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3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the last five years (10)								
Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
						Link to website of the Journal	Link to article/paper/abstract of the article	Is it listed in UGC Care list/Scopus/Web of Science/other, mention
JAMES BALDWIN'S GO TELL IT ON THE MOUNTAIN : A DISCOURSE OF THE PLIGHT OF FEMALE NAGGERS	DR.BORSE PRAVIN S.	ENGLISH	LANGLIT	2017	2349 - 5189	https://www.lannglit.org/	http://lannglit.org/vol-3-issue-3-2017/	YES
A green chemical Approach:For synthesis of substituted chromenes via three	Mr. S.S. Palkhe	Chemistry	Research Journey	2017	2348 - 7143	https://www.researchjourney.net/	no link	Yes

component reaction by using various catalyst								
Issues and Challenges before Services Sector with implementation of GST	Dr. C.S. Sukhadane and D. A. Pati	Commerce	Research Journey	2018	2348 - 7143	https://www.researchjourney.net/	no link	Yes
Identity crisis in Thomas Hardys Tess of D'Urbervilles	Dr.P.S. Borse	English	Research Journey	2018	2348 - 7143	https://www.researchjourney.net/	no link	Yes
Digital Resources and consortia approach in collection development	Mr.P. R. Deshmukh	Library Sci	Interdisciplinary Multilingual refereed Journal	2018	2319 - 9318	https://www.vidyawarta.com/02/?p=4269	no link	Yes

1970 ते 1980 या दशकातील मराठी नाटक:इतिहास परंपरा आणि नवता	Dr.K.M .patil	Marathi	Research Journey	2018	2348-7143	https://www.researchjourney.net/	no link	Yes
Total quality management (TQM)in laboratory	Mr. Pankaj R Deshmukh	Library Sci	research journey International multidisciplinary E-research	2018	2348-7143	https://www.researchjourney.net/	no link	Yes

			journal					
Franz Kafka: A Story teller	Dr. Pravin S Borse	English	research journal International multidisciplinary E-research journal	2019	2348-7143	https://www.researchjournal.net/	no link	Yes
Reflections of contemporary Indian society in the works of Aravind Adiga	Dr. Pravin S Borse	English	research journal International multidisciplinary E-research journal	2019	2348-7143	https://www.researchjournal.net/	no link	Yes
Foibles of NAAC: A study	Dr. Pravin S Borse	English	research journal International multidisciplinary E-research journal	2019	2348-7143	https://www.researchjournal.net/	no link	Yes

The diatom flora of Khandesh region	Dr. K.D. Mahajan	Botany	International Journal of research and analytical review	2019	2349-5138	https://www.ijrar.org/	https://essence-journal.com/wp-content/uploads/Archives/Volume III/Issue 2/Studies-on-the-diatom-flora-of-north-Maharashtra-region-genus-%E2%80%93-caloneis.pdf	yes
The diatom flora of padmalaya Lake padmalaya village from North Maharashtra region	Dr. K.D. Mahajan	Botany	Research journey International E-research journey	2019	2348-7143	https://www.researchjourney.net/	no link	Yes
Observing climate impact on cotton yield in dharangaon Tahsil of Maharashtra state India	Mr. Raju mahadevrao Kendre	Geography	International refereed Journal	2019	2319-6459	http://www.horizonpalaestra.org/	no link	yes
Groundwater modelling using Visual in the last one decade in Maharashtra	Mr. Raju mahadevrao Kendre	Geography	interdisciplinary multilingual refereed journal	2019	2319-9318	https://www.vidyavarta.com/02/?p=4269	no link	yes
On α -Prime and Weakly α -Prime Ideals in Semirings	Dr. Dipak Ravindra Bonde,	Mathematics	Asian - European Jour	2020	1793-7183	https://www.worldscientific.com/	https://www.worldscientific.com/toc/aejm/14/08	Yes

	Jayprakash NinuChaudhari		Journal of Mathematics			oi/aej m/grou p/d202 0.y202 1		
Sea Buckthorn Oil Tocopherol extractions by product utilization in green synthesis of polyurethane coating	M.S. Pabhaudesai, PM Parasakar, Rahul Kedar, RD Kulkarni	Chemistry	European Journal of Lipid Science and Technology	2020	1438-9312	https:// online library. wiley.c om/jou rnal/14 389312	https://onlinelibrary. wiley.com/doi/abs/10 .1002/ejlt.201900387	Yes
Agricultural Policy of the British Government in Erandol Pargana and Locality –A Historical Study	Prof.S anjay Baburao Shingane Prof. Dr.Pra shant Sudhakar Rao Deshmukh	History	Journal of Information and Computational Science	2020	1548-7741	http:// www.j oics.or g/	http://www.joics.org/	yes
A study of problems of Banana processing entrepreneurs in Jalgaon district	Mr.Gaurav Ganesh Mahajan	Commerce	Journal of Information and computational science	2020	1548-7741	http:// www.j oics.or g/	https://drive.google.c om/open?id=13R1KFp E5ZS- 2TFKxSxTGjzm5mUee Z2Zb	yes
LIFE HISTORY OF STINK BUG HALYOMORPHA HALYS (HETEROPTERA : PENTATOMIDA E)	Dr.S.H. Waghmare	Zoology	BIOINFOLLET	2020	0973 - 1431	https:// www.i ndianjo urnals. com/	https://indianjournals .com/ijor.aspx?target =ijor:bil&volume=17& issue=4b&article=044	yes

PANI - ZnO Cladding - Modified Optical Fiber Biosensor for Urea Sensing Based on Evanescent Wave Absorption	Dr.D.K. Gaikwad	Physics	Frontiers In Materials	2020	2296 - 8016	https://www.frontiersin.org/journals/all	https://doi.org/10.3389/fmats.2020.00184	yes
Urea biosensors : A Comprehensive review	Dr.D.K. Gaikwad	Physics	Biotechnology and Biochemistry Applied biochemistry	2021	1470 - 8744	iubmb.onlinelibrary.wiley.com/	https://doi.org/10.1002/bab.2168	yes
Effect of Ago addition on the mechanical ,optical ,and radiation attenuation properties of V2 O2/P2 O5/B2O3 glass system	Dr.D.K. Gaikwad	Physics	Applied physics a material science & processing	2021	0947 - 8396	https://www.springer.com/	https://hdl.handle.net/20.500.12619/95555	yes
Influence of Bi2 O3 /WO3 Substitution on the optical,mechanical ,chemical durability and gamma ray shielding properties of lithium - borate glasses	Dr.D.K. Gaikwad	Physics	Ceramics International	2021	5286 - 5299	https://www.journals.elsevier.com/	https://doi.org/10.1016/j.ceramint.2020.10.109	yes

Newly developed glasses containing Si/Cd/Li/Gd and their high performance for radiation applications: role of Er ₂ O ₃	Dr.D.K. Gaikwad	Physics	J Mater Sci: Mater Electron (2021)	2021	9440–9451	https://www.springer.com/journal/10854	https://link.springer.com/article/10.1007/s10854-021-05608-z	yes
Ethnobotany of exotic plants in Khandesh region of maharashtra	Dr.Khare S.M	Botany	International Journal of Botany Studies	2021	2455 - 541X	http://www.botanyjournals.com/	https://www.botanyjournals.com/archives/2021/vol6/issue3/6-3-53	yes
Fe-based alloys and their shielding properties against directly and indirectly ionizing radiation by using FLUKA simulations	Dr.D.K. Gaikwad	Physics	Physica Scripta	2021	1402-4896	https://iopscience.iop.org/journal/1402-4896	https://ui.adsabs.harvard.edu/link_gateway/2021PhyS...96d5303A/doi:10.1088/1402-4896/abdd52	yes



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The Founder Editor of the "Progress reports" and later of the Journal was **Prof. M.T. Naranjinger** (on the left) who continued till 1927 and nurtured it for 20 years. Then the Editorship of the journal was entrusted to **Prof. R. Vaidyanathswamy** (on the right) who served the Society as the Editor of the Journal for 23 long years from 1927 to 1950. During his tenure of Editorship, **the JIMS new series was started in 1934 and was turned into a quarterly journal**.

It was due to the hard work put in by these two pioneering editors that the JIMS established itself as one of the leading international journals - a position which it continues to have even today.

It may be noted with great pride that

$\frac{1}{2}$ 1911 volume of this Journal contains earliest contributions of the great legendary mathematician **Srinivasa Ramanujan**. They were in the form of questions. Interestingly, a fifteen page paper entitled $\frac{1}{2}$ Some properties of Bernoulli Numbers, $\frac{1}{2}$ contributed by Ramanujan also appeared in the same 1911 volume of the Journal. In fact, he published 12 of his research papers in the Journal of Indian Mathematical Society.

$\frac{1}{2}$ S. S. Pillai, $\frac{1}{2}$ another brilliant Indian mathematician, $\frac{1}{2}$ who almost solved the famous "Waring Problem", $\frac{1}{2}$ published 23 of his research papers in the Journal of Indian Mathematical Society $\frac{1}{2}$ and 8 papers in the Mathematics Student.

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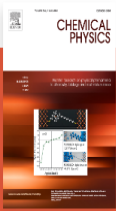
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JAMES BALDWIN'S *GO TELL IT ON THE MOUNTAIN*: A DISCOURSE
OF THE PLIGHT OF FEMALE NAGGERS

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ABSTRACT

A woman always found herself under the suppression of male dominance. She is subdued by the forces like religion, ethics, identity, socio-economic as well as gender politics. She is often forced to live Diaspora as a wanderer, homeless and alienated. She has to search a room in her own family. In short, woman has always been subjected to discrimination and exploitation in the male dominated society. She is considered as inferior to man.

Being treated others by male; she has started to long her belonging, her identity, her existence, her own history. She has stepped to dismantle the patriarchal order and to develop a female discourse. Under all such circumstances the feminist movement becomes able to sustain suffrage; the right of woman to vote. Though limited voting right has been gained by woman in some parts of the world, it proved a milestone in the history of feminism.

Unfortunately the rays of morning would not lighten the life of woman niggers or black woman. "In the eyes of the 19th century white public, the black female was a creature unworthy of the title woman; she was mere chattel, a thing, an animal." Black woman were supposed as sexually immoral and licentious. She was victim of racism, classism and sexism. Since American slavery, she has experienced much brutality. It is said that the social hierarchy of 400 years of United State located white men at the top, white woman next followed by black men and finally at the bottom black woman. This hierarchy is depicted aptly by James Baldwin in his *Go Tell It On The Mountain*.

The novel *Go Tell It On The Mountain* is an exploration of the exploitation of woman niggers in Harlem. Harlem is a town place that stands as a platform or stage where on the action against black woman takes place. In Harlem black woman are tortured and oppressed on multi levels. At first level these woman are treated as 'woman' by all people including their husbands. They are tortured physically as well as mentally by the white people as 'black woman'. They are slave to their masters who treat them as animals that have no right to express their love affection towards their own born children. As they born children, they are snatched away and sold out as calves and puppies.



Issues and Challenges before Service Sector with implementation of GST.

Dr. C.S. Sukhadane.
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Arts Commerce And Science College,
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Abstract:-

As we know a most awaited and visionary reform in Indian taxation has come into force now. The Good and Service Tax frequently also called One Nation One Tax. After waiting for many years, lots of discussions and doubts, the GST came in to force from 1st July 2017 with new challenges and expectations. As the country facing too many issues in economic development such as unemployment, Underdeveloped Infrastructure, Low level of technology etc., expected to be resolve and nation will move forward to be global economic leader with the help of GST. But the several concerns and problems also with the India's GST like Dual Model based on Canadian GST (CGST and SGST) and the Indian invention IGST. So, there were the challenges to maintain the laws similar and complete the objective of one nation one tax. Before GST there was a Federal Structure of Taxes in India, Which lead the unhealthy competition among the states. Now with the help of GST the central government is trying to maintain economic balance of the country. But, the main issue with GST is Tax on Services as there are several different Rates. But in case of Services tax it's pretty similar earlier to GST concept. Like the Service Tax levied by the central Government with uniform Rate and there was only one Law (Finance Act, 1994). Now with the introduction of GST the services also divided into the different Rate of taxes. As we all know the Service Tax is the one of the most important revenue source for the central Government and they hold the dominance over collection of revenue over services. The India's economy is classified mainly in three parts - Agriculture and allied, Industry and Services. In which the Service sector is the most important factor of India's economic Growth. The service sector Contribution to GDP is around 57.77 % and service sector provides employment to 27% of the work force. That means any complication about service sector and there laws can lead the country indirectly towards economic crisis.

Keywords:- Gross Domestic Product, Economy, Goods and Service Tax, Service Tax, Tax Rates, Returns etc.

Overview of Service Sector in India

Introduction:-

The economy of India is a developing mixed economy. It is the world's sixth-largest economy by nominal GDP and the third-largest by purchasing power parity (PPP). The country ranks 141st in per capita GDP (nominal) with \$1723 and 123rd in



A Green Chemical Approach: For Synthesis of Substituted Chromenes via Three-Component Reaction By Using Various Catalyst

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4. Department of Chemistry, MGSMS's ASC Chopda, Dist-Jalgaon, Maharashtra, India.

Abstract:

A simple, efficient, and environmentally benign method for the synthesis of substituted 2-amino-4H-chromenes using the various catalyst in aqueous, 50% alcoholic and alcoholic media in excellent yields at room temperature. This method provides a green and improved pathway for the synthesis of chromenes in the terms of Multicomponent reactions, excellent yields, short reaction times and green catalyst.

Keywords: 2-Amino-4H-chromene, Na_2CO_3 , K_2CO_3 , Inorganic double salt (Rochelle salt), Malononitrile, Resorcinol,

Introduction:-

Chromones (Figure 1) constitute one of the major classes of naturally occurring compounds, and interest in their chemistry continues unabated because of their usefulness as biologically active agents.¹

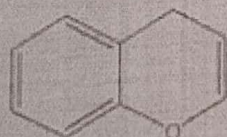


Figure 1. The chromone nucleus

Some of the biological activities attributed to chromone derivatives include cytotoxic (anticancer),²⁻⁴ neuroprotective,⁵ HIV-inhibitory,⁶ antimicrobial,^{7,8} antifungal⁹ and antioxidant activity¹⁰. Due to their abundance in plants and their low mammalian toxicity, chromone derivatives are present in large amounts in the diet of humans¹¹. Therefore the synthesis of chromone derivatives is a research field of great interest and long history.

Our aim is to synthesize Aminochromenes. Aminochromenes are an important class of organic compounds being the main components of many naturally occurring products. In addition, they are valuable precursors used for the synthesis of cosmetics, pigments, and potentially biodegradable agrochemicals.

In continuation of our work concerning the synthesis and biological evaluation of new heterocycles and aiming to explore the efficiency of Rochelle salt as a green heterogeneous

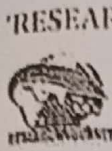
१९७० ते १९८० या दशकातील मराठी नाटक : इतिहास, परंपरा आणि नवता

प्रा.डॉ. किशोर मंगेश पाटील
प्रमुख, मराठी विभाग,
फला, चाणिज्य आणि विज्ञान महाविद्यालय,
धरणगाव जि. जळगाव ७५८८०५२४०५
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पाश्चात्य वाङ्मय व रंगभूमीच्या परिचयाने मराठी नाटक आधुनिक झाले आणि खऱ्या अर्थाने नवे झाले. "1954-55 मध्ये मुंबई द्वैभाषिक राज्यात प्रथमच राज्य पातळीवर नाट्यस्पर्धा सुरु झाल्या. या स्पर्धेमुळे हीशी मंडळींना दरवर्षी नाटक करायला एक महत्त्वाचे कारण मिळाले. येथून मराठी रंगभूमीला नवेपणाचे चाहूल लागली. रंगभूमी या माध्यमाकडे डोळसपणे, विचारपूर्वक, काही उद्देशाने हीशी मंडळी पाहू लागली. या काळात काही शहरात नाट्य मंडळ, नाट्यसंस्था उदयास आल्या. स्पर्धासाठी नाटकांचा, त्यांच्या वेगळेपणाचा, सादरीकरणाचा सखोल विचार ही मंडळी करू लागली. तसेच त्यांचे हे प्रयत्न हे स्पर्धेपुरतेच मर्यादित न राहता सतत वर्षभर झपाटलेल्या अवस्थेत नाट्यमाध्यमाचा संप्रयोग विचार ही मंडळी करू लागली. इथे होस बाजूला पडली. नाटक हे या मंडळींच्या जीवनाचे फार महत्त्वाचे अंग बनले," असे मत अरुण काकडे यांनी म्हटले आहे ते या संदर्भात महत्त्वाचे आहे.

प्रायोगिक रंगभूमी हा शब्द मराठी नाटकाची परंपरा नाकारून नवेपणा स्वीकारणारा परबलीचा शब्द आहे. १९५५ च्या आसपास प्रायोगिक नाटकांची चळवळी सुरु झाली. या संदर्भात प्रसिध्द नाटककार महेश एलकुंजवार म्हणतात, "नाटक हा एक विशुध्द कला प्रकार आहे, सामूहिक असला तरी मनोरंजन व अर्थाजन या दोन हेतूंपेक्षा काही वेगळा म्हणजे विशुध्द कलात्मक अनुभव घेणे, हा हेतू नाटक करण्यामागे असू शकतो, नव्हे असावाच, या जाणीवेतून व हद्दातून नवे प्रायोगिक नाटक सुरु झालेले दिसते".

प्रस्तुत निबंधात १९७० ते ८० या दशकातील मराठी रंगभूमीवरील सादर झालेल्या नाटकांचा इतिहास आणि परंपरेच्या संदर्भात नवेपणाचा विचार करण्याचा प्रयत्न केला आहे. प्रायोगिक किंवा नवेपणाच्या संदर्भात हे दशक महत्त्वाचे आहे. कारण मराठी रंगभूमीवरचे प्रयोग हे फक्त कमानी रंगभूमी अर्थात प्रोसिनियम थिएटर या संकल्पनेत जे अडकून राहिले होते ते या दशकात बाहेर पडलेले दिसते. वेगळेपणा आणि नाचोप्य या संदर्भात छबिलदासी रंगमंचाचे महत्त्व विशेष आहे. या दशकात छबिलदासी रंगमंचावर सादर झालेली नाटके व आविष्कार या नाट्यसंस्थेचे कार्य महत्त्वाचे आहे. १९७० मध्ये आविष्कार या नाट्यसंस्थेत अरविंद देशपांडे, सुलभा देशपांडे, अरुण काकडे या सारख्या नव्या दमाच्या रंगकर्मींनी नव्या वाटा चोखाळून मराठी रंगभूमीला वेगळी दिशा दिली. यातून छबिलदास रंगमंचाचे कार्य जांरात सुरु झाले. या दशकात पाश्चात्य व इतर प्रांतीय, भाषिक तसेच मराठीतील नवी, विविधंग नाटके नाटके छबिलदास रंगमंचावर सादर झाली. नव्या संवेदनशीलतेने आणि नव्या प्रयोगात सादर केलेली ही नाटके मराठी नाटकांचे बलस्थान ठरली. लोंकां, टेनेरी विल्यमस, जॉ अर्नुई, युजीन आयनेस्को, हेरॉल्ड पिटर, लुईजी पिरांदला, युरीडिंस यासारखी काही पाश्चात्य नाटकांचे खेळ नवेपणाची पायवाट ठरली. ही नाटके स्वतंत्र असली तरी पाश्चात्य संवेदनेतून सादर झालेली आहेत. भारतीय नाटककार म्हणून बादल सरकार,



Identity Crisis in Thomas Hardy's *Tess of D'Urbervilles*

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Shakespeare of the English novel, Thomas Hardy is one of the greatest novelists in English literature. Critics have studied him a tragedian, regionalist, philosopher and the master of the art of characterization. He is known for his plot construction as well. All his novels are set in Wessex, partly a real and partly a dream land. In this regional setting, Hardy's characters survive. Most of his novels are the explosion of reality in human sufferings. He views in *The Mayor of Casterbridge*, "Happiness is an occasional episode in a general drama of pain". It means that life is a drama of pain that is the reality of life.

Alike his other novels, *Tess of D'Urbervilles* is also a drama or depiction of sufferings. The very novel is titled as *The Pure Woman* too. Throughout the novel the protagonist, the pure, Tess suffers. The novel is a story of her journey in search of her own identity. She is shown always busy in her identity dilemma. Not only the protagonist but also the other characters are in search of identity.

The novel begins or opens with the identity crisis. Mr. John Durbeyfield, a haggler, Tess' father is informed by a parson that his family links with D'Urbervilles ancestry which is a noble one. And the poor man suddenly starts celebrations upon his noble ancestry or new identity. Being a representative of a noble and ancient family, he feels very proud of himself. In his excitement he prefers to go home by a Horse-Carriage instead of on feet. He asks his wife to cook a very special dinner in this special occasion. Both Mr. and Mrs. Durbeyfields celebrate the eve in an Inn where they use drink and dance for a long time. Mrs. Durbeyfield suggests establishing or claiming a relationship with a rich lady, D'Urberville. Even they decide to marry their daughter, Tess with any rich and high-class gentleman so that they can enter into a high class or strata of society. All this dreaming, explores the search for identity on the part of poor Mr. and Mrs. Durbeyfield.

We have another character in the novel depicting identity dilemma and he is Angel, a son of a Parson. Against the will of his parents, he works on a farm as a dairyman, as he wills to learn agricultural activities. He has some agricultural projects in his mind. And for that instead of showing any interest in the doctrine of Christianity and the life of a priest, he craves to establish his identity as an agrarian. In the course of time he marries with Tess, a fellow worker who is able and suitable hand to help

DIGITAL RESOURCES AND CONSORTIA APPROACH IN COLLECTION DEVELOPMENT

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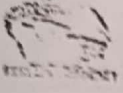
Abstract: This paper introduces the concept of digital Resources and discussed the various forms of digital resources and the consortia approach to subscribe digital resources.

Keywords: Digital resources, E-resources, Consortia approach

1. **Introduction:** Digital resource and E-resource are synonymously used concepts and having similar meaning. Libraries have been playing the role of a provider of learning resources to the learning communities. Drastic changes in the technology and the way internet is evolving has changed the attitude of users towards learning resources. The role of libraries as a facilitator by providing access to the digital resources like e-books, e-journals, e-databases and e-thesis etc. using the modern technology is widely encouraged. E-resources do not require physical space and hence the problem of shelving or re-shelving doesn't arise. E-resources cannot be damaged or mutilated; stock taking or missing will not be a problem. The most important advantage is that, any authenticated user can access the e-resources 24*7 from anywhere as well as the same resource can be used by many at a time. If the e-resources are made available through the library portal, users need not have to visit the library to access e-books. There are many applications for managing music, pictures and documents online or at one's desktop

1.1 Definition of Digital resource:

"Digital resource" is used interchangeably with "electronic resource." "Electronic resource" is defined as any work encoded and made available for access through the use of a computer. It includes data available by remote access and direct access (fixed media). In other words: Remote access (electronic resources) refers to the use of electronic resources via computer networks. Direct Access (electronic resources) refers to the use of electronic resources via physical carriers (e.g., discs/disks, cassettes, cartridges) designed to be inserted into a computerized device or its auxiliary equipment.



'पोटमारा' तील ग्रामीण वास्तव

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प्रास्ताविक :-

१९९० नंतरची ग्रामीण कांदबरी ही वास्तवान्मुख आहे. विषयाच्या एकाच बंधनात ती अडकून न पडता अनेकविध विषय घेऊन ही कांदबरी अभिव्यक्त होतांना दिसते. हे या कथात्म साहित्याचे यश फटले पाहिले ग्रामीण परिसर, ग्रामसंस्कृती आजही अनेक समस्यांनी ग्रस्त आहे. गावगाड्यातील परिसर अनेक कारणांनी ढवळून निघत आहे. यांची काही दाखले ही आहेत. "या व्यवस्थेला जागतिकीकरणाने गाठले सारी संस्कृतीच धोक्यात आहे. अशा हाकटी पिटवली गेली. भाषा प्रदेश आणि जात यातून अस्मिता जागृत केली गेली आपल्या संस्कृतीवर आक्रमण होत आहे. संस्कृतीची विशिष्टता नष्ट होत आहे. या भावना प्रबळ झाल्या आणि जातसमूहाच्या संस्कृती बदलत्या पूज्यभाव व्यक्ता करणाची स्पर्धा सुरू झाली. त्यासाठीचा आवंश व्यक्त झाल्या समूह भावनेचे स्वरूप त्याला प्राप्त झाले. मराठी कांदबरीने हेच स्वरूप आपल्यामधून साकार केली". असे मत प्रल्हाद तुलंकर ग्रामीणकांदबरीच्या स्वरूपाबद्दल व्यक्त करतात.

परंतु नव्यदन्तर ग्रामसंस्कृतीला अनेक हादरे वसू लागले. नवविन, संकल्पना, तंत्रज्ञानाने प्रश्न न सुटता अधिक तीव्र बनले या प्रश्नांची तीव्रता अधिक गतिशील झाली. त्यामुळे ग्रामीण परिसरातील माणसांचे जगणे समृद्ध न होता अधिक जटील बनले निसर्गाचा लहरीपणा दुष्काळ, नापिकीमुळे शेतकऱ्यांच्या आत्महत्या वाढू लागल्या कर्ज, मालाचे भाव, महागाई पाण्याचे प्रश्न वीज तसेच शेतीशी निगडित शासकीय क्षेत्रातिल भ्रष्टाचार सरकारचे उदाशिनतेचे धोरण, विकासाची योजनांची, धोरणे, अंमलबजावणीचे कारणे, खाजगीकरण, जागतिकीकरण, औद्योगिकीकरण, यांत्रिकीकरण यांचा कृषीजीवनावर पडलेला प्रभाव शिक्षणाचे बाजारीकरण, बेरोजगारी, गावपतळीवरील राजकीय वातावरण, झपाटयाने बदलत चाललेले सामाजिकरण. मोडकळीस आलेल्या कुटुंबव्यवस्था तसेच शेतकऱ्यांचा खालावत चाललेली मानसिकता असे अनेक विषय डोळ्यासमोर ठेवून अनेक कांदबरीकार नव्या जाणिवेने कथात्म साहित्य लिहितांना दिसतात त्यात रंगनाथ पठारे, राजन गवस बाबागांव मुसळे, विश्वास पाटील सदानंद देशमुख, कृष्णात खोत अशोक कोळी, प्रकाश देशपांडे, इ. कांदबरीकारासोबत रवींद्र पांडरे, यांचाही महत्वाचे कांदबरीकार म्हणून नामोल्लेख करावा लागतो.

रवींद्र पांडरे यांचे 'लढाळ्यांचे तुरे' (कवितासंग्रह) 'मातीतली माणस' (कथासंग्रह) 'अवघाची संसार' (कांदबरी) 'कथोकळी' (ललित गद्य) 'गाण्यात झुले रान' (किशोरांसाठी कविता) इत्यादी साहित्य प्रकाशित असून त्यांच्या साहित्यांना पुरस्कारांही सन्मानित केले आहे. 'मातीतली माणस' या कथासंग्रहास राज्य शासनचा उत्कृष्ट वाङ्मयनिर्मितीचा गं.ल.ठोकळ पुरस्कार आणि रोहमारे ट्रस्टचा उत्कृष्ट ग्रामीण साहित्य निर्मिती पुरस्कारां प्राप्त झालेले आहेत. या खेरीज त्यांची 'पोटमारा' ही अलिकडील कांदबरी लोकवाङ्मय गृह मुंबई येथून एप्रिल २०१४ ला प्रकाशित झालेले आहे. या कांदबरीच्या अर्पणपत्रिकेत रवींद्र पांडरे लिहितात. कष्टान उच्च शिक्षण घेऊन ही बेरोजगार राहिलेल्या आणि अजूनही कष्टातच जीवन जगणाऱ्या बेरोजगारांना त्यांनी समर्पित केली आहे.

पोटमारा आशय-विश्लेषण :-

रवींद्र पांडरे यांची पोटमारा ही ग्रामीण कांदबरी आहे. गाव पांडरीतील ग्रामीण भागातील कोरडवाहू शेतकऱ्यांच्या अनेक प्रश्नांची ती दाखल घेते. ग्रामसंस्कृतीतील बदलत्या मूल्यांची नोंद घेते. त्यांचे जगणे कुंधणे यांचा शोध घेते.

THE DIATOM FLORA OF KHANDESH REGION

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Khandesh region comprises three district Jalgaon, Dhule and Nandurbar. Though earlier workers have paid attention on taxonomy of diatoms in Maharashtra, but Khandesh region is unexplored regarding to taxonomy of diatoms. In present study the genus *Nitzschia* is represented by thirty nine species from only North Maharashtra, hitherto unexplored area. The total fifty two diatom taxa were reported from different localities of North Maharashtra region, from the rivers, dams, nala, lakes, ponds, streams, ditches and several water bodies as the diatoms are cosmopolitan in habitat.

KEY WORDS: BIODIVERSITY, ALGAE, DIATOMS, NITZSCHIA.

INTRODUCTION:

In India, the pioneer work was done by Venkatraman (1939, 1940, 1969) on diatoms. He gave a systematic account of south Indian Diatoms. Gonzalves (1947) was probably the first to record the Diatoms from Maharashtra. Gonzalves and Gandhi (1952-1954) gave a systematic account of the Diatoms of Bombay. Gandhi (1959, 1962, 1967) made the contribution to our knowledge of fresh water Diatoms of India. Sarode and Kamat (1984) studied fresh water diatoms of Maharashtra.

The present investigation is the outcome of studies on the genus-*Nitzschia* from North Maharashtra region, from different habitats of different localities.

MATERIALS AND METHODS:

Algal samples were collected from different localities of North Maharashtra region or Khandesh comprises of three districts – Jalgaon, Dhule and Nandurbar. The present investigation pertains to nearly 37 places in their respective districts. Covering all habitats like rivers, ponds, dams, lakes, streams, ditches, barrages, from high altitudes like Toranmal, big dams like Hatnoor dam and Malangaon dam. Also, collections were made from epilithic, epiphytic, epipsammonic, and epipellic habitats. Collections as far as possible are made through out the year. Smol's method was used for isolation of diatoms. One ml. of wet



THE DIATOM FLORA OF PADMALAYA LAKE OF PADMALAYA VILLAGE FROM NORTH MAHARASHTRA REGION

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ABSTRACT

Diatoms are algae that live in houses made of glass. They are the only organism on the planet with cell walls composed of transparent, opaline silica. Diatoms cell walls are ornamented by intricate and striking patterns of silica. Diatoms are free floating epilithic, benthic etc. types of habitat. They are cosmopolitan in habitats. Earlier workers have concentrated mainly on the taxonomy of diatoms in Maharashtra, but North Maharashtra region is unexplored regarding taxonomy of diatoms. From the hitherto unexplored area the lake Padmalaya from Padmalaya village of Erandol Taluka, District Jalgaon from North Maharashtra region. Padmalaya means 'Padmasya' and 'Alaya' means 'Home of Lotus' (Lotus Pond). The Genus *Synedra*, *Achnanthes*, *caloneis*, *navicula*, *Pinnularia*, *Cymbella*, *Gomphonema*, *Denticula* represented by twenty four species, and total thirty taxa reported from this lake.

KEY WORDS: Biodiversity, algae, diatoms.

INTRODUCTION:

A Systematic account of south Indian Diatoms was done by Venkatraman (1939, 1956). The Gonzalves (1947) was probably first to record the Diatoms from Maharashtra. Gonzalves and Gandhi (1952-1954) gave a systematic account of the Diatoms of Bombay. Gandhi (1955-1962) contributed to our knowledge of fresh water Diatoms of India. Sarode and Kamat (1984) studied fresh water diatoms of Maharashtra.

The present investigation is the outcome of studies on the genus- *Synedra*, *Achnanthes*, *caloneis*, *navicula*, *Pinnularia*, *Cymbella*, *Gomphonema*, *Denticula* from Padmalaya Lake situated near the temple of God Ganesha at Padmalaya Village, Taluka Erandol of Jalgaon District, North Maharashtra region.

MATERIALS AND METHODS:

Algal samples were collected from Padmalaya Lake near the Padmalaya Temple of jalgaon District from North Maharashtra region or Khandesh. Collection was made in winter season. Smol's method was used for isolation of diatoms. One ml. of wet sediment from each sample was placed in centrifuge tube and 1 % Hydrochloric acid was added to remove carbonates and avoids the formation of Calcium Sulphate. Sample were then washed several times before they were mixed with 1% solution of Sulphuric acid in which Potassium dichromate had been dissolved (10 ml: 1 gm) in order to remove organic matter. After five days, the sample was boiled for one hour to remove any final residue. Sample was then washed with distilled water eight times. This washed sample was then placed in a drop of 70% alcohol, and mounted in Canada balsam for microscopic observations. Line drawings were made with the help of Camera Lucida. All drawings are under oil immersion. All the taxa of the genus *Synedra*, *Achnanthes*, *caloneis*, *navicula*, *Pinnularia*, *Cymbella*, *Gomphonema*, *Denticula*



Total Quality Management (TQM) In Libraries

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ABSTRACT:

Total quality management is one of such concept which was originally associated with the industrial products and later on accepted in library science. Basically this concept was not considered as applicable to service institutions, but later on it was accepted that service also requires quality. Library offers service to its clients. This service must be having promptness, effectiveness and comprehensive. To achieve all these qualities, it is essential to find out requirements of the users, assess the quality of the service offered, and find out the measures to improve the quality of the service.

KEY TERMS: TQM, Quality Assurance, TQM culture, Benefits of TQM, Customer Focus, TQM in Libraries, ISO 9000

DEFINITION:

What is Total quality management (TQM)?

- "Management philosophy and company practices that aim to harness the human and physical resources of an organization in the most effective way to achieve the objective of the organization." (British Standard)
- "A basic business strategy that provides good and services that completely satisfy both internal and external customers by meeting their explicit and implicit expectations. This strategy utilizes the employees to the benefit of the organization in particular and society in general and provides positive financial return to the shareholders." (Tencer and De Turo)

LIBRARY AND ITS CHANGING FACADES

Library and information is not new as what we understood in our sense, but it was in existence from the ancient times and is as old as the origin of education in the olden days. The entire human civilization until these days had experienced three waves of social change, viz., and the age of agriculture, the age of industrialization and the age of information. Throughout the world libraries that we have modern are type of libraries characterized by print and electronic collections, manual and ICT (informatics and communication technology) based services. It cannot rest up at this stage. It has to move beyond these traditional role and supposed to function as custodians of books and integrate new methods of storage and transmission of information into an already existing structure. All these modern libraries must link the users with the information they seek. It was observed that the recent times users of library expect more from libraries than ever before.

Hence there is a necessity of the library experience from libraries than ever before. quality services to all its users. Most of us during the earlier days thought that higher rate of resource consumption, purchasing, stacking and stacking of new books in the institution premises is deemed to quality improvement process. In the present situation the above approach doesn't hold well enough as it is revealed. Today quality improvement in the Library and Information Service is to offer the needed information to the users at the required and appropriate times. This could be possible



only through a total and comprehensive transformation in the existing system to the modern ones by understanding the specific user needs and the types of information required by them and to satisfy the stakeholders at the utmost level. In the recent years it is strongly believed by most library professionals and educational institutions, that Total Quality Management implementation could provide the desired goals of the stakeholders and as well as the organizational objectives. Due to these reasons TQM is regarded as the most popular mechanism that could transform any organization in different spheres and hence becoming trendy among the modern libraries.

As a corollary the level of expectation among the users started to increase manifold and thus forced libraries to conform higher level of changes. In turn they started to indulge in the attempt of improvisation of the quality in its services.

In the present context due to increasingly tight budgetary restrictions, library managers are under high pressure to fully exploit available resources. Therefore, several libraries and information services have adopted quality management practices in recent years. Among the various initiatives implemented include ISO 9000 standards, Johansen, IS movement, Tupper Municipal Library, and benchmarking Zairi & Hutton, Garrod & Kinnell, Garrod & Kinnell, Buchanan & Marshall. By adopting quality management, the library's image and service quality can be improved, and librarians can increase productivity while focusing on the customer's needs, Johansen.

QUALITY:

What is quality?

Each one gives his or her own definition, but one meaning of quality is customer satisfaction through product or by service. The customer in the academic library is the user/reader/student. Here the customer is not an outsider, but part of the academic community.

Quality is primarily concerned with meeting the wants and needs of customers. One of the key and enduring definitions is that, 'quality is fitness for purpose'. Quality can be described as doing the right thing, in the right way on right time as well as doing it right the first time and doing it right every time. In the context of the Library, it can be described as:

- Q - Quest for excellence of knowledge
- U - Understanding the user's need
- A - Actions to achieve user's demand
- L - Leadership quality for Librarian
- I - Involving all staff
- T - Team spirit in achieving common goals
- Y - Yardstick to measure progress

THE CONCEPT OF TOTAL QUALITY MANAGEMENT:

Total Quality Management (TQM) is both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization. TQM is the application of quantitative methods and human resources to improve the materials and services supplied to an organization, all the processes within an organization, and the degree to which needs of customers are met, now and in future. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach focused on continuous improvement.



Reflections of Contemporary Indian Society in the Works of Aravind Adiga

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India is one of the developing nations of the modern world. It has become an independent country, a republic, more than a half century ago. During this period the country has been engaged in attaining development and growth in various areas. Therefore, there are two parts of India, one is metropolitan or urban and second is poor, hungry and uneducated. As literature is the Mirror of society, it depends upon the writer where he places the mirror. Indian English literature has been impressive and has attracted attention widely to this diversity. It has witnessed a rapid change therefore it is very important to know and realise such changes took place in Indian society and vice-e-versa in Indian English literature. In the post Independence era, writers focused on the problems of newly independent country. After this the literary focus is shifted from the public to private life. The themes of novels are alienation, detachment and loneliness. Realism and fantasy is the style of this literature. Contemporary Indian English literature proved a milestone at International level. Writers are now writing with a confidence and blend of social aspects and changing scenario.

Indian contemporary literature is exception in its scope and encompasses literature of various genres and styles. Contemporary literature in India is influenced considerably in content by the western philosophy and thought. Indian English literature has been always the changes in Material reality and theoretical perspectives. At the earlier stage of Work the writers like Mulk Raj Anand, R.K.Narayan and Raja Rao were mainly concerned with the down- trodden strata of the society, the Indian middle class life and the expression of traditional cultural ethos of India. Then writers like Kamala Markandaya , Bhabani Bhattacharya, Ruth Pawar Jhabvala, Nayantara Sahgal, Arun Joshi, Khushwant Singh, Arundhati Roy, and Salman Rushdie wrote about the themes related to social reality of the times. Their view was not only related to the study of external reality, but also the psychological reality expressed through different characters formed another aspect of literary works. Aravind Adiga's works are the true pictures of India in its social, political and cultural sense.

However, there are many areas in which Indian society is experiencing various problems like poverty, hunger, social inequality, unemployment and problems of children and their voices which are not heard by anyone they speak through the portrayal of characters in Aravind Adiga's works.

Aravind Adiga was born in Chennai on 23 October 1974 to Dr. K. Madhava Adiga and Usha Adiga. Adiga grew up in Mangalore and studied at Canara High School, then at St. Aloysius College. After emigrating to Sydney, Australia, with his family, Aravind studied at James Ruse Agricultural High School. He later studied English literature at Columbia College of Columbia University, in New York city, under Simon Schama and graduated as salutatorian in 1997. He also studied at Magdalen College, Oxford, where one of his tutors was Hermione Lee.

Adiga began his journalistic career as a financial journalist, interning at the *Financial Times*. With pieces published in the *Financial Times* and *Money*, he covered the stock market

Foibles of NAAC: A Study

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When we open the official website of NAAC, we are very warmly welcome with the encouraging statement that, "India has one of the largest and diverse education systems in the world. Privatization, widespread expansion, increased autonomy and introduction of Programmes in new and emerging areas have improved access to higher education. At the same time, it has also led to widespread concern on the quality and relevance of the higher education.The mandate of NAAC as reflected in its vision statement is in making quality assurance an integral part of the functioning of Higher Education Institutions (HEIs)".

This welcome note contains two things that NAAC knows very well. The first one is that 'India has diverse education systems' and the second one is that NAAC has to 'make quality assurance'. But when we see the functioning of NAAC through its various formats like AQAR and SSR, one can't find any assurance of quality on the basis of diversity of our country. Throughout all the Higher Educational Institutions, NAAC uses the same format of AQAR and SSR. It clearly decodes that the authorities of NAAC are not paying attention towards the social, economical and geographical diversities of our country. Regarding the educational policy of India, Dr. Babasaheb Ambedkar believed that "we should follow the principal of 'unequal treatment to unequals' and provide with some concessions to some classes. There is no alternative to give special status and concessions to the people who are lagging behind".

Hence if you have inequality or diversity with your system, you have to treat it with unequal treatment. You can't treat all the stakeholders equally. Unfortunately we can't find the unequal treatment in the functioning of NAAC. It applies the equal indicators to assess the unequal HEIs throughout the country including Urban, Rural, Coastal and even Tribals. In India we have the diversity in quality of the students, teachers and even the managements that run the HEIs. Obviously there are number of good governing Higher Education Institutes in our country. But on the contrary, there are some HEIs that are run by the professionals as a business. In regard to this, Dr. Ambedkar wanted "the educational system to be independent. No individual or political institutions should have direct interference in education. The education system should not

be under the control local self-governments. He believed that the main cause of educational backwardness lies in social and economic backwardness. Education is a source of social transformation, and therefore education must prepare itself for change. We must never close eyes to this social objective of education".

Definitely, there are some managements who want to run their HEIs very devotedly for the sake of social welfare, but they have some resource problems. They are unable to cope up with the new modern technologies and infrastructural facilities due to the insufficient funds or economical sources. Hence such institutes can't get the speed to compete with the present educational scenario of the nation as well as the world on the standards of quality. The standard measurements of quality in education have some shades that have to be assessed.

Dubhashi added that quality of higher education depends upon four factors:

1. Quality of content or technique of education;
2. The quality of teachers;
3. The quality of infrastructure;
4. The quality of students.

In NAAC format, obviously we have the focus on the quality of content. But the content is not decided at college level. The syllabus and the course content is decided and prescribed by the university authorities like Board of Studies under the guidance of UGC. The same syllabus content is taught in a district college as well as in a college from remote and tribal village. In many courses and papers, some contents are needed to teach by using ICT which is great problem in the colleges from rural area. The stakeholders from rural colleges, do not find their life structure, its issues and problems in the content they learn.

When a graduate student learns a unit of any subject he couldn't find his people, his geography and even the history in which he is born and lived. It becomes tiresome work for him to develop the interest in teaching learning process of classroom. While attending Criterion No. 1, "Teaching- Learning and Evaluation" such HEI faces lot of problems due to lack of less freedom in content framing and content selection choice.



PANI-ZnO Cladding-Modified Optical Fiber Biosensor for Urea Sensing Based on Evanescent Wave Absorption

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Based on Evanescent Wave
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In the present investigation, we demonstrated a simple, rapid, and highly sensitive cladding-modified optical fiber urea sensor based on the evanescent wave absorption (EWA) technique. Cladding modification was performed over a 2-cm unclad portion of optical fiber using a polyaniline-zinc oxide (PANI-ZnO) matrix with enzyme-Urease (Urs) cross-linked to it using glutaraldehyde as a cross-linking agent. The PANI-ZnO matrix was characterized by X-ray diffraction, scanning electron microscopy, ultraviolet-visible, and Fourier transform-infrared spectroscopy to explore its various properties. The developed sensor shows a linear response to urea concentration in the range 10 nM–1 M in the form of the absorption spectrum at a wavelength of ~250 nm with specific selectivity. Under the proper conditions (storage at temperature 4°C after each measurement), it shows 40-day stability without any decrement in the intensity of the absorption spectrum. Thus, the developed sensor is highly sensitive, stable, and specific, with a lower detection limit of a urea concentration of 10 nM.

Keywords: optical fiber, urea, PANI-ZnO, evanescent wave absorption, cladding modification

INTRODUCTION

Biosensors are utilized in multidimensional fields, including medicine, home diagnosis (Mehrotra, 2016), agriculture (Velasco-García and Mottram, 2003), the military (Rossi et al., 2000), environmental monitoring (Rodríguez-Mozaz et al., 2005), food preservation, fishery industries (Terry et al., 2005) etc. A biosensor is an analytical device that has extraordinary characteristics such being compact, cost-effective, ultra-sensitive, and specific and having shorter response and recovery times along with very low analyte concentration detection limits (Luong et al., 1997). Generally, a biosensor comprises three main components, viz. a bioreceptor (enzyme, nucleic acid, cells, etc.), a physicochemical transducer (electrochemical, optical, piezoelectric, thermometric, ion-sensitive, magnetic, or acoustic, etc.), and an immobilization matrix. Each component contributes to improving the reliability of the biosensor in practical applications (Turner et al., 1987; Monošik et al., 2012). The worldwide scientific and academic community has invented various types of schemes and materials for fabricating biosensors (Banica, 2012). In a sense, biosensors can be classified according to the bioreceptor and transducers used for their fabrication. As regards the selection of a physicochemical transducer, optical fiber has received incredible consideration for



Structural, optical features and gamma ray shielding properties of $\text{Bi}_2\text{O}_3\text{-TeO}_2\text{-B}_2\text{O}_3\text{-GeO}_2$ glass system

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ABSTRACT

$\text{Bi}_2\text{O}_3\text{-TeO}_2\text{-B}_2\text{O}_3\text{-GeO}_2$ quaternary glass system was prepared using a conventional melt quenching technique. The amorphous nature of prepared glasses was confirmed by X-ray diffraction measurement. The effect of Bi_2O_3 content on the B–O network structure was studied by FTIR spectroscopy. The existence of fundamental vibrations of germanates and tellurite network was confirmed by FTIR measurement. The study of optical absorption revealed that the indirect optical band gap (E_g) decreases with the increment of Bi_2O_3 content. Results of E_g shown that the E_g varied between 2.81 and 3.07 eV. The refractive index (n_o) obtained using E_g was observed to change from 2.38 to 2.45. Besides, the molar refraction, oxide ion polarizability, optical basicity and interaction parameters were observed to vary with the increment of Bi_2O_3 mol% in the prepared glass samples. The glasses were observed highly ionic. In this study, mass attenuation coefficients (μ_m), half-value layer (HVL), mean free path (MFP), effective atomic number (Z_{eff}), radiation protection efficiency and exposure buildup factor (EBF) were determined experimentally and compared with Phy-X/PSD code. It was perceived that all prepared glasses have high μ_m values at 356 keV and found between 0.231 and 0.257 cm^2/g . The results of HVL and MFP indicated that prepared glass containing 65 mol% of Bi_2O_3 exhibited the lowest values of MFP (0.731 cm) and HVL (0.506 cm) at low energy. Obtained results of shielding parameters revealed that 65BiTBG glass has the highest gamma ray shielding capability than commercial shielding glasses and concretes.

1. Introduction

Researchers have been developed new radiation shielding material such as concrete-baryte, ceramics, alloys and polymers for high energy gamma/x-rays and neutrons for radiation protection applications [1–5]. Concretes are used widely for radiation shielding due to low-cost, abundance, moldable to different building designs and comparable radiation shielding properties. Though, some disadvantages are associated with the use of concretes such as opaque to visible light, inhomogeneity and crack formation during the heat. In this context, glasses are most suitable for radiation shielding design vowing to exhibit excellent homogeneity, transparent to visible light, resistance to corrosion and easy to fabricate. The radiation shielding ability of glasses can be easily altered by adding a wide range of chemical constituents.

Glasses utilize for gamma ray protection purposes, it should have higher density, interaction cross-section and minimal air-water effect

on physical properties [6,7]. The mass attenuation coefficient (μ_m), mean free path (MFP), Half value layer (HVL), effective electron density (N_{eff}), effective atomic number (Z_{eff}) and exposure buildup factor (EBF) are the fundamental physical parameters to decide the proficiency of the materials against gamma radiation. Also, fast neutron removal cross-section (Σ_R) has been used in fast neutron shielding calculations [8–10].

Glasses containing metal oxides (like Bi_2O_3 , BaO, MoO_3 , PbO, etc) have been used extensively for gamma ray protection [11]. In the literature, various heavy metal oxide glasses tested for gamma ray shielding applications [12–14]. Lakshminarayana et al. [15] have reported radiation shielding competence of glasses with composition $\text{TeO}_2\text{-B}_2\text{O}_3\text{-BaO-ZnO-Na}_2\text{O-Er}_2\text{O}_3\text{-Pr}_6\text{O}_{11}$ using MCNP5 simulation and XCOM software to determine, μ_m , MFP and HVL. The influence of WO_3 content on the gamma ray shielding capability of the $\text{B}_2\text{O}_3\text{-P}_2\text{O}_5\text{-PbO-WO}_3$ glass system has reported by Mustafa et al. [16]. Recently, Al-Buriah et al. [17] have reported the results of superior gamma

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SEMI n -ABSORBING IDEALS IN THE SEMIRING \mathbb{Z}_0^+

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ABSTRACT. In this paper, all principal (m, n) -closed ideals and principal semi n -absorbing ideals in the semiring of non-negative integers are investigated.

1. INTRODUCTION

The concept of 2-absorbing ideals in a commutative ring R with $1 \neq 0$ was introduced by Ayman Badawi [2] and extended to n -absorbing ideals in R by Anderson and Badawi [3]. Chaudhari [4] introduced the concept of 2-absorbing ideals in commutative semiring R with $1 \neq 0$, which is a generalization of prime ideals in R . All 2-absorbing ideals in the semiring of non-negative integers are investigated by Chaudhari [5]. Chaudhari and Ingale [8] have introduced the notion of n -absorbing ideals in commutative semiring R with $1 \neq 0$ and investigated all n -absorbing ideals in the semiring $(\mathbb{Z}_0^+, gcd, lcm)$ and all n -absorbing principal ideals in the semiring of non-negative integers. Several other authors used these concepts and some other relative concepts which are generalizations of prime ideals. Anderson and Ayman Badawi [1] introduced the concept of semi- n -absorbing ideal and (m, n) -closed ideal in a commutative ring R with $1 \neq 0$ which are generalizations of n -absorbing ideals in R . Chaudhari and Ingale [7] have characterized prime ideals, semi prime ideals, irreducible k -ideals and irreducible principal T -ideals in the ternary semiring of non-positive integers. For

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Sea Buckthorn Oil Tocopherol Extraction's By-Product Utilization in Green Synthesis of Polyurethane Coating

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The focus of the present study is to utilize a by-product obtained during extraction of tocopherols, a valuable vitamin E compound, from sea buckthorn (SBT) oil and in doing so find a reliable alternative to petrochemical based polyols. Bio-based polyurethane (PU) is prepared by using SBT oil based fatty acid methyl ester polyesteramide polyols (SBTFEP) with toluene diisocyanate (TDI). The fatty acid methyl ester is converted to the corresponding fatty amide by reaction with diethanolamine. The formed fatty amide is then esterified with phthalic anhydride to synthesize polyesteramide polyol. Characterization techniques used to evaluate polyesteramide polyol are Fourier-transform infrared spectroscopy (FTIR) and NMR. The cured PU coating is also put through various mechanical tests to analyze the physical properties. The cured PU coating shows good surface and mechanical properties. It shows a gloss value of 87.4 and passes impact, adhesion, and chemical resistance tests. It is hydrophobic which is evident from its contact angle of 100.2°. It has good thermal stability which is evident from its contact transition temperature of 53.9 °C. Use of phthalic anhydride contributes to the bio-based characteristics of synthesized PU.

Practical Application: The present study presents a synthesis route which has minimal dependence on hazardous feedstock by utilization of green feedstock. The results obtained from physical and mechanical evaluations favor the use of this PU formulation in the coating sector. The adhesion and impact strength test results show potential application in the industrial sector coatings where the applied coat must be able to withstand high levels of physical stress and strain. The presence of aromatic rings and oil-based moiety, that is the fatty acid hydrocarbon chain, contributes to the hydrophobic nature of the PU coating. Hydrophobic coatings have tremendous application in various fields such as marine coatings, automotive, electronics, and decorative coatings. These are potential fields of application for the synthesized green PU coating obtained from tocopherol extraction by-products.

1. Introduction

Polyurethane (PU), as a class of polymers, has proven to be an important polymeric binder component in the field of

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Desroches et al. has discussed the amidification route for PU synthesis in which the use of 2-aminoethanol has been investigated. The synthesis of multi-hydroxyl functional polyol, a necessary component in numerous polymer formulations, using bio-based vegetable oils has been researched extensively for several years.^[17,26,27] Further exploration is possible by incorporating bio-based raw materials in the synthesis routes mentioned above. One of the most widely used antioxidant additives in the food industry is tocopherol, a vitamin E compound which carries out its antioxidant activity by donating phenolic hydrogens to lipid-free radicals.^[28] The by-products obtained during tocopherol

applied coatings due to its versatile behavior and simplicity of synthesis.^[15,16] Elastomers,^[17] coatings,^[18] thermosets,^[19] thermoplastic^[20] adhesives,^[21] sealants, nano-composites,^[22] smart materials,^[23] and foams are just a few of the many applications where PU has been incorporated. Typical PU production, which is practised widely on a global scale, involves the crosslinking of a petroleum-based polyol^[24] and an diisocyanate. In recent years, with the implementation of more stringent regulations on the usage of petrochemicals and the increased awareness regarding depletion of petroleum feedstock and environmental hazards, it has become a necessity to explore alternate processes which utilize raw materials of renewable nature to ensure a sustainable growth of the industry.^[25] Currently, the most reliable alternative to petrochemicals which is available to us is vegetable oil and its derivatives. The triglyceride molecule and are known to contain various potential functionalities like unsaturations,^[26] hydroxyl,^[27] and ester^[28] linkages which can be further enhanced and modified by action of different chemical reactions. Various routes have been explored to obtain hydroxyl moiety in the oleochemical-based hydrocarbon chain such as ozonolysis,^[19,21] hydroformylation,^[16,29] metholysis,^[19,21] epoxidation combined with ring opening,^[26] and coupling of thiol with mercaptoethanol.^[31,32] One of the novel routes which has been researched extensively is amidation-esterification,^[33,34]

extraction include free fatty acids and triglycerides which can be used as feedstock for synthesis of various chemicals. Sea buckthorn oil fatty acid methyl ester (SBTFAME), obtained as a by-product from tocopherol extraction has been used as feedstock in this study. The seed and pulp of SBT differ in the fatty acid composition.^[31] The SBT seed oil contains monoglycinoleic (C18:2) and α -linolenic acid (C18:3) and hence the methyl esters utilized in this study are a mixture of methyl esters of linoleic and linolenic acid. In the present research, the use of diethanolamine for amidification of methyl ester is followed by esterification with phthalic anhydride which yields polyesteramide polyol. The polyol was later crosslinked with TDI to form the final PU coating which was applied on metal substrate. The cured PU coating was analyzed for different mechanical, thermal, and chemical characteristic properties.

2. Experimental Section

2.1. Materials

SBT oil was procured from local market and used without any purification. TDI was obtained from Covestro India Ltd., Mumbai, India. Phthalic anhydride, diethanolamine, sodium methoxide, sulphuric acid, dibutyltin dilaurate (DBTDI), sodium chloride, sodium carbonate, and sodium sulfide were purchased from Thomas Baker (Chemicals) Pvt. Ltd., Mumbai, India, and acetone were purchased from Research-Lab Fine Chem Industries, Mumbai. All chemicals were used without any purification. Mild steel (MS) panels of dimensions 75 × 150 × 0.8 mm were procured from Varanasi, Mumbai (MS), India. A 50 μ bar applicator was procured from Raj Scientific, Mumbai, India.

2.1.1. Synthesis of Fatty Amide

The introduction of amide functionality in polymer structure is a novel synthesis route as it imparts mechanical and thermal properties to the final PU coating. SBTFAME (SAP value = 197.51, equivalent weight = 284.04 g mol⁻¹) was obtained from the methanolysis of tocopherol extraction deodorized distillates, obtained by sodium methoxide (0.5 wt% of SBTFAME) catalyzed reaction between diethanolamine (0.1 moles) and SBTFAME (0.1 moles).^[31] Diethyl ether was used as solvent to reduce viscosity. Diethanolamine, sodium methoxide, and diethyl ether were taken in a 250 mL four-necked round bottom flask fitted with an overhead stirrer, thermometer, nitrogen gas purger, dropping funnel, and condenser, and was kept in an oil bath. SBTFAME was added dropwise to the vessel. The complete reaction was carried out for 4 h, of which addition of SBTFAME was carried out for 1 h at a temperature of 80 °C followed by continuous stirring for 3 h at 125 °C in N₂ atmosphere. Post-reaction treatment involved 15% brine solutions washings, passing it through a bed of anhydrous sodium sulfate in order to remove any traces of water and solvent using rotary vacuum evaporator. The reaction occurring during the synthesis of fatty amide is given in Figure 1.

2.1.2. Synthesis of Polyesteramide Polyol

SBTFEP was synthesized by reacting previously prepared SBTFAME with phthalic anhydride, taken in molar ratio of 1.0:7. Xylene (50 mL) was used as solvent and the reaction was catalyzed using DBTDI. All the reactants were added to a four-necked round bottom flask, which was placed in an oil bath to provide uniform heating, combined with an overhead stirrer, N₂ purger, thermometer, and Dean-Stark trap. The reaction was carried out for 4 h at a constant temperature of 180 °C with constant stirring and inert N₂ blanket. Reaction progress and indication of successful reaction was verified by matching the expected amount of water formed during the reaction with the water collected in the Dean-Stark trap. The reaction occurring between phthalic anhydride and fatty amide is shown in Figure 1.

2.1.3. Preparation of PU Coatings

SBT oil based polyurethane (SBTFPU) was prepared by crosslinking the synthesized polyol (SBTFEP) with TDI in a two-pack system. The synthesized SBTFEP and TDI were taken separately based on OH:NCO equivalent weight ratio of 1.1:2.^[32,33] In the presence of DBTDI (0.5 wt% of polyol) and xylene as solvent, excess of isocyanate was taken to account for the oxidation of isocyanate when exposed to atmosphere. Adequate amount of solvent was added and the mixture was mixed rigorously so as to ensure desirable crosslinking between the polyol and diisocyanate. The progress of crosslinking occurring between the two moieties was monitored by rise in viscosity and final point was indicated by achieving suitable Daniel flow. The crosslinking reaction that occurs between the polyol and isocyanate is shown in Figure 1. The mild steel panels were subjected to chemical pre-treatment prior to application of coat. A 50 μ bar applicator was used to apply coats on the panel. The panels were kept undisturbed for 8 h. The coating became tack-free after 1.5 h and completely dry after 8 h.

2.2. Methods of Characterization

All chemical analysis of monomer products was conducted using ASTM standard. The SBTFAME were analyzed in the laboratory by standard tests such as saponification value (ASTM D-5558-95) and acid value (ASTM D 1980-87) using Equations (1) and (2), respectively. The equivalent weight of SBTFAME was calculated using Equation (3).

$$\text{Saponification value} = \frac{56.11 \times (B - S) \times N}{W} \quad (1)$$

where
 B = Volume in milliliter of Std HCl required for the blank, S = Volume in milliliter of Std HCl required for the sample, N = Normality of the standard hydrochloric acid, W = Weight in gram of the sample taken for the test.

$$\text{Acid value} = \frac{56.11 \times S \times N}{W} \quad (2)$$

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ON B -IDEALS IN SEMIRINGS

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ABSTRACT. In this paper, we introduce the notion of B -ideal in a commutative semiring R . Then 1) A characterization of B -ideals in the Semiring of non-negative integers is obtained. 2) Relation between B -ideals in a semiring R containing a Q -ideal I of R and B -ideals in the quotient semiring $R/I(Q)$ is obtained. Further study of k -Noetherian semirings is developed. Also B -ideals in polynomial semirings are studied.

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1. INTRODUCTION

Theory of semirings is given by Golan [8]. For the definition of semiring we refer [8]. Clearly every ring is a semiring. Denote the sets of all non-negative integers, positive integers and non-negative rationals respectively by \mathbb{Z}_0^+ , \mathbb{N} and \mathbb{Q}_0^+ . The set \mathbb{Z}_0^+ is a semiring under usual addition and multiplication of non-negative integers but it is not a ring. In this paper, all semirings are assumed to be commutative semirings with non-zero identity. The concept of ideal, principal ideal, finitely generated ideal, Noetherian semiring in semirings can be defined on the similar lines as in rings. For $a_1, a_2, \dots, a_n \in \mathbb{Z}_0^+$, we denote $\langle a_1, a_2, \dots, a_n \rangle$, the ideal generated by a_1, a_2, \dots, a_n in the semiring $(\mathbb{Z}_0^+, +, \cdot)$. An ideal I of a semiring R is called a subtractive ideal ($= k$ -ideal) if $a, a+b \in I$, $b \in R$, then $b \in I$. If I is an ideal of a semiring R , then $\bar{I} = \{x \in R : x+y \in I \text{ for some } y \in I\}$, is called the k -closure of I and it is a k -ideal of R . A semiring R is called zerosumfree if $a+b=0$, $a, b \in R$, then $a=0=b$. A semiring R is said to be k -Noetherian if R satisfies the ascending chain condition on k -ideals of R [11]. An ideal I of a semiring R is called partitioning ideal ($=Q$ -ideal) if there exists a subset Q of R such that i) $R = \cup\{q+I : q \in Q\}$; ii) if $q_1, q_2 \in Q$,

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Shielding behaviour of $(20 + x) \text{Bi}_2\text{O}_3 - 20\text{BaO} - 10\text{Na}_2\text{O} - 10\text{MgO} - (40-x) \text{B}_2\text{O}_3$: An experimental and Monte Carlo study

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ABSTRACT

In this study, $(20 + x) \text{Bi}_2\text{O}_3 - 20\text{BaO} - 10\text{Na}_2\text{O} - 10\text{MgO} - (40-x) \text{B}_2\text{O}_3$ (where $x = 0, 5, 10, 15$ and 20 mol%) are fabricated by the melt quenching method. The various radiation shielding parameters for the present glasses are determined experimentally using the gamma spectrometric system and Monte Carlo N-Particle Transport Code System-extended (MCNPX). The mass attenuation coefficient and the effective atomic number are found to be dependent on the photon energy, the glass composition and the concentration of Bi_2O_3 . The results reveal that Bi40B20 sample with the maximum amount of Bi_2O_3 has the lowest MFP and HVL values among all the other samples as well as the other standard shielding glasses. The radiation shielding efficiency also is calculated and the result shows that the present glass samples can highly attenuate low energetic gamma photons, while the capability to attenuate the incident photons is minimized with increasing the photon energy.

1. Introduction

In radiation physics, shielding materials [1–5] are necessary to control the exposure of radiations of neutrons and gamma rays [6]. These radiations are emitted from the radioactive sources which are very harmful to human health, plants and animals [7]. Glasses can be used as shielding material in different applications such as nuclear power plants, agriculture, industry and medicine. They have high interaction cross section and a small change in mechanical and optical features resulting from composition [8]. From many years, the borate glasses have been having great importance due to their excellent physical, optical and structural properties [9]. The vitreous structure of B_2O_3 contains BO_3 triangles and boroxyl rings. When the modifiers are added, the conversion of BO_3 to BO_4 takes place which, in turn, helps to form pentaborate, diborate, tetraborate and triborate groups [10]. The other specific characteristic such as high transparency and high density are required for calorimetric applications [11]. Borate glasses have been attracted a great deal of interest due to their excellent features such as high chemical resistance, low melting point, good heat resistance, good thermal stability rather than tellurite, phosphate,

germinates and silicate glasses [12]. Under tough conditions, heavy metal oxides (HMO) are generally used for shielding purpose [13]. Many workers have studied the role of borosilicate, borate and tellurite heavy metal oxide doped glasses for various applications in which shielding material is required [6,14–18].

Lead and bismuth oxide glasses can act as both network former as well as network modifier in the glass network [19]. However, lead oxide should be avoided due to the toxic nature of the lead [20]. On other hand, bismuth borate based glasses have interesting physical, chemical stability and reduce the phonon energy of glass because Bi^{3+} ions have maximum solubility [21,22]. Due to various extraordinary properties namely high refractive index, high third order non linear optical susceptibility, nontoxic, high polarizability, long infrared cut-off wavelength, high moisture resistance, bismuth oxide glasses are more important than other heavy metal oxide glasses [23,24]. These properties make Bi_2O_3 a suitable candidate for various applications such as photonic devices, transmission components and optical switches, reflecting windows, thermal and mechanical sensors [25–27]. Both structural units of BiO_6 and BiO_3 are present in the bismuth oxide which directly affects the properties of Bi_2O_3 [28]. Vitreous formation range of

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Synthesis, local structure and optical property studies of α -SnS microrods by synchrotron X-ray pair distribution function and micro-Raman shift

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A hydrothermal synthesis method was employed for the preparation of tin sulfide (α -SnS) microrod samples (SnS-A and SnS-B) using ethylenediamine and deionized water as the surfactant at ratios from 50 : 50 to 100 : 00. The atomic structures of the α -SnS microrods were studied using atomic pair distribution function (PDF) analysis and total synchrotron X-ray scattering data. The synchrotron X-ray diffraction (ScXRD) patterns and PDF data reveal that the structure of the SnS microrods is orthorhombic. From the refinement of the PDF, the first and second peaks correspond to nearest ($\text{Sn}^{2+}-\text{S}^{2-}$) and second nearest distances ($\text{Sn}^{2+}-\text{Sn}^{2+}$) of 2.546 (0.003) Å and 4.106 (0.004) Å, and 2.527 (0.005) Å and 4.087 (0.006) Å for SnS-A and SnS-B samples, respectively. The TEM results show that samples SnS-A and SnS-B have a microrod structure, with microrod diameters of 800 nm and 500 nm with lengths of tens of micrometers, respectively. The SnS-A and SnS-B samples show a direct band gap of 1.6 eV and 2 eV, respectively, using the Kubelka–Munk transformation of the UV-visible spectra. The micro-Raman spectra of the SnS-A and SnS-B microrods exhibited an Ag mode of SnS at 228.4 and 223 cm^{-1} , respectively. The second peaks at 306.7, and 309 cm^{-1} are associated with the secondary phases of the SnS_2 phase, whereas the third broad peaks at 616.5, and 613 cm^{-1} revealed that there was a deformation mode of sulfate in the SnS-A and SnS-B samples.

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Introduction

Tin sulfide (SnS) has attracted much attention in recent years due to its narrow bandgap that displays optical activity in the near-infrared (NIR) region, with potential applications in photovoltaic devices and NIR detectors.^{1,2} Tin sulfide is one of the most abundant, cheapest, eco-friendly and, due to its direct band gap, is used for applications in solar cells,³ lithium storage,⁴ hydrogen storage,⁵ thermoelectric and photonic devices⁶ and so on. Tin sulfide has two structures one is π -SnS cubic and the other is an α -SnS orthorhombic structure. Orthorhombic SnS crystallizes in space group $Pnma$ in the GeS (B16) type structure with lattice parameters of $a = 11.200(2)$ Å, $b = 3.987(1)$ Å and $c = 4.334(1)$ Å.⁶ The Sn and S occupy the Wyckoff position 4c ($x, 1/4, z$) with fractional coordinates of $x =$

$0.1194(1)$, $z = 0.1198(2)$ for tin and $x = 0.8508(3)$, $z = 0.4793(8)$ for sulfur.⁶

A large amount of research is carried out on the synthesis and characterization of 1D well-designed SnS materials.^{4,7} The 1D structure can be fabricated by number of techniques, such as surfactant-assisted techniques,⁸ hydrothermal methods,⁹ noncovalent self-assembly,¹⁰ chemical vapor deposition,¹¹ thermal decomposition,¹² and so on. However, further development of these techniques for practical routes to make large quantities of materials with a porous 1D structure with accurate size, shape control, rapidly and reasonably low costs, are still a great challenge.

The determination of the crystalline structure of a solid is a key part of materials' science, and for this, the powder diffraction method is widely used. It is an excellent method but challenges exist when determining the local structures of complex materials. Nowadays, synchrotron X-ray diffraction (ScXRD) with fast computing methods has been used for the determination of the atomic-scale structure of materials. The ScXRD with a pair distribution function (PDF) is one of the most powerful tools for determining the local structure of atoms with shorter and moderate lengths.^{13,14} The PDF is one of the most versatile methods which can be applied to any materials.¹⁵⁻¹⁷ This method has numerous applications for the analysis of the structures of materials for determining crystal phase and unit-

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OBSERVING CLIMATE IMPACTS ON COTTON YIELD IN DHARANGAON TAHASIL OF MAHARASHTRA STATE IN INDIA

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Abstract

Cotton is an important cash crop for the economy in Maharashtra India. It also supports the livelihoods of a large proportion of the population. At the same time, Cotton growth is sensitive to climatic conditions making it vulnerable to climate change and variability. Identifying the Cotton yield response to climatic variability in operational plantations, and identifying the most important climatic variables that impact Cotton yield is critical to assessing the vulnerability of the industry and informing adaptation. Here, we developed a farms level panel dataset and estimated statistical models to identify the causal effect of monthly temperature, monthly precipitation, drought intensity, and precipitation variability on Cotton yield. We found decreasing Cotton yield returns to warmer monthly average temperatures, and when monthly temperatures were above 26.6 C warming had a negative effect. We found that drought intensity more affect Cotton yield and that precipitation variability, and in particular precipitation intensity, negatively affect Cotton yield. An increase in average temperatures as expected with global warming will reduce the productivity of Cotton plantations, all else held equal. Further, interventions to reduce the sensitivity of Cotton plantations to warming and precipitation variability will have immediate pay-offs as well as providing climate change adaptation benefits.

Keyword – Climate Impacts, Cotton yield

Introduction

Cotton crops produced in Maharashtra India are of major importance for the regional economy. India is the second largest producer and exporter of Cotton (Cotton Board of Marathwada 2017) with the Dharangaon, state of Maharashtra being a key producing region. The predominant Cotton variety produced in Dharangaon is Maharashtra-type var.

A Study of Problems of Banana Processing Entrepreneurs in Jalgaon District

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Abstract

Banana is one of the most consumable fruit throughout the year. Jalgaon district is famous for banana. The cultivation & production of banana was in constantly high during last some decades. But nowadays only banana production can't generate enough income for farmers so processing industries are required for supportive income. This research paper will focus on the role, importance & problems of banana processing industries & entrepreneurs in Jalgaon district. The researcher collected data from 50 banana based entrepreneurs with the help of a questionnaire & try to suggest a policy for the processing industry.

Keywords: Banana, Jalgaon district, Processing Industries, Entrepreneurs, Problems of Banana Processing Unit Entrepreneurs.)

Introduction

Banana is one of the most fruit which is used since thousands of years. It has numerous qualities & minerals which helps human body to re-energizes. Jalgaon district is famous for Banana. As per article in Indian Express Jalgaon district is a seventh largest producer of banana fruit if it were a country.

Banana is used as a raw material in processing industries for preparation of different products such as banana powder, chips, paste etc. Moreover the male flowers of banana used as a vegetable in Bengal. Some banana species yields fiber. So not only fruits of banana useful but its leaves, stump also. As production increases the requirement of processing industry is also increases. So many entrepreneurs have started banana processing plants in the district. So it is necessary to study the importance of this small-scale processing industries. Therefore with the help of this research paper, the researcher will try to find out the role, importance & problems of banana processing industries in the economic development of Jalgaon district.

Objectives:

- 1) To study the status of banana processing industry in district.
- 2) To study the management practices of the banana processing industries.
- 3) To study the problems of banana processing unit entrepreneurs.

Review of Literature:

- 1) (Dr. Vishal S Rana, Nov. 2015) stated that it is essential to promote food processing industries as it is phase of the green revolution. The industry has huge span & market so that fresh food like banana maybe got extra income which helps to get better the normal of living of banana farmers. The increase in processing industries may help to reduce unemployment in the specific region.
- 2) (Dr. Prashant P. Bornare, Dec 2014) observed that importance & types of banana by-products the various by-products of banana used by society in day to day routine which is more health oriented. And concluded that food preservation and proper low-cost consumption to reduce malnutrition problem is possible through banana fruit. and it's various by-products.
- 3) (K. K. Surendramathan, 2004) studied & stated that increase of this skill provides an tremendous scope for the progress of nonconventional products from the banana. The extracted juice after a dilution is ready to serve up as nectar and/or after carbonation as a drink. Banana juice also can be used for the manufacture of banana wine by fermentation, which has a lot of profitable value.

Research Methodology:

The research is based on both Primary & Secondary data. Primary data was collected from various entrepreneurs working their banana processing unit in Jalgaon district using non probability convenience sampling method. The banana processing units were started all over district in the form of banana chips. But in raver, yawal & Jalgaon Tahsils have more banana fiber, banana paper, banana fertilisers manufacturing units.

The secondary data was collected through government reports & District Industrial Center, Jalgaon. The total number of banana processing unit in the district as per DIC report was 68. But active working unit were only 52 so the researcher decide to collect information from total 50 respondents with the help of well structured questionnaires & interview with entrepreneurs.

Results & Findings:

The collected data was analyses by SPSS Software. While analyzing the data following details were revealed relating to problems faced by entrepreneurs.

1) Problems facing while starting the business:-

The study shows there are some problems faced by entrepreneurs while starting the business.

ROLE OF LIBRARIES IN HIGHER EDUCATION

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Abstract: Role of Library in the education system is unbeatable. Every library in India runs the libraries had transformed from conventional to contemporary. Now a days the libraries are using computers, internet, library software to give better services to its users. The importance of library in the education is also accepted by the UGC, MHRD, NAAC & INFLIBNET. Now the more emphasis is on e-content, paperless and 24x7 availability of library materials and services.

Keywords: Library, Academic Library, Higher education,

Introduction:-

The role of a library in the education process at any level, especially at the college level for the overall development of students such as personality, skill communication, career, and creativity is very significant etc. so, a well-organized library is essential for the teaching-learning process done in a college, especially when the emphasis is shifted from classroom teaching centered process. The quality of education is greatly linked with libraries. The information collected and disseminated by libraries decides the quality of teaching and learning process in a college. In the words of S.R. Dongerkery, "A well-stocked and up-to-date library is a sine qua non for every modern educational institution". The libraries of modern educational institutions have to plan, to develop and organize their library resources and services in such a way that it should facilitate retrieval of the desired information as quick as possible and save the time of the users. The purpose of a library is to provide the right information to the right user at the right time in the right form.

In India higher education as a sector usually stands with undergraduate programs and moves laterally forward. The higher education in India quantitatively grown to become one of the largest system of its kind in the world. The present society is transforming itself into knowledge society. Knowledge is power and therefore has remained one of the most important driving forces of the sustaining human existence. As higher

education's institutions are contributing directly to the economic, social and political upliftment of the nations. One of the major aims of higher education is to make people self-reliant and self-sustaining.

Libraries serves as the agency for collecting, processing, managing and disseminating the information needs for education, socio-economic and cultural development, etc. Libraries' are the repositories of the wisdom of ages stored in the form of recorded information for the use of present and future generations.

Importance of Library:-

Libraries are knowledge hub, Libraries are the most important part of educational system, at School, College and University level. Availability of books, reference books magazines, journals, e-journals and e-books in the library improves the knowledge level of teachers and students and researchers of the academic institutions. Availability of various infrastructural facilities of the library motivates the users to use the library to gain the required knowledge and upgrade themselves. Libraries are also known as local centre of information and learning. Academic libraries and public libraries are the source of information and ideas for all sectors of the society. Thoughts, information and knowledge is disseminated through the libraries creating the opportunities for research, development and employment generation. Library of any academic institutions is a mirror of that institution one can judge that institute on the basis of their Library. More developed and rich Library, shows that the institute is also developed and rich in all aspects.

Aims and objectives of an Academic Library:-

1. To provide the facilities for advanced study and research work.
 2. To encourage the qualitative academic environment of teaching and research.
 3. To provide proper guidance and training in order to prepare the students for master and doctorate degree.
 4. To improve the quality of education at various level.
 5. To enhance the research output by faculty through useful information resources.
 6. To cooperate with other institutions with respect of information resources
- Dr. S. R. Ranganathan (1892-1972), called the father of library and information science in India, gave the five laws of library which need to be acknowledged and pursued every time:

- > Books are for use
- > Every reader his/her book
- > Every book its readers
- > Save the time of reader and staff
- > Library is a growing organism

Higher Education:-

The higher education is the basic need of the society for individual development. Education is to equalized opportunities enabling the backward and under privileged classes



Urea biosensors: A comprehensive review

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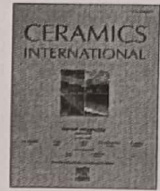
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Abstract

Present study is specially designed for the recent advances in biosensors to detect and quantify urea concentration. Urea (carbamide) is an organic compound made up of the carbonyl (C=O) functional group with two -NH₂ groups having chemical formula CO (NH₂)₂. In nature, urea is found everywhere as the result of various processes, and in the human body, urea is an end product of nitrogen metabolism. An excessive concentration of urea in the human body is responsible for different critical diseases such as indigestion, acidity, ulcers, cancer, malfunctioning of kidneys, renal failure, urinary tract obstruction, dehydration, shock, burns, gastrointestinal bleeding, and so on. Moreover, below the normal level may cause hepatic failure, nephritic syndrome, cachexia, and so on. As well as in various fields such as fishery, dairy, food preservation, agriculture, and so on, urea is normally found and its detection is necessary. In urea biosensors, enzyme urease (Urs) is used as a bioreceptor element and retains its long last activity is the critical issue in front of the researcher. During recent decades, different nanoparticles (zinc oxide, nickel oxide, iron oxide, titanium dioxide, tin(IV) oxide, etc.), conducting polymer (polyaniline, polypyrrole, etc.), conducting polymer-nanoparticles composites, carbon materials (carbon nanotubes, graphene oxide, reduced graphene oxide graphene), and so on are used in urea biosensors. The main emphasis of the present study is to provide cumulative and comprehensive information about the sensing parameters of urea.

Abbreviations: Ag/NiOOH, silver-nickel(II) hydroxide; AgNPs, silver nanoparticles; CNTs, carbon nanotubes; CNW, cellulose nanowhiskers; CPH, conducting polymer hydrogels; CPH/Urs, conducting polymer hydrogels/urease; C₅/Co₃O₄, chitosan/cobalt oxide; CuInS₂, chalcopyrite copper indium sulfide; EIS, electrolyte-insulator-semiconductor; Fe-PAMAM, ferrocene-poly(amidoamine); Fe₃O₄, iron oxide; FTO, fluorine doped tin oxide; GCE, glassy carbon electrode; GLDH, glutamate dehydrogenase; GO, graphene oxide; GSH, glutathione; HANCD, high-content nanocellulosedialdehyde; LbL, layer-by-layer; LOD, lowest detection limit; NC, nanocellulose; NiCo₂O₄, nickel cobalt oxide; Ni-MOF, nickel-metal organic framework; NiO, nickel oxide; Ni-NiO, NiO nanorods; OCPs, organic conducting polymers; PAMAM, polyamidoamine; PANI, polyaniline; PANI/MWCNTs, polyaniline-multiwalled carbon nanotubes; p-DMAB, p-dimethylaminobenzaldehyde; PGMA, poly (glycidylmethacrylate); PnBA, nonplasticized poly (N-butyl acrylate); PPy, polypyrrole; PUB, photoelectrochemical urea biosensor; PVA/SbQ, poly(vinyl alcohol), N-methyl-4(4'-formylstyryl)pyridinium methosulfate acetal; PVdF-HFP, polyvinylidene fluoride-co-hexafluoropropylene; RF sputtering, radio frequency sputtering; RGO, reduced graphene oxide; SF, silk fibroin; SiO₂NPs, silica-gel nanospheres; SNARF-1-dextran, carboxy seminaphthorhodamine-1-dextran; SnO₂, tin(IV) oxide; SPCE, screen-printed carbon electrode; ssDNA, single-stranded DNA; TCFH, N,N,N',N'-tetramethylchloroformamidinium hexafluorophosphate; TiO₂, titanium dioxide; Urs, urease; Urs/ZnONR/ITO, urease/zinc oxide nanorods/indium tin oxide; ZnO, zinc oxide; ZnO NRs, zinc oxide nanorods; ZnO-en/PANI-g-CHIT, zinc oxide encapsulated polyaniline-grafted chitosan; ZrO₂, zirconia.



Influence of Bi₂O₃/WO₃ substitution on the optical, mechanical, chemical durability and gamma ray shielding properties of lithium-borate glasses

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ABSTRACT

Six different lithium bismuth boro-tungstate glasses with chemical composition 20Li₂O-(20-x)Bi₂O₃-xWO₃-60B₂O₃ (x = 0, 1, 2, 3, 4 and 5 mol%) were produced by the quenching method. Then, the glasses were investigated by means of their optical, mechanical, chemical durability and gamma ray shielding properties. Measured values of density and ultrasonic velocities were used to determine the elastic properties of the glasses. The optical band gap determined using the absorbance spectrum fitting (ASF) model was found to decrease under Bi₂O₃/WO₃ substitution. The presence of BO₃, BO₄, BiO₆, and WO₄ structural groups in the glasses was confirmed by Fourier transform infrared spectroscopy (FTIR). The dissolution rate in the glass 20Li₂O-15Bi₂O₃-5WO₃-60B₂O₃ (LBWB5) was found to be 10 times lower than 20Li₂O-20Bi₂O₃-60B₂O₃. Mass attenuation coefficients (MAC) values of the produced glasses were determined using the MCNPX Monte Carlo code and Phy-X/PSD program. The photon attenuation parameters such as half value layer (HVL), mean free path (MFP), effective atomic number (Z_{eff}), exposure buildup factor (EBF) and energy absorption buildup factor (EABF) were also studied. The obtained results showed that Bi₂O₃/WO₃ substitution has a direct impact on the photon attenuation abilities of produced glasses. More specifically, HVL values increased from 0.252 × 10⁻² cm for LBWB0 glass to 0.275 × 10⁻² cm for LBWB5 glass. However, different trends were observed for the photon buildup factors for the produced glasses. It can be concluded that the produced glasses have promising structural, optical, and photon attenuation properties to be used for gamma shielding applications.

1. Introduction

The charged particles, gamma and X-rays have been used vastly in medical, agriculture, scientific and engineering fields. Whereas, gamma ray is extremely penetrating ionizing radiations, can cause radiation sickness, cell mutation and cancer like diseases. Thus it is essential to introduce efficient shielding material to protect humans from radiation hazards. Several materials such as concretes, rocks, polymer fillers, alloys, clay-bricks and compounds have been studied extensively in order to use in gamma radiation protection applications [1–3]. However, some disadvantages are associated with these materials such as opaqueness, difficult of transportation from one place to another and weakening of structural strength due to aging [4–6].

Materials with comparable (or superior) shielding capacity to concrete have been thoroughly investigated [7–9]. Since few decades, several amorphous materials such as glasses have attracted the huge attention of nuclear researchers and engineers owing to its intriguing characteristics such as good transparency to visible light, homogeneous in density/chemical composition, easily moldable in bulk volume and effectively absorb high energy photons of MeV order. The shielding parameters such as MAC, HVL, MFP, and Z_{eff} along with elastic features have been assessed to use glass material efficiently in diverse conditions. The gamma ray protection capability of tellurite, borate and other heavy metal oxide containing glasses was studied in various research papers [10,11]. The B₂O₃ is an excellent glass former and has the ability to enhance thermal stability, transparency and decrease the melting point.

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Effects of AgO addition on the mechanical, optical, and radiation attenuation properties of $V_2O_5/P_2O_5/B_2O_3$ glass system

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Abstract

The effects of AgO addition on the mechanical, optical, and radiation attenuation parameters of $46V_2O_5-46P_2O_5-xB_2O_3-yAgO$ glass system, namely VP-B_xA_y: (x,y) = (8,0), (6,2), (4,4), (2,6), and (0,8) mol%, was examined. Values of molar polarizability (α_m , 19.397×10^{-24} to 18.820×10^{-24} cm³) were in direct relation with the molar refractivity (R_m , 48.882–47.427 cm³/mol), while the optical transmission (T) parameter showed an inverse relation with reflection loss (R_L) as a function of AgO concentrations. Both static (ϵ^{static}) and optical ($\epsilon^{optical}$) dielectric factors showed a direct relation with each other and an opposite trend with the other factors. The values of the bulk modulus (K_{B-C}) were increased from 59.99 to 64.67 GPa. The shear modulus (G_{B-C}) was increased from 32.91 to 36.37 GPa, longitudinal modulus (L_{B-C}) was increased from 103.77 to 103.05 GPa, and Young's modulus (E_{B-C}) was increased from 83.48 to 91.89 GPa, respectively. The results of Poisson's ratio (σ_{C-B}) have a decreasing trend from 0.268 to 0.263. Moreover, the radiation attenuation properties of VP-B_xA_y glasses for photons, neutrons (fast and thermal), and charged particles (electron, proton, and alpha) are investigated. The Monte Carlo method was employed via FLUKA code to investigate photons attenuation properties of the examined glasses. The simulation implementation was experimentally and theoretically confirmed. Linear attenuation coefficients (LAC) of VP-B_xA_y glasses followed the trend: $(LAC)_{VP-B0A8} > (LAC)_{VP-B2A6} > (LAC)_{VP-B4A4} > (LAC)_{VP-B6A2} > (LAC)_{VP-B8A0}$. Therefore, AgO addition played an improvement role in the photon attenuation processes. The VP-B_xA_y glasses showed superior attenuation properties for photons beam compared with different photon attenuators. This indicates that the VP-B_xA_y glasses have superior features to use as promising shields for various applications against photons beam (X or gamma radiation).

Keywords Glass · Mechanical properties · Optical properties · Radiation · Shielding

1 Introduction

The use of radioactive materials in research institutions, industry, agriculture, energy generation, and other nuclear processing plants leads to the emission of hazardous ionizing radiation in the environment. Besides, radioisotopes have gained huge attention due to advance technical uses in pharmaceuticals, medical diagnostics, radiotherapy, sterilization of medical equipment, agriculture, food industry, manufacturers, etc. [1–5]. Thus, exposure to ionizing radiations, especially X- and gamma rays, has also been increased tremendously owing to innovative technological applications of radioisotopes. A long-time exposure to photons beam has deleterious effects on humans. To utilize nuclear radiation efficiently without any health concerns, the development of novel promising shielding materials is extremely important. Concretes are widely utilized materials for radiation protection due to their widespread availability, low-cost,

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Newly developed glasses containing Si/Cd/Li/Gd and their high performance for radiation applications: role of Er_2O_3

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ABSTRACT

Recently, many studies trended to develop new glass systems to serve for various radiation applications. In this article, we report on the radiation attenuation and shielding performance of the Er/Cd/Li/Gd/Si glass system in the chemical form of $50\text{SiO}_2 \cdot 30\text{Li}_2\text{O} \cdot (19-x)\text{CdO} \cdot 1\text{Gd}_2\text{O}_3 \cdot x\text{Er}_2\text{O}_3$ (here, $0 \leq x \leq 2.5$ mol%). The shielding performance (LAC, MAC, MFP, EAC, HVL, EBF, EABF, and FNRC) is investigated by using the Monte Carlo method (via Geant4 simulations) and theoretical calculations (via Phy-X approach). The obtained results indicate that the Er_2O_3 addition has a significant influence on the attenuation performance of the present glasses. We also found that the maximum (minimum) value of MAC is obtained at photon energy of 15 keV (10 meV) with the corresponding value of 20.537 (0.028), 22.525 (0.0283), 24.44 (0.0287), 26.286 (0.0290), and 28.067 (0.0293) cm^2/g for SLGC-E1, SLGC-E2, SLGC-E3, SLGC-E4, and SLGC-E5 respectively. This rivals the performance of commercial glass shields (RS-253), concretes (ordinary and barite), and recently developed and studied glass (TBZP10 glass). It can be concluded that the SLGC-E5 glassy material has promising attenuation properties to use for the radiation shielding applications.

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Ethnobotany of exotic plants in Khandesh region of Maharashtra (India)

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Abstract

Sacred and religious places in Khandesh region of Maharashtra (India) are botanised from status of floral elements and ethnobotanical standpoint. This paper particularly emphasized exotic plant species in these places. Total 53 exotic plant species pertaining to 41 genera and 32 families of angiosperms are documented. Their importance in view of native utilities such as ethnomedicine, ornamental, edibles, cosmetics and other miscellaneous use-reports is limelighted. The exotic elements belong to both Old and New Worlds and substantially added sources for human sustenance. These sacred and religious places help conserve the alien plant species and even enrich our traditional knowledge.

Keywords: exotic plants, ethnobotany, khandesh, bioculture

Introduction

Khandesh region of Maharashtra state is comprised of three districts viz., Jalgaon, Dhule and Nandurbar. It occupies north-western part of the state bordering the state of Gujarat and Madhya Pradesh. The ranges of Western Ghats (Sahyadri) extended in the western part, whereas Satpura mountain borders on the north in a wall-like manner between Maharashtra, Gujarat and Madhya Pradesh. A considerable tribal population, besides rural folks and urban people reside in the region. The region has been investigated floristically (Patil, 2003; Kshirsagar and Patil, 2008) [15, 11] and ethnobotanically (Pawar and Patil, 2008) [17]. Pawar and Patil (2010) [18] paid cursory attention on this aspect as a part of general ethnobotany. The region is presently studied for its sacred places as an exclusive topic of research revealing biodiversity elements and ethnobotany, a hitherto neglected aspect. The results of this study are being published (Khare, et al., 2020) [9]. Khare et al. (loc.cit.) focussed earlier only plants in bioculture.

Methodology

The authors botanised religious places and temples, worships and festivals of various tribes and Hindus in the districts viz., Jalgaon, Dhule and Nandurbar. Investigation was conducted during 2013 to 2017 interviewing trustees, worshippers and persons intimately concerned with the sacred places. Plant determination was completed consulting various regional, state and district floras (Cooke, 1958; Sharma et al., 1996; Singh et al., 2000, 2001; Patil, 2003; Kshirsagar and Patil, 2008) [6, 22, 26, 27, 15, 11]. Inquiries were made w.r.t. local plant names, part used, medicinal recipes, doses, diseases treated, etc. Region of origin of the exotic species is deciphered consulting relevant literary sources as mentioned against each plant species. The data obtained is presented in the Table-I.

Results

Exotic plant species growing naturally or planted intentionally in sacred and religious places and temples were tapped ethnobotanically. Temples have generally definite borders. However, deities are sometimes found in open spaces without certainty of boundaries. Plant species in all such places, whether cultigen, wild or even escapes from cultivation, are conceived sacred by the concerned devotees or people. (I) Floristic analysis: As many as 53 exotic species of ethnobotanical importance pertaining to 41 genera and 32 families of angiosperms form part of this communication. (II) Habitual categories: These aliens can be categorised on the basis of habits such as: trees (10), shrubs (21), lianas (02), climbers (05), herbs (17) and geophytes (05). The figures in parenthesis belong to number of exotic species in the sacred places. (III) Parts employed: Various parts of the species are found useful e.g. leaves (06), stem (02), bark (02), roots (03), flowers (13), fruits (11) and seeds (08), besides plant products like latex and gum. (IV) Supplementary species: Apart from principal 53 exotic species, some other few plant species are also added in the medicinal recipes viz., *Citrus aurantifolia*, *Ocimum tenuiflorum* and *Zingiber officinale*. (V) Medicinal recipes: The aforesaid species and their plants or products are used to prepare recipes to be administered. They are advised in the form of decoction, extract, juice, oil, paste and powder. During their preparations, certain domestic substances are also added such as turmeric powder, sugar, jaggery, honey, coconut-oil, besides multani soil.

Various human sufferings have been documented benefited by applications of these exotic taxa as occurring in sacred and religious places. The different recipes are administered to combat a wide array of afflictions such as: (i) Digestive system complaints e.g. stomach-ache, dysentery, diarrhoea, constipation, digestive problem, (ii) Respiratory system complaints e.g. asthma, cough, bronchitis, (iii) Oral problems e.g. tooth-ache, (iv) Skin problems e.g. wounds,



Role of exotic sacred plants in Bioculture of Khandesh region of Maharashtra (India)

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Abstract

Khandesh is comprised of three districts viz., Jalgaon, Dhule and Nandurbar and lies in the North-Western part of Maharashtra state (India). This region inhabited by people various religions, apart from native tribal population. All communities have their own culture and belief systems and have faith in their gods and goddesses. They lead religious life through worships, festival, rites and rituals.

Ethnobotanical inventories were extended on religious, sacred places and temples. Informants were interviewed to have traditional knowledge and usages. The data accrued was verified during subsequent visits.

The present authors documented 55 especially exotic plant species belonging 53 genera and 32 angiospermic families. Majority of them are found under cultivation (45 species), whereas 08 species are wild and 02 species both as wild and cultigens. The literary survey of these exotic taxa revealed their nativity or origin from foreign lands. Maximum species (25) are American, which is then followed numerically as: African (08 species), Europe (04 species) and Australian (02 species). Other countries or region such as Java, Myanmar, China, Indonesia, West Indies and Mediterranean regions are reported by one species each. All these are being conserved since they have been appropriated by native people for various religious worships, ceremonies and have deep faith in them. Occurrence of some exotics in ancient period is evidenced by archaeobotanical studies and mythology.

All these human sentiments are indicative of their role in local biodiversity conservation and bioculture of Khandesh regions. Khandesh region is thus a land of celebrations, worships and religious festivals interwoven with local biodiversity. An attempt has been made for appropriation of exotic species to Indian deities. Similar studies are still needed to know bioculture and Indian heritage. An cultural dimension relating to biodiversity should be integrated with decision making for appropriate conservation strategies. Such investigations need a scientific and prudent approach for the well-being of mankind.

Keywords: exotic sacred plants, Bioculture, Khandesh, India

Introduction

Several plant species are intimately linked with religious and some ancient traditions in India. The cultural attributes have influence on conservation of biodiversity. The subject of Ethnobotany is few decades old. Biodiversity is exploited traditionally for material uses and find wide space in economy. Most of Indian ethnobotanical researches were/are directed on this line.

The investigations connecting biodiversity and bioculture are, however, limited. Sacred groves are sanctified forest regions protected by the strength of religious beliefs as abodes of deities. The sacred groves viz., Kanagad-kava and Kuvumkara in Kozhikode district of Kerala state (India) are studied from the standpoint of biodiversity conservation. These authors highlighted 20 species under 20 genera and 14 families of angiosperms for their religious potentialities and role worship of local deities. They pinpointed a need to conserve these-grove as these are changing due to erosion of cultural practices and modernization (Chaithra & Thomas 2017)^[5]. Big temples in Cuddalore district of Puducherry region (Tamil Nadu: India) are maintained by the authorities of these temples. Sthalavriksha is a natural tree found in these temple sites before construction of the temple. Most temple myths and histories refer to a prime deity that was first unearthed or found under the tree. A total of 06 plant species belonging to 06 families were studied. Interestingly,

these are used to treat 30 different diseases. Leaves was found most useful. The authors also pointed out IUCN threatened categories as: LC (least concerned) one, V (vulnerable) one and EN (endangered) two. The authors provided a significant ethnobotanical information of these sacred sthalavrikshas (Sivalingam, Rajendran & Anbarasan 2016)^[36]. Investigation on sthalavrikshas in Tamil Nadu is also carried out (Gunasekaran & Balasubramanian 2012)^[13]. These authors studied 1165 ancient temples and revealed 112 plant species conserved. Sacred groves of Bundelkhand region of Madhya Pradesh state in India was investigated. These authors studied 13 sacred groves and revealed medicinal importance of 13 genera belonging to 13 angiospermic families. They also mentioned myths associated with each plant species, apart from disease treated, part used and medicinal preparations (Sahu, Kumari, Sao, Singh & Pandey 2013)^[29]. The deities and festivals associated with the various plants of the Indo-Gangetic plain highlighted for local utilities and myths, beliefs and faith interwoven them. The authors opined that traditional worshipping has protected nine plant species with tremendous medicinal value (Pandey & Pandey 2016)^[22]. Baitadi, Dadeldhura and Darchula districts of western Nepal was investigated for medicinal plants, their use patterns and availability, especially in the lower Kailash sacred landscape (Nepal). The authors revealed total 160

**LIFE HISTORY OF STINK BUG HALYOMORPHA HALYS (HETEROPTERA: PENTATOMIDAE)
ON LANTANA CAMARA**

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ABSTRACT

Halyomorpha halys is a serious agricultural pest feed on wide range of fruit and vegetable crop species. This bug was commonly noticed on plant *Lantana camara* throughout the year. Present study was undertaken to learn life history of *H. halys* on *L. camera* under laboratory conditions. The adult female deposited about 28 eggs on underside of leaves in the form of cluster. The egg incubation period was 4-5 days. In laboratory condition hatching percentage was 100%. There were 5 nymphal instars and completed their development within 32-46 days. Adults become sexually mature about two weeks after their final molt. Male and female starts mating after two weeks from their last molt. Adult female bugs were bigger and had more longevity compared to male bugs. Females lived 26-28 days while males 18-20 days. The entire life cycle was completed within 57-66 days.

Key wards : Life cycle, *Halyomorpha halys*, Chloroform, Instar

Introduction:

The stink bug *Halyomorpha halys* belongs to family Pentatomidae. It is a serious agricultural pest that is native to Asia (Lee *et al.*, 2013). This bug is commonly known as brown marmorated stink bug (BMSB) or simply stink bug. Like other members in the Pentatomidae family, this bug possesses shield shaped body and stink gland in the thorax. They are characterized by having alternate light bands on the antennae and alternate dark bands on the thin outer edge of the abdomen. When handled or crushed these bugs release their foul smelling secretion with the help of stink glands.

H. halys is a polyphagous insect that can causes significant injury to a wide range of fruit and vegetable crop species. Both adults and nymphs prefer to feed on plant reproductive structures (McPherson and McPherson 2000). They have a wide host range including ornamental shrubs, hardwood

trees, and cultivated crops, such as soybean, apple, pear, cherry, peach and more than three hundred cultivated and wild plants (Bariseli *et al.* 2016). During present investigation the life cycle of *Halyomorpha halys* was studied.

Material and Method:

The life cycle of *Halyomorpha halys* was studied under laboratory condition at 25°C to 30°C and 60 to 70 RH. The hatched eggs and 1st instar nymphs were collected from the Department of Zoology, Shivaji University Kolhapur on 20 Nov 2015. First instar nymphs were reared in aluminum meshed cages (15cm×15cm×22cm). The hatched nymphs were separated in two groups as 14 each and transferred in separate cages of same size for observations.

The first instar did not feed on diet, but they were found moving around the egg mass. Feeding started from 2nd instar, wherein those were fed on fruits of *Lantana camara*. The



Effects of AgO addition on the mechanical, optical, and radiation attenuation properties of $V_2O_5/P_2O_5/B_2O_3$ glass system

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Abstract

The effects of AgO addition on the mechanical, optical, and radiation attenuation parameters of $46V_2O_5-46P_2O_5-xB_2O_3-yAgO$ glass system, namely VP-BxAy: (x,y) = (8,0), (6,2), (4,4), (2,6), and (0,8) mol%, was examined. Values of molar polarizability (α_m , 19.397×10^{-24} to 18.820×10^{-24} cm³) were in direct relation with the molar refractivity (R_m , 48.882–47.427 cm³/mol), while the optical transmission (T) parameter showed an inverse relation with reflection loss (R_L) as a function of AgO concentrations. Both static (ϵ^{static}) and optical ($\epsilon^{optical}$) dielectric factors showed a direct relation with each other and an opposite trend with the other factors. The values of the bulk modulus (K_{B-C}) were increased from 59.99 to 64.67 GPa. The shear modulus (G_{B-C}) was increased from 32.91 to 36.37 GPa, longitudinal modulus (L_{B-C}) was increased from 103.77 to 103.05 GPa, and Young's modulus (E_{B-C}) was increased from 83.48 to 91.89 GPa, respectively. The results of Poisson's ratio (σ_{C-B}) have a decreasing trend from 0.268 to 0.263. Moreover, the radiation attenuation properties of VP-BxAy glasses for photons, neutrons (fast and thermal), and charged particles (electron, proton, and alpha) are investigated. The Monte Carlo method was employed via FLUKA code to investigate photons attenuation properties of the examined glasses. The simulation implementation was experimentally and theoretically confirmed. Linear attenuation coefficients (LAC) of VP-BxAy glasses followed the trend: $(LAC)_{VP-B0A8} > (LAC)_{VP-B2A6} > (LAC)_{VP-B4A4} > (LAC)_{VP-B6A2} > (LAC)_{VP-B8A0}$. Therefore, AgO addition played an improvement role in the photon attenuation processes. The VP-BxAy glasses showed superior attenuation properties for photons beam compared with different photon attenuators. This indicates that the VP-BxAy glasses have superior features to use as promising shields for various applications against photons beam (X or gamma radiation).

Keywords Glass · Mechanical properties · Optical properties · Radiation · Shielding

1 Introduction

The use of radioactive materials in research institutions, industry, agriculture, energy generation, and other nuclear processing plants leads to the emission of hazardous ionizing radiation in the environment. Besides, radioisotopes have gained huge attention due to advance technical uses in pharmaceuticals, medical diagnostics, radiotherapy, sterilization of medical equipment, agriculture, food industry, manufacturers, etc. [1–5]. Thus, exposure to ionizing radiations, especially X- and gamma rays, has also been increased tremendously owing to innovative technological applications of radioisotopes. A long-time exposure to photons beam has deleterious effects on humans. To utilize nuclear radiation efficiently without any health concerns, the development of novel promising shielding materials is extremely important. Concretes are widely utilized materials for radiation protection due to their widespread availability, low-cost,

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