DOI : 10.18090/samriddhi.v14spli01.31

INTRODUCTION

In current era, nanocrystalline transition metal oxides (TMO) have attracted extensive interest because of their various different potential applications. Out of these, the most attractive material is nickel oxide (NiO). NiO is formed of nickel metal and nonmetal oxygen. It has a cubic structure with crystal lattice constant ($a = 0.04816$ A.U.) [1]-[4] and it is the most widely used because of its chemical stability. The most chemically stable metal oxide that is NiO due to its low cost is found to have wide applications in various fields namely as a catalyst, TCO, photodetectors, electrochromic, a gas sensor, photovoltaic devices, electrochemical supercapacitors, photo- solar cells and many opto- electronic devices [5]-[7]. As one of the components NiO was used in the Nickel-Iron (Ni-Fe) battery (Edison Battery), and fuel cells also.

Corresponding Author : Ujwala M. Pagar, Department of Physics HPT Arts and RYK Science College, Nashik, India; e-mail : ujwalapagar7@gmail.com

How to cite this article : Pagar, U.M., Shinde, U.P. (2022). Influence of Annealing on Physical, Physiological and Electric Properties of Mono Nickel oxide Thick Films Prepared by using Screen-Printing Technique.

SAMRIDDHI : A Journal of Physical Sciences, Engineering and Technology, Volume 14, Special Issue (1), 200-206.

Source of support : Nil

Conflict of interest : None

Greater surface area-to-volume ratios, high dispersion rates, less porosity, large photo-absorption, and little heat capacities were NiO nanoparticles characteristics. Out of these, unique characteristics of NiO nanoparticles which make it feasible and cost-



Investigation of structural and optical properties of graphene derivatives as a route for optical sensing

Anil B. Patil^{a,*}, Umesh J. Tupe^b, Dharma K. Halwar^c, Vikas V. Deshmane^d, Arun V. Patil^e

^a Department of Electronic Science and Research Center, L.V.H College, Nashik, Dist.-Nashik (M.S.), India

^b Department of Electronics, Panchavati College of Management & Computer Science, Nashik (M.S.), India

^c Department of Electronic Science, MSG College, Malegaon Camp Dist., Nashik (M.S.), India

^d Department of Physics, SICES Degree College, Ambarnath, Dist. Thane, India

^e Arts, Science and Commerce College, Manmad Dist., Nashik (M.S.), India

ARTICLE INFO

Article history:

Available online 17 October 2022

Keywords:

Reduced Graphene Oxide (rGO)

FTIR

UV Spectra

XRD

SEM

ABSTRACT

In the present research work, thick films of graphene oxide (GO) and reduced graphene oxide (rGO) were fabricated on glass substrate by using standard screen-printing technique. Silver paste was used to make contacts of thick films. Fabricated thick films of GO and rGO were characterized by scanning electron microscopy (SEM), elemental data analysis (EDS), and X-ray diffraction (XRD) to make sure the morphological, elemental and structural characteristics of the thick films. Optical characteristics of the fabricated thick films were carried out by UV Spectra, Raman spectroscopy and Fourier Transform Infrared Spectroscopy (FTIR). In addition, the optical studies were performed by homemade system to investigate the effect incident light intensity with different colour (Blue, Yellow, and Green) filters on GO and rGO sensing. XRD and EDS confirms the materials were GO and rGO. The findings revealed that reduced graphene oxide has a high light absorption capacity to consider as an optical sensor.

Copyright © 2022. Elsevier Ltd. All rights reserved.

Selection and peer-review under responsibility of the scientific committee of the Integrative Nanotechnology Perspective for Multidisciplinary Applications - 2022.

1. Introduction

Graphene is now widely emerged as a potential material for a wide range of applications, including transparent electronics products, which are the subject of much research. Because of their distinct physiochemical properties, graphene oxide (GO) and reduced graphene oxide (rGO) nanomaterials have attracted a lot of research attention. It can be used in a number of biological fields due to its 2D allotropic structure [1]. The distribution of graphene layers in the polymer matrix and the interfacial bonding between the graphene layers and polymer matrix determine the physical and chemical properties of graphene-based polymer nanocomposite. However, since graphene is incompatible with organic polymers, it does not form homogeneous composites. Graphene oxide (GO) sheets, on the other hand, are compatible with organic polymers since they are highly oxygenated graphene [2]. As a result, GO is commonly used in polymer nanocomposites as a nanofiller. Graphene oxide is electrically insulating and therefore cannot be used

to make conductive nanocomposites. However, graphene produced by thermal or chemical reduction of GO (i.e., the removal of oxygen) can produce large quantities of rGO platelets with low sheet resistance, making rGO behave as a semiconductor with electrical conductivity of ~ 1000 S/m. This makes it suitable for antistatic coatings and semi-transparent electric circuits, among other applications [3]. rGO is intended to be used in energy storage supercapacitors, Li-ion battery electrodes, and solar cell transparent electrodes [4,5].

Modification of the electronic structure to form islands of pristine graphene, or graphene quantum dots, within the GO sheet affects the tuning of electronic and optical properties. The energy gap reduces as the number of O adatoms removed or the dot diameter grows, allowing for tuning across the UV, visible, and IR light spectrums. In contrast to completely oxidised graphene has insulating properties. rGO has both insulating and conducting properties depending on the percentage of oxygen remaining on the graphene layer. Nanometric sp^2 graphitic islands separated by oxidised graphene regions are commonly used to define the structure of rGO [6,7]. First principles and statistical calculations have

* Corresponding author.

E-mail address: anilbpatil1@gmail.com (A.B. Patil).

Received: 5th January 2022

Revised: 19th January 2022

Accepted: 10th February 2022

INFRARED SENSOR FOR MEASUREMENT OF FORWARD TRAVEL SPEED

MRS SEEMA V. AWARE AND DR. U.P. SHINDE

INTRODUCTION

The basic concept of an Infrared Sensor which is used for speed measurement is to transmit an infrared signal, this infrared signal bounces from the surface of an object and the signal is received at the infrared receiver. Here it was used for determination of forward travel speed of the vehicle on which sprayer is mounted. It was placed at the ground wheel of the trolley. IR sensor through arduino microcontroller is programmed for the velocity measurement. The number of obstruction per 2 s sensed by Infrared sensor was calculated with the developed algorithm and the forward speed was commuted using the standard formula. Hussain (1993) developed experimental infrared optical system to detect and monitor vehicular road traffic. The system used was developed and first tested in the laboratory using infrared laser sources and detectors in conjunction with computerized signal processing and correlation techniques. Preliminary road tests confirmed the system's capability to detect, monitor, and count the passage of vehicular road traffic. Mohammad, 2009 studied ultrasonic and IR sensor for distance measurement and found that Ultrasonic sensor has slightly higher resolution than that of the IR sensor, for small distance measurement and suggested that more care should be taken when placing the objects from the sensors during acquiring data since the small change in angle could show very different distance than the actual one. Rana et al. (2016) estimated the gait velocity with passive IR sensor with an average error of <2.5 cm/s. Singh et al (2020), used the IR-sensor based technology for traffic data collection under mixed

vehicular traffic conditions on Indian highways and found that an infrared sensor was one of the promising and robust techniques for collecting traffic data on highways due to the non-intrusive nature of the IR sensor-based devices. In their study they used a traffic detector device based on IR sensors, named Transportable InfraRed Traffic Logger (TIRTL) and generated a large amount of accurate speed and headway data on Indian highways that exhibited heterogeneity in its traffic composition.

METHODOLOGY

The infrared sensor (E18-D80NK Adjustable IR Sensor Proximity Switch 3-80cm Range)

is used for the measurement of the velocity of the vehicle. A four-spoke wheel was fabricated to form four obstacles for the infrared sensor and it rotated along with ground wheel. Sensor was placed Infront of the four-spoke wheel on the rotating shaft of the vehicle. As the vehicle travelled, four spoke wheel passed Infront of Infrared sensor. The generated infrared signal, bounced from the spoke and the signal was received at the infrared receiver. Hence, the number of obstructions passed per unit time was calculated. Arduino Microcontroller was programmed for conversion of revolution per two second into revolution per minute and by knowing the diameter of the wheel, the forward speed was calculated. The measured rotational speed in rpm by infrared sensor was converted into forward speed in m/s with algorithm as,

$$v = \pi d N / 60$$

where,

v – forward speed in m/s

d – diameter of ground wheel, m

N- Rotational speed of ground wheel, rpm

Set up to vary rotation speed

The set up (Fig 1) was developed for generating different speed with single phase geared electric motor (0.25 hp) with speed at output shaft as 34 rpm. The drum of diameter 107.5 mm (Fig 2) was mounted on the shaft. Three different speed ratios viz.,

1.43, 2.5 and 3.33 were achieved using combinations of 10 inch-7-inch, 10 inch-4 inch and 10 inch-3-inch diameter pulleys. The rotational speeds of the drum were 47.60, 83.30 and 111.7 rpm for those combinations. There were four metallic strips welded on the periphery of the drum, hence four obstructions were created.

Preparation and Nano Structural Investigation of Screen-Printed Cobalt Oxide (Co₃O₄) Thick Film with Annealing Temperature

U.M. Pagar^{1,*} and U.P. Shinde²

¹Department of Physics, M.S.G. Arts, Science College, Malegaon camp, Nashik-423203, India

²Department of Physics and Electronics, L.V.H. Arts, Science & Commerce College, Panchavati, Nashik-422003, India

ABSTRACT

Co₃O₄ thick films are deposited on glass substrate by screen printing technique. All characterization was carried out for unannealed, annealed at 250°C-400°C. The XRD analysis indicates prepared films are of polycrystalline nature with cubic structure having preferential orientation through (311) plane. Crystallite size is found to be 18.516nm. The lattice parameter found to be 8.036-8.138 Å⁰, approaches to standard value. SEM analysis films shows agglomeration of nanoparticles and occurrence of spherical-shaped grain aggregations. Spherical grain size increases 47.66 to 77.33nm with annealing temperature. The link between structural and morphological properties are noted. The EDAX analysis indicates that all compositions have desired stoichiometric ratios. Besides electrical measurements, film D.C. resistance, resistivity was measured and assures semiconducting nature of material. Calculated Specific surface area, TCR, activation energy decreases with increasing in annealing temperature. It shows that structural, morphological, and electrical properties of Co₃O₄ films were improved by increasing annealing temperature.

KEYWORDS: Co₃O₄ -Thick Films, XRD, SEM-EDAX, Resistivity, TCR, Activation energy.

INTRODUCTION

Recently material science has become more promising field in the catalysis and sensors technology. Here nanostructured transition metal oxides are extensively studied to reveal their potential use and diverse applications in different areas such as smart windows, negative electrodes in Li- ion batteries and mirrors with variable reflectance. As properties (such as structural, magnetic, optical, catalytic, and electronic) of nanomaterials depend strongly on their size, structure, and shape so research is presently being carried to enhance these properties and to add to novel functionalities to the metal oxides.

Mentioned material (Co₃O₄) is an electrochromic material and would be classified into two categories: cathodic (i.e., coloured in the reduced state) like molybdenum oxide, tungsten oxide etc, and anodic coloured materials (i.e., coloured in the oxidized state) like, ruthenium oxide, cobalt oxide, nickel oxide, etc. [1] However, Cobalt oxide films is a promising anodically colouring electrochromic material. After oxidation it becomes grey in colour, which is opposite to the reduced tungsten oxide.

Among transition metal oxides, spinel type tricoalt tetra oxide is versatile metal oxides because of its two characteristics namely variable valance state and existence of oxygen vacancy defects. It exists in different forms such as CoO₂, Co₂O₃, CoO (OH), Co₃O₄ and CoO. Of these, Co₃O₄ acquires the normal spinel structure magnetic Co²⁺ (3d⁷) cations are placed in tetrahedral sites and nonmagnetic Co³⁺ (3d⁶) cations have occupied octahedral ones. In bulk crystal structure, Co₃O₄ exhibits antiferromagnetic property while in nanostructured it shows weak ferromagnetism with an energy bandgap of 1.4 – 1.8 eV [2].

Owing to their enhanced and exclusive properties such as increased surface to volume ratio, good chemical stability and high specific surface area, semiconductor nanoparticles are used in field of gas sensors for detection purpose. In the advanced technological world, Co₃O₄ (Tricoalt tetra oxide) has found enormous applications because of larger efficiency due to small dimensions [3]. In most of the research work the Co₃O₄ has been selected for investigation, because of its chemical stability, desired electrochemical property, and high annealing temperature. This Co₃O₄ phase can be easily obtained in air atmosphere. Cobalt oxide thin and thick films are prepared by different methods such as atomic layer deposition, sol- gel technique, chemical vapour deposition, RF magnetron sputtering, chemical bath deposition, screen printing technique, spray pyrolysis and nebulizer spray pyrolysis. Among these techniques, screen printing technique has many advantages such as low cost, easy to handle, convenient for large area deposition, uniform film deposition and less deposition time. This technique has been employed by many researchers to fabricate the films of tin oxide, cerium oxide, zinc oxide and indium oxide. [4-8]. After preparation, films are ready for characterization by X-ray diffraction, Scanning

Influence of annealing on electrical and optical properties of NiO thick film Sensors developed by screen printing technique

Ujwala M. Pagar¹, U. P. Shinde²

^{1,2} Research Centre in Physics,
Department of Physics, M. S. G College, Malegaon, Dist- Nashik.

Abstract: The current study present the preparation of NiO thick film sensors by using screen printing technique on glass substrate and study influence of annealing on electrical and optical properties of prepared thick films. Prepared films were annealed at in the range of 250°C to at 400°C using muffle furnace for 2 hours. Electrical properties of NiO thick film sensors were studied using resistivity, temperature coefficient ratio, and activation energy and optical properties were studied using FTIR and UV spectroscopy. It has been found that the resistivity of all prepared NiO thick film sensor decreased as annealing temperature increased. The energy band gap (Eg) of un-annealed and annealed at 250, 300, 350 and 400 °C NiO thick film sensors was found to be 3.25, 2.99, 2.81, 2.73, and 2.49 eV respectively. The change in optical band gap energy, reveals the impact of annealing on optical properties of the NiO films.

Keywords: Annealing, muffle furnace, resistivity, FTIR and UV spectra.

1. INTRODUCTION:

Metal oxide Semiconductors (MOS) have a wide range of structural topologies with an electronic structure that can be metallic, semiconductor, or insulator, giving them a wide range of chemical and physical properties [1]. As a result, metal oxide semiconductors are the most widely employed functional materials in chemical and biological sensing. Furthermore, their distinct and controllable physical features make them ideal candidates for electrical and optoelectronic applications. Because of their scientific relevance and prospective applications, nanostructured metal oxide semiconductors have been extensively researched [2, 3]. When MOS's reduced to nano-scale, there is increase in surface to volume ratio and so many materials exhibit unique structural, electrical and magnetic properties.

NiO is very well anti - ferromagnetic substance with a 3.6 eV band gap and is a metal-deficient p-type semiconductor [4]. NiO is a well-researched antiferromagnetic p-type semiconductor with good gas-sensing, catalytic, and electrochemical capabilities, and has gained importance in solid-state sensors, electrochromic devices, heterogeneous catalysts, and rechargeable batteries [5, 6]. Because of their exceptional chemical stability, nickel oxide (NiO) films have a variety of uses. Catalysts, electrochromic display devices, fuel cells, and gas sensors have all been employed with them [6, 7]. Among others preparation or synthesis methods like plasma deposition; electrochemical deposition, CVD, RF sputtering, pulsed laser deposition and physical vapour deposition method, screen printing method is most suitable because of its low expensive, low-temperature operating condition and freedom to deposit materials on a variety of substances [8].

The fundamental disadvantage of NiO thin or thick films is that they have a higher resistance. Annealing NiO thin films is a popular method for overcoming the foregoing disadvantage and obtaining high pseudo capacitance. The association between the electrolytes ion and active sites, porous nature, surface area, electrical conductivity, and hydrophobicity of NiO thin films are all enhanced by annealing temperature, which improves the optimum performance of NiO films. As a result, post-deposition annealing is a significant step in improving structural, morphological, optical, and electrical properties of NiO films [9].

The current research work focus on the preparation of NiO thick films by using screen printing technique and studied electrical and optical properties of prepared NiO thick film sensors.

2. Methods and materials

2.1 Preparation of thick film sensor using screen-printing technique

Commercially available AR grade (99.99 % purity) NiO powder was for the preparation of films. Films were developed on glass substrate. Initially, glass substrates were properly clean using acetone then films placed under IR lamp. The 70-30 % ratio were used for material composition. In 70 % consist organic material (NiO) and 30% consist inorganic material (ethyl cellulose and BCA). Using mortar and pestle, thixotropic paste were formed then prepared paste was used to deposit thick films on glass substrate using screen printing technique. The prepared thick films were kept under IR irradiation for 60 minutes to remove contamination. After, preparation of films, some films were annealed at in the range of 250°C to at 400°C using muffle furnace for 2 hours then un-annealed and annealed films were used for further study.

2.2 Characterizations of NiO thick film sensor:

2.2.1 Electrical characterizations:

Using resistivity, TCR (thermal coefficient of resistance) and activation energy at high and low temperatures electrical properties of prepared thick films were studied. Equations 1, 2 and 3 were used to investigate resistivity, temperature coefficient of resistance (TCR), and activation energy, respectively [10].

RESEARCH ARTICLE

THERMALLY EVAPORATED MGO-NIO NANOCOMPOSITE THIN FILMS FOR ETHANOL GAS SENSOR

Shinde, U. P. ^{1,*} and Gosavi R. S. ²

¹Department of Electronic Science and Research Center, L.V. H College Panchavati, Nashik, India

²Department of Electronic Science, Arts, Science College Rahuri, Dist- Ahmednagar, India

ARTICLE INFO

Article History:

Received 10th July, 2021

Received in revised form

27th August, 2021

Accepted 20th September, 2021

Published online 30th October, 2021

Key words:

Sensitivity, MgO-Ni Nanocomposites,
Muffle Furnace, Activation Energy.

ABSTRACT

In the current research work, MgO-NiO nano composite thin films have been prepared on glass substrate by using thermal evaporation technique and studied electrical and gas sensing properties of prepared films. The prepared films were annealed for 2 hours at 350°C in a muffle furnace. The electrical properties of prepared MgO-NiO nano composite thin films were investigated on the basis of resistivity, Temperature Coefficient Resistance (TCR) and activation energy. The prepared MgO-NiO nano composite thin films were exposed to NH₃, LPG, NO₂, and ethanol gas at concentration of 100,200,300 and 400 ppm and at surrounding temperature of 50, 100,150, 200 and 250 °C for determine sensitivity of the films. Maximum sensitivity has been found to the ethanol gas 85.48% at 150 °C temperature and concentrations of ethanol gas was 300 ppm. Films also show quick response time (~ 9 sec) and recovery time (~ 18 sec).

INTRODUCTION

Gas sensors are utilized in a variety of applications in everyday life, including pollution monitoring, medical diagnostics, and agriculture (1, 2). Metal oxide semiconductor (MOS) and nanocomposites gas sensors are extremely popular due to their speedy detection, simple execution, and inexpensive costs. They have chemical and thermal properties that remain stable over time. The sensors are mostly used to estimate actual amounts and to operate a few structures. A sensor is a type of electronic device that detects multiple kinds of input signals. The demand for gas detection and monitoring has posed a problem. The heart problems, respiratory illnesses, cellular breakdown in the lungs, hemoglobin depletion, mental impairment, hypertension, and other issues can all be caused by exposure to toxic and hazardous gases. The atmosphere is polluted by gases from automobiles and technological depletes (3, 4). Nanomaterials with diameters of less than 100 nm are now being investigated in a wide range of fields. Nanoparticles offer wide surface-to-volume ratio, which is helpful for gas sensing mechanism (5). Doping can be utilized to increase the characteristics of chemical resistance gas sensors in addition to noble metal decoration. Doping has been employed by certain researchers to improve MOS sensor attributes such as sensitivity, response time, and recovery time. Metal oxide, metal, nonmetallic elements, and others can be used as dopants (6-8).

In gas sensing, p-n heterostructures, which are made up of n-type and p-type MOSs, are extensively studied Core-Shell nanostructures. Ethanol is an oxygenated hydrocarbon gas that is colourless and flammable. It's commonly referred to as "alcohol." Ethanol concentration in the human body can interfere with mental capacities and bring injury. People who work in the ethanol industry have a high risk of developing lung and abdomen cancers. Ethanol can impact the respiratory system and is an irritant in concentrations greater than 1000 mg L⁻¹ in the gas phase, quantifying ethanol vapour may be necessary for workplace safety and health. The food and beverage industry is interested in ethanol sensing because it allows for online quality control and the assessment of alcohol concentration in drinks. As a result, there is a lot of interest and challenges in monitoring ethanol gas at the right track threshold (9-11). Nickel oxide (NiO) is a p-type semiconductor with outstanding electrical, optical, and chemical characteristics. In the 3.6-3.8 eV range, it possesses a large band gap. NiO is the transition metal oxide that has been studied the most extensively. NiO crystals that are perfectly stoichiometric are perfect insulators. NiO is extremely durable and electrochemically stable (12). Electrochromic material in displays, catalyst in fuel cells, photoelectrolysis, solar thermal absorber, and gas sensor are only a few of the applications for NiO. NiO is also used in aircraft low-weight engineering constructions and alkaline battery cathode materials as a catalyst (13, 14). Spray Pyrolysis techniques, electron beam evaporation, CVD, CBD, RF-magnetron sputtering, anodic oxidation, plasma deposition, atomic layer epitaxy, sol-gel, and vacuum evaporation have all been used to prepared nickel oxide pure as well as nanocomposites thin films (12, 15).

*Corresponding author: Shinde, U. P.,

Department of Electronic Science and Research Center, L.V. H College Panchavati, Nashik, India.



STUDY OF ELECTRICAL AND GAS SENSING PROPERTIES OF THERMALLY EVAPORATED NICKEL OXIDE THIN FILMS

U. P. Shinde¹, R. S. Gosavi²

¹Department of Electronic Science and Research Center, L.V. H College Panchavati, Nashik, India.

²Department of Electronic Science, Arts, Science College Rahuri, Dist- Ahmednagar, India.

Abstract:

Thin films currently play an important role in the field of gas sensors. Thin films are changing the physical, electrical, structural, and gas sensing properties of the functional material. The current study explicates on the fabrication of NiO thin films by using thermal evaporation method and investigates their electrical and gas sensing properties. The films were fabricated on glass substrate. After fabrication, in a muffle furnace the films were annealed for 3 hours at 400°C. Resistivity, temperature coefficient ratio (TCR), and activation energy were used to investigate the electrical properties of fabricated NiO thin films. Gas sensing studies were carried out in the presence of NH₃, LPG, NO₂, and methanol in the surroundings of NiO thin films at various surrounding temperatures. The characteristics of sensitivity, selectivity, and response and recovery time were investigated. The maximum sensitivity was found to be NO₂ gas. The sensitivity was 82.65% at 100 °C to NO₂ gas of concentration 200 PPM. The response and recovery time were found to be ~ 05 sec and ~ 13 sec respectively.

Keywords- NiO, Thin films, NO₂, selectivity and reproducibility.

I. INTRODUCTION:

Nano materials have been used in gas sensors for decades. The potential for employing nano materials with dimensions of less than 100 nm in a variety of applications is now being studied in a variety of fields [1]. The synthesis of the material is the first criterion in any new nanoparticle investigation. Many researchers used various approaches of synthesis like physical and chemical routes. These routes also contain different methods of synthesis [2]. Films are divided into two categories based on the thickness of the deposited material layer on the substrate: thick film and thin film. Thin films have a diameter of 50 nm to 300 nm; whereas thick films have a diameter of 15 µm to 80 µm [3, 4]. Thin films can be prepared using the physical vapor deposition process. It covers a number of vacuum deposition techniques. When using the physical vapor deposition process, the phase of the material changes from solid to vapor, then back to solid during the formation of the thin film, this is vapor condensation on the substrate. Glass or alumina can be utilized as a substrate. One of the most significant advantages of the physical deposition method is that no chemical process is required for the fabrication of thin films. The PVD process is quite convenient, and it may be used to make thin films out of a variety of materials. The nano structure of several metal oxide semiconductors can also be fabricated using this technology. Ion sputtering, thermal evaporation and arc discharge are the three types of PVD methods. PVD is used in a variety of fields, including mechanical item manufacture, optical, electrical, chemical coating, textile, firearms, and solar panels, medical, industrial, jewellery purposes, battery and fabrication of microelectronic devices [5-7].

Patient Health Monitoring System Using IoT

**Prof. U. P. Shinde, Asst. Prof. Anil B. Patil,
Mr. Ajay R. Gaikwad**

Departments of Electronic Science and Research Center,
L.V.H College, Nashik, (MS) India.
upshinde1965@gmail.com, anilbpatil1@gmail.com

Asst. Prof. Umesh J. Tupe

Department of Electronics,
Panchavati College of Management & Computer Science,
Nashik (MS) India.
umeshtupe14@gmail.com

Abstract- This paper depicts a method for using IoT to monitor a patient's body 24 hours a day, seven days a week. Patient monitoring systems are becoming increasingly popular among researchers and patient guardians these days. Caregiving duties are increasing as the older population grows. As a result, patient health monitoring systems are becoming increasingly popular. The monitoring of patients is the basis for this paper. We created a patient monitoring device that is both dependable and energy efficient. It has the capability of sending real-time patient parameters. It allows clinicians to track the patient's health parameters in real time. The proposed federal system continuously monitors the patient's health utilizing several sensors attached to the Arduino board. The data is then sent to the server using the Arduino Ethernet shield. An alarm is sent to the doctor via an Android application loaded on the doctor's smartphone if any of the parameter values exceed the specified threshold.

Keywords- IoT, patient's body, Sensors, health monitoring systems, and real time etc.

I. INTRODUCTION

Whenever doctors and nurses are tasked with caring for many patients at the same time, they encounter significant challenges. Patients confront challenges such as queuing, travel time, relocating patients, and waiting for a doctor, among others [1].

In the field of health, the rising usage of mobile technology and smart gadgets has had a prominent effect. Health professionals are increasingly taking advantage of the advantages that these technologies provide, resulting in major improvements in healthcare services. Similarly, countless regular people benefit from M-Health (Mobile Health) applications and E-Health (healthcare enabled by ICT) to enhance, assist, and support overall health.

The best possible state of health is a fundamental right for an individual, as per the World Health Organization (WHO) constitutions. We strive to provide a new system that proposes a smart patient health tracking system that uses data to identify patient vital metrics and uses the internet to alert doctors so that they may assist in the event of any concerns at the earliest possible, reducing mortality rate. According to research, the rapid spread of wearable gadgets and smart phones, as well as Internet of Things-enabled technologies, is transforming health care from a traditional hub-based system to a more individualized one [2, 3].

Patient surveillance via IoT is a technology that allows patients to be monitored outside of traditional clinical settings (such as at home), potentially increasing access to care and lowering healthcare expenditures. This can have a

substantial impact on a person's quality of life. It allows patients to keep their freedom, avoid complications, and save money [3, 4]. This strategy helps to achieve these objectives by bringing care to the patient's home. Furthermore, patients and their families may be assured that they are being watched over and will be helped if a problem occurs [5].

II. HARDWARE SECTION

Block Diagram:

Figure 1 illustrates a block diagram of a Patient Health Monitoring System using IoT, which is made up of six elements: a DHT11 sensor, an accelerometer, a heartbeat sensor, a Wi-Fi module, a buzzer, and an Arduino Nano, among others.

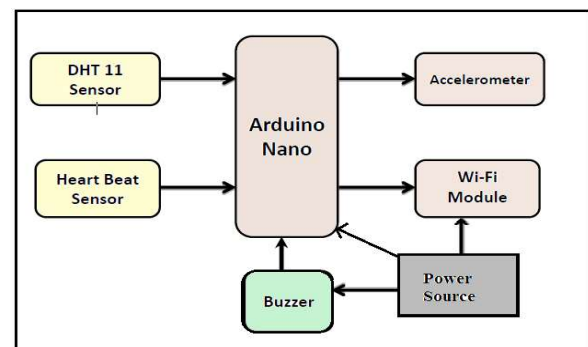


Fig 1. Block diagram of a Patient Health Monitoring System using IoT.

2. Circuit Diagram:



International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

PCB DESIGN PLOTTER USING CNC SHIELD AND ARDUINO

Vivek S. Kulkarni^{1*}, U. P. Shinde², Anil B. Patil³, Umesh. J. Tupe^{4,5}

¹⁻⁴PG Department of Electronic Science and Research Center, L.V.H College, Nashik, (MS) India.

⁵Department of Electronics, Panchavati College of Management & Computer Science, Nashik(MS) India.

Corresponding Authors: vkulkarni014@gmail.com, umeshtupe14@gmail.com

ABSTRACT:

The word "CNC" refers to a broad category of devices that includes drills, wood cutters, 3D printers, and milling machines. Essentially, "CNC" stands for computerised numerical controlled, and actual movement of the machine is controlled by computer-generated instructions such as coordinate position. We give here an idea of CNC bit plotter using ARDUINO based on CNC technology, the most significant revolution in the field of digital electronics and microcontrollers. The goal of this paper is to build a small CNC machine that can draw graphics or photos on any surface, such as paper. It employs three stepper motors as linear actuators on each of the three axes (X, Y, and Z). The most difficult aspect during printing is the appropriate synchronisation of this full three axis, i.e. stepper motors. At the moment, the data to draw is provided programmatically, i.e. hardcoded in binary format in the software. For logic 1, a bit touches the surface and prints the pixel; for logic 0, a bit rises up in the air and the actuator changes position for the next command to be executed. As a future plan, it will be able to access the G-Code directly from supporting software, such as in scale. The plotter presented here is a one-dimensional (1D) plotter. The current research study describes the automatic design of a PCB utilising CNC and an Arduino mega.

Keywords: CNC, PCB, Arduino, Micro-controller, Plotter.

1 Introduction:

Electronic device output has expanded dramatically in recent years, including mobile phones, tablets, notebooks, and other devices. This technological revolution has occurred as a result of the widespread adoption of PCBs in all circuits. The flow of electrical current through a desired channel from one place to another is the basis for the operation of an electronic circuit. The conductive marker on the 2D plotter is used to design this path [1]. The operation of a 2D plotter is similar to that of a CNC machine or 3D printing, in which an object is, moved in the x and y directions using two stepper motors in accordance with the input image. Express PCB or Autodesk eagle programme is used to create the input picture. With the use of Benbox software, the image is turned into g-code, a numerical form of code that instructs the plotter to move the object in co-ordinates form as per the pattern. According to our programme, the object utilized here is a conductive marker [2, 3].

This technology replaces the use of dangerous chemical procedures with a computerized mechanic system, removing the need for human involvement with such chemicals.

2 Experimental Work:

Methodology:

The hardware and software implementation of a CNC to sketch PCB layout and drill holes is examined in this study. A computer, a driving stepper motor, and a software programme make up the system, which includes an electro-mechanical setup that can move in the X, Y, and Z directions. The drive circuit is designed to both operate the mechanical equipment and connect with the computer via software. The software programme is designed to govern the machine's entire operation. We designed a PCB layout to show that the machine can produce a trace line on a single layer PCB board and drill holes on both ends of the trace line in this early work. A flat layer on the X-axis of the mechanical setup is where the PCB is placed for further processing. A drill that can travel along the Y and Z axes is located above the X-axis. Through the Z-axis, the drill can also move up and down for a predetermined distance. A milling and drilling bit is attached to the bottom of the drill. This bit creates both the arrangement and the holes. On a single layer PCB, create a trace line. The start coordinates of a trace line are then sent to the arduino uno board. The drill is moved to the coordinate point when the arduino uno board

DEVELOPMENT OF ETHANOL GAS SENSORS USING TERNARY METAL OXIDE THICK FILMS

SEEMA V. AWARE¹, DR. U. P. SHINDE² & V. V. AWARE³

¹Assistant Professor, CAET, Dr. B. S. Konkan Krishi Vidypeeth, Dapoli

²Head, LVH College, Panchavati, Nashik

³Professor (CAS), Farm Machinery and Power, CAET, Dr. B. S. Konkan Krishi Vidypeeth, Dapoli

ABSTRACT

Screen printing was used to successfully create a thick film of SnO₂: ZnO: CuO ternary oxide. The formation of nanocomposite material from this thick film was confirmed by XRD and SEM. According to XRD analysis, the structure of SnO₂ was orthorhombic, ZnO was hexagonal, and CuO was monoclinic, with an average crystallite size in the nano range. The particle size was larger than the crystallite size on average. The TCR was found to be negative, indicating the semiconductor behavior of the prepared thick film.

It was discovered that thick films made of the ternary oxides SnO₂: ZnO: CuO responded better at 200^o C and when exposed to ethanol gas. The sensitivity to ethanol gas of a thick film made of ternary metal oxide was 82.15 percent when the gas concentration and operating temperature were, respectively 1000 ppm and 200^o C. The film showed 72.72 percent sensitivity to ethanol gas at a gas concentration of 500 ppm and an operating temperature of 200^o C. Similarly, the film has a sensitivity of 60.68 percent at 100 ppm gas concentration and an operating temperature of 200^o C

KEYWORDS: thick film of SnO₂: ZnO: CuO ternary oxide, XRD and SEM. According to XRD analysis

Original Article

Received: Apr 08, 2021; Accepted: Apr 28, 2021; Published: Jun 21, 2021; Paper Id.: IJASRDEC20214

1. INTRODUCTION

Despite substantial measures taken to control land pollution and water pollution, populated areas are severely affected. Air is a mixture of nitrogen and oxygen as main constituents with other gases in small proportions. It also contains fog and other liquid particles, smoke, dust and other solid particles etc. An increase in proportion of those constituents beyond the particular limits leads to pollution.

Modern gas composition evaluation is executed using state-of-the-art analytical equipment which includes chromatography mixed with mass spectrometry, flame ionization, picture ionization and electron seize gas chromatography detectors.

Those classical analytical devices are especially accurate and reliable devices, capable of locating even lines of pollution in combos and with lifetimes in the variety of a few years, however, their obstacles are an excessive initial cost, high protection charges, size and weight, excessive energy intake, the want for certified personnel and a comparably low time-resolution. A fuel sensor or chemical sensor is a device that can capture and process specific alerts generated and reproducible interactions with the gasoline/vapour molecules.

As a result of the importance of gases in environmental control or dangerous emissions, our society requires gas sensors for domestic, automotive, and industrial statistics applications. As a result, the main reasons for

Influence of Annealing on Physical, Physiological and Electric Properties of Mono Nickel oxide Thick Films Prepared by using Screen-Printing Technique

Ujwala M. Pagar^{*1}, U.P. Shinde²

^{1*} Department of Physics HPT Arts and RYK Science College, Nashik, India; e-mail : ujwalapagar7@gmail.com

² Department of Electronics L.V.H. Arts, Sci. and Com. College, Panchavati, Nashik, Maharashtra, India

ABSTRACT

To study changes in physical, physiological and electrical properties of AR grade Nickel monoxide (NiO), thick films of NiO were fabricated on a glass substrate and annealed at 250 °C - 400 °C. Using characterization techniques, such as XRD, SEM-EDS and static gas sensing system, the structure of the film was found to be polycrystalline with a cubic structure and chemical composition study confirmed its non- stoichiometric nature. Half bridge method is used for measurement of D.C. resistance of thick films in air atmosphere at 30 °C to 350 °C. The prepared thick films of NiO nanoparticles were analysed for electrical properties and it ascertained that they are semiconducting in nature. The TCR, activation energy as well as film resistivity were measured at selected annealing temperatures. The D.C electrical conductivity results obtained from electrical properties at room temperature is $0.086 \times 10^{-4} (\Omega m)^{-1}$. The crystallite size changes from 8.20 nm to 8.54 nm for strong predominant orientation (200) with increase in annealing temperature. Study of correlation between annealing temperature and electrical resistivity showed that there is decrease in resistance with increase in temperature.

Keywords: XRD, TCR, Nickel Oxide thick films, D.C electrical conductivity, activation energy.

SAMRIDDHI : A Journal of Physical Sciences, Engineering and Technology, (2022); DOI : 10.18090/samriddhi.v14spli01.31

INTRODUCTION

In current era, nanocrystalline transition metal oxides (TMO) have attracted extensive interest because of their various different potential applications. Out of these, the most attractive material is nickel oxide (NiO). NiO is formed of nickel metal and nonmetal oxygen. It has a cubic structure with crystal lattice constant ($a = 0.04816$ A.U.) [1]-[4] and it is the most widely used because of its chemical stability. The most chemically stable metal oxide that is NiO due to its low cost is found to have wide applications in various fields namely as a catalyst, TCO, photodetectors, electrochromic, a gas sensor, photovoltaic devices, electrochemical supercapacitors, photo- solar cells and many opto- electronic devices [5]-[7]. As one of the components NiO was used in the Nickel-Iron (Ni-Fe) battery (Edison Battery), and fuel cells also.

Corresponding Author : Ujwala M. Pagar, Department of Physics HPT Arts and RYK Science College, Nashik, India; e-mail : ujwalapagar7@gmail.com

How to cite this article : Pagar, U.M., Shinde, U.P. (2022). Influence of Annealing on Physical, Physiological and Electric Properties of Mono Nickel oxide Thick Films Prepared by using Screen-Printing Technique.

SAMRIDDHI : A Journal of Physical Sciences, Engineering and Technology, Volume 14, Special Issue (1), 200-206.

Source of support : Nil

Conflict of interest : None

Greater surface area-to-volume ratios, high dispersion rates, less porosity, large photo-absorption, and little heat capacities were NiO nanoparticles characteristics. Out of these, unique characteristics of NiO nanoparticles which make it feasible and cost-

Potentiometric Study and Statistical Analysis of Human Urine Samples using Reduced Graphene Oxide Screen Printed Electrodes

Anil B. Patil^{1,*}, Umesh. J. Tupe², Vikas V. Deshmane³,
Dharma K. Halwar⁴, Sunil J. Patil⁵ and Arun V. Patil^{6,*}

¹Department of Electronic Science and Research Centre, L.V.H College, Nashik, India

²Department of Electronics, Panchavati College of Management & Computer Science, Nashik, India

³Department of Physics, SICES Degree College, Ambarnath, Dist.-Thane, India

⁴Department of Electronic Science, MSG College, Malegaon, Dist.-Nashik, India

⁵Department of Physics, L.V.H College, Nashik, India

⁶Professor, Arts, Science and Commerce College, Manmad, Dist.-Nashik, India

ABSTRACT

In this work, the reduced Graphene Oxide (rGO) based screen printed electrodes (SPEs) were fabricated by using standard screen-printing technique to study electrical response of human urine samples. Under-test solutions of randomly collected human urine sample from different persons with different health condition were tested with the fabricated SPEs. For all tests, variation of output signal was noted for 1 minute at the interval of 2 seconds. For the urinalysis of collected samples, ion selective potentiometric method to sense generated electric signal was used which shows that electric potential of sensing layer change caused by adsorption due to hydrophobic or hydrophilic nature of urine samples of normal and diabetic persons. From the histogram and boxplot, we observed that the distribution seems to be normal for both normal person (range of -138.80 mv to -6.60 mV) as well as diabetic patients (range of 19.81 to 586.66 mV). So, we have performed two-sample t-test to check the significance within these two samples. We compare our test statistic i.e. p-value $< 2.2e^{-16}$ with a critical value ($p < .05$). It is found that true difference in means is not equal to 0 and our results fall within the acceptable level of probability and hence, we conclude that there is difference between the two samples which will be useful for testing of human urine samples.

KEYWORDS: Urinalysis, rGO, SPEs, Potentiometric method, t-test.

INTRODUCTION

Urine is a sterilized liquid comprising of water, urea, and salts, which is by-product of the body. This is secreted by the kidneys through a process called urination. Urinalysis is a standard clinical analysis method used to study the physical or chemical components of urine which helps to understand the processes within the body for several disease conditions. Physical appearances like pH, density, colour, odour, and transparency of urine samples are prominent and distinguishable by vision only but, laboratory testing is required for few of them. Abnormalities in any one of these features will be the symptoms of minor problem in health condition of a person but can actually be indication of severe diseases, like diabetes. Diabetes could be a metabolic disease that affects the body's capability to either produce or use insulin. This is caused by the presence of high glucose levels resulting either weakened insulin excretion or malfunctioning insulin action, or both^{1, 2}. Body utilize the glucose for energy in the form of insulin.

Approximately 422 million people worldwide are diabetic with a very high incidence every year as per report of World Health Organisation. Diabetes leads to blood glucose that upsurges to unusually high levels. Glucose level in healthy persons' urine is in the smallest amount typically 0 to 0.8 mmol/L. Presence of higher glucose level in urine sample is the indication of un-healthiness. Diabetes is that the most typical reason behind elevated glucose levels. It also merely reflects the state of your glucose over the prior few hours. If urine samples of persons shows pre-diabetic symptoms, more clinical tests of glucose level for diagnosis of diabetic condition of person will be required, but when neglected, led to severe disease related to diabetes, like neuropathy, nephropathy, retinopathy, and disorder, which arise in both type 1 and sort 2 diabetes, are core factors of severe morbidity, mortality, and big economic burdens³⁻⁸. Therefore, screening at an early stage is vital for the management of diabetes persons. Evaluation of glucose levels as screening and diagnostic criteria for diabetes⁹. However, both biomarkers have limitations. For blood sugar, fasting for a minimum of 8 h is required.

When quick treatment responses are essential, a urine glucose test which may be a non-enzymatic way for the testing and monitoring of diabetic. Additionally, people that potentially had diabetes could use the urine testing as the simplest method of measuring and monitoring the effectiveness of treatments to control glucose level.

Research Study of Structural, Morphological and Optical Properties of Screen Printed Thick Films of Titanium Oxide with Tin Oxide Composition

K.B. Bhamare¹, A.N. Ahirrao² and R.M. Nikam³

¹Associate Professor, Department of Physics, L.V.H. A.C.S. College, Panchavati, Nasik-422 003, India

²Assistant Professor, Department of Electronic Science, K.T.H.M, A.C.S. College Nasik-422002, India

³Assistant Professor, Department of Chemistry, M.J.M.A.C.S. College, Karanjali, Nasik-422 208, India

ABSTRACT

Nanomaterial plays significant role in science and technology. The nanomaterial is used in different applications including sensors, optoelectronic devices, gas sensing applications, electronic devices. In current research article thick films of titanium oxide (TiO₂) surface modified by tin oxide (SnO₂) were prepared by standard screen printing method. These thick films were prepared on glass substrates and annealed at 650°C for 5 hrs in muffle furnace in air atmosphere. The as-prepared samples were morphologically, texturally and structurally characterized using SEM, XRD and FTIR. The Ultraviolet-visible radiation absorption was also verified. Structural parameters for thick films of titanium oxide (TiO₂) and tin oxide (SnO₂) doped into titanium oxide were performed by scanning electron microscopy, energy dispersive spectroscopy, X-ray diffraction, Fourier transform infra-red and UV-visible to study surface morphology and surface area, elemental detection, crystalline phases of films and size of tin oxide (SnO₂) doped into titanium oxide, vibrational and optical modes in terms of absorbance and band gap respectively.

KEYWORDS: Nanomaterial's, structural parameters, XRD, SEM, absorbance and band gap etc.

INTRODUCTION

The improvement of reliable and selective solid-state gas sensors has high priority both in the field of atmospheric pollution and in the emission regulation from thermogenesis plants. Recently, to improve the gas sensor performances many efforts have been made and related techniques were developed. Improved selectivity has been obtained by addition of catalysts or dopants, while significant improvement of performance can be achieved by decreasing the particle size down to nanometre scale, thus obtaining an increased specific surface area. Screen printing technique is versatile technique to prepare robust, compact and inexpensive hybrid circuit for different applications.¹⁻² Different methods have been investigated to grow pure titanium oxide (TiO₂) and doped tin oxide into base material incorporated into pure titanium oxide (TiO₂) such as Spray pyrolysis, Vacuum evaporation, chemical vapour deposition, magnetron sputtering, pulsed laser deposition, sol-gel technique and screen printing technique.³⁻⁵ The material Titanium oxide (TiO₂) in nanostructure form show remarkable physiochemical properties such as large surface area, small size of particles and quantum size effect. Screen printing technique is simple to fabricate thick films of doped as well as base material. Among all screen-printing process has found to demand for the formation of superconducting oxide films. TiO₂-based Nanomaterial's are becoming suitable for their potential use in medicine, biology, self-safety, transportation industries, gas sensor and environmental protection purposes.⁶⁻⁷ Tin oxide (SnO₂) doped titanium oxide (TiO₂) thick films were fabricated via Screen printing Technique system on glass substrate. This work reports the preparation of tin oxide (SnO₂) doped-titanium oxide in thick-film form by screen printing technology for gas sensing applications and to investigate the influence of annealing on the properties of metal oxides. Such a technique allows the formation of low-priced and robust chemical sensors with good reproducibility and repeatability provided that the starting materials are very well controlled.

EXPERIMENTAL

Preparation of thick films: Titanium oxide and composite thick films of 1% tin oxide (SnO₂) blended in Titanium oxide (TiO₂) with percentage composition were prepared on glass substrate with particular dimension by using standard screen-printing technique. The analytical grade titanium oxide (TiO₂) and tin oxide (SnO₂) chemical powder (99.99 %) was weighed. The calcined pure titanium oxide (TiO₂) and tin oxide (SnO₂) powder of 1% composition was mixed and crushed thoroughly with glass frit which acts as permanent binder and ethyl cellulose acts as a temporary binder. The mixture was then blended with butyl carbitol acetate as organic vehicle to form the paste.⁸⁻¹⁰ The paste so formed was screen printed onto the glass substrate. After screen

Preparation and Characterization of WO₃ Thick Film Resistors using Screen Printing Technique

S.J. Patil^{1,*}, A.V. Patil², K.S. Thakare³, A.B. Patil¹ and R.R. Ahire⁴

¹Department of Physics, L.V.H. College, Panchavati, Nashik, India

²Department of Physics, ASC College, Manmad, Dist.-Nashik, India

³Department of Physics, M.P.H. Mahila Mahavidyalaya, Malegaon, Dist.-Nashik, India

⁴Department of Physics, S.G. Patil College, Sakri, Dist.-Dhule, India

ABSTRACT

Tungsten trioxide (WO₃) thick films prepared by standard screen printing technique and fired at different temperatures in air atmosphere. The compositional, morphological and structural properties of films were analyzed by Field Emission scanning electron microscopy (FESEM), Energy dispersive spectroscopy (EDS) and X-ray diffraction (XRD). The films were observed to be oxygen deficient, it indicates that the films are non- stoichiometry in nature. As deposited and fired films were analyzed using SEM to know its surface morphology. XRD showed the polycrystalline nature. The crystallite size changes from 28.2133 nm to 58.5176 nm for all strong orientation with increase in firing temperature. The role of firing temperature on electrical resistivity has been studied and showed decrease in resistance with increase in temperature.

KEYWORDS: Thick films, XRD, FESEM, Structural properties, Electrical properties.

INTRODUCTION

To produce compact, robust and relatively inexpensive hybrid circuit for many purposes, Screen printing technique was introduced in the later part of 1950's, after that thick film technique has attracted by the sensor field¹. Thick films are suitable for gas sensors since the gas sensing properties are mostly related to the material surface and the gases are always adsorbed and react with the films surface². Screen printing is simple and economical method used to produce thick films of various materials³⁻¹⁰. The semiconducting metal oxides such as TiO₂, SnO₂, ZnO, Fe₂O₃, WO₃ etc. such type of semiconducting metal oxides (SMO's) offer the potential for developing portable and inexpensive gas sensing devices, which have advantages of simplicity, high sensitivity and fast response. The sensor is a device senses input signal. The working principle of these semiconductor gas sensors is based on change in conductivity when exposed to the target gases¹¹. WO₃ is a widely studied transition metal oxide and behaves as n-type semiconducting oxide due to non- stoichiometry. It has been widely studied for several applications in optical fields and used as gas sensor. Several deposition methods have been used to grow WO₃ films such as Spray pyrolysis, Vacuum evaporation, chemical vapor deposition, magnetron sputtering, pulsed laser deposition, sol -gel technique, screen printing technique¹². Among the various metal oxides that can be used in gas sensors, only those materials based on tungsten trioxide/titanium oxide have been widely manufactured and utilized¹³.

EXPERIMENTAL

WO₃ Thick film preparation:

Table 1: Preparation of WO₃ films

Substrate material	Glass
Active Material	WO ₃ (AR Grade)
Deposition Technique	Screen Printing
Types of screen	40S-Mesh No.355
Material Calcined time	1 hour.
Calcined temperature	4500c
Active Material to Organic vehicles ratio	70:30
Organic vehicles (Binders)	BCA & EC
Settling time	15-20 minutes.
Drying under IR	45 minutes.
Firing Time	2 hours.
Peak firing temp. (FT)	350 ⁰ C, 450 ⁰ C & 550 ⁰ C

Comparative Study of Electrical and Gas Sensing Properties of Undoped and Tin Oxide Doped with Antimony and Cadmium

K.S. Thakare^{1*}, S.J. Patil² and R.R. Ahire³

¹Department of Physics, M.P.H. Mahila Mahavidyalaya, Malegaon, Dist.-Nashik, India

²Department of Physics, L.V.H. College, Panchvati, Nashik, India

³Department of Physics, S.G. Patil College, Sakri, Dist.-Dhule, India

ABSTRACT

This paper presents the electrical and gas sensing characterizations of pure tin oxide annealed at 400°C and tin oxide doped with antimony and cadmium. The effect of doping on conductivity and stability of SnO₂ is presented by comparing electrical parameters of undoped and tin oxide doped with antimony, and cadmium annealed at different temperatures. The film samples were fabricated by Physical Vapour Deposition technique at room temperature and high vacuum. The prepared film samples were annealed at 300, 400 and 500°C for 2 hours. They were analyzed XRD, FESEM, EDXS for structural, surface morphology, compositional, Electrical and Gas Sensing Characterizations to study electrical resistance, activation energy calculations and gas sensing of the prepared samples.

KEYWORDS: Tin oxide, Doping, TCR, Activation energy, Sensitivity.

INTRODUCTION

Undoped tin oxide and that doped with cadmium and antimony are compared with reference to electrical and gas sensing characterizations such as sensitivity and selectivity. Electrical parameters were studied by using I-V characteristics and variation of film resistance with film temperature. Ohmic and semiconducting nature of the sample material was confirmed from I-V characteristics. Activation energy was evaluated from the resistance temperature curves. Similar electrical resistance measuring system was employed for gas sensing purpose. Electrical resistance of thin film samples was measured in air and in the test gas atmosphere as well. The ratio of the two resistances gave sensitivity of the sample towards the test gas. Other gas sensing parameters like selectivity, response time, recovery time, stability etc. of the sample were studied using the same electrical circuit arrangement. Gas sensing studies respectively involved gas response (sensitivity) variation with operating temperature and selectivity. Tin oxide has been a versatile material for gas sensing purpose. It behaved as a sensor for more than one gas hence it is less selective and more sensitive. Doped samples showed relatively higher selectivity than the pure ones under the similar conditions of operating temperature and gas concentrations.

Methodology: Tin oxide thin film samples were prepared by using Physical Vapour Deposition technique at room temperature and pressure of about 10⁻⁵ torr. The samples were annealed at three different temperatures, viz. 300, 400 and 500°C for 2 hours. It was found from optimization of annealing temperature that those samples annealed at 400°C showed better results over the samples annealed at other temperatures. Hence all the investigations were carried out for this annealing temperature. It is well known that strain developed during deposition could be removed from the films by annealing. Thus, annealing gives rise to the well stabilized film sample required for gas sensing purpose. This stability can be observed during electrical as well as gas sensing studies.

EXPERIMENTAL

Electrical characterizations were carried out in two parts. First part is I-V characteristics and the second one is Resistivity profile (R versus t and logR versus 1000/T graphs).

I-V Characteristics

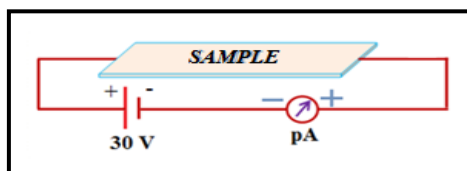


Fig. 1 Circuit connections for I-V characteristics

ATTITUDE TOWARDS ONLINE EXAMINATION AMONG PROFESSIONAL AND CONVENTIONAL COLLEGE STUDENTS DURING THE SECOND WAVE OF COVID-19 PANDEMIC

Dr. Jaimala Ashok Sode

Assistant Professor

Department of Psychology

Smt. M.P.H. Mahila College, Malegaon

Prof. Dr. M.A. Bhardwaj

Dean Arts and Humanities

MG Vidyamandir, Professor and Head

Department of Psychology & Research Centre

L.V.H. College, Panchavati, Nashik

Dist-Nashik, State - Maharashtra

Affiliated to Savitribai Phule Pune University

ABSTRACT

Aim: The purpose of the study was to examine the attitude towards online examination among professional (Engineering & MBA Colleges) and conventional (Arts, Science & Commerce Colleges) college students in Nashik districts of Maharashtra.

Settings and Design: A comparative study with simple two group design of professional college students and conventional college students in Nashik district, Maharashtra, India.

Material and Methods: The total sample of 350 (Professional College- 182 & Conventional College -168) college students from age group of 18-28 years out of which 184 Males and 166 Females from various colleges in Nashik districts of Maharashtra. For examine the attitude towards online examination researchers prepared one questionnaire and data was collected by online mode (Google Form) for avoiding physical contacts as per the government guidelines of physical distancing during the COVID-19 pandemic. Researchers prepared 20 items questionnaire for measuring attitude of online examination each items was based on online and offline examination related difference, methods, connectivity issue, fear and anxiety of passing, worried feeling of future and career and further education related worried feeling etc.,

Statistical Analysis: Descriptive and inferential statistical analysis were used for observing the attitude towards the online examination methods and Student's t-test was used for finding gender difference & compares the attitude difference of professional and conventional college students.

Results: The Mean and SD of professional college students were $M = 64.35$, $SD = 8.36$ and conventional college students $M = 55.64$, $SD = 7.98$ and the t value 2.871 was found statistically significant at 0.05 level. The Mean and SD of total male students, were $M = 62.15$, $SD = 7.28$ and the Mean and SD of total female students $M = 60.25$, $SD = 6.32$ and the t value 0.318 was found statistically not significant.

Conclusions: The researchers found that professional college students are more favorable towards online examination as compared to conventional college students and no difference was found between male and female in terms of attitude towards online examination.

Research Paper

Specific Phobia During the Covid-19 Pandemic First Wave in Maharashtra

Dr. Jaimala Ashok Sode^{1*}, Prof. Dr. M.A. Bhardwaj²

ABSTRACT

The purpose of the study was to examine the specific phobia among general people during the Covid-19 Pandemic first wave in different districts of Maharashtra. The total sample of 458 people from age group 18 to 60 years out of which 279 Males and 179 Females from various districts of Maharashtra. The data was collected by online mode (Google Form) for avoiding physical contacts as per the government guidelines of physical distancing during the COVID-19 pandemic. Researchers prepared 20 items questionnaire for measuring specific phobia each items was based on covid-19 pandemic related fear and anxiety such as fear of covid-19 virus, cleanliness, excessive buying, trying home remedies, worried feeling of family members and updating knowledge about covid-19 etc., The result findings revealed that majority of participants 196, 42.14% experiencing high level of phobia, the 34, 7.43% participants were experiencing extreme level of phobia of corona, 176 participants 38.43% were experiencing average level of fear and 55 participants 12% were experiencing very low level fear of covid-19 pandemic.

Keywords: *Specific Phobia, Covid-19 Pandemic, Male & Female*

In Maharashtra the first case of covid-19 was found in Pune district and spread very fast all over the state. The number of infected people increased day by day and health sector tries their best to save human life but fail to protect them and the number of deaths is increased. For controlling the spread of infection and save the life central and state government has taken variety of public health measures, such as quarantines for people returning from outside state or district, government & private sector employees work from home arrangements, school are close and online teaching, examination methods were start, and total shutdown of non-essential services, to reduce the risks of infection and impact of the disease. Such all of sudden changes and restrictions in to daily life are the factors that crate the fear, stress, anxiety and affect the mental health of general public.

According to Taylor, S 2019, health threat of closed ones and oneself this kind of psychosocial stressors are related with pandemics and during the pandemic there are major

¹Assistant Professor, Department of Psychology, Smt. S.P.H. Mahila College, Affiliated to Savitribai Phule Pune University Malegaon, Maharashtra

²Dean Arts and Humanities, MG Vidyamandir, Professor and Head, Department of Psychology & Research Centre, L.V.H. College, Panchavati, Nashik, India

*Corresponding Author

Received: January 05, 2022; Revision Received: February 10, 2022; Accepted: March 04, 2022

दलित स्त्रियांच्या आत्मकथनातील सांस्कृतिक संघर्ष

- डॉ. विद्या सुर्वे, नाशिक

“उदात्त जीवनमूल्ये व सांस्कृतिक मूल्ये आपल्या साहित्य प्रकारातून अविष्कृत करा. आपले लक्ष आकुंचित, मर्यादित ठेऊ नका. ते विशाल बनवा. आपली वाणी चार भिंतीपुरती राखू नका. तिचा विस्तार होऊ द्या. आपली लेखणी आपल्या प्रश्नांपुरतीच बंदिस्त करू नका. तिचं तेज खेड्यापाड्यांतील अंधार दूर करील असे प्रवर्तित करा. आपल्या या देशात उपेक्षितांचं, दलितांचं फार मोठं जग आहे हे विसरू नका. त्यांचं दुःख, त्यांच्या व्यथा नीट समजावून घ्या आणि आपल्या साहित्याद्वारे त्यांचे जीवन उन्नत करण्यासाठी झटा, त्यातच खरी मानवता आहे.

- डॉ बाबासाहेब आंबेडकर

१९६० नंतर मराठी साहित्यामध्ये निरनिराळ्या साहित्य चळवळींचा उदय झाल्याचे दिसते, व्यापक अशा सामाजिक, सांस्कृतिक, वाङ्मयीन असंतोषातून या चळवळींचा जन्म झाला. एका अर्थाने साठोत्तरी साहित्य चळवळी या सांस्कृतिक संघर्षाची परिणिती आहेत. उदाहरणार्थ, १९५४ च्या मागे पुढे सुरू झालेली लघुनियतकालिकांच्या चळवळ ही विशिष्ट वाङ्मयीन केंद्राविरुद्ध असंतोष व्यक्त करणारी होती. या चळवळीतील काहींनी सत्यकथा' या मासिकाची जाहीर होळी केली. सत्यकथा', मौज' आणि अन्य वाङ्मयीन नियतकालिकांबद्दलचा असंतोष, त्यांच्या एकाधिकारशाहीला विरोध, त्यांच्या सांस्कृतिक विचारांना विरोध, सांस्कृतिक मान्यतांना विरोध अशा विविध पातळ्यांवर लघुनियतकालिकांची चळवळ १९५४ ते १९७० या काळात निर्माण झाली.

१९६७ च्या मागे पुढे दलित साहित्य चळवळीचे स्वरूप ठळकपणे लक्षात आले. सामाजिक असमानतेविरुद्धचा लढा या चळवळीची मुख्य भूमिका होती. हजारो वर्षांपासून नाकारले गेलेले माणूसपण मिळवून त्याची प्रतिष्ठापना करणे आणि सीमेवर उभ्या असलेल्या उपेक्षित समूहांना त्यांचा स्वर देणे, याबद्दलचे ऐतिहासिक महत्त्वाचे काम दलित साहित्य चळवळीने केले.

अंतर्यामी दृष्टी वळवणारे लेखन - 'वधिकाच्या आठवणी'

प्रा. विद्या सुर्वे - बोरसे
मराठी विभागप्रमुख,
लोकनेते व्यंकटराव हिरे महाविद्यालय,
पंचवटी, नाशिक

भाषांतरीत पुस्तकांनी मराठी साहित्याचे दालन समृद्ध केले आहे. जीवनाचे न ऐकू आलेले आवाज, धडपड आणि कोलाहल, सुन्न करणारे अनुभव, तत्वज्ञानाची - भूमिकांची - बांधिलकीची ससेहोलपट, अपरिचित भावविश्व जगभच्या लेखकांनी मांडले आहे, ही अभिव्यक्ती मराठी वाचकांपर्यंत पोहचली ती भाषांतरांमुळे. भाषांतरकार निव्वळ एका भाषेतील कथानक भिन्न भाषेत घेऊन जात नसतो किंवा सांस्कृतिक सेतू निर्माण करून थांबत नसतो तर तो भाषेला समृद्ध करत असतो, अनेक नवे शब्द - संकल्पना - विचारधारा यांना घडवत असतो, नवा आकार देत असतो. भाषांतरकार हा लेखकाला एका भिन्न भाषेत, भिन्न काळात पुनर्जन्म देत असतो.

शशि वारियर यांची 'वधिकाच्या आठवणी' ही कादंबरी वाचत असताना भाषांतरांनी मराठीला दिलेले भरीव योगदान पुन्हा लक्षात येत गेले. संध्या पेडणेकर यांनी या कादंबरीचा अत्यंत ओघवता आणि प्रवाही अनुवाद केला आहे.

'वधिकाच्या आठवणी' ही त्रावणकोरच्या वधिकाच्या जीवनाची अस्वस्थ करणारी कहाणी आहे. ही कादंबरी वाचत असताना वाचक विलक्षण अस्वस्थ होत राहातो. जनार्दन पिल्लै या कादंबरीचे नायक आहेत. १९४० च्या मागेपुढे त्रावणकोर राजासाठी वधिकाच्या पदावर त्यांची नियुक्ती करण्यात आली. स्वातंत्र्यानंतरच्या काळातही ते याच पदावर कार्यरत राहिले. तीन दशके त्यांनी या पदावर काम केले आणि पूजापूरच्या कारागृहात एकशे सतरा व्यक्तींना फासावर लटकावले. फाशीची शिक्षा झालेल्या कैद्यांना प्रत्यक्ष फासावर चढवणारा तो वधिक. हॅंगमैन या इंग्रजी शब्दाचा वधिक हे मराठी रूप. अनुवादिकेनं हा शब्द या कादंबरीच्या निमित्ताने घडवला आहे. वधिक म्हणजे, वध करणारा, ठार मारणारा, मृत्यूची दोरी ओढणारा, कळीच्या दरवाजाआडच्या कुट्ट काळ्या आणि कधीही न संपणा-या अंधारात लोटणारा माणूस.

मराठीत या विषयावर पुस्तके नसावीत. कादंबरी तर नाहीच आहे. त्यामुळे मराठी वाचकांना ठाऊक नसणारं एक भयप्रद वास्तव ही कादंबरी आपल्यापर्यंत घेऊन येते. जनार्दन पिल्लै यांचे वडीलही राजाच्या मदरी वधिक होते. त्यांच्यानंतर वारसा हक्काने हे पद मोठ्या मुलाकडे जाणे शक्य होते, पण जनार्दनच्या वडीलबंधूंनी या कामासाठी नकार दिल्यानंतर वडीलांनी जनार्दनला विनंती केली. वधिक असल्यामुळे मिळणारे त्ते आणि किमान वेतन यामुळे कुटुंब हालाकीच्या दिवसातही अन्नाला मोताद होणार नाही ही अभिलाषा, यामुळे जनार्दनने हे काम स्वीकारले आणि नंतर तीन साडेतीन दशके ते केले.

ही कादंबरी बहूपदरी आहे. प्रथम पुरुषी निवेदनाचा लेखकाने वापर केला आहे. मल्याळी भाषा हीणारा बोलणारा लेखक हा इंग्रजी प्रकाशकाच्या सांगण्यावरून वधिकाच्या संदर्भातील कादंबरी लिहीण्याचे ठेकारतो, त्यासाठी तमीळ जाणणा-या मैत्रिणीला घेऊन शोध घेत दुरच्या गावातील जनार्दनला भेटतो. जनार्दनला स्वतःच्या आयुष्याची हकीकत कथन करण्याबद्दल सकारात्मक करतो. कुणा दुस-याला आपल्या

समकालीन समाजवास्तव आणि मराठी कविता.

(जागतिकीकरणाच्या विशेष संदर्भाने)

प्रा. विद्या सुर्वे बोरसे,

प्रमुख मराठी विभाग, लोकनेते व्यंकटराव हिरे महाविद्यालय,
पंचवटी, नाशिक.

कलाकृतीला तिच्या जन्माशी संबंधित स्थलकालाचा संदर्भ हा असतोच. अगदी कालजयी म्हणवल्या गेलेल्या आणि थेट ठरलेल्या कलाकृतीमधूनही स्थलकाल अवकाशाचा हा संदर्भ अधोरेखित करता येतो. लेखक कलावंत ज्या अवकाशाचा अंश असतो त्या समकाळाचे दुवे, राजकीय - धार्मिक - आर्थिक - सामाजिक - तात्वीक - वैज्ञानिक - तांत्रिक - ऐतिहासिक विचारधारा आणि घडामोडी यांचे प्रभाव कलाकृतीमधून स्पष्ट अस्पष्टपणे व्यक्त होताना दिसतात.

१९९० नंतरच्या काळातील व मागच्या सव्वीस वर्षातील मराठी कवितेविषयी विचार करताना या पावशतकातील हालचाली आणि विचारधारांचे ताणेबाणे व एकमेकांवर त्यांनी केलेल्या कुरघोड्या तपासणे गरजेचे आहे.

या अभ्यासविषय झालेल्या कालखंडाच्या अगदी आरंभी विशिष्ट धर्म संप्रदायाचा पुरस्कार करणाऱ्या प्रवृत्ती राष्ट्रीय पटलावर ठळक होत गेलेल्या दिसतात. धर्माचा आणि प्रादेशिक अस्मितेचा पुरस्कार करणाऱ्या राजकीय शक्ती नंतरच्या काळात प्रबळ आणि अधिकाधिक प्रबळ होत गेल्याचे जाणवते. गॅट करार, डंकल प्रस्ताव, जागतिकीकरण- खाजगीकरण- उदारीकरण या क्रांतिकारी आर्थिक कृतींचा ठळक परिणाम जाणवायला एक दशक जावे लागले, तोपर्यंत विशिष्ट मताच्या राजकीय शक्तींनी राज्य व राष्ट्रातील महत्वाची सत्तास्थाने स्वतःकडे अंकीत केली होती. चळवळ हाच ज्यांचा पाया आहे अशा डाव्या प्रबोधन परिवर्तनवादी राजकीय विचारधारा या काळात आपला प्रभाव आवाधित ठेऊ शकल्या नाहीत आणि परिणामी त्यांचा जनाधार हळू हळू कमकुवत होत गेला, चळवळींचा अंत झाला, विशिष्ट बुद्धीवंत वर्ग यांच्यातच केवळ 'सामान्य माणसाची' बाजू म्हणून परिवर्तनवादी विचारधारा शिल्लक राहिली. आर्थिक बदलांचे असे काही परिणाम झाले की बाजार आणि पैसा हा जीवनाच्या केंद्रस्थानी आला आणि बहुतेक आदर्श परिघाकडे सरकत गेले. पैसा हेच मूल्य झाले. पैसा हीच गुणवत्ता झाली. भौतिक बदल आणि डोळे दिपवणारा चकचकाट विकास म्हणवला गेला.

अभ्यासविषय झालेल्या या काळाच्या काही वर्षे अगोदर दुसरी एक क्रांतिकारी घटना घडली होती, ती म्हणजे 'मंडल आयोगाची' अंमलबजावणी. तत्कालीन व्ही पी सिंह सरकारने घेतलेल्या या निर्णयामुळे देशातील खुप मोठा जनसमुह हा मुख्य प्रवाहात येण्यास मदत झाली. इतर मागस गटातील नवे नेतृत्व सामाजिक राजकीय क्षेत्रात उदयाला आले आणि स्थिर झाले. परिणामी वर्षानुवर्षे सत्तेपासून दूर असणाऱ्या वर्गाचा राजकीय पटलावर दबदबा निर्माण झाला. नवद्वोन्तरी सामाजिक घडामोडींवर याचा परिणाम होणे साहजिक होते.

विद्यापीठाचे नामांतर, बाबरी मशीदीचे पतन, गुजरातच नरसंहार, महाराष्ट्र गुजरात व इतर ठिकाणी झालेले भूकंप, कारगिलचे युद्ध, प्रादेशिक पक्षांना गाव पातळीपासून देशपातळीपर्यंत सत्ताकारणात

गुगल अॅप्स व गुगलच्या विविध सेवा

डॉ. प्रकाश कारभारी शेवाळे,
सहाय्यक प्राध्यापक, मराठी विभाग,
महात्मा गांधी विद्यामंदिर संचलित,
महाराजा सयाजीराव गायकवाड कला, विज्ञान व वाणिज्य महाविद्यालय
मालेगाव कॅम्प, जि. नाशिक
prof.prakashshewale@gmail.com

आजचे युग हे माहिती तंत्रज्ञानाचं युग म्हणून ओळखले जाते. संगणक आणि इंटरनेट ही आपल्या काळाची महत्वाचे माध्यम आहेत. ज्ञान, विज्ञान, माहिती तंत्रज्ञान, व्यापार, उद्योग, व्यवसाय, मनोरंजन आणि संपर्क व्यवस्था अशा सर्वच क्षेत्रांची कक्षा संगणकामुळे विस्तारलेली आहे. पर्यायाने आपल्या जीवनपद्धतीत बदल झालेला आहे. त्यामुळे संगणक आणि संगणकाशी संबंधित ज्ञान मिळवणे ही आजच्या काळाची गरज बनली आहे. तथापी आपल्या पारंपारिक शिक्षण व्यवस्थेमध्ये संगणकाचे आणि संगणकाशी संबंधित इतर माध्यमांचे ज्ञान फार क्वचित दिले जाते. या युगात प्रत्येक गोष्ट झटपट आणि बिनचूक उपलब्ध होणे ही बाब आवश्यक आहे. यासाठी मानव वेगवेगळ्या साधनांचा वापर करतो.

संगणक हे त्यापैकी एक महत्वाचे साधन आहे. पारंपारिक शिक्षणाच्या जोडीला संगणकाचे ज्ञान मिळवणे आणि संगणक साक्षर होणे काळाची गरज आहे. संगणक ही गोष्ट आता कौतुकाची राहिलेली नाही. जीवनाच्या प्रत्येक क्षेत्रात त्याचा अपरिहार्यपणे झालेला वापर महत्वाचा आहे. म्हणून संगणकाची निकड निर्माण झालेली आहे. संगणकाची आपल्याला अनेक प्रकारच्या कामांमध्ये त्याची मदत होत आहे. पर्यायाने मानवी श्रमांची बचत संगणकामुळे झालेली आहे. विविध उपाययोजनांबरोबर संवाद आणि संदेशाने पूर्ततेसाठी होणारा संगणकाचा वापर महत्त्वपूर्ण ठरला आहे. संगणक हे मानवनिर्मित उपकरण आहे तथापि संगणकाचे काम करण्याची क्षमता मानवी क्षमतेपेक्षा कितीतरी पटीने जास्त आहे. माहितीचे संकलन, विश्लेषण प्रक्रिया, सांख्यिकी आकडेमोड, माहितीचे जतन, विभागणी व अनेक कामांसाठी संगणकाचा वापर केला जातो.

संगणक प्रत्येक विभागातील सर्व क्षेत्रांमध्ये वेगवेगळ्या कामांसाठी वापरला जातो. दुकाने, हॉटेल्स, मॉल्स, बँका, पोस्ट व खासगी उद्योग व्यवसाय, दवाखाने, सरकारी-निमसरकारी कार्यालय, सहकारी संस्था अशा सर्व ठिकाणी आपल्याला संगणक दिसतो. या प्रत्येक ठिकाणचा संगणकाचा वापर निराळा आहे. आता अनेक व्यक्ती वैयक्तिक कामासाठी स्वतःच संगणक वापरू लागले आहेत. संगणकाचा सर्वव्यापक वापर होण्याचे कारण तो विविध स्वरूपाची माहिती तयार करतो. आकडे, चित्रे, नकाशे, फोटो, आवाज, संगीत, भाषा व चलचित्र इत्यादी विविध स्वरूपाची माहिती संगणकाला आपण पुरवू शकतो म्हणूनच संगणकाचा वैयक्तिक वापर दिवसेंदिवस वाढताना आपल्याला दिसतो. त्यामुळे संवादक क्षेत्रात संगणकाची मोठी मदत होताना आपल्याला दिसते. इंटरनेटमुळे आपण सगळे जी माहिती आहे ती माहिती मिळवू शकतो किंवा संवाद साधू शकतो. इंटरनेट म्हणजे इंटरनॅशनल नेटवर्क. इंटरनेट हा सर्वत्र कानावर पडणारा शब्द आहे नेटवर जाहिरात सुटली आहे.

‘पुढल्या हाका’ : एक मानसशास्त्रीय दृष्टिकोन

– डॉ. प्रकाश शेवाळे

(४२०)

सुबोध जावडेकर यांच्या विज्ञानकथांचा विषय हा मानव व यंत्रमानव असाच राहिला आहे. या कथांमधील माणसाच्या सर्व कार्यव्यापाराचे मूळ हे मानवी मन राहिले आहे. मानवी मनच अशा साहित्याची निर्मिती करत असते आणि या साहित्याचे वाचन आणि आकलन हेच मन करीत असते. मानवी मनाचे व साहित्याचे नाते हे अजोड आहे. जावडेकरांच्या पुढल्या हाका या विज्ञानकथासंग्रहातील कथा या मानवी मनाची निर्मिती आहे. मन हे प्रवाही असते. मानवी मन, त्याचे विचार, त्याच्या भावना, समाज व वास्तव या गोष्टी सुबोध जावडेकर यांनी आपल्या कथांमध्ये मांडल्या आहेत.

या कथासंग्रहातील भाषा ही प्रभावी व प्रवाही आहे. मनाचा सतत होणारा बदल स्वाभाविक आहे. या कथांमधील मानवी मन व वर्तन यांची उकल करणे महत्वाचे वाटते. या संग्रहातील सर्व कथांचा विचार केल्यावर आपणास कथेची शैली, पात्रांची मनोभूमिका, परिस्थिती, जीवनसंग्रर्ष, स्वप्नातली जाणीव व नेणिवेच्या पातळीवरच्या असंख्य गोष्टी जाणवतात. या कथांमध्ये मानवी मनाचा एक अविष्कार आहे. चेतनपूर्व अवस्था, चेतन अवस्था, अर्धचेतन अवस्था, अचेतन अवस्था यांच्यात एक अव्यक्त संबंध असतो व त्या संबंधामुळे चेतन व अचेतन मनोव्यापारांना एक गती प्राप्त होते. एकूणच ह्याच प्रकारच्या कथा ‘पुढल्या हाका’ या कथासंग्रहात आपणास दिसतात.

‘कलावंताचा जन्म’ ही कथा या दृष्टीने अतिशय महत्वाची कथा आहे. निखिलेश हे एक मनाचे स्वच्छ व निरागस असे पात्र लेखकाने उभे केले आहे. आपण दर्जेदार पेंटिंग काढावे असे विचार सदैव त्याच्या मनात रुंजी घालत असतात पण त्याच्या काही मर्यादा असल्याने त्याला ते शक्य होत नाही. या

RELIGIOUS TOURISM IN MAHARASHTRA: PROBLEMS AND PROSPECT

Mr. G.U. Harkar^{*1}, Mr. S.P. Dhatrak^{*2}

^{*1}Associate Professor, Department Of Geography, L.V.H. College, Panchavati, Nashik, India.

^{*2}Assistant Professor, Department Of Geography, L.V.H. College, Panchavati, Nashik, India.

ABSTRACT

The study of this paper aims to study the various religious destination of Maharashtra. Religious tourism destinations (or pilgrim-towns as conventionally known) are special places where urbanization processes are driven by visitor influxes that visit these places for cultural and religious reasons. Billions of tourists are crossing international borders as they have not communicated with these diverse expressions of spirituality faith and culture. The interaction stimulated by such encounters has the potential to evoke deep spiritual experiences and transformative spiritual growth. Maharashtra boards of a large number of popular and revered religious venues that are heavily frequented by locals as well as international tourists. Maharashtra has many religious sites and pilgrimage places for different faiths. From lakes to hills forest to temples valley to rivers and waterfalls to meadow these less known places in Maharashtra host everything a nature lover and travelers would wish for so these. For this paper used secondary research methodology has been used for research for data collection, secondary data collected from, the literature the review also government agency data, tourism online news has been collected. This paper emphasizes the emergence of religious tourism in Maharashtra and also explored the potential growth and suggested the some solutions for development tourism in Maharashtra.

Keywords: Religious Tourism, Destinations, Spiritual, Faith, Culture.

I. INTRODUCTION

The Indian tourism industry is one of the important contributors to the economy of the country. Maharashtra is brimming with an array of colorful shrines, a remarkable collection of caves, olden beaches lined with swaying historic hotspots with strong past connections, and hill stations under the canopy of lush Western Ghats. The state is primarily known for ancient Ellora and Ajanta caves and pilgrim destinations. Maharashtra enjoys 720km of coastline having beaches and shorelines Also Konkan coast mesmerizes the eyes with its white beaches. People of diverse cultures and religions live amicably in the state. Maharashtra States its tops in foreign tourist arrivals (20.8%) and counted among leading states for domestic tourists (7.2%). offers a variety of destinations for its tourists business, cultural-historical, geographical, and religious, etc. Ancient and medieval Maharashtra included empires of the satvahana dynasty, Rasttrakuta, Western Chalukyas Mughals, and Marathas. it has popular Hindu places of pilgrim such as Pandharpur, Dehu, Alandi, Hazur Sahib Gurudwara At Nandedsaibaba Shrine And Dikshabhumi at Nagpur. Maharashtra has ambitious plans to boost tourism as evident from the 2016 tourism policy. Aurangabad is the tourism capital of Maharashtra. These destinations in Maharashtra are very crowded tourists.



Sai Baba Shirdi ((www.tourmyindia.com/pilgrimage/shirdi))

II. REVIEW OF LITERATURE

Review about the present work is very important because it helps to know what has been written about present study. Some important research work to present topic is given here. Maharashtra attracts tourist from different states and foreign countries it was the second most visited Indian state by foreigners and fourth most visited states by domestic tourists in 2014.

Dr. Kishore R. Nikam

Associate Professor, PG Department of English, LVH College, Nashik (India)

Abstract:

Good communication is one of the important prerequisites to be successfully sharing any knowledge, thought, idea, data, etc. The quality of communication ultimately decides the results of it; good quality will pave a way for excellent results whereas poor quality will surely affect the entire process and the end product. For quality enhancement in Higher Education in India, National Assessment and Accreditation Council (NAAC) is established to work for the assessment and accreditation of the institutes of higher education including different types of universities and colleges. Being a preferred language of official communication with NAAC, English language has a certain privilege in the entire process. Ultimately, there is a need to understand its importance therein while writing the Self Study Report. The way/quality of communication has a crucial role to play in the entire process. The present research paper is an attempt to explore the same.

Keywords: Communication, quality of communication, Higher education, National Assessment and Accreditation Council (NAAC), assessment and accreditation, Self Study Report

Introduction:

English language is a medium of communication in India for almost all of the important official work of different organizations, agencies, and offices. The organizations, agencies, and offices concerned expect correct and clear communication to for better understanding. National Assessment and Accreditation Council (NAAC) which performs the role of assessing and accrediting the institutes of higher learning in the country is no exception to this. Poor quality of communication may make a bad impression of the presenting institute and affects the score, in the assessment of both quantitative and the qualitative metrics used for assessment and accreditation. So, for any institute undergoing the process of assessment and accreditation, it is very important to know that it should have both the content and a quality presentation/communication of the same. Language as a medium of communication plays a vital role in the entire presentation. An effective presentation is possible only through correct and clear communication which shall result in a good result. In an online survey of the reports, submitted to NAAC, of the institutes of higher learning, it is observed that sometimes the report uses correct, clear and convincing communication of the activities carried out in the assessment period and sometimes it does not. So the reports using quality communication as a means of informing can definitely get a good grade over the others; it cannot be understood by many how they could achieve the success even if having a similar kind of content. Here, the possibility is that of communicating the same thing in two different ways; of course, presentation also matters. For this research, the following are a few examples, taken virtually from the reports submitted to NAAC, of proper and improper ways of communication used.

Example 1:

"The institution's mission reflects the distinctive characteristics of the institution. The College caters to the educational, social, cultural and economic needs of the society. All these characteristics are reflected in its policies. High quality educational programmes and healthy practices are being implemented keeping in mind the policy of uncompromising adherence to the values and principles of inclusion, responsibility and social accountability."* (p.03)

This part of information may be rewritten/presented as follows to make it a more appropriate

DEPICTION OF THE MARGINALISED IN THE GOD OF SMALL THINGS

- Dr. Sandeep A. Wagh, Nashik

Abstract :

The Marginalized or the untouchables have been the most pathetic figures of our country. Untouchability has been the greatest reason, that has been hampering the progress of Indian society. Untouchability has been the huge obstacle in the development of the marginalized or the Dalits. Arundhati Roy has deliberately foregrounded the issues of these sections of the society and has shown how much deprivations these people has to undergo in the 20th century India. She intentionally draws the attention of the readers towards the biased, prejudiced, caste-ridden mindset of the upper caste and its victims by portraying the social outcastes in Kerala in the form of Velutha.

Key Words : Marginalisation, Outcaste, Paravan, Untouchables.

The Untouchables of Kerala during the period that Arundhati Roy describes in her novel were victims of social atrocities. They were forced into 'silence'. Anyone who dared to break the silence did so at his/her peril Velutha, who is projected as an untouchable, Christian Paravan, living at the mercy of forces of social hegemony, hierarchically superior to him caste wise, ventures to break his imposed silence, and pays the price. In contrast to his better experiential realities, what is inherent in his natural disposition fits in with his name, Velutha', and its symbolic significance of 'whiteness' that stands for purity. Unfortunately, his black complexion and his 'low birth' suggest his social inferiority and the resultant segregation and subjugation that he is subjected to.

Velutha, an emblem of the adage Black is Beautiful, is adept at carpentry, and is exploited by the owners of the Paradise Pickle factory. Yet, Velutha is not allowed into their Syrian Christian family house because of their high caste profile. Velutha's personality is portrayed through a series of words and phrases that signify 'quietness'. His gait,

The Myth of Yavakri in Girish Karnad's 'The Fire and the Rain'

Dr. Sandeep A. Wagh

Asst. Prof in English

L.V.H Arts, Science and Commerce

College, Panchavati Nashik.

Nashik (MS)

Mob: 9420716151

Email- mesandeepwagh78@gmail.com

Abstract:

Karnad has been inspired by the myth of Yavakri as told in C. Rajagopalachari's version of the Mahabharata. It is narrated by the ascetic Lomasha in the Vana Parva (Forest Canto) to the Pandavas as they wander across the land during their exile.

Key Words: Myth, Lomasha, Tapasya.

The myth concerns Yavakri, son of the sage Bharadwaja, who insisted on obtaining spiritual knowledge direct from the gods instead of getting it by diligent study at the feet of human gurus. His father Bharadwaja advised him against it but Yavakri went to the jungle and 'tapasya' (penance) for ten years so that he could obtain the knowledge of the Vedas from the gods direct. The rigors of his ascetic practice were such that Lord Indra, the King of Gods, appeared to him, but only to persuade him that there were no short cuts to knowledge, which has to be obtained by studying at the feet of a guru. But Yavakri was so adamant that Indra ultimately relented and granted him his wish.

Bharadwaja, being a wise man, was anxious lest the triumph turned his son's head. He cautioned Yavakri against delusions of omnipotence. But his fears unfortunately proved unfounded. For one of the first things Yavakri did was to corner Raibhya's daughter-in-law in a lonely spot and molest her.

Yavakri's misdemeanor incensed Raibhya. He involved the 'kritya' spirit. He tore a hair from his head and made an oblation of it to the fire. From it sprang a woman who looked exactly like his daughter-in law. From another hair he similarly brought forth a rakshasa (demon). Then he sent the two to kill Yavakri.

The spirit in the form of the daughter-in-law approached Yavakri seductively and stole the urn which contained the water that made him invulnerable to danger. The rakshasa then chased him with a trident. Yavakri ran toward a lake in search of water, but the lake dried up. Every spot with a bit of water in it dried up at his approach. Finally, Yavakri tried to enter his father's hermitage. But a blind man of the Sudra caste, who was guarding the gate, barred Yavakri's entry. At that moment the rakshasa killed Yavakri.

When Bharadwaja learnt from the Sudra how his son had died, he was naturally distressed. Although he knew his son was to blame for all that had happened, he cursed Raibhya that he would die at the hand of his elder son. And then shocked at his own folly in cursing a friend, he entered the fire and immolated himself.

According to Girish Karnad, 'The myth of Yavakri' forms a major portion of Karnad's play but he has tweaked it at places to suit his dramatic requirements. Yavakri's father Bharadwaja, shown as Raibhya's brother in the play, is already dead. He died of a "broken heart", we are told, when Yavakri went to the jungle to undergo his ten-year-old "ordeal" to obtain the

The Study of Identity Crisis in 'The God of Small Things'

Smt. Sarala Kisan Sanap

Research Scholar, SPPU, Pune and

Associate Professor (English)

LVH Arts, Science and Commerce College, Nashik

saralaksanap@yahoo.com

Abstract :

Arundhati Roy's *The God of Small Things* is a wonderful literary creation say a master piece which deals with multiple themes, such as - caste and cultural conflict, social consciousness, class antagonism, oppression of women and untouchables etc. The novel also depicts the tyranny and injustice the women and the untouchables have to suffer without any reason. The novel in a sense breaks the boundaries of the caste, minority- untouchables, gender, and most importantly love rather right to love. *The God of Small Things* portrays the love story of Velutha and Ammu. Though the story is narrated from Rahel's perspective, the above key aspects are closely related with the theme of identity crisis of Ammu and hence the researcher in view of the above, ventures to analyse the character of Ammu, as the protagonist. Ammu is victimised in several ways in the patriarchal set-up. Service, sacrifice, submissiveness and tolerance are required attributes of Indian Women in general. The same is applicable to Ammu. She is seen insulted, humiliated and expected as a mute sufferer in the story by the patriarchal set-up. Ammu is seen shackled at the very important stages of her life by the patriarchal and orthodox set-up. The researcher through this paper is trying to analyse Ammu's character, in order to explore her identity crisis caused by multiple elements such as her family background, the prevailing socio-cultural conditions, the workings of religion, caste, race and class system, the established culture and tradition, gender inequality in the larger context of man dominated and patriarchal set-up.

Keywords : class antagonism, oppression of women, untouchables, identity crisis, patriarchal, orthodox set-up.

Introduction:

The contemporary Indian novels in English published in the last few decades reveal new heights with sudden spurt in creative activities, rich in quality and quantity as well. The creative or aesthetic vision of Indian English writing has got a tremendous change. Indian English women writers like Arundhati Roy, Manju Kapur, Bharati Mukherjee and others have depicted pathetic plight of the women, constantly suffering from patriarchal domination, their identity crisis and their revolt against tradition. Arundhati Roy's debut novel, *The God of Small Things* is undeniably a unique novel in the history of Indian English Literature, which "fulfils the highest demand of the art of fiction". It bagged the coveted 'Man Booker Prize' 1998 for depicting the horrors of the caste system in India and how the women in general are marginalised. It is a sarcastic account of gender structure, caste system and communalism in India. Roy has effectively presented the wretched predicament and victimization of the female protagonist Ammu in the novel.

The novel discusses small things in everyday life. It depicts the social system in which caste repression and male domination go hand in hand. Apart from the cultural crisis, the novel has exposed the malpractices of systems e.g. treatment given to working class in industry and in

**THE ANALYSIS OF MULTIPLE DIMENSIONS OF IDENTITY CRISIS IN ANURAG
MATHUR'S THE INSCRUTABLE AMERICANS**

Smt. Sarala Kisan Sanap

Research Scholar, SPPU, Pune and Associate Professor (English), LVH Arts, Science and Commerce
College, Nashik, saralaksanap@yahoo.com

Abstract:

'Identity Crisis' has been one of the major concerns in the contemporary Indian novels in English. The protagonist as an isolated individual, a victim of identity crisis, is portrayed in several contemporary Indian novels in English published in recent times. The issue of identity crisis has always been a poignant one, particularly for those, who spend their life away from their homeland for multiple reasons- willingly or unwillingly. People are forced to settle down in foreign lands for a variety of reasons and as a result they come into close contact with people from diverse cultural background. This close cultural interaction obviously leads to cultural conflict resulting in cultural and identity crisis. The victims are seen continuously suffering the psychological trauma. People who immigrate to foreign land carry a sense of belonging and affinity to their homeland naturally. Physically they are away from their homeland but emotionally and psychologically they are connected to homeland all the times. The contemporary Indian literature in English has explored the experiences of these tormented individuals. The present paper is an attempt to explore the identity crisis and experiences of the protagonist, Gopal Kumar, a small town young-boy in Anurag Mathur's 'The Inscrutable Americans'. The present paper attempts to depict the sense of detachment, which arises as a result of emotional and psychological conflict, experienced by Gopal Kumar, the immigrant, living away from his homeland (India) trying to assimilate into a new culture (American). The paper depicts Gopal Kumar's quest for redefining his identity. In all, the researcher has done the textual analysis of identity crisis of the protagonist – Gopal Kumar by applying Erik Erikson's 'Theory of Identity Development'.

Keywords: Identity crisis, immigrant, homeland, assimilate, psychological trauma, emotional and psychological conflict.

Introduction:

The contemporary Indian writing in English has made recognizable and notable contribution to the world literature. The contemporary Indian novels in English, which have been published recently, are creative, rich in quality and quantity. The authors like Salman Rushdie, Anurag Mathur, Aravind Adiga, Arundhati Roy, Jhumpa Lahiri, Manju Kapoor, Kiran Desai, and others are the creators of new literary inventions. Most of these authors have taken significant shift in the aesthetic perspectives and portrayed an isolated protagonist, constantly suffering psychological dilemma, leading to identity crisis. Anurag Mathur, a prominent name in contemporary Indian Writing in English, through his debut novel 'The Inscrutable Americans' has presented the aforesaid theme, but with a sarcastic and hilarious manner, while describing the experiences of the protagonist, Gopal Kumar. However, beneath the sarcastic, comic and hilarious situations, one needs to fathom the undercurrents and the psychological dilemma that leads to identity crisis, basically due to the life style and clash of two cultures viz. Indian and American. The apparent funny situations portrayed in the novel, if analyzed in the light of psycho-social crisis, yield to the enriched depth of meanings.

Theorizing the Theory for Analysis of Multiple Dimensions of Identity Crisis:

“Recent Trends And Development In Digital revolution through online marketing”

Dr. Arti C. Lokhande

Asst. Prof., Department of Commerce, MGVS Loknete Vyankatrao Hiray Arts, Science & Commerce
College, Panchavati, Nashik.
Email ID.- aarti.lok@gmail.com.

Abstract

In today's digital world, online marketing is a powerful tool. The backbone of online marketing is the digital revolution, which has been employing online words since the mid-twentieth century. Today's online marketing is undergoing a digital revolution. Convergence with the future of technology is the future of internet marketing. The use of the digital world in internet marketing has narrowed the scope of traditional or conventional marketing that relies on manual processes. The Third Industrial Revolution is also known as the Digital Revolution. India is on the verge of a massive digital transformation. In India, the Digital Revolution has also resulted in the development of digital entertainment and media. In India, the potential for digital marketing is enormous.

Key Words: Customer Life Cycle, Digital Revolution, Digital Revolution, Online Marketing and Technology.

Introduction:

The corporate world has changed dramatically in the twenty-first century, but these shifts have been tempered by constant advances in computer and communication technologies. Moore's law is related to today's growing global speed of change. Emerging markets have taken centre stage since the turn of the century, the digital revolution has arrived, social networks have become ubiquitous, the sharing economy has emerged, scientific advances such as the mapping of the human genome have changed our lives, and the people's voice has reinvented markets and overturned governments. Computing and information systems science has arisen as a key shift in business and society. In the field of internet commerce, a revolution is taking place. In today's industry, global networking and other broadband technologies are being employed as competitive weapons. The world of network infrastructure began a rapid transformation to new technological advancement, local area network, protocols, routers, and user friendly, software found market place that motivated individual initiative to experiment with net working under pressure from technologies change, competition, and decreasing hardware prices.

Meaning of Digital Revolution:

The environment we live in is rapidly being digitized, and digital connections will soon dominate our space — even our personal space. In fact, it has begun to occupy a significant portion of our personal lives. Human beings' basic needs and desires are growing. The emergence of Digitalization in the last one decade has brought about revolution in the economy of India. Now, it has become crucial part of one's life. The basic needs and wants of human beings are building up the innovation cycle of the economy. India witnessing tremendous growth in the past decades, almost all the sectors in Indian economy has been influenced by the digital revolution.

Definition - Digital Revolution:

The term "digital revolution" refers to the transition from analogue electronic and mechanical devices to today's digital technologies. The era began in the 1980s and continues today. The beginning of the Information Era is also marked by the Digital Revolution. The Third Industrial Revolution is another name for the Digital Revolution.

Developing/ Progressing Stages of Digital Revolution:

The Internet was the catalyst for the creation and advancement of digital technologies. Here's a quick review of how the Digital Revolution unfolded:

- 1) 1947-1979 – In 1947, the transistor was introduced, paving the door for the creation of powerful digital computers. During the 1950s and 1960s, computer systems were used by the government, military, and other institutions. The World Wide Web was born as a result of this study.
- 2) 1980s - The computer became a commonplace machine by the end of the decade, and knowing how to operate one was a requirement for many employments. During this decade, the first cell phone was also introduced.
- 3) 1990s - The World Wide Web was introduced in 1992, and by 1996, it had become a standard feature of most commercial activities. By the late 1990s, about half of the American population had adopted the Internet as part of their daily routine.

Prof. Dr. Gonte Kiran Dnyaneshwar

(Associate Professor)

Loknete Dr. Balasaheb Vikhe Patil (Padma Bhushan Awardee)

Pravara Rural Education Society's,

College of Agriculture Business Management, Loni

Dr Arti Chudamanrao Lokhande (Assistant Professor)

MGV's, L.V.H. Arts, Science & Commerce College, Panchavati, Nasik,

Maharashtra. (Affiliated SPPU, Pune)

ATISHAY KALIT

Vol. 9, Pt. A

Sr. 15, 2022

ISSN: 2277-419X

“Rise of Digital Wallet in Pandemic”

ABSTRACT

Pandemic teaches us so many new things; lockdown and social distancing foster everyone to work from home. In dealing with such tragedy situation, use of smart phones and laptop exponentially increased. Smart phones are used everywhere in this modern world. The technological advancement has made everything possible under one touch. By using applications installed in the smart phones the user can pay bills and transact their money to anyone at their ease. During pandemic consumers were asked to stay at home and strict rules were imposed. This resulted in heavy use of digital wallet for payments for different purposes of consumers such as ordering food, booking a cab, ordering grocery, ordering medicals and other online payments such as bank transfer. These mobile applications work with the support of e-wallets which is recognized as digital wallets. This paper shows how much the consumers preferred using e-Wallets on daily basis for making day to day transaction during this pandemic.

Key words: Smart Phones, Consumers, Digital Wallet, Pandemic.

INTRODUCTION

Coronavirus (COVID-19) pandemic forced nationwide strict lockdown in India. Preventive measures like social distancing compelled people to use digital payment applications to complete their day to day transactions. It is proved that higher is the perceived security, social influence, performance expectancy higher is the e-wallet usage in amid of Covid-19 lockdown period. (Revathy & Balaji, 2020). “Paytm” and “Google pay” are emerged as mostly used digital payment apps (PTI, 2020). The shift from physical payments to digital payments seems to be smooth owing to the increasing number of smartphone users in India. There were 439.42 million smartphone users in the

A STUDY ON HRM PRACTICES IN SMALL AND MEDIUM ENTERPRISE

Dr. Suvarna S¹, Dr. Manochandar S², Dr. S. Jyothirmaye Reddy³, Dr. Arti Chudamanrao Lokhande⁴,
Dr. Shailesh Kediya⁵, Dr. Archana Rathore⁶

-
1. Assistant Professor, Department of Business Administration, GSS Jain College for Women, Vepery, Chennai
 2. Assistant professor, Master of Business Administration CARE college of engineering, #27, Dindugal main Road, Thayanur, Tamil Nadu 620009, India.
 3. Associate Professor, Faculty of Management Studies, Marwadi University, Morris Road, Rajkot - 360003 (Gujarat)
 4. Assistant Professor, Department of Commerce, MGV's Loknete Vyankatrao Hiray Arts, Science and Commerce College, Panchavati, Nashik, Maharashtra
 5. Associate Professor, Department of Management Studies, G H Raison College of Engineering, Nagpur
 6. Associate Professor, ICFAI Business School, The ICFAI University Jaipur- 302031

Abstract

Small scale industries play a vital role in economic development. The Government looks to this sector for alleviating the problems of poverty, rural unemployment, attainment of reliance, reduction in disparities in income and regional imbalances, because of its shorter gestation period, adaptability to semi urban and rural environment where infrastructure is undeveloped and capacity to attract small savings and divert instrument in the development of backward and rural areas. More importance is attached to this sector since more employment can be created per unit of investment at a comparatively shorter period than the medium & large scale sector. Retaining essential workers is critical to an organization's existence and success. Employees must be managed with extreme caution, since they are the most valuable and complicated resource. Organizations may retain personnel only if they match their present needs. According to Workforce Planning, the business need a systematic approach to establishing an environment that supports employees' diverse requirements in order to retain them as employees. This is the first step toward success and progress. The main aim of the study is to study the nature of the sample respondents and to analyze the factors affecting employee retention through HRM practices in SME. The study is designed as descriptive based research. The descriptive research study is used for the defining and analyzing the research problem effectively. A descriptive study may help the researcher to describe various characteristics associated with the subject population. The study has attempted to explain the reality prevailing among SMEs in terms of their HRM practices. The present study is mainly based on the primary data collected from the sampled employees of SMEs. Simple random technique is used for the study with sample of 300 respondents. The study concluded that recognition of skill, learning and working climate, career development, compensation and benefits are mostly affecting the factors on the retention of employees.

1. HRM in SMEs- Introduction

Increasingly, SMEs are seen to have an important role in our economy, indeed it would seem that both national and local economies are largely constituted of smaller enterprises, with the addition of a minority of larger enterprises. Given this significance, the SME potentially provides

a rich source of material for management researchers on a range of current themes. However, Hendry et al. (1995) suggest that much management theory continues to emphasize large firms even though their economic significance has declined in recent years. Indeed they suggest that there are two common inferences within the management literature that operate to the



Goat Farming: History & Importance in the Era of Globalization

Dr. Pragati B. Marakwar

Head & Assistant Professor, Department of History, L.V.H. College, Nasik

Introduction :-

In India, the goats are among the main meat producing animals. Most of the people prefer goat meat and has a huge domestic demand. Along with meat production, goats are also very suitable for milk, fiber and skin production. They also produce high quality manure which helps to increase the crop production. Goat has a great and important contribution in the rural economy. Specifically in mountainous, semi-arid and arid regions of India. There are more than 25% goats among the total livestock in the country. Here I am describing about History and Importance of Goat Farming in the era of globalization History of Goat Farming:

Goat population witnessed +8.1% change between 1990 and 1996 at global level and the maximum change (+27%) has been in Asian countries. Over the last 15 years, the number of goats has increased by almost 50% at world level, whereas, sheep decreased by 4% and cattle increased by only 9%. Thus, goat has emerged as a major livestock species that is enormously rising in number (Morand-Fehr and Boyazoglu, 1999, Devendra, 2001). In India too, during the last 40 years, the goat population rose by 140%. Goat population in India has increased at a faster rate than that of other species of farm animals. In 1952, there were 47.0 million goats, which has risen now to 123.0 million (17.08% of the world's goat population) making India number two in the world ranking and number one in goat milk production (<http://www.apps.fao.org>). The National Commission on Agriculture (NCA, 1976) in India had recommended the reduction in goat population on the grounds of environmental implications of goat rearing on degradation of forest and grazing lands.

The phenomenal increase in goat population despite NCA recommendations against it, clearly explains importance of goats for the rural people in India. In India, the contribution of livestock sector to Gross Domestic Product (GDP) is rising though the contribution of agricultural sector in general is witnessing a declining trend. This indicates that India is moving towards industrialization like developed countries where livestock sub sector contributes over 50% of the agricultural sector's contribution. In such a situation, goats are going to be even more important source of livelihood for many more people in coming years, thus, deserves greater attention both at micro and macro level. The current study being a part of a broader study on livestock production systems was undertaken mainly to appraise the role of goats for small scale farmers including the landless rural population in predominant crop livestock mixed farming systems operating in India.

Goat is usually referred to as the cow of the poor. Rearing of goat is easy and can be done by landless

सातवाहन काळातील लेणी स्थापत्याचा आविष्कार

- डॉ. प्रगती बी. मारकवार

इतिहास विभागप्रमुख, एल.व्ही.एच.कॉलेज, पंचवटी, नाशिक-2

ई-मेल : pragatimarakwar@gmail.com

महाराष्ट्राची भूमी ही शौर्याची, संतांची कलेची भूमी म्हणू ओळखली जाते. महाराष्ट्रातील कलेचा वारसा अतिशय संपन्न असा आहे. अनेक कलांपैकी स्थापत्यकला या वारशाचे दोन ठळक पौलू म्हणजे लेणी आणि गड किल्ले. महाराष्ट्राच्या सांस्कृतिक जडण-घडणीमध्ये त्यांचे अतिशय मोलाचे योगदान आहे. भारताचे जवळपास 1200 लेणी आहेत. त्यापैकी 75 % लेणी महाराष्ट्रात आहेत. याचे प्रमुख कारण म्हणजे महाराष्ट्राची भौगोलिक घडण व ऐतिहासिक पाश्र्वभूमी येथील अग्निजन्य खडकापासून तयार झालेल्या पठाराच्या स्तरयुक्त घडणीमुळे हा भु-भाग लयन स्थापत्यासाठी आदर्श आहे. यासाठीच अशा स्तरयुक्त रचनेचे महत्व अनन्यसाधारण आहे. याच भौगोलिक घडणीचा कल्पकतेने वापर करून लोकजीवनाचे प्रतिबिंब त्यात उमटले आहे. सातवाहन सत्ताधिकांच्या काळात ठिकाणी लेणी स्थापत्य निर्माण झालेले दिसू येते लोकजीवनाचे प्रतिबिंब त्यात उमटले आहे. लेणी स्थापत्यापैकी बहुतांश लेणी स्थापत्य हे बौद्ध धर्माशी संबंधित आहे प्रस्तुत शोधनिबंधामध्ये सातवाहनकालीन लेणीचा अभ्यास करण्याचे प्रयोजिले आहे.

मौर्यपूर्वकाळात महाराष्ट्रात बौद्ध धर्माची ओळख झाली होती असे म्हणण्यास वाव आहे. मौर्य सम्राट अशोकाच्या काळात बौद्ध भिक्षू हिरिरीने बौद्ध धर्माचा प्रचार करू लागले. पण बौद्ध परंपरेचा अभ्यास केल्यास या आधी गौतम बुद्धाच्या काळातच बौद्ध धर्म महाराष्ट्रात येऊन दाखल झाला होता असे स्पष्ट होते. बुद्धाच्या काळातच सर्व जगभर परिवर्तन सुरू झाले होते. जुने (स्थितप्रज्ञ /स्थितीशील) जग नाहिसे होऊन नवीन जग डोकावू लागले होते. इतिहासाची पौराणिकता जाऊन त्याला ऐतिहासिकता येण्याचा काळ हाच होता. याच परिवर्तनाचा प्रभाव तत्कालीन लोकजीवनाप्रमाणेच कलेच्या विशेषतः लेणी स्थापत्यावर पडल्याचे दिसते. त्यामुळेच येथे भिक्षू संघाचा पाया घातला गेला आणि यातूनच पुढे लयन स्थापत्याची सुरुवात महाराष्ट्रात झाली. भिक्षूंना राहण्यासाठी व प्रार्थनेसाठी या लेण्यांची निर्मिती झाली. घरांपेक्षा लेणी उन्हाळ्यात थंड व हिवाळ्यात उबदार असतात. तसेच चिरकाल टिकतात. सातवाहन

स्त्री संताचा वारसा: संत जनाबाई

डॉ.प्रगती बी. मारकवार इतिहास विभागप्रमुख एल.व्ही.एच.कॉलेज, पंचवटी, नाशिक-2

: pragatimarakwar@gmail.com

सारांश :

ज्ञानेश्वर माऊलीच्या भगिनी मुक्ताबाई व तुकाराम महाराजांच्या अनुग्रहिता बहिणाबाई यांच्या सारख्या फार मोठा पारमार्थिक अधिकार असणाऱ्या स्त्री-संत ही होऊन गेलेत. त्यांनी आपली अभंगरचना अतिशय शुद्ध व संस्कृत भाषेत केली. त्याकाळी होऊन गेलेल्या सर्व स्त्री संतांनी वेगवेगळ्या पद्धतींनी काव्यरचना केली. जसे की समर्थ रामदास स्वामींच्या शिष्या वेणाबाईंनी संस्कृत भाषेत सीता-स्वयंवर हा मोठा ग्रंथ लिहीला. त्याचप्रमाणे संत चोखामेळा यांच्या पत्नी सोयराबाई याही अभंग रचत असत. त्यांनी रचलेले अभंगही अतिशय सुंदर आहेत. संत चोखामेळा यांची बहीण निर्मला हिनेही अतिशय सुरेख अशी अभंग रचना केलेली आहे. सुदैवाने हया स्त्री संतांचे आज अनेक अभंग उपलब्ध आहेत.

पण या सर्वांमध्ये जनाबाई इतकी प्रसिद्ध अशी अभंग रचनारी दुसरी कुठलीही कवयित्री नाही. कारण आजही महाराष्ट्रातील भाविकांना नामदेव महाराजांच्या काळात होऊन गेलेल्या ओव्या व निर्मळ मनाच्या जनाबाईंनी रचलेले साधे, भोळे, पण प्रेमळ असे अभंग फार आवडतात. सर्व संत कवींमध्ये अभंग रचनाऱ्या तुकाराम महाराजांची जी योग्यता होती, तीच योग्यता संत कवयित्रीमध्ये जनाबाईंची होती. प्रस्तुत शोधनिबंधातून स्त्री संत जनाबाईंच्या अभंगांचे महत्व सांगण्याचा प्रयत्न केला आहे.

कीवर्ड: स्त्री, संत, अभंग, संत जनाबाई, कवयित्री, संत नामदेव, विठ्ठलभक्ति

प्रस्तावना:

सुमारे सातशे-आठशे वर्षांपूर्वी महाराष्ट्रात ज्ञानेश्वर महाराज, नामदेव महाराज, तुकाराम महाराजांसारखे अनेक संत होऊन गेले. त्यांनी आपले विचार जनतेला समजावून सांगून त्यांची पारमार्थिक प्रगती घडवून आणली. त्यांनी अनेक अभंग रचून लोकांना उपदेश केला त्यांचे अभंग आजही आपल्याला स्फूर्ती देतात. खऱ्या भक्तीचा अर्थ समजावून सांगतात.

त्या काळी समाज सुधारणेच्या कार्यात या संतांबरोबरच अनेक स्त्री संतांनी बहुमोल वाटा उचलला. त्यांनीही अनेक अभंग रचून त्याद्वारे लोकांमध्ये पारमार्थिक क्रांती घडवून आणली.

त्यांच्यामध्ये ज्ञानेश्वर माऊलीच्या भगिनी मुक्ताबाई व तुकाराम महाराजांच्या अनुग्रहिता बहिणाबाई यांच्या सारख्या फार मोठा पारमार्थिक अधिकार असणाऱ्या स्त्री-संत ही होऊन गेलेत. त्यांनी आपली अभंगरचना अतिशय शुद्ध व संस्कृत भाषेत केली. त्याकाळी होऊन गेलेल्या सर्व स्त्री संतांनी वेगवेगळ्या पद्धतींनी काव्यरचना केली. जसे

स्वातंत्र्य चळवळीत नाशिक मधील स्त्रियांचे योगदान

डॉ. प्रगती बी. मारकवार इतिहास विभागप्रमुख एल.व्ही.एच.कॉलेज, पंचवटी, नाशिक-2
pragatimarakwar@gmail.com

गोषवारा:

इ.स. १८१८ मध्ये ब्रिटीशांनी पुण्यातील पेशवाई संपवून आपले निशाण शनिवार वाड्यावर लावले. तेव्हापासून महाराष्ट्राचा प्रत्यक्षपणे ब्रिटीशांशी संपर्क आला. त्यांचे प्रशासकीय धोरण, राजनिती, शिक्षण इ. गोष्टींचा महाराष्ट्रीयनांना परिचय होवू लागला. जसजसा संबंध महाराष्ट्रीय लोकांचा ब्रिटीशांशी येवू लागला तसतसे महाराष्ट्रीयन आत्मपरिक्षण करू लागले, तेव्हा त्यांना आपल्यातील उणिवा भासू लागल्या. यातून ठळकपणे जाणवू लागले की समाजातील 50 टक्के घटक हा स्त्रियांचा असून त्यांना कोणतेही अधिकार किंवा शिक्षण दिले जात नव्हते. समाज जर सुशिक्षित करावयाचा असेल तर स्त्री शिक्षण हे महत्वाचे आहे याची जाणीव अनेक समाजसुधारकांना झाली व त्यातूनच म.फुले, महादेव गोविंद रानडे, पंडिता रमाबाई इ.नी मुलींसाठी शाळा काढल्या. शिक्षणामुळे स्त्रिया डोळसपणे राजकीय, सामाजिक परिस्थिती पाहू लागल्या व त्यातूनच जागृती होवून अनेक स्त्रियांनी स्वातंत्र्य आंदोलनात भाग घेतला.

कीवर्ड्स: स्वातंत्र्य चळवळ, नाशिक, स्त्रिया, महात्मा गांधी, योगदान, छोडो भारत आंदोलन

यंत्र नार्यस्तु पूज्यन्ते रमन्ते तत्र देवता: ।

यत्रैतास्तु न पूज्यन्ते सर्वास्तत्राफलाः क्रिया ।।

संतुष्टे भार्यया भती भर्त्रा भायी तुथैव च ।

यस्मिन्नेव कुले निलं कल्याणं तत्र वै ध्रुवम् ।।

प्रस्तावना :

देशाच्या स्वातंत्र्य आंदोलनात पुरूषांबरोबरच स्त्रियांनीही मोठा सहभाग घेतला होता. गांधीजींच्या प्रेरणेने महिलावर्ग या लढ्यात उतरल्या हे खरं असलं तरी सुरूवातीला गांधीजी स्त्रियांच्या सहभागाबाबत तितकेसे उत्साही नव्हते. पण स्त्रियांचा उत्साह व कामगिरी पाहून त्यांनी मनापासून दाद दिली होती. मात्र स्वातंत्र्य मिळाल्यावर स्त्रियांच्या या कामगिरीची म्हणावी तेवढी दखल घेतली गेली नाही. हा विषय अभ्यासकांच्या मनात मात्र जागाच राहिला. त्या अनुषंगाने नाशिक जिल्ह्यातील स्वातंत्र्य चळवळीत स्त्रियांनी केलेल्या कार्याचा थोडक्यात आढावा घेण्याचा प्रयत्न प्रस्तुत लेखात केला आहे.

इ.स. १८१८ मध्ये ब्रिटीशांनी पुण्यातील पेशवाई संपवून आपले निशाण शनिवार वाड्यावर लावले. तेव्हापासून महाराष्ट्राचा प्रत्यक्षपणे ब्रिटीशांशी संपर्क आला. त्यांचे प्रशासकीय धोरण, राजनिती, शिक्षण इ. गोष्टींचा महाराष्ट्रीयनांना परिचय होवू लागला. जसजसा संबंध महाराष्ट्रीय लोकांचा ब्रिटीशांशी येवू लागला तसतसे महाराष्ट्रीयन आत्मपरिक्षण करू लागले, तेव्हा त्यांना आपल्यातील उणिवा भासू लागल्या. यातून ठळकपणे जाणवू लागले की समाजातील 50 टक्के घटक हा स्त्रियांचा असून त्यांना कोणतेही अधिकार किंवा शिक्षण दिले जात नव्हते. समाज जर सुशिक्षित करावयाचा असेल तर स्त्री शिक्षण हे महत्वाचे

Copyright @ 2022 Author

भारतीय स्वातंत्र्यसंग्रामात मराठी वृत्तपत्रांची भूमिका

डॉ. प्रगती बी. मारकवार

सहाय्यक प्राध्यापक, विभाग प्रमुख (इतिहास विभाग),

एल.व्ही.एच.कॉलेज, पंचवटी, नाशिक

१) प्रस्तावना

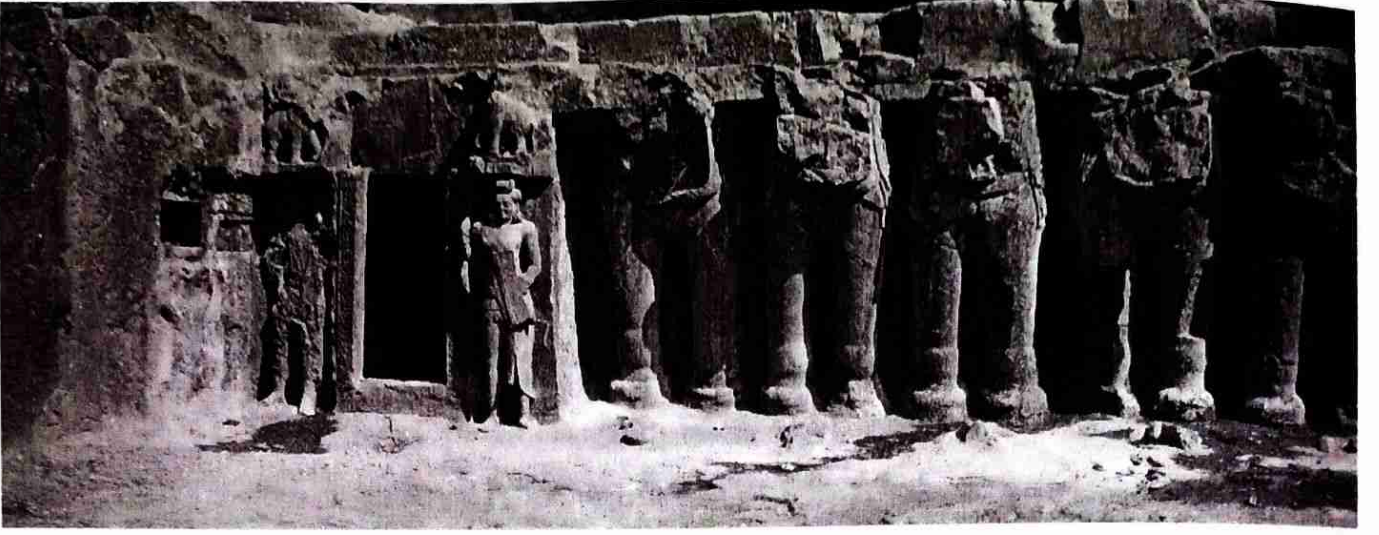
स्वातंत्र्यलढयात मराठी वृत्तपत्रांनी महत्वाचे कार्य केले असून, भाषिक वृत्तपत्रात मराठी पत्रांचा वाटा निश्चितपणे मोलाचा आहे, यात शंकाच नाही. जनजागृती करणे, जनतेत स्वातंत्र्याची आकांक्षा निर्माण करणे, ब्रिटिश राजवटीला विरोध करून, तिच्या जोखडातून मुक्त होण्यासाठी विचारवंतांना आणि सर्वसामान्यांना प्रवृत्त करणे, हे महत्वाचे कार्य वृत्तपत्रांनी केलेले आहे. ब्रिटिश राजवटी या देशात स्थिर होण्यासाठी इंग्रज राज्यकर्त्यांनी इंग्रजी शिक्षणाने सरकारी नोकऱ्यांच्या प्रलोभनाने, बुद्धीमान समजल्या जाणाऱ्या वर्गाला प्रथम वश करून घेतले. दुसरा वर्ग होता तो गुलामगिरीचाच, खंत मनात बाळगून स्वातंत्र्याची चळवळ उभारणाऱ्यांचा. या वर्गाने सत्याग्रह केले. मोर्चे काढले, कायदेभंग केला, सशस्त्र लढा दिला, लोकांपर्यंत पोहचण्यासाठी या मंडळींना माध्यमाची गरज पटली आणि वृत्तपत्र सुरू करण्याकडे, ते चालविण्याकडे त्यांचे लक्ष गेले. बाळशास्त्री जांभेकर आणि भाऊ महाजन यांनी मराठीत प्रथम दर्पण नावाने इंग्रजी व मराठी असे समिश्र स्वरूपातील वृत्तपत्र १८३२ मध्ये सुरू केले. १९८१ मध्ये केसरी आणि त्यानंतर ज्ञानप्रकाश सुरू केलेत. या दोन्ही मराठी वृत्तपत्रांचा विचारवंतांवर पगडा बसण्यास वेळ लागला नाही. लोकांना माहिती पुरवणे आणि त्यांचे लोकशिक्षण करणे एवढेच या पत्रांचे मर्यादित हेतू नव्हते. सर्वसामान्य जनतेला राष्ट्राच्या उत्थापनासाठी कार्यप्रवृत्त करणे हाही उद्देश होता. केसरीसारख्या पत्राच्या मागे टिळक व आगरकर ह्या दोन प्रभावी व्यक्ती होत्या. त्यांनी विशिष्ट विचाराने, ध्यानाने भारावून वृत्तपत्र सुरू केले होते. ४२

२) भूमिका

एकोणिसावे शतक उजाडले, त्याला सर्वार्थाने चमत्कार युग म्हणता येईल. छापण्याच्या कलेचा शोध वृत्तपत्रांच्या वाढीचा कणा ठरता. आजच्या आणि उद्याच्या वृत्तपत्रात छपाई यंत्रे व अन्य

तांत्रिक साधनांची जसजशी वाढ होत गेली, तसतसा वृत्तपत्रीय क्षेत्रात बदल होत गेला, पुढे होत जाणार आहे. पुण्यातल्या ज्ञानप्रकाश या मराठीतल्या पहिल्या दैनिकाने दूरध्वनीचा वापर करून बातम्या देण्याची पद्धत सुरू केली. लोटिळक यांच्यावरील खटल्याची बातमी दूरध्वनीवरून मुंबईत येत होती आणि ती ऐकण्यासाठी बराच मोठा समुदाय दैनिकांच्या कचेरीसमोर जमत होता अशी आठवण जुनी मंडळी सांगतात. मुद्रणसुलभतेने वृत्तपत्रांचा प्रसार सुलभतेने झाला. इतर सर्व सुधारणांप्रमाणे इंग्रजांकडेच या सुधारणेचेही पितृत्व जाते, हे खरे पण पुढे भारतीयांनी विशेषतः स्वातंत्र्यप्राप्तीसाठी या साधनांचा ज्या तऱ्हेने वापर करून घेतला तो संस्मरणीय इतिहास होय. मराठीतले पहिले वृत्तपत्र दर्पण होय. मुंबईत त्यापूर्वी मुंबापुरी समाचार सुरू झाल्याची माहिती अ.का.प्रियोळकरांनी उजेडात आणली आहे. परंतु साधारणपणे दशकभर तरी सातत्याने चाललेले व सर्वप्रथम निघालेले नियतकालिक म्हणून दर्पणचाच उल्लेख करणे योग्य होय. त्याचा व त्या पाठोपाठ निघालेला वृत्तपत्राचा ज्ञानप्रसार - विद्यादान हाच हेतू होता. त्यावेळच्या वृत्तपत्रांची नावेही याला साजेशीच म्हणजे ज्ञानोदय, ज्ञानप्रसारक, ज्ञानदर्शन, इंदुप्रकाश, ज्ञानसंग्रह, ज्ञानचंद्रोदय, प्रभाकर, ज्ञानाकर, विविध ज्ञानविस्तार अशी आढळतात. ज्ञानोदयाच्या एका अंकात म्हटलेले आहे की, वर्तमानपत्रांनी लोकांचे एकमत होते. राजास लोकांचे बोभाट कळतात आणि लोकास माहितीगिरी होते व झोपेत इकडेच लोक आहेत, ते जागृत होतील. ४३

मराठी वृत्तपत्रांनी दोन आघाड्यांवर वैचारिक संघर्ष चालविला होता. एक राजकीय आघाडी आणि दुसरी सामाजिक आघाडी होय. वृत्तपत्रांना ब्रिटिश साम्राज्यशाही विरुद्ध, समाजातील उच्च वर्णीयांविरुद्ध विचार व्यक्त करावे लागत होते. या सर्व सामाजिक आणि राजकीय भिन्न पद्धतीच्या इतिहासाला एकोणिसाव्या शतकाच्या आरंभापासूनच नवे वळण लागले होते. इंग्रजी सत्तेबरोबरच युरोपातील विचारांचाही प्रभावही येथे पडू लागला होता. या सर्व विचारांचे आणि आधुनिक युगाचे प्रतीक म्हणून पहिले मुद्रणयंत्र येथे आले. त्या यंत्राने ज्ञानक्षेत्रात अभिनव किमया घडून आणली. या निमित्ताने विद्याप्रसारासाठी एक क्रांतीकारक साधन समाजाला मिळाले. मुद्रित पुस्तके आणि पोथ्या वाचणारा एक नवा वर्ग वाढू लागला. इंग्रजी विद्या शिकणाराही अल्प का होईना, एक गट तयार झाला. हा वर्ग भोवतालच्या समाजजीवनाकडे नव्या दृष्टीने पाहू लागला. मिळालेले नवे ज्ञान विज्ञान पुढच्याही पिढीलाही मिळावे, अशी त्या वर्गाला उत्कट इच्छा होणे स्वाभाविक होते. आपल्याला प्राप्त होत असलेल्या अशा ज्ञान साधनांचा समाजालाही उपयोग व्हावा या लोकशिक्षणाच्या सद्भावनेतूनच वृत्तपत्रांचा जन्म झाला. या सर्व परिवर्तनवादी पद्धिने



किल्ले रामशेजवरील जलव्यवस्थापन

- गोरख शिवाजी शेवाळे

संशोधक विद्यार्थी

मो. ९१७५४०८२५४,

इ-मेल : gorakhshevale11@gmail.com

प्रा चीन काळापासून पाणी व्यवस्थापना विषयीचे संदर्भ मिळतात. भारतात बौद्ध भिखूनच्या निवासासाठी जे विहार बांधले गेले त्या ठिकाणी पाण्याची व्यवस्था आढळून येते. याचे संदर्भ त्या ठिकाणी कोरलेल्या शिला लेखांवरून मिळतात. मध्ययुगीन महाराष्ट्राचा विचार केला तर यादव वंशाचा प्रधान हेमाद्री याने जलसिंचनाला पुण्यकर्म असे संबोधले आहे. त्याने विहीर, बारव व आड इ. च्या निर्मितीसाठी योगदान दिले आहे.^१

मराठ्यांच्या इतिहासात किल्ल्यांना महत्वाचे स्थान होते. मोक्याची ठिकाणे हाती असणे हे दीर्घकाळ सत्ता राखण्याचा मापदंड समजला जाई. छत्रपती शिवाजी महाराज किल्ल्यांचा संदर्भात अतिशय जागरूक व दक्ष होते. नवीन किल्ल्याची जागा शोधणे, त्याचे भौगोलिक स्थान शोधणे, त्यावरील जलसाठ्याचे नियोजन करणे, इ. कार्य अतिशय सजगपणे केली जात. छ. शिवाजी महाराजांचे आजोबा मालोजीराजे यांनी काही बारव बांधल्याचे संदर्भ मिळतात. शहाजी राजे भोसले यांनी देखील बादशाह तलाव बांधला होता. शिवाजी महाराजांना जल व्यवस्थापनाचा वारसा हा कुटुंबाकडूनच मिळालेला दिसून येतो.

छत्रपती शिवाजी महाराजांचा इतिहास आणि किल्ले आपणास सदैव प्रेरणा देतात. हे किल्ले दुर्गम भागात बांधलेले होते. या किल्ल्यांवर मोठ्या प्रमाणात अश्वदळ, सैनिक आणि नागरिकांचे वास्तव्य असायचे. त्यांची पाण्याची गरज लक्षात घेता किल्ल्यावर प्रामुख्याने दगडाचे खोदकाम करून तलाव निर्माण केले जात असत. हाच खोदकाम केलेला दगड विविध बांधकामासाठी वापरला जात असे.

रामचंद्र पंत अमात्य यांनी किल्ला निवडतांना जलव्यवस्थापनाच्या नियोजनाकडे कशा पद्धतीने लक्ष द्यावे या विषयी भाष्य केले आहे. त्यांनी आपल्या आज्ञापत्रात लिहिले आहे की, “गडाचे पाणी बहुत जनत राखावे.”^२



मुघल स्थापत्यकला : फतेहपुर सिक्रीच्या विशेष संदर्भासह

- प्रा. रुचिरा विकास दंडगव्हाळ

संशोधक विद्यार्थी, मो. 9922010900, ई-मेल : dandgavalr@gmail.com

इस्लामचा उदय इ.स.७व्या शतकात अरब देशामधील वाळवंटी प्रदेशात झाला आणि इराण, मध्य आशिया आणि अफगाणिस्तानपासून संपूर्ण मुस्लिम उपखंडात पसरला. उत्तर भारतात इस्लामचे आगमन इ.स.१२व्या शतकात झाले. भारतामध्ये मुस्लिम स्थापत्यकला तीन टप्प्यांत विकसित झाली, एक म्हणजे दिल्ली सुलतानशाहीच्या अधिपत्याखाली, दोन स्वतंत्र प्रादेशिक सत्तांच्या प्रदेशात, आणि तिसरा टप्पा म्हणजे वरील दोन्ही शैलींचे एकत्रीकरण होऊन एक नवीन स्थापत्य शैली विकसित झाली ती म्हणजे मुघल स्थापत्य शैली. मुघल स्थापत्यकलेचा इतिहास प्रथम मुघल बादशाह बाबरपासून सुरू होतो. त्यानंतर येणाऱ्या अकबर, जहांगीर यांच्या काळात स्थापत्य कलेमध्ये होणारे बदल पाहायला मिळते. मुघल स्थापत्यकला शाहजहानच्या काळात त्याच्या अत्युच्च शिखरावर पोहोचली होती. “मुघल काळातील बाबर ते औरंगजेबाच्या राजवटीपर्यंतच्या महान मुघलांच्या कालखंडातील इमारत बांधकामांचे वैशिष्ट्य, वैविध्य आणि सौंदर्य यांची तुलना गुप्त काळाशी करता येईल.” ^(१) मुघल काळात समाजामध्ये हिंदू-मुस्लिम संस्कृती आणि चालीरीती यांचे मिश्रण पाहायला मिळते. या संमिश्र व्यवस्थेची झलक त्या काळातील सरदार, प्रशासन धर्म, सामाजिक व्यवस्था आणि त्याचबरोबर स्थापत्यकलेत सुद्धा दिसते. स्थापत्यकला, बांधकाम तंत्रज्ञान आणि अलंकारात केवळ हिंदू आणि इस्लामिक शैलीच मिसळल्या नाही तर त्यात इराणी आणि तुर्की प्रभाव सुद्धा दिसून येतो. याची परिणीती एक नवीन शैली विकसित होण्यामध्ये झाली, ज्याला विद्वानांनी मुघल स्थापत्य शैली, इंडो-पर्शियन शैली आणि इंडो-सारासेनिक शैली अशी नावे दिली आहेत. मुघल काळात धर्मनिरपेक्ष वापराच्या इमारतींपासून ते धार्मिक हेतूसाठी बांधलेल्या इमारतींपर्यंत सर्व योजना मोठ्या प्रमाणावर तयार केल्या गेल्या. यातील अनेक इमारती आजही अस्तित्वात आहेत. पैसा आणि संसाधनांच्या अभूतपूर्व उपलब्धतेमुळे अधिक भव्य इमारती बांधल्या गेल्या.

स्थापत्यशास्त्राच्या दृष्टिकोनातून अकबराची कारकीर्द विशेष महत्त्वाची आहे. त्याचा काळ हा प्रत्येक क्षेत्रात नवनवीन प्रयोगांचा काळ होता. वास्तुकलेच्या माध्यमातून इमारतींमध्ये आपली उदारता आणि सहिष्णुता समाविष्ट



नहपान विहार : सातवाहन कालीन जागतिकीकरणाचे प्रतिक

- प्रा. किर्ती विकास वर्मा

संशोधक विद्यार्थी, नाशिक, फोन नं. ९०११३१३२९६ Email - kirtivarma.scca2012@gmail.com

सह्याद्री पर्वताच्या कुशीतील गोदावरी नदीच्या तीरावर नाशिक हे शहर वसलेले आहे. नाशिक हे शहर पुराणकाळापासून प्रसिद्ध व पवित्र क्षेत्र म्हणून ओळखले जाते. प्राचीन आणि संस्कृतीचा अनोखा संगम नाशिक शहरात बघायला मिळतो. नाशिक ला ऐतिहासिक वारसा तर लाभलेला आहेच पण, सोबतच अगदी रामायणातील पौराणिक काळाशी ही नाशिकचा संबंध आहे. नाशिक मधील अंजनेरी मंदिर, त्र्यंबकेश्वर येथील ज्योतिर्लिंग मंदिर, काळाराम मंदिर, गोराराम मंदिर, रामकुंड वरील विविध देवतांचे मंदिर तर प्रसिद्ध आहेतच त्याच बरोबर इ.स.पू. दुसरे शतक ते इ.स. २ दुसरे शतक या कालखंडात निर्माण झालेल्या त्रिशूरी लेण्या प्रसिद्ध आहे. या लेण्यांलगत मुंबई- आग्रा महामार्ग आहे, नाशिक कडे जाणारा हा प्राचीन व्यापारी मार्ग होय, या व्यापारी मार्गावरच व्यापाऱ्यांच्या मदतीने सातवाहन, क्षत्रप इ. तत्कालीन सत्तांनी त्रिशूरी लेण्या खोदल्या. या लेण्यांच्या प्रवेशद्वारातून आत शिरताच प्रथम दर्शन होते ते १० व्या क्रमांकाच्या लेणीचे, ही लेणी नहपानाचे लेणे अथवा नहपानाचा विहार म्हणूनही प्रसिद्ध आहे. या लेणीमध्ये नहपान क्षत्रपांचे शिलालेख आहेत, क्षत्रप राजा नहपान हा गौतमीपुत्र सातकर्णीच्या समकालीन, त्यांचे येथील शिलालेख हे ब्राह्मी, संस्कृत मध्ये असून त्यावरून त्यांनी दिलेल्या दानाचे उल्लेख सापडतात त्याच बरोबर या लेणी चे महत्वाचे वैशिष्ट्य म्हणजे इथे ओसरीतील स्तंभांवर कोरलेली शिल्पे या पैकी काही महत्वाच्या शिल्पांविषयी या शोधनिबंधात चर्चा करण्यात आली आहे. त्याच बरोबर सातवाहन काळात व्यापाराच्या माध्यमातून जागतिकीकरणाची प्रक्रिया विकसित झालेली होती त्याविषयीची मांडणी देखील करण्यात आली आहे.

नाशिक मधील सातवाहनांची पार्श्वभूमी व व्यापारी उल्लेख :

प्राचीन भारतातील एक बलाढ्य राजवंश म्हणून सातवाहन घराण्याचा उल्लेख येतो. या घराण्याची माहिती मुख्यत्वे त्यांची नाणी, शिलालेख, पुराण ग्रंथ तत्कालीन साहित्यिक कृति यातून मिळते. या वंशातील राजांनी इ. स. पू. सु. दुसऱ्या शतकापासून इ. स. तिसऱ्या शतकादरम्यान महाराष्ट्रात अधिसत्ता गाजविली, सातवाहन राजांच्या कारकीर्दीत

जहाँगीरकालीन मोगल चित्रकला



डॉ. व्ही. बी. लांब

इंद्रराज कला, वाणिज्य व विज्ञान महाविद्यालय,
सिल्लोड, जि. औरंगाबाद

प्रा. कीर्ती विकास वर्मा

शिव छत्रपती महाविद्यालय,
औरंगाबाद, जि. औरंगाबाद

प्राचीन कालखंडापासून मानवी जीवनात सतत बदल, स्थित्यंतरे होत गेली. त्याचबरोबर राजकीय परिस्थितीमध्ये सतत बदल होत गेले. इ. स. १५२६ मध्ये बाबरकडून प्रस्थापित मोगल साम्राज्याने संपूर्ण भारतभर अंमल प्रस्थापित केला आणि या कालखंडातील कला, स्थापत्य, साहित्य इत्यादी सर्वच क्षेत्रात बदल घडून आले. मोगल राजवटीमधील हिंदू-मुस्लिम यांच्यातील सांस्कृतिक संबंध तपासत असताना या दोन्ही संस्कृतींच्या संबंधाचा उद्घापोह करणाऱ्या साहित्यात इतकी विविधता आहे की, त्यात उपलब्ध असणाऱ्या पुराव्यांची थोड्याफार फरकाने मांडणी केली की, हाती आलेले निष्कर्ष हे वेगवेगळे ठरतील. या कालखंडातील हा बदल कलेच्या क्षेत्रातही दिसून येतो. या सर्व साधन मर्यादा लक्षात घेऊन प्रस्तुत शोधनिबंधात जहाँगीरकालीन मोगल चित्रकलेच्या विकासाचा, वैशिष्ट्यांचा अभ्यास करण्यात आला आहे.

भारतातील सल्तनत काळाची समाप्ती आणि 'मोगल काळ' या नवयुगाचा प्रारंभ या घटनेने भारताच्या राजकीय नव्हे तर सामाजिक, सांस्कृतिक, प्रशासकीय अशा सर्वच क्षेत्रात बदल घडवून आणला. या नवराजवंशाचा, संस्थापक "जहिरुद्दीन महम्मद बाबर फरगना प्रांताच्या उमरशेख मिर्झा यांचा मोठा मुलगा, त्याच्या आईचे नाव कुतलुग निगार खानम असे होते."^१ "आईकडून बाबर हा चंगीझखानचा तर वडिलांकडून तो तैमूरलंगाचा वंशज होता."^२ इ. स. १५२६ मध्ये बाबरकडून प्रस्थापित मोगल साम्राज्याने कालांतराने भारतभर अंमल प्रस्थापित केले. त्याचबरोबर एक विशिष्ट मोगल-भारतीय संस्कृतीचा पाया घातला गेला की ज्यामुळे भारतीय लोकांचे सामाजिक जीवन, चालीरीती, राहणीमान इत्यादींवर दूरगामी परिणाम झाले. राजदंड जरी मुस्लिमांच्या हाती असला तरी 'सुलहकुल' (सर्वतोमुखी शांती आणि सद्भाव)^३ च्या तत्त्वाने मोगलकालीन भारतात एक सामान्य जीवनदर्शन विकसित

स्थापत्य कलात्मक नवाचार : अकबर काल

प्रा. कीर्ती विकास वर्मा

नाशिक

भारत का सामाजिक संघटन प्राचीन काल से लेकर आधुनिक काल तक लगभग एक समान रहा है। प्राचीन काल में विदेशी जातिवर्गों का आगमन हुआ तथा उनके प्रभाव से भारतीय समाज में जिस तरह परिवर्तन हुए। तथा उनके यहाँ स्थायी रूप से बस जाने के बाद उनकी सभ्यता भारतीय संस्कृति में विलीन हो गई। यह विलीनता और प्रभाव हम खान-पान, रीति-रिवाज में जिस तरह महसूस करते हैं। उसी तरह का प्रभाव कला-स्थापत्य के क्षेत्र में भी देखा जा सकता है। इसी तरह का प्रभाव और विलीनता इस्लाम के आगमन के बाद तथा मुस्लिम शासन की स्थापना के बाद हिंदू-मुस्लिम संस्कृति में भी दिखाई देती है। भारतीय इतिहास में मध्य युग का विशेष महत्व है, इस दौर में राजकीय परिवर्तन हुए यही सामाजिक-सांस्कृतिक क्षेत्र में दोनों संस्कृतिवर्गों का एक दूसरे पर प्रभाव पड़ा।

प्राचीन काल से भारत में मूर्तिकला, मंदिर, गुफाएं आदी क्षेत्र में उन्नति दिखती है, हिंदू स्थापत्य कला अपनी प्रगत अवस्था में थी। हिंदू स्थापत्य में जादातर स्तंभों का प्रयोग होता था जिसपर भारतीय शिल्पकार नक्काशी करते थे। उत्तरी भारत में साधारणतः १२ वीं शताब्दी में इस्लाम का आगमन दिखाई देता है। उनके साथ मध्य एशियायी कला का आगमन भारत में हुआ जिनमें मेहराब, गुम्बज, मीनारे आदी थे। स्थापत्य कला में राज्यकर्ताओं ने अपनी रुचि के अनुसार इमारतें बनाने पर ध्यान दिया। भारतीय स्थापत्य निर्माण पद्धती और मुस्लिम स्थापत्य पद्धती का पारस्परिक प्रभाव निर्माण हुआ और एक नयी भारतीय - इस्लामी स्थापत्य शैली विकसित होने लगी।

भारत में मध्य युग में दिल्ली सल्तनत, प्रादेशिक सत्ताओं के अंतर्गत तथा मोगल काल में स्थापत्य कला का विकास दिखाई देता है। मुगल काल की स्थापना के साथ भारतीय स्थापत्य कला में एक युग प्रारंभ होता है। अकबर के स्थापत्य काल से इस वास्तु

हिंदी उपन्यासों में किसान विमर्श

डॉ. योगिता हिरे

हिंदी विभागाध्यक्ष, एल.व्ही.एच. महाविद्यालय, पंचवटी (नाशिक)

प्रा. डॉ. अनिता नेरे

म.स.गा.महाविद्यालाल, मालेगांव कैम्प, जि. नाशिक

आज के दौरमें नारी विमर्श, दलित विमर्श, आदिवासी विमर्श विशेष महत्व पूर्ण एवं प्रमुख है। इन विमर्शों में अपनी अस्मिता, अपने अधिकारों, न्याय एवं जागृति की बातें हैं। प्रत्येक विमर्श का एक निश्चित उद्देश्य होता है और उन उद्देश्यों की पूर्ति इन विमर्शों के माध्यम से की जाती है। किसान विमर्श में भी इसी प्रकारसे किसानों की समस्याओं एवं किसानों की स्थितियों पर गंभीरता से विचार चिंतन किया जा रहा है। भारत प्रगतितो कर रहा है लेकिन किसानों की जमीन नष्ट होती दिखाई दे रही है। आधुनिकीकरण, उदारीकरण, औद्योगिकीकरण, बाजारवाद में फंसा किसान विविध यंत्रों में फंसकरफंसकर खोकला बनता जा रहा है। वह हमारा पोशिदा है। किसान दिन-रात खेत में मेहनत करता है तब कहीं मनुष्य अपनी जीविका सुख-चैनसे बीता सकता है। किसानों के संदर्भ में मीडिया, प्रिंट मीडिया जैसे क्षेत्रों पर बहुत कम चर्चा सुनने एवं देखने को मिलती है। हिंदी साहित्यमें प्रेमचंद का गोदान; फणीश्वरनाथ रेणुका मैला आंचल, परती परिकथा; जगदीशचंद्र का धरती धन न अपना, कभीना छोड़े खेत; नागार्जुन का बलचनमा; शिवप्रसाद सिन्हा का अलग अलग बैतरणी; विवेकीराय का लोक ऋण, नमामिग्रामम; शिवमूर्ति का आखिरी छलांग; मिथिलेश्वर का माटी कहे कुम्हार से; संजीव का जंगल जहां शुरू होता है, फ्रांस; विद्यासागर नौटियाल का उत्तर बाया है; रामधारी सिंह दिवाकर का काल संध्या; भीमसेन त्यागीका जमीन; पंकज सुबीरका अकाल में उत्सव किसान विमर्श पर लिखे और चर्चा में रहे उपन्यास हैं। ये किसान के जीवन का चित्रण करती हैं।

हिंदी साहित्य में प्रेमचंद के कथा साहित्य में किसानों के जीवन संघर्ष का चित्रण प्रामाणिकता एवं कुशलता से मिलता है। इसमें भारतीय किसान की दयनीय एवं उनका जीवन संघर्ष दृष्टिगोचर होता है। उनका गोदान उपन्यास इस बात का प्रमाण माना जा सकता है। इस उपन्यास को कृषक जीवन का महाकाव्य माना जाता है। उपन्यास का नायक होरी भारतीय किसानों का प्रतिनिधि बनकर हमारे समक्ष उभरकर आता है। होली के माध्यम से प्रेमचंद ने समग्र भारतीय किसानों की नियतिको, उनकी समस्याओं को बहुत मार्मिक ढंगसे उजागर किया है। गोदान में होरी अनेक समस्याओं से आजीवन संघर्ष करता है-जैसे कर्ज, प्राकृतिक आपदाएं, गरीबी, शोषण, निर्धनता, नैतिक मर्यादाओं का पालन आदि। इन समस्याओंसे जूझते जूझते, संघर्ष करते हुए दम तोड़ देता है। आजका किसान भी इसी प्रकारकी अनेक नई नई समस्याओं से घिरा है। वह भी होरीकी भांति इन समस्याओंसे लड़ते-लड़ते अपने प्राण त्यागने के लिए अभिशप्त हैं।

प्रेमचंद की परंपरा का निर्वाह करने वाले कथाकारोंमें संजीव और विवेकीराय का एक विशेष एवं महत्वपूर्ण स्थान है। विवेकीराय के उपन्यासों में भी ग्रामीण समाज एवं किसान जीवन का चित्रण मिलता है। उनका समग्र लेखन किसानों का पक्षधर है। नमामि ग्रामम उपन्यास में उन्होंने किसान के शोषण एवं दमन को बखूबी दर्शाया है। तो किसानों की दयनीय स्थिति, उनकी विडंबना और आजीवन अभाव में जीनेकी नियतिको अपने बबूल नामक उपन्यास में चित्रित किया है। प्रस्तुत उपन्यास का प्रमुख पात्र महेसवा भारतीय किसान का प्रतिनिधि बनकर चित्रित हुआ है। प्राकृतिक आपदा के माध्यम से महेसवा की त्रासदी, नियति और विवशता का चित्रण लेखकने किया है। जब

Toxicity of Monocrotophos in Freshwater Bivalve, *Lamellidens marginalis*, Using Different Markers

Lalit G. Tank¹, Sunil D. Patil²

Department of Zoology, Mahatma Gandhi Vidyamandir's Loknete Vyankatrao Hiray Arts, Science and Commerce College, Panchavati Nashik – 422003. (MS) India.

Abstract: The present study was undertaken to evaluate the toxic effects of monocrotophos, a widely used organophosphorus pesticide, on *Lamellidens marginalis* with a wide battery of biomarkers consisting of AchE inhibition, lipid peroxidation, the levels of antioxidant enzymes, and histopathological changes. Animals were exposed to monocrotophos (52.36 mg/l) for four days. Malondialdehyde (MDA) values were measured as index of oxidation while Superoxide dismutase (SOD), Catalase (CAT), Glutathione s-Transferase (GST), and Glutathione-Reductase (GR) were measured as index of an antioxidant status. After exposure, a significant reduction of the capability to neutralize radicals was observed. Histopathological changes, such as fibrosis in gill filaments and hypertrophy in mucous cells of foot tissue, were observed after treatment. In a second series of experiment, exposed animals were there after transferred to clean water and kept in it up to 28 days to assess the recovery pattern. Significant recovery is observed in AchE and antioxidant enzymes. Oxidative damage observed after acute exposure indicate that mussels faced an oxidative challenge but were able to counteract, as values of anti-oxidants returned near to control values after 28 days.

Altered activities in anti-oxidant enzymes due to stress recovered well after 28 days in gill and muscles as compared to foot and mantle. Overall results suggested that oxidative markers are highly sensitive and could be profitably applied to freshwater mussels for environmental quality assessment in freshwater.

Keywords: Antioxidants, hypertrophy, monocrotophos, oxidative stress, recovery

I. INTRODUCTION

Pesticides are widely used in agriculture for pest control.^[1] The pesticides that enter the aquatic system through surface run off may adversely affect the aquatic biota.^[2,3] The half-life of monocrotophos (MCP) in natural water (pH 7.6) at 25°C and at 35°C is 147 days and 29 days, respectively. This suggests a considerable biodegradability and hence relatively low persistence in the environment.^[4] Furthermore, many authors postulate that these compounds disturb the redox processes, change the activities of anti-oxidative enzymes, and cause enhanced lipid peroxidation in many organs.^[5] MCP-induced biochemical alterations are studied in *Tilapia mossambica*.^[6] Hyperglycemic condition accompanied by AchE inhibition^[7,8] and oxidative stress is observed in rats exposed to MCP.^[9] Altered expressions of selected cytochrome P450s are observed in MCP-induced apoptosis in neuronal cells.^[10] In the context of the present study, *Lamellidens marginalis* was selected as test species as it is known to accumulate significant amount of contaminants because of its sedentary life style and long life span. Moreover, it links primary producers with higher organisms in aquatic food-chain and forms a part of the diet of the local population.^[11] Therefore, the study aims to:

- 1) Investigate the effect of exposure of MCP on the tissues of *L. marginalis* and the associated histopathological changes.
- 2) Estimate oxidative damage to the exposed tissues.
- 3) Investigate the effect of MCP on acetylcholine esterase activity (AchE).

II. MATERIALS AND METHODS

A. Animal Collection site and Rearing of Animals

The reservoir selected for the study is near Yedgaon dam on the river Kukadi (19°10' 59.62" N and 73°57' 19.09" E). The pesticide contamination in reservoir water was assessed by Gas chromatography Mass spectrometry (GC-MS) analysis. The freshwater mussels, *L. marginalis*, were collected from reservoir (shell- length 7-9 cm), transported to laboratory, and acclimatized to laboratory condition for seven days in aged tap water. The animals were fed daily *ad libitum* with algal suspensions of spirulina.^[12] every day during acclimatization period. The water was renewed after every 24 hours.

HISTOPATHOLOGICAL MANIFESTATION IN GALLUS GALLUS DOMESTICUS INFECTED WITH CESTODE PARASITE

Ziyaurrehman Z. Husain¹, Sunil D.Patil²

¹ Dept. of Zoology, Loknete Vyankatrao Hiray Arts Science & Commerce College

² Dept. of Zoology, M.S.G. College, Malegaon Camp, Dist. Nasik (MS) India

ABSTRACT

In the present investigation on histopathology of *Gallus gallus domesticus* infected from cestode parasite, *Amobetanea* sp. The cestode worm attaches to the host tissue and ingests the food. The worm is linked to the mucosal layer, according to the T. S. of the gut. The gut mucosal layer was disrupted and seemed to be damaged as a result of its attachment. It also shows hemorrhages, nodular growth, lesions, eroded mucosal epithelium, and ulcerations. Moreover, Intestinal mucosa was damaged and eroded as a result of the parasites' attachment, which may have favoured additional bacterial infections that led to greater inflammation and severe cellular reactions in the affected area.

Keywords: Histopathology; *Amobetaenia*; *Gallus gallus domesticus*; cestode.

1. INTRODUCTION

Chicken have a significant role in the supply of animal protein. Their affordable supplies are directly related with rural economic status includes poultry meat and eggs (Allouse, 1961). It is seen that, most of the diseases of various origins such as parasitic, bacterial and viral diseases affect local chickens and constitute a real blight which slows down the development of this breeding. Among these diseases, chicken digestive parasitism, which is defined by the presence of parasites in different parts of the digestive tract, from the oral cavity to the cloaca, is a fairly common pathology. Endoparasites can produce nodules and severe enteritis in the intestine, which reduces the ability of the intestine to absorb nutrients and vitamins from the host (Hayat and Hayat, 1983). According to Borghare *et al.*, (2009) parasite causes body weight loss, delays in growth, decreased egg production, impaired body defenses, and even death.

The parasitic disease decreases the poultry's output in rural areas. Despite the fact that parasite infections are among the main causes determining the decline in chicken output, they are frequently disregarded due to their rarely fatal effects (Alemu, 1985; Sonaiya, 1990). Helminth parasites were implicated as major causes of health deterioration and loss of productivity, and helminthiasis is regarded as a significant concern for local hens (Abebe *et al.*, 1997; Eshetu *et al.*, 2001).

१३. ऑनलाइन शिक्षण - उपयोग आणि स्वीकार्यता

डॉ. रुपाली मन्सराम देवरे

लोकनेते व्यंकटराव हिरे महाविद्यालय पंचवटी, नाशिक.

गोष्टवारा

१९९१ नंतरच्या काळात खासगीकरण हळूहळू समाजात रुळू लागल्यावर शिक्षणक्षेत्र आणि खासगीकरण याचा सहसंबंध हळूहळू दृढ व्हायला लागला. अस्तित्वात असलेल्या सरकारी शाळा आणि नव्याने उदयास आलेल्या खासगी संस्थांद्वारे चालवल्या जाणाऱ्या शाळा महाविद्यालये यांच्या नव्या लाटेत बदलते तंत्रज्ञान मोलाचे ठरले. तांत्रिक बदल आत्मसात करून सॉफ्टवेअर आणि माहिती तंत्रज्ञान क्षेत्रात प्रचंड प्रगती केली आहे. शैक्षणिक क्षेत्रातील नवे स्थित्यंतर येऊ घातले आहे, ते म्हणजे ऑनलाइन शिक्षण. ऑनलाइन शिक्षण घेण्याला असलेल्या मर्यादा ज्या अभ्यासक्रमात असतात तेथे ऑनलाइनची सक्ती न करणे व फक्त संकल्पना समजणे पुरताच ऑनलाइनचा आग्रह धरणे, हा महत्त्वाचा मुद्दा आहे. एखादा नवीन प्रयोग येऊ घातलेला असतो तेव्हा त्यात जितक्या अडचणी येतात तितकाच तो प्रयोग अत्यंत यशस्वी ठरतो हा इतिहास आहे. ऑनलाइन शिक्षण हे त्याच मार्गाने जाईल असे वाटते.

मूलभूत शब्द - (ऑनलाइन शिक्षण, डिजिटल साहित्य निर्मिती)

प्रस्तावना

शिक्षणावर केला जाणारा खर्च असतो, ती गुंतवणूक नसते, अशी भारतीय समाजाची मानसिकता आहे. ऑनलाइन शिक्षण स्वीकारण्यासाठी ही मानसिकता बदलणे अत्यंत आवश्यक आहे. सर्व ऑनलाइन गोष्टींमध्ये शिकणेही आता डिजिटल होऊ लागले आहे. शिक्षणाची ही नवी व्यवस्था अद्यापही अंगवळणी पडलेली नसली, तरी ती आता अपरिहार्य आहे. इलेक्ट्रॉनिक उपकरणे, सुखसोयी आणि चैनीच्या वस्तू दागदागिने, घरगुती वापराची यंत्रे याबरोबर शिक्षण हे अत्यंत खर्चिक असे माध्यम ठरते. शैक्षणिक बाबींवर केला जाणारा खर्च नियमितपणे नोंदवत नाही. टीव्ही, फ्रिज, वॉशिंग-मशीन हजारो रुपयांना घेतले व इतके वर्षे वापरले आता नवीन घ्यायला हरकत नाही हे गणित कसे मांडले जाते? मात्र शिक्षणाचे मांडण्याची पद्धत नाही. इयत्ता पहिलीपासून ते पोस्ट ग्रेज्युएट होईपर्यंत साधारण पंधरा ते सतरा वर्षे एखाद्या व्यक्तीचा शैक्षणिक प्रवास सुरू असतो. त्यामध्ये शैक्षणिक साहित्य, संगणक, अभ्यासक्रमाची फी, क्लासेस, प्रवास खर्च, विविध सॉफ्टवेअर यांचा खर्च विचारात घेतला तर शिक्षण हे खासगी खर्चातील महाग ठरते

ऑनलाइन शिक्षण अर्थ

व्हिडिओ कॉन्फरन्स सारखे लाईव्ह लेक्चरद्वारे ऐकणे म्हणजेच ऑनलाइन शिक्षण. गेल्या २ वर्षांत शाळांमधून, महाविद्यालयांमधून Zoom व तत्सम माध्यमातून ऑनलाइन तासिका भरवण्याची प्रक्रिया सुरू झाली.

भारतीय अर्थव्यवस्थेतील आव्हाने व संधी

डॉ. रुपाली मन्साराम देवरे

लोकनेते व्यंकटराव द्वारे महाविद्यालय पंचवटी नाशिक

ई-मेल - rupdeore007@gmail.com

गोष्टवारा -

सध्याच्या आर्थिक स्थितीची स्वातंत्र्यपूर्व काळाशी तुलना केली, तर असे दिसून येते की भारतीय अर्थव्यवस्थेतील दीर्घकाळ सन्ध्या भारताच्या स्वातंत्र्यानंतर खंडित झाली होती. भारतीय अर्थव्यवस्थेची सध्याची स्थिती जरी समाधानकारक नसली तरी ५०- ७० वर्षांपूर्वीच्या तुलनेत खूपच चांगली आहे. आर्थिक नियोजनाच्या प्रारंभी आर्थिक विकासाचे युग सुरू झाले. भारतातील आर्थिक विकासाला परिमाणान्मक आणि मंरचनान्मक असे बदल झाले. राष्ट्रीय उत्पाद, दरडोई उत्पादनात वाढ, मूलभूत भांडवली वस्तु उद्योगांची वाढ, देशातगत उत्पादनांचे क्षेत्रीय वितरण, लोकसंख्येच्या व्यावसायिक वितरणाने स्थिरता, जमीन संवर्धन बदल, सामाजिक बरकड भाडवलाचा विस्तार, बँकिंग आणि विनीय क्षेत्रातील प्रगती इ. परिणामी अर्थव्यवस्थेत गुंनवर्णक वाढली आहे. कृषि आणि औद्योगिक उत्पादनातही वाढ झाल्याचे आपण पाहतो. भारताने या क्षेत्रांचे आधुनिकीकरण करण्यासाठी पावले उचलण्यात आली आहेत. भारतातील सध्याची आर्थिक स्थिती कमी-अधिक प्रमाणात उन्मादवर्धक आहे, परंतु तसेही आपण पूर्ण रोजगार, गरिबी निर्मूलन, सर्वांसाठी शिक्षण आणि औद्योगिकीकरण साध्य करण्यात मागे आहोत. भारतीय अर्थव्यवस्था ही विकसनशील अर्थव्यवस्था असून आर्थिक समस्यांना तोंड देण्यासाठी उपाययोजना करून, भारत निश्चितपणे विकसित अर्थव्यवस्था बनण्याचे लक्ष्य गाठू शकतो.

मूलभूत शब्द - (आर्थिक समस्या, असमानता)

प्रस्तावना -

सध्या लोकांच्या नेतृत्वाखाली भारत विकासाला टप्पा पाहत आहे. अजूनही अनेक आव्हाने आहेत ज्यांचे निराकरण करणे आवश्यक आहे. ही आव्हाने आणि समस्यांचे निराकरण करण्यासाठी संपूर्ण देश गुंनलेला असणे आवश्यक आहे आणि सरकारी क्षेत्राबाहेरून प्रतिभा आणणे आवश्यक आहे, विशेषत: जेथे जात किंवा उद्योग नेतृत्व आवश्यक आहे, जे लोक उत्कट अगतात ते उत्तम गोष्टी तयार करतात आणि मोठ्या समस्या सोडवण्याची आकांक्षा वाळगणाऱ्या कंपन्या फक्त निधी आणि पैश्यासाठी आजूबाजूला पाहणाऱ्यांपेक्षा खूप चांगले काम करतात एक विकसनशील देश म्हणून आपल्यासमोर असलेल्या अनेक आव्हानांना तोंड देण्यासाठी प्रबळ राजकीय इच्छाशक्ती आणि विविध अनुभवांचे संयोजन हे महत्वाचे घटक आहेत.

भारताची अर्थव्यवस्था हळूहळू भाडवली अर्थव्यवस्थेकडे झुकत आहे असे दिसते. सामान्य, सामान्य आणि काही अतिमहत्वाच्या सेवा, तसेच ज्यांची खाजगी क्षेत्रामध्ये तफा होण्याची शक्यता कमी अशा राष्ट्रीय सर्वसाधारणपणे सार्वजनिक क्षेत्राकडे देण्यात येतात, स्वातंत्र्याप्रीत्यंत बँकांसारखी क्षेत्रे राष्ट्रीयीकरण आणि खाजगीकरण अशा अवस्थांमधून गेली आहेत, परंतु अलीकडे खाजगीकरणाचे बरे जाग्य वाहताना दिसून येतात. **शोधनिबंधाची उद्दिष्टे** - पुढील उद्दिष्टे निश्चित केली आहेत.

1. भारतातील आर्थिक समस्यांचा व आव्हानांचा अभ्यास करणे
2. आर्थिक समस्यांचे अध्ययन करून त्यांचे प्रभावी उपाययोजना सुचविणे.



MODERNIZATION OF INDUSTRIALIZATION - MAKE IN INDIA

Dr. Rupali Mansaram Deore

Loknete Vyankatrao Hiray Mahavidyalaya, Panchavati, Nashik.

Abstract:

With economic development, education, health, life expectancy and quality of life are expected to be possible for citizens. Natural resources need to be used properly and adequately. The process of economic development should be such that future generations can have access to production, income and employment opportunities. Natural resources can be used. This means that economic development should be eternal. Sustainable development means sustainable development for the present generation without any compromise in economic development. This means that not only should the rate of economic growth be high, but you should be able to consistently achieve this rate in the future. To achieve the goal of sustainable development, the United Nations General Assembly in September 2015 set out 17 goals for inclusive development by 2030. These goals are called Millennium Development Goals or Goals. The goal is to eradicate poverty in all the countries of the world, to protect the environment all over the world, and to bring peace and prosperity to the people. As part of achieving the economic goals of the new millennium, the Government of India has undertaken several special initiatives since 2014, including policies such as Build India, Skills India, Invest in India, Sustainable Cities and Society.

Keywords: Industrialization, Make in India.

Introduction:

The Government of India has launched the Make in India campaign to increase investment in India, create a conducive business environment and significantly increase production to make India a manufacturing hub. The campaign was launched on 25 September 2014 at Vigyan Bhavan in New Delhi. India is expected to be a world-class hub for manufacturing and manufacturing. India's industrial production growth was negative in 2013-14. Is it an opportunity or a risk to invest in the world's largest democracy? Global investors are finding it difficult to make that decision. The Make in India campaign has been instrumental in breaking this cycle of confusion and boosting investor confidence. Indian and foreign companies should jointly produce goods using Indian labour, equipment, foreign capital and foreign technology. The program was implemented to reduce India's imports, increase exports and produce quality goods.

Research Objectives

1. To study the concept of 'Make in India'.
2. To study the changes that have taken place in the industrial sector due to the Make in India policy.
3. To study the impact of the Make in India scheme on manufacturing, investment, infrastructure, exports.

Research Methods- The type of research presented is descriptive and analytical.

Data Collection - Data Collection is considered to be a very important factor in any research. Secondary sources are used for truth collection. Various reference books, published and unpublished materials, research reports, financial survey reports, central budget statements, magazines, weeklies, newspapers have been used.

Areas of India's Make in India Policy

The 25 types of product areas have been selected for the Make in India campaign in India, each of which has a one-year and three-year action plan.

- | | |
|------------------------|---|
| 1. Automotive industry | 2. Spare parts required for the automotive industry |
| 3. Plane | 4. Biotechnology |
| 5. Chemicals | 6. Construction |
| 7. Protection product | 8. Electronic missionary |
| 9. Electronic system | 10. Food processing |

महाराष्ट्रातील मानवी प्रगतीचा चिकित्सक अभ्यास

प्रा.डॉ.रुपाली मनसाराग देवरे.

लोकनेते व्यंकटराव हिरे कला विज्ञान आणि वाणिज्यमहाविद्यालय, पंचवटी, नासिक

ईमेल- rupdeore007@gmail.com

गोषवारा- सद्यःस्थितीचा विचार करता जनतेची सुस्थिती हे विकासाचे ध्येय आहे, केवळ पैसा लोकांची आर्थिक, सामाजिक, सांस्कृतिक अशा अंगांनी सुस्थिती निर्माण करू शकत नाही. मानवी विकासाच्या घटकांमध्ये दीर्घ व आरोग्यदायी जीवन, शिक्षण व उत्तम राहणीमानाचा दर्जा यांचा समावेश होतो. इतर निवडीमध्ये राजकीय स्वातंत्र्य, मानवी हक्कांची हमी आणि स्वावलंबन व आत्म प्रतिष्ठेचे विविध घटक यांचा समावेश होतो. या अत्यावश्यक निवडी आहेत कारण त्यांच्या अभावी लोकांना इतर अनेक संधीपासून वंचित रहावे लागू शकते. यावरून मानवी विकास ही लोकांच्या निवडीच्या विस्ताराच्या प्रक्रियाबरोबरच सुस्थिती उंचावण्याची प्रक्रिया आहे असे म्हणता येते.

मूलभूत शब्द - (मानवीविकास, दीर्घायुष्य, ज्ञान, राहणीमान)

प्रस्तावना - विकासाच्या प्रक्रियेतील प्रभावी घटक आणि विकास सगळ्या व्यक्तीजवळ पोहोचविण्याचे साधन म्हणून मानवी विकासाकडे पाहिले जाते. यातूनच मानवी विकास ही संकल्पना जन्माला आली. आर्थिक विकासामध्ये मानवी विकासाला मध्यवर्ती स्थान मिळाले. अँडम स्मिथ यांनी आपल्या अर्थशास्त्रीय विचारात मानवी विकासाला महत्त्व दिले आहे. मानवी क्षमता व कौशल्याला भांडवलाचा एक घटक म्हटले आहे. मानवी भांडवलातील गुंतवणूक सर्वाधिक मौल्यवान गुंतवणूक आहे. मार्शल म्हणतात की, मानवी ज्ञान व कौशल्याचा विकास व वापर करू न शकणारा देश संपन्न होणार नाही. आर्थिक विकासात मानवी संसाधनाला महत्त्वाचे स्थान आहे. मानवीविकास म्हणजे अधिकाधिक उत्पादकता होय. उत्तमनिरोगी आरोग्य, साक्षर आणि जागरूक असलेला श्रम पुरवठा उत्पादित भांडवल मालमते साठी आवश्यक आहे. तेव्हा उत्तम शिक्षण, आरोग्यसेवा आणि योग्य आहारामध्ये गुंतवणूक करणे समर्थनीय आहे. तसेच भौतिक पर्यावरण चांगले राखण्यासाठी मानवी विकास आवश्यक आहे. दारिद्र्य मध्ये घट होण्यामुळे आरोग्यदायी समाज, सकस लोकशाही आणि सामाजिक स्थिरता प्राप्त करून देण्यास मदत होते. मानवी विकास हा त्या देशातील लोकांचे शिक्षण, आहार आरोग्य आणि राष्ट्रीयत्वाची भावना इत्यादी घटकावर अवलंबून असतो.

मानव विकास निर्देशांकाची मुळ कल्पना सन 1990 मध्ये संयुक्त राष्ट्रसंघ विकास कार्यक्रमांतर्गत कार्यरत असलेल्या पाकिस्तानचे अर्थतज्ञ मेहबुब-उल-हक आणि भारतीय अर्थतज्ञ अमर्त्यसेन यांनी मांडली. 1990 पासून युनोने (United Nations Development Programme -UNDP) आपला विकास अहवाल प्रसिद्ध करण्यास सुरुवात केली. UNDP ने मानवी विकासाचा निर्देशक विकसित केला. 1997 मधील अहवालात मानवी विकासाची संकल्पना स्पष्ट केली. मानव विकास निर्देशांकाचे मापन करण्यासाठी तीन मूलभूत दर्शक आहेत ते पुढीलप्रमाणे.

- 1) दीर्घायुष्य -यामध्ये दीर्घ व आरोग्यदायी जीवनाचे मापन असते जे जन्माच्या अपेक्षित आयुर्मर्यादेने केले जाते. आयुर्मान किमान 25 वर्ष व कमाल 75 वर्ष मानले आहे.
- 2) ज्ञान किंवा शैक्षणिक प्रगती- ज्ञान हे प्रौढ साक्षरता (ज्यास 2/3 इतका भार दिला जातो) आणि शाळेतील नाव नोंदणी (ज्यास 1/3 इतका भार दिला जातो) याद्वारे मोजली जाते.
- 3) राहणीमानाचा दर्जा-राहणीमानाचा दर्जा वास्तव स्थूल राष्ट्रीय उत्पन्नाच्या सहाय्याने किंवा पैशातील खरेदीशक्ती क्षमतेच्या सहाय्याने मोजला जातो.

“STRATEGY TO INCREASE AGRICULTURAL PRODUCTION IN INDIA”

Dr. Rupali Mansaram Deore

L.V.H. college Panchavati Nashik

ABSTRACT: -

The Indian economy is known as an agrarian economy. About 55% of the total population of the country is dependent on agriculture. Due to the heterogeneous climate in India, kharif crops are grown in the rainy season and rabi crops in the winter. The process of formulating and implementing strategies for the development of the agricultural sector was started from the first Five Year Plan (1961-66) after independence. For this, more emphasis was laid on the construction of irrigation facilities. During the five years from 1961 to 1966, Damodar Valley Development Project, Bhakra Nangal Project and Koshi Project were constructed. In India, large, medium and small-scale irrigation projects have been set up in every five-year plan period to increase the area under irrigation. The government set up the Agricultural Value Commission in 1965 to ensure a guaranteed price for agricultural produce produced by farmers, and the Food Corporation of India in 1966 to store food grains. This gave a boost to agricultural production. Strategies have been formulated from time to time to increase agricultural production in India. Recently, from the financial year 2017, the central government has launched a multi-purpose 'National Agricultural Development Plan'. This strategy can make India self-sufficient in agricultural production.

Experts in the Planning Commission and Niti Aayog of India have developed strategies from time to time to increase agricultural production in line with the situation, making India self-sufficient in food grain production. As India's population grew exponentially after independence, so did the country's efforts to increase food production. But it cannot be said that the strategy of the agricultural sector has been successful only by increasing the production of food grains from the agricultural sector. This is because the production of raw materials required by the industrial sector from the agricultural sector also requires strategic planning. Since India gained independence, only 45 per cent of the land has been provided with artificial irrigation facilities. Half of the arable land in India is still arid. For this, a new strategy of agricultural development will have to be formulated to increase the area under irrigation in the coming period.

KEYWORD: -

Agricultural strategy, Irrigation facilities, kharif and rabbi season, agricultural scheme, Agricultural development.

७. शाश्वत शेती आणि आधुनिक तंत्रज्ञान

डॉ. रूपाली एम. देवरे

सहाय्यक प्राध्यापक (अर्थशास्त्र), लोकनेते व्यंकटराव हिरे महाविद्यालय, पंचवटी, नाशिक.

प्रस्तावना

भारत हा कृषिप्रधान देश असून कृषीला अर्थव्यवस्थेचा कणा मानले जाते. आजही भारतीय अर्थव्यवस्थेत शेतीला अनन्यसाधारण महत्त्व असून ५० टक्क्यांपेक्षा जास्त लोकसंख्या शेतीवर आपली उपजिविका करीत आहे. मुंबवातीच्या काळात भारतात जमिनीतून पारंपारिक पद्धतीने उत्पादन घेऊन अन्न विषयक गरजा पूर्ण केल्या जात होत्या परंतु १९६५ ला हरित क्रांती झाली आणि त्यामुळे शेतीचे उत्पादन मोठ्या प्रमाणात वाढावी यासाठी रासायनिक खतांचा वापर जास्तीत जास्त करण्यात आला परंतु या रासायनिक खतांच्या अतिरिक्त वापरामुळे जमिनीवर विपरीत परिणाम झाला. त्याचबरोबर समाजात अनेक आरोग्यविषयक समस्या निर्माण झाल्या. अशा या रासायनिक शेतीचे दुष्परिणाम लक्षात आल्याने शाश्वत शेतीला प्राधान्य दिले गेले. या शाश्वत शेतीचा प्रसार जास्तीत जास्त शेतकऱ्यांपर्यंत होऊन शाश्वत शेतीचे तंत्र अवलंबले जावे यासाठी शासन स्तरावरून विविध योजना हाती घेतल्या जात आहेत फक्त भारतातच नव्हे तर ११० देशांमध्ये शाश्वत शेतीचा अवलंब केला जात आहे. याचे श्रेय शाश्वत शेतीचे जनक अल्बर्ट हॉवर्ड यांना जाते. त्यांच्या मतानुसार जमिनीची सुपीकता ही आरोग्याची गुरुकिल्ली असून सेंद्रिय खतामुळे जमिनीची सुपीकता वाढून निरोगी पिकाची उत्पादकता जास्त होते आणि शेतकऱ्यांना जर शेती अर्थशास्त्राचे गणित जगायचे असेल तर त्यांना शाश्वत शेतीशिवाय दुसरा कोणताही पर्याय नाही कारण शाश्वत पदार्थांमुळे प्रदूषण घडून येत नाही, जमिनीचा दर्जा सुधारतो, कीड रोगराईचा प्रभाव कमी होतो, शेतकऱ्यांचा शेतीवरील खर्च कमी होतो म्हणजेच बचत होते सर्वात महत्त्वाचे म्हणजे पर्यावरण संरक्षण घडून येते.

शाश्वत शेतीची उपयोगिता व काळाची गरज या गोष्टी लक्षात घेता शाश्वत शेतीच्या विकासासाठी नवनवीन आधुनिक तंत्रज्ञानाचा वापर करण्यात येत आहे असे हे आधुनिक तंत्रज्ञान मांडण्याचा प्रयत्न प्रस्तुत शोधनिबंधात करण्यात आलेला आहे.

संशोधनाची उद्दिष्टे

1. शेतीचा शाश्वत विकास करण्यासाठी वापरण्यात येणारे आधुनिक तंत्रज्ञान अभ्यासणे.

गृहीतक

1. शाश्वत शेतीसाठी वापरण्यात येणाऱ्या आधुनिक तंत्रज्ञानामुळे शेतीचा विकास होण्यास मदत होत आहे.
2. शाश्वत शेतीतील आधुनिक तंत्रज्ञानामुळे शेतकऱ्यांच्या उत्पादन खर्चात बचत होऊन उत्पन्न वाढ होत आहे.

महिला सक्षमीकरण - जागतिक आणि भारतीय धोरणे

डॉ. रूपाली मन्साराम देवरे,

लोकनेते व्यंकटराव हिरे महाविद्यालय, पंचवटी, नाशिक.

गोषवारा -

विकास साध्य करण्यासाठी महिलांच्या सबलीकरणा इतके दुसरे प्रभावी साधन नाही. महिलांमध्ये असलेल्या क्षमतांचे वर्णन करण्यासाठी शब्दसंग्रह सुद्धा कमी पडतो. आज अशी परिस्थिती आहे की कोणतीही गोष्ट आता महिलांसाठी असाध्य राहिलेली नाही. माता-भगिनी आणि सहचारिणी अशा वेगवेगळ्या भूमिका निभावताना महिला नेहमीच पुरुषांना भक्कम आधार देत असतात. आधुनिक जगात तर महिला शिक्षिका आहेत, व्यवस्थापक आहेत, आणि राजकारणीही आहेत. याचबरोबर अगदी अलीकडच्या काळात गिर्यारोहण, वैमानिक, लष्कर या क्षेत्रातही महिलांची भूमिका महत्त्वाची मानली जात आहे. भारतात जवळपास शंभर वर्षांच्या संघर्षानंतर महिलांना मालमत्तेचा, मतदानाचा हक्क प्राप्त झाला. विवाह आणि रोजगाराच्या बाबतीत नागरी हक्काचा रूपाने समानतेचा हक्क मिळाला आहे. देशाच्या स्वातंत्र्यानंतर घटनाकार आणि राष्ट्रीय नेत्यांनी महिलांना पुरुषांच्या बरोबरीने असलेल्या सामाजिक स्थानास मान्यता दिली. सत्तेत असलेल्या तत्कालीन सरकारने महिलांना आर्थिक, राजकीय आणि सामाजिक क्षेत्रात समान दर्जा वागणूक सुनिश्चित करण्यासाठी वेळोवेळी अनेक उपाययोजना केल्या. आपले कौशल्य क्षमता सिद्ध करण्यासाठी आणि राष्ट्राच्या प्रगतीत हातभार लावण्यासाठी महिलांना नवीन क्षेत्रे खुली करून देण्यात आली. शिक्षणामुळे मोठ्या प्रमाणात महिलांचे सबलीकरण झाले असून अशिक्षित महिला असलेल्या ठिकाणी सबलीकरण करण्याची प्रक्रिया जास्त वेगात झाल्याचे दिसून आले. शिक्षणामुळे महिलांना विवाह, मातृत्व आणि नोकरी-व्यवसाय याबाबत निर्णय घेण्याचे सामर्थ्य आणि शक्ती प्राप्त झाली. शिक्षणामुळे महिलांचे पुरुषांवरील अवलंबित्व कमी होऊ शकले.

मूलभूत शब्द - (महिला सबलीकरण,).

प्रस्तावना - महिला सबलीकरणासाठी मोठ्या प्रमाणात सर्व स्तरावर प्रयत्न केले जात आहेत. त्यासाठी मोठ्या प्रमाणात योजना राबवून महिलांना सुविधा उपलब्ध करून दिल्या जात आहेत. परंतु आजही राजकारणात महिलांचे मोठ्या प्रमाणावर मागासलेपण दिसून येत आहे. जोपर्यंत महिला सर्वांगीण सबळ होत नाही तोपर्यंत त्यांचे शोषण थांबणार नाही. महिला सक्षमीकरणाचा व्यापक अर्थ म्हणजेच महिला समाजकारण, राजकारण यामध्ये नेतृत्व करत नाही तोपर्यंत त्या आर्थिक दृष्ट्या समृद्ध होत नाही.

महिला सबलीकरण म्हणजे महिलांचा सत्ता विभागणीत समान वाटा निर्णय प्रक्रियेत योग्य स्थान आणि सामाजिक राजकीय तसेच आर्थिक जीवनात त्याबाबतची समानता प्राप्त होणे होय. याचाच अर्थ महिलांचा आर्थिक, सामाजिक, राजकीय, शैक्षणिक, उद्योग इत्यादी सर्व क्षेत्रात समान सहभाग अपेक्षित आहे. महिलांच्या सबलीकरणासाठी शासकीय महिला वसतीगृहे, स्वयंसेवी आधारगृहे, संरक्षण गृहे, समुपदेशन, मनोवैयर्थ योजना, शुभमंगल सामुदायिक विवाह योजना, नोकरदार महिलांसाठी वस्तीगृह, प्रशिक्षण व रोजगार कार्यक्रम, स्वाधार, उज्वला यासारख्या योजना राबविल्या आहेत. तसेच महिला आर्थिक विकास महामंडळ सुद्धा कार्यरत आहे. लिंगाधारित अंदाजपत्रक, भारतातील महिला बँक, बचत गट यासारखे कार्यक्रम राबविले आहेत.

शोधनिबंधाची उद्दिष्टे - प्रस्तुत शोधनिबंधाची उद्दिष्टे पुढीलप्रमाणे मांडली आहेत.

1. महिला सबलीकरण धोरणाचा आढावा घेणे.
2. दुर्लक्षित महिला घटकाच्या विकासासाठी शासनाचे लक्ष वेधणे.

संशोधन पद्धती - प्रस्तुत शोधनिबंधाचे प्रकार वर्णनात्मक आणि विश्लेषणात्मक आहे.

तथ्य संकलन - संशोधनात तथ्य संकलनाला अतिशय महत्त्व असते. तथ्य संकलनासाठी प्रकाशित व अप्रकाशित साहित्याचा आधार घेतला आहे. संदर्भ ग्रंथ, मासिके वर्तमानपत्र शासनाचे अहवाल यांचा आधार घेतला आहे.

जागतिक धोरणे- महिलांवरील सर्व प्रकारच्या भेदभावाच्या निर्मूलनावरील अधिवेशन युनायटेड नेशन्स जनरल असेंब्लीद्वारे 1979 मध्ये घेतले गेले. या अधिवेशनाला महिला आणि त्यांच्या सक्षमीकरणासाठीचे हक्कांचे आंतरराष्ट्रीय विधेयक म्हटले जाते. हे महिलांवरील भेदभावासाठी अटी आणि तरतुदी ठरवते. या अधिवेशनात 30 लेख आहेत आणि त्यात विविध उपाययोजना आहेत, ज्यांचे पालन सर्व राज्यांनी स्वीकारले पाहिजे. या उपायांमध्ये खालील गोष्टी समाविष्ट आहे

1. स्त्री-पुरुष समानतेचे पालन करण्यासाठी, देशात लागू केलेल्या सर्व भेदभावाच्या चौकटी रद्द करा आणि महिलांविरुद्ध भेदभाव रोखणारे कायदे लागू करा.
2. न्यायालये, न्यायाधिकरण आणि इतर संस्था स्थापन करणे जे स्त्रियांना कोणत्याही प्रकारच्या भेदभावाविरुद्ध पुरेसे संरक्षण मिळतील याची खात्री करतात.

८. जागतिकीकरणाचा भारतीय कृषी क्षेत्रावर झालेला परिणाम

डॉ. नारायण नामदेव गाढे

प्राध्यापक व अर्थशास्त्र विभाग प्रमुख, लोकनेते व्यंकटराव हिरे, कला, विज्ञान आणि वाणिज्य महाविद्यालय, पंचवटी, नारिक. (महाराष्ट्र).

गोष्टवारा

भारताने सन 1991 साली जागतिकीकरणाचा स्वीकार केला. भारतीय अर्थव्यवस्था संपूर्ण जगाशी जोडली जाऊन अधिक खुली झाली. साहजिकच त्याचे भारतीय अर्थव्यवस्थेतील प्रत्येक क्षेत्रावर परिणाम झाले. भारतीय अर्थव्यवस्था खुली झाल्यामुळे परकीय प्रत्यक्ष गुंतवणुकीचा ओघ सुरु झाला. व्यापार-उद्दीम वाढला. निर्याती मध्ये वाढ झाली. रोजगाराच्या नवनवीन संधी निर्माण झाल्या. जागतिकीकरणाला अनुसरून सरकारने शासकीय धोरणांची आखणी व अंमलबजावणी केलेली दिसून येते. जागतिकीकरणाने जसे उद्योगक्षेत्र, सेवा क्षेत्र ढवळून निघाले तसेच कृषीक्षेत्रावरही त्याचे बरे वाईट परिणाम झालेले दिसून येतात. शेतमालाच्या निर्यातीत झालेली वाढ, त्यातून मिळणारे परकीय चलन, कृषिमालाच्या निर्यातीत झालेली वाढ, पीक पद्धतीत झालेला बदल, शेतीतील तंत्रज्ञानात झालेला बदल, शेती क्षेत्रात वाढलेली परकीय गुंतवणूक, उपभोग रचनेत झालेला बदल इत्यादी सकारात्मक परिणाम दिसून आलेले आहेत. परंतु या सकारात्मक परिणामाबरोबरच जागतिकीकरणाचे काही नकारात्मक परिणाम देखील कृषीक्षेत्रावर झालेले आढळून येतात. शेतकऱ्यांच्या वाढलेल्या आत्महत्या, शेती आदनांच्या वाढलेल्या किमती, रासायनिक खते व कीटकनाशकांच्या किमतीत झालेली भरघोस वाढ, अन्नधान्याच्या, डाळींच्या व खाद्यतेलाच्या किमतीत झालेल्या वाढीमुळे गरीब उपभोक्त्यांवर झालेला परिणाम. इत्यादी नकारात्मक परिणाम देखील दिसून आले आहेत.

प्रस्तुत शोधनिबंधात जागतिकीकरणाचे भारतीय कृषीक्षेत्रावर झालेले सकारात्मक व नकारात्मक परिणाम याचे अध्ययन करण्यात आलेले आहे. प्रस्तावना

जागतिकीकरणाचे प्रमुख तीन साधने आहेत. ते म्हणजे उदारीकरण, खाजगीकरण आणि जागतिकीकरण. सन १९९१ मध्ये भारतावर आर्थिक संकट ओढवले, परकीय चलनाची गंगाजळी आटली, आयातीचे देणे केवळ तीन आठवडे पुरेले एवढेच परकीय चलन शिल्लक होते. आंतरराष्ट्रीय नाणे निधीने भारताला आर्थिक मदत करताना काही अटी लादल्या. त्यातील महत्त्वाची अट म्हणजे खुल्या अर्थव्यवस्थेचा स्वीकार करावा लागला. त्यालाच आपण

“A STUDY OF MARKETING FUNCTIONS AND MARKETING METHODS OF AGRICULTURAL PRODUCE IN MAHARASHTRA”

Dr. Narayan N. Gadhe

Head & Professor, Department of Economics, Loknete Vyankatrao Hiray Arts, Science & Commerce College, Panchavati, Nashik

INTRODUCTION:

Maharashtra is one of the developed state in India and third largest state in terms of area of about 3.08 lakh square kilometer and second rank by population with 11.24 crore, as per census 2011. The state has been divided into 36 districts and 6 revenue division for the administrative convenience. Despite the shift in the composition of state income from the primary sector to secondary and tertiary sectors, Maharashtra continues to depend mainly on agriculture. Over the decades, more than 50% of the state population is depend on primary sector for livelihood. As per the 10th agriculture census (2015-16) the numbers of total operational holdings are 1.37 crore and area of operational holdings is 2.05 crore hectare. The average size of holding in the state is 1.08 hectare¹. Agriculture sector contributes 25percent of state's GDP². Maharashtra has total 305 APMCs³. Seventy percent of the agricultural produce selling and buying through APMCs.

The present paper seeks to analyze the following objectives.

1. To understand the term Agriculture marketing.
2. To understand the agricultural marketing functions in Maharashtra state.
3. To acquainted with the methods of agricultural produce selling.

What is Agriculture Marketing?:

Agricultural marketing is an important phenomenon in the whole agricultural activities. It covers the services like planning of production, growing and harvesting, grading, packaging, transport, storage, organizing, selling of products to the final consumer etc. Agricultural marketing is linking to the farmers and consumers.

The National Commission on Agricultural, defined agricultural marketing as a process which starts with a decision to produce a saleable farm commodity and it involves all aspects of market structure of system, both functional and institutional, based on technical and economic considerations and includes pre and post-harvest operations, assembling, grading, storage, transportation and distribution⁴.

Agricultural Marketing in its widest sense of comprises of all the operations involved in the movement of goods and raw materials from the farm to the final consumer⁵.

MARKETING FUNCTIONS:

Marketing of any product is as important as production. Marketing functions and services are important in agriculture sector too. A marketing function is a service by which the farmers and the consumer are linked together. Several marketing functions of agricultural produce are beings used in Maharashtra. According to the Pyle's the agricultural marketing functions classify into two major categories i.e. Concentrating and Dispersing⁶.

रशिया-युक्रेन युद्धाचा भारतावर झालेल्या व होणाऱ्या परिणामांचा अभ्यास

डॉ. एन. एन. गाढे

प्राध्यापक व विभाग प्रमुख, अर्थशास्त्र विभाग

लोकनेते व्यंकटराव हिरे महाविद्यालय, पंचवटी, नाशिक

narayangadhe123@gmail.com

प्रास्ताविक:

दुसरे जागतिक महायुद्ध ३ सप्टेंबर १९३९ रोजी सुरू झाले आणि २ सप्टेंबर १९४५ रोजी संपले.^१ हे महायुद्ध सहा वर्षे चालले. संपूर्ण जगाला प्रचंड मोठे नुकसान सहन करावे लागले. जीवितहानी व विनहानी मोठ्या प्रमाणावर घडून जगातल्या सर्व देशांनी त्यापासून धडा घेऊन शांततेच्या मार्गाने आर्थिक विकास साध्य करण्याचा प्रयत्न केलेला दिसून येतो. आता पुन्हा युद्ध नको या भूमिकेतून सर्व देश वागू लागले. शांततेच्या मार्गाने वाटाघाटी करण्यासाठी अनेक करार घडून आले परंतु अजून मधून काही प्रमाणात बलाढ्य देशांनी लहान व कमकुवत देशांवर हल्ले चढवले. तसे म्हटल्यावर काही देशांमध्ये झालेली किंग्कोळ स्वरूपाची युद्ध वगळता दुसऱ्या महायुद्धानंतर गेली ७५ वर्षे जगात शांतता नांदत होती. परंतु मोवियत युनियन मधून वेगळ्या झालेल्या युक्रेनवर २४ फेब्रुवारी २०२२ रोजी रशियाने युद्ध लादले. अमेरिका किंवा नाटो युक्रेनच्या बाजूने उभे राहिले तर जागतिक युद्ध भडकण्याची शक्यता आहे. अमेरिका व नाटोतील बऱ्याच देशांनी रशियाच्या या कृत्याचा निषेध नोंदवला आहे. भारताने मात्र याबाबत तटस्थ भूमिका घेतली आहे. अर्थात भारत रशियाचा जुना मित्र असल्यामुळे व रशियाने भारताला वेळोवेळी केलेल्या सहकार्यामुळे भारताला ही भूमिका घेणे गरजेचे होते. रशिया-युक्रेन युद्धाचे जगातील सर्व देशांवर कमी-जास्त प्रमाणात परिणाम होणारच आहेत. भारतावर देखील याचे परिणाम होत आहेत. युद्ध जास्त दिवस चालल्यास अजूनही काही परिणाम संभवतात. प्रस्तुत शोधनिबंधात रशिया-युक्रेन युद्धाचे भारतावर कोणते परिणाम झालेले आहेत व आगामी काळात आणखी कोणते संभाव्य परिणाम होऊ शकतील यासंदर्भात मांडणी केलेली आहे.

शोधनिबंधाची उद्दिष्टे

प्रस्तुत शोधनिबंधाची पुढील उद्दिष्टे आहेत.

- १) रशियाच्या विघटनाची पार्श्वभूमी समजून घेणे आणि युक्रेन बगेवरच्या युद्धाची कारणमीमांसा माहित करून घेणे.
- २) भारत व युक्रेन यांच्यामधील संबंधांचा आढावा घेणे.
- ३) रशिया-युक्रेन युद्धाचे भारतावरील परिणाम अभ्यासणे.

रशियाचे विघटन आणि युक्रेनवर युद्ध लादण्याची कारणे

सोव्हिएत रशिया हे एकसंघ साम्यवादी राष्ट्र होते परंतु २५ डिसेंबर १९९१ रोजी सोव्हियेत संघाने मिखाईल गोर्बाचेव्ह यांनी विघटन घडवून आणले.^२ सोव्हिएत रशियाचे विभाजन होऊन एकूण पंधरा स्वतंत्र देश निर्माण झाले. त्यामध्ये रशिया, युक्रेन, उझबेकिस्तान, कझाकस्तान, बेलारुशियन, अझरबैजान, जॉर्जिया, ताजिकिस्तान, मोल्दोव्हिया, किर्गिझिस्तान, लिथुएनिया, तुर्कमेनिस्तान, आर्मेनिया, लात्व्हिया आणि एस्टोनिया इ. देशांचा समावेश होता. यातील बहुतेक देशांनी रशियाच्या आधिपत्याखाली राहणे पसंन केले

भारतातील आरोग्यसेवा व वास्तव एक दृष्टीक्षेप

डॉ. आशा पाटील

सहा प्राध्यापक व विभागप्रमुख अर्थशास्त्र विभाग
लोकनेते व्यंकटराव हिरे महाविद्यालय, पंचवटी, नाशिकasha.patil793@gmail.com

गोष्टवारा (Abstract)

आरोग्य आणि स्वास्थ्यपूर्ण जीवन असलेला देश आर्थिक प्रगती करू शकतो हे विधान आजच्या मानार्थिक व आर्थिक विकासासाठी अगदी सत्य झालेले दिसते. निरोगी आणि स्वास्थ्यसंपन्न जनता देशाचे अत्यंत महत्वाचे मानव मयाप आहे. भारतीय अर्थव्यवस्थेत देशातील आरोग्य हे विकासासाठी कसे निगडित आहे आणि अर्थव्यवस्थेतील मूलभूत विश्लेषणाद्वारे आरोग्याचे विवेचन कसे करता येते याची उकल या लेखातून होण्यास मदत होते. प्रस्तुत लेखात भारतातील वैद्यकीय सेवेची रचना, मानवी संसाधने, आरोग्यसेवेची उपलब्धता, आरोग्यसेवेवरील खर्च करण्याची देय क्षमता, संपन्न नित्यन पद्धतीचा प्रश्न, राष्ट्रीय आरोग्य धोरण इत्यादींचा परामर्श घेऊन भारतातील आरोग्य सेवेविषयी विश्लेषण केलेले आहे. प्रस्तावना

युनायटेड नेशन्सच्या अंदाजानुसार भारताची लोकसंख्या ४ एप्रिल २०२० पर्यंत जवळपास १३८ (१३७ कोटी ६३ लाख १४ हजार ९५९) इतकी होती. जगाच्या एकूण लोकसंख्येपैकी १७.७ टक्के एवढी ही संख्या आहे. अवर वर्ल्ड इन डेव. ऑक्सफर्ड युनिव्हर्सिटी यांच्या अभ्यासानुसार २०५० पर्यंत भारताची लोकसंख्या जगात सर्वाधिक म्हणजे १६८ अर्ब इतकी झालेली असेल. देशातील निम्न्यापेक्षा अधिक लोकसंख्या २९ वर्षाखाली आहे. परंतु हा कल पढील दोन दशकात कमी होऊ शकतो. आर्थिक सर्वेक्षण २०१९ मध्ये असे नमूद करण्यात आले आहे की, २०४९ च्या आसपास देशातील काम करणारा म्हणजे २० ते ५९ या वर्षातील वयोगट हा एकूण लोकसंख्येच्या ५९ टक्के असेल. पण त्यानंतर ही संख्या कमी होत जाईल आणि ६० वर्षे आणि त्यापुढील वयाच्या लोकांमध्ये २०४९ पर्यंत १६ टक्के इतकी वाढ होईल. ही सर्व आकडेवारी देशाचे आरोग्य विषयक धोरणे ठरविताना आणि आरोग्यविषयक नियोजन करताना उपयुक्त ठरेल. याच्या साहाय्याने जुलै २०२१ च्या भारताच्या महालेखापाल(कॅग) यांच्या अहवालानुसार २०३० पर्यंतची आरोग्य विषयक शाश्वत विकासाची उद्दिष्टे उदा. सार्वजनिक खर्च, मूलभूत सोयी इत्यादी साध्य करण्यापासून भारत अद्याप बराच लांब आहे. भारतातील वैद्यकीय सेवेची रचना मानवी संसाधने, आरोग्यसेवेची उपलब्धता, आरोग्यसेवेवरील खर्च करण्याची देय क्षमता, राष्ट्रीय आरोग्य धोरण इत्यादींच्या विश्लेषणाद्वारे भारतातील आरोग्य सेवा संबंधी उकल होण्यास व समस्या समजण्यास मदत होईल.

भारतातील वैद्यकीय सेवेची रचना

अ) भारतात आरोग्य सेवेची प्रामुख्याने त्रिस्तरीय रचना आहे. पहिल्या स्तरावर आरोग्य उपकेंद्राचा समावेश होतो. भारतातील ग्रामांचा आरोग्यासंबंधी पहिला संपर्क उपआरोग्य केंद्राशी होतो. यात कुटुंब नियोजन, लसीकरण, विशिष्ट स्थानिक रोग जसे चिकन गुनिया, इन्फ्लुएंझा इ. वरील उपचार व्यवस्था, सर्वसाधारण दुखापत, आरोग्य केंद्रांना उपकेंद्रे जोडलेले आहे. आरोग्य उपकेंद्र स्थापन करण्यासाठी विंगर आदिवासी भागात ५००० तर आदिवासी भागात ३००० इतक्या लोकसंख्येचे निकष आहेत. प्राथमिक आरोग्य केंद्राची स्थापना होण्यासाठी विंगर आदिवासी भागात ३०००० तर आदिवासी भागात २०००० इतकी लोकसंख्या असणे आवश्यक असते. उपकेंद्रात साहाय्यक परिचारिका, प्रसूती परिचारिका, आरोग्य सेवक इत्यादींचा समावेश असतो. प्राथमिक आरोग्य केंद्राच्या खाली सहा उपकेंद्रे असतात. प्राथमिक आरोग्य केंद्रात वैद्यकीय अधिकारी आणि इतर गणसंवा संलग्न सेवकवर्ग नेमलेला असतो.

क्रिप्टो करन्सी- एक अभ्यास

प्रा. सुजाता वसंत आहेर

डॉ. बी. एस. आव्हाड

लोकनेते व्यंकटराव हिरे कला, विज्ञान व वाणिज्य महाविद्यालय पंचवटी, नाशिक

प्रस्तावना:-

सर्वच देशांच्या अर्थव्यवस्थांचा परिपूर्ण विकास झाला तरी, परस्परांवरील अवलंबित्व हे संपत नाही. म्हणून देवाणघेवाण ही संज्ञा अस्तित्वात आली, आणि या देवाणघेवाणीसाठी एखादी सर्वमान्य वस्तू असावी ही संकल्पना लोकांच्या लक्षात आली. पूर्वी या देवाणघेवाणीसाठी वस्तुविनिमयाची पद्धत होती; परंतु ही पद्धती कालांतराने अडचणीची वाटू लागली. तेव्हा नाण्यांचा उगम झाला. इतिहासकारांच्या मते, शेरशहा सुरी यांनी 1540 ते 1545 च्या दरम्यान रुपया या शब्दाचा वापर सर्वप्रथम केलेला आढळून येतो. शेरशहा सुरी यांनी रुपयाची प्रथा सुरू केली आणि चांगली अर्थव्यवस्था आणि चांगल्या कारकिर्दीला अधिक सुदृढ करण्यासाठी त्याने रुपया प्रथम नाने म्हणून चालविण्याचे आदेश दिले. त्यानंतर भारतात 1770 इ. स. पासून कागदी नोटा सुरू झाल्या. आणि त्या पहिल्यांदा बँक ऑफ इंडिया ने सुरू केल्या हा झाला कागदी पैसा. त्यानंतर अस्तित्वात आला तो प्लास्टिक मनी. व्यवहारांच्या संख्येनुसार पैसा जवळ बाळगणे शक्य होत नाही. म्हणून क्रेडिट कार्ड, डेबिट कार्ड सारखे प्लास्टिक मनी अस्तित्वात आले. पैशाची उत्क्रांती येथेच न थांबता पुढे जाऊन आभासी चलन अस्तित्वात आले. त्यालाच आज क्रिप्टो करन्सी असे संबोधले जाते. चलनी नोटांना पर्याय असणारी एक डिजिटल वा व्हर्चुअल करन्सी हे चलन भारतीय रुपया, अमेरिकन डॉलर, ब्रिटिश पाँडासारखे नसते. सदर शोधनिबंधात क्रिप्टो करन्सी, क्रिप्टो करन्सीच्या निर्मितीची पार्श्वभूमी, क्रिप्टो करन्सीचा इतिहास, भारतात क्रिप्टो करन्सी कधी वापरात आली व त्याचे परिणाम याबद्दलची माहिती बघणार आहोत.

संशोधनाचा उद्देश:-

- 1) क्रिप्टो करन्सी बद्दलचा इतिहास व माहिती जनसामान्यांपर्यंत पोहोचविणे.
- 2) क्रिप्टो करन्सी चे आधुनिक काळातील महत्त्व स्पष्ट करणे

क्रिप्टो करन्सी इतिहास:-

करन्सी हा इंग्रजी शब्द आहे. त्याला मराठीत चलन असे म्हणतात. प्रत्येक देशाचे चलन हे वेगवेगळे असते. जसे; भारतीय रुपया, अमेरिकन डॉलर, जपानी येन इत्यादी. तसेच त्या चलनाचे मूल्य देखील वेगवेगळे असते. या चलनाचा वापर प्रत्येक देश पैसे म्हणून करतात आणि या पैशांच्या साह्याने वस्तू व सेवांची खरेदी केली जाते. चलन कागदावर किंवा धातूच्या तुकड्यावर छापले जाते ज्याला आपण स्पर्श करू शकतो. आपण स्वतः जवळ ठेवू शकतो, मात्र क्रिप्टो करन्सी यापेक्षा वेगळी आहे.

क्रिप्टो करन्सी 2009 मध्ये सुरू झाली. ज्याचे नाव बिटकॉइन होते. बिटकॉइन हे जपानी अभियंता सातोशी नाकामोटो यांनी तयार केलेले आहे. सुरुवातीला क्रिप्टो करन्सी इतकी लोकप्रिय नव्हती. परंतु आता याच चलनाला फार महत्त्व प्राप्त होत आहे. चलनी नोटांना पर्याय असणारी ही एक डिजिटल करन्सी आहे. कोणत्याही देशाचे सरकार व बँक हे चलन छापत नाही. क्रिप्टो करन्सी फक्त ऑनलाइनच उपलब्ध असते. तिला आंतरजालीय चलन असेही म्हणतात. बिटकॉइन हे क्रिप्टो करन्सीचे उत्तम उदाहरण आहेत. आजच्या काळात हळूहळू क्रिप्टो करन्सीचे दर खूप वाढू लागले आणि पाहता पाहता क्रिप्टो करन्सी खूप महाग झाली. आणि आता क्रिप्टो करन्सीकडे लोकांचे लक्ष वेधले गेले. त्यात गुंतवणूक करायला सुरुवात केली आहे. काही महत्त्वाच्या क्रिप्टो करन्सी चे नावे खालीलप्रमाणे सांगता येतील.

राष्ट्रकवि डॉ. बृजेश सिंह की गज़लों में जल - पर्यावरण संरक्षण

प्रो. डॉ. अनीता नेरे

शोध निर्देशक एवं अध्यक्ष, हिन्दी विभाग,
श्रीमती पुष्पाताई हिरे महिला महाविद्यालय,
मालेगाँव कैम्प, जिला- नासिक (महाराष्ट्र)

डॉ. योगिता हिरे

हिन्दी विभागाध्यक्ष,
लोकनेते व्यंकटराव हिरे महाविद्यालय, पंचवटी,
नासिक (महाराष्ट्र)

भूमिका :-

प्रकृति और मानव का संबंध अन्योन्याश्रित है। प्रकृति के बगैर मानव के अस्तित्व की कल्पना भी नहीं की जा सकती। प्रकृति या पर्यावरण का मानव जीवन पर गहरा प्रभाव है। पर्यावरण में मानव को कई अनमोल उपहार दिए हैं। जिन्हें प्राप्त करके मनुष्य ने अपनी उन्नति का रास्ता आसान बनाया है। विकास की लालसा में मनुष्य ने प्रकृति का बेखौफ दोहन किया है। प्रकृति ने मनुष्य को शुद्ध हवा दी, शीतल और स्वच्छ जल दिया, तेज चिलचिलाती धूप से बचने के लिए छायादार पेड़ दिए। परंतु मनुष्य अपनी स्वार्थी प्रवृत्ति से बाज नहीं आया। यांत्रिक जीवन की चमक-दमक में आकर मनुष्य ने कल-कारखानों का निर्माण किया। मोटारकारों पर सवार होकर मनुष्य मिलों की दूरी घंटों में तय करने लगा। परिणामतः मोटरों और कारखानों से निकलने वाले धुएँ ने शुद्ध हवा को प्रदूषित कर दिया। अलग-अलग रसायनों से मिश्रित नालों का जल जब नदी झरनों में सम्मिलित हुआ तब जल का प्रदूषण बढ़ गया। खेती, कारखानों, बड़ी-बड़ी कंपनियों को बसाने के लिए हरे भरे पेड़ों को काटकर वीरान किया गया। जिसके परिणाम स्वरूप पर्यावरण में ग्लोबल वार्मिंग, भयंकर अकाल जैसी वैश्विक समस्याएँ निर्माण हो गई हैं। जिसके कारण मनुष्य ही नहीं अपितु सारी जीव सृष्टि का अस्तित्व खतरे में आ गया है।

वर्तमान समय में पर्यावरण संरक्षण के लिए अनेक संस्थाएँ सरकार तथा समाजसेवी काम कर रहे हैं। पर्यावरण का संरक्षण सब का उत्तरदायित्व हो गया है। पर्यावरण का संतुलन अगर बिगड़ा तो आने वाले दिनों में धरती पर मानव समाज ही नहीं अपितु समस्त जीव सृष्टि के लिए खतरा निर्माण हो सकता है। अतः मानव समाज को खतरे से आगाह करने के लिए हिंदी साहित्य की ग़ज़ल विधा का विशेष योगदान रहा है। शेरों के माध्यम से ग़ज़लकार सोए हुए समाज में चेतना भरने का कार्य कर रहे हैं। ऐसे ग़ज़लकारों में सामाजिक, राजनीतिक, दार्शनिक, पारिवारिक, आर्थिक और पर्यावरण चेतना को बखूबी चित्रित किया गया है।

हिंदी ग़ज़ल विधा का स्वरूप और विकास :-

ग़ज़ल हिंदी की अत्यंत प्रभावी विधा है। 'गागर में सागर' भरने की क्षमता ग़ज़ल में है। तथा भावाभिव्यक्ति के लिए ग़ज़ल महत्वपूर्ण मानी जाती है। कवि कम शब्दों में अपने शेरों के माध्यम से समाज में चेतना निर्माण करता है। इसलिए वर्तमान समय में ग़ज़ल सबसे लोकप्रिय विधा बन गई है।

ग़ज़ल का इतिहास काफी पुराना है। ग़ज़ल उर्दू की देन है। परंतु हिंदी ग़ज़ल में आज अपना अस्तित्व और लोकप्रियता स्वयं निर्माण की है। हिंदी साहित्य में ग़ज़ल लिखने की परंपरा बहुत प्राचीन है। अमीर खुसरो ने हिंदी ग़ज़ल का सूत्रपात किया। बाद में संत कबीर, भारतेन्दु हरिश्चंद्र से होकर दुष्यंत कुमार तक ग़ज़ल का विकास होता रहा। दुष्यंत कुमार ने पहली बार ग़ज़ल को आम जन की पीड़ा के साथ जोड़ा और हिंदी ग़ज़ल की लोकप्रियता को व्यापक बनाया। वास्तव में दुष्यंत कुमार ने हिंदी ग़ज़ल को गरिमा दी और इसके बाद समकालीन ग़ज़लकारों ने इसकी वृद्धि की है। इनमें गोपालदास सक्सेना 'नीरज', शमशेर बहादुर सिंह, देवेंद्र