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| ISSN | 1945-5453 [Organic Preparations and Procedures International The New Journal for Organic Synthesis] | | |

ORGANIC PREPARATIONS AND PROCEDURES INTERNATIONAL
2022, VOL. 54, NO. 6, 556–562
<https://doi.org/10.1080/00304948.2022.2090221>



OPPI BRIEF



An Efficient One-Pot Synthesis of 2-Aryl-4,5-diphenyl-1H-imidazoles with Amberlite IR-120(H) as a Reusable Heterogeneous Catalyst

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Shweta N. Dandekar^b, and Seema R. Jadhav^c

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ARTICLE HISTORY Received 4 March 2022; Accepted 11 June 2022

Imidazoles have piqued the interest of researchers in modern organic synthesis, and this can be attributed to their unique physicochemical properties and medicinal value. Several imidazoles have widespread medicinal applications, including antibacterial, anti-viral, anti-inflammatory, antinociceptive, and anticancer properties.^{1–6} Other compounds in this class function as inhibitors of kinases, modulators of p-glycoproteins, and glucagon receptor antagonists.^{7–13} Due to the broad array of applications of substituted imidazoles, considerable efforts have been made for their synthesis from benzil, aromatic aldehydes, and ammonium acetate, taking advantage of such diverse catalysts as picolinic acid, L-cysteine, BiCl₃, iodine, ionic liquids, polymer-supported nanocatalysts of iron oxides, Y(TFA)₃, pumice, light-emitting diodes, and sulfonic and phosphoric acid catalysts.^{14–31} Recognizing the significance of imidazoles, it is a desirable goal to develop new methods that avoid hazardous reaction conditions, expensive reagents, and complex workup and purification procedures.

With these considerations in mind, we now report a new, simple and mild one-pot protocol for the synthesis of 2,4,5-trisubstituted imidazoles. This method employs Amberlite IR-120(H) as an active and stable catalyst (Scheme 1). Amberlite IR-120(H) is an acidic styrene-divinylbenzene cross-link polymer-supported material bearing sulfonic acid groups. The catalyst has particle size 620–830 μm and thus provides large active sites. The catalyst withstands high temperatures.

As a model, we first chose the reaction of benzil (1 mmol), p-chlorobenzaldehyde (1 mmol), and ammonium acetate (1 mmol) to produce the related 1H-imidazole. The reaction was studied in the absence of catalyst, but the yield was low; then the reaction was carried out by employing 0.15 g of catalyst in ethanol at room temperature and showed a substantial increase in yield (Table 1). The reaction was further examined by varying the temperature and concentrations of catalyst and NH₄OAc. The best results (Table 1, entry 13) were obtained with molar ratios of benzil:p-chlorobenzaldehyde:ammonium acetate of 1:1:3.5, in the presence of 0.15 g of catalyst, in ethanol at reflux for 1.5 h.

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Link to the recognition in UGC
enlistment of the Journal / Digital
Object Identifier (doi) number

<https://doi.org/10.1080/00304948.2022.2090221>

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| ISSN | 2349-5162 [Journal of Emerging Technologies and Innovative Research (JETIR)] | | |

© 2022 JETIR October 2022, Volume 9, Issue 10 www.jetir.org (ISSN-2349-5162)

JETIR.ORG | ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

 **JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)**
 An International Scholarly Open Access, Peer-reviewed, Refereed Journal

A Review of the Startup India Scheme of the Government of India

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STARTUP INDIA
STAND UP INDIA

Abstract:
 Startup India scheme is a flagship initiative of Government of India under the Ministry of Commerce and Industry. This scheme was first announced by the Honorable Prime Minister Shri Narendra Modi in his speech on 15 August 2015. The startup India scheme aims to build an eco-system for promoting innovation and design, sustainable economic growth and generation of employment opportunities. As an initial step to this initiative, an extensive action plan was launched by the Prime Minister in 2016 which provided for reforms that would help in boosting the start-ups in India. The paper discusses the start-up scheme and also the challenges faced by the Startups in India.

Keywords: Innovation, economic growth, startups, entrepreneurship, eco-system

Introduction:
 The Honorable Prime Minister Shri Narendra Modi had stated that, "I see startups, technology and innovation as exciting and effective instruments for India's transformation."
 Startups have played an important role in the growth, development and industrialization of many countries across the world. Accordingly, Startup India scheme is all about promoting entrepreneurship in India. With a huge number of young population who are now wanting to become entrepreneurs with the wide and innovative business ideas in their minds, sometimes feel discouraged due to the lack of skills, inadequate government support, lack of funding support, excessive regulatory compliances, etc.
 The Indian Government in order to promote entrepreneurs has started implementing various initiatives. In this respect, The Make in India scheme needs a mention. Make in India is a scheme launched by Prime Minister Narendra Modi in 2014 intended to boost the domestic manufacturing sector and also increase the investment into the country.
 Similarly, in order to make the country number one in the startup field, Government of India (GoI) has introduced a new campaign called 'Start up India' in 2015 which aims to promote entrepreneurship especially among women and to help startups with funding.
 Research Methodology The study is based on the secondary data which has been collected through journals, magazines, newspapers, research papers, websites etc.

Objectives of the Study:

1. To review the startup eco system in India.
2. To study the Startup India scheme.
3. To study the challenges faced by the start up in India.

JETIR2210299 | Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org | c768

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| Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number | http://doi.org/10.1729/Journal.31899 |
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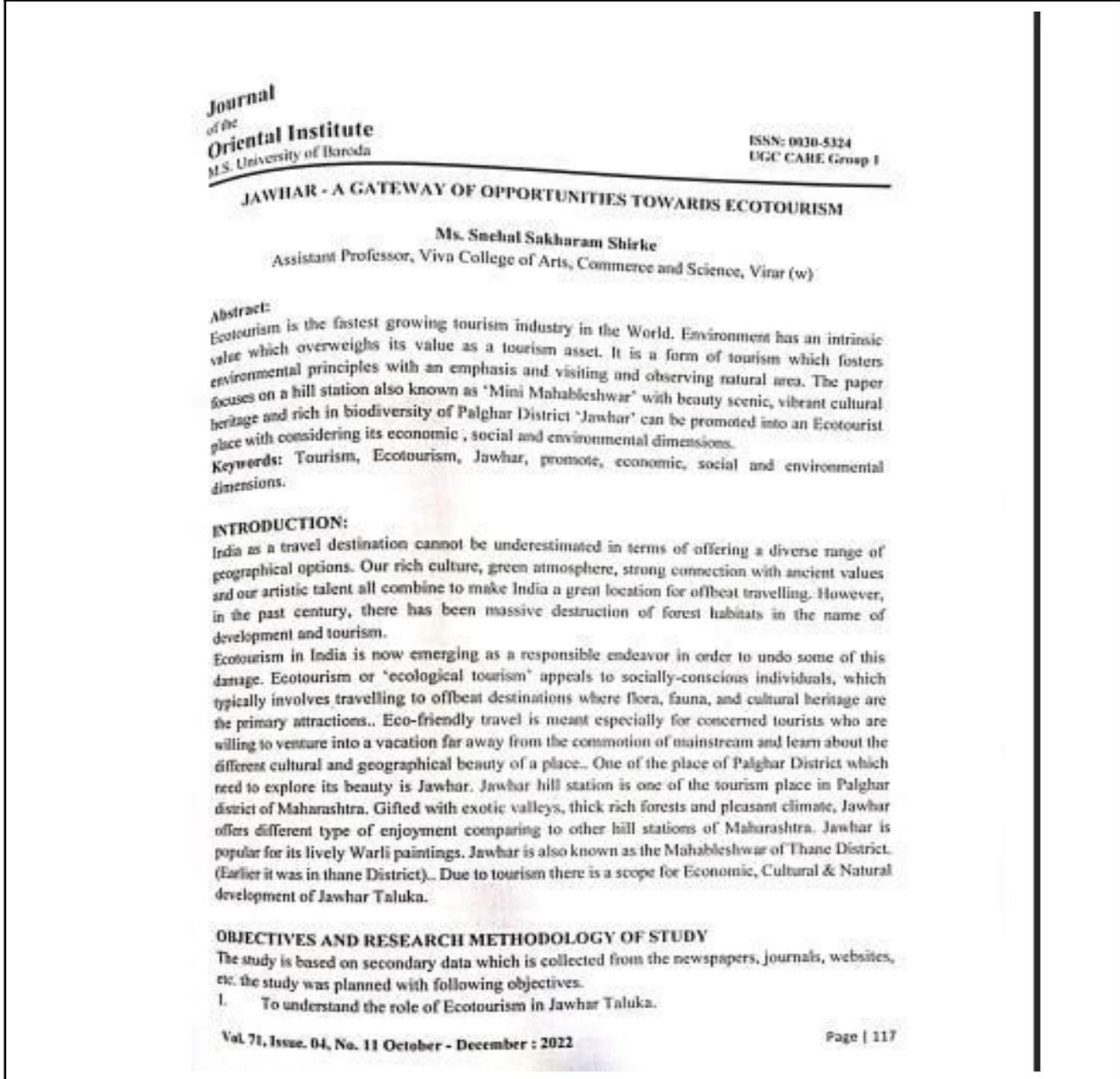


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| ISSN | 0030 - 5324 [The Journal of Oriental Institute] | | |



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शोधप्रभा ISSN: 0974-8946
 Shodha Prabha (UGC CARE Journal) Vol. 48, तृतीयक, Book No.08: 2023
EVALUATING THE ROLE OF FEMALE EDUCATORS IN PROMOTING SOCIO-ECONOMIC GROWTH IN REMOTE COMMUNITIES

Dr. Deepakkumar Ramnath Gupta Assistant Professor Viva College of Arts Commerce and Science

ABSTRACT:

Evaluating the influence of educators on community development is paramount, especially in remote regions. This study examines the role of female educators in fostering socio-economic growth in isolated communities. Drawing from qualitative and quantitative data, key findings demonstrate that female educators not only enhance educational outcomes but also contribute significantly to local economies. Their presence boosts female student enrolment, subsequently increasing women's participation in the workforce. Furthermore, these educators often serve as community leaders, promoting civic engagement and advocating for infrastructural improvements. By empowering the next generation, they indirectly stimulate local businesses and entrepreneurship. However, challenges like cultural barriers and limited resources persist. To maximize their impact, tailored interventions and governmental support are crucial.

Key words: female educators, socio-economic growth, remote communities, educational outcomes, workforce participation, community leadership, empowerment, local businesses, cultural barriers, governmental support.

INTRODUCTION

Remote communities around the world face daunting socio-economic challenges. Limited access to education and healthcare, high poverty rates, a lack of economic opportunities, increased crime, violence, and social isolation characterize these communities. Such challenges are further compounded by factors like climate change, conflict, and natural disasters, making it difficult for individuals to achieve their full potential.

Amid these challenges, education emerges as a transformative tool. It can break the cycle of poverty by providing access to better jobs and opportunities. Education empowers people to make informed decisions about their lives, contributes to stronger communities, and can improve the health and well-being of individuals. It has the potential to reduce infant mortality rates, enhance nutrition, and prevent diseases. Additionally, education promotes economic development by increasing employment opportunities and productivity.

Within this educational framework, female educators stand out as significant agents of change. They bring unique insights and empathy to teaching and often serve as role models for young girls. By inspiring and motivating girls and women, providing role models, breaking down gender stereotypes, and advocating for the needs of females, they contribute to a more inclusive and balanced education system. Female educators are often more likely to stay in remote communities and better relate to the needs of students and families.

Education is a powerful tool for promoting socio-economic growth in remote communities, characterized by isolation and restricted resources. Female educators play a vital role in this process, serving as change agents who inspire, motivate, and challenge traditional norms. This study aims to evaluate the role of female educators in promoting socio-economic growth in remote communities, highlighting their unique contribution and the importance of a gender-inclusive approach to education. Their work leads to community transformation, fostering a more equitable and prosperous society, and underlining the importance of education in overcoming the socio-economic challenges faced by remote communities.

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| ISSN | 2455-2631 [International Journal of Scientific Development and Research (IJSDR)] | | |

ISSN: 2455-2631 February 2023 IJSDR | Volume 8-Issue 2

A Review on The Impact of Covid 19 On the Travel and Tourism Industry in India.

Prof Mezbin Lalani,
 Department of Accountancy, VIVA College of Arts, Commerce & Science

Abstract: The outbreak of the coronavirus pandemic created worldwide disruptions. It threatened not just the public health but created economic and social disruptions thereby affecting millions worldwide. Of all the industries that were impacted by COVID, one of the industries that saw severe damage was the Travel and Tourism industry. India is one of the most popular tourist destinations across the world. With a culturally and geographically rich and diverse nature, it provides multicultural experiences, beautiful attractions ranging from the Snowlad Mountains to the magnificent forests, India has various tourist products such as various heritage sites, national parks, religious and spiritual tourism, cruise, beaches, adventure, caravan trips, film tourism and various attractive landscapes. The official slogan of the Tourism ministry of India truly describes India as Incredible India. Tourism and hospitality industry has been one of the biggest service industries in India. This industry plays a critical role in enhancing India's growth rate and helps in employment generation directly or indirectly. This paper aims to study the impact of COVID 19 on the travel and tourism industry by analyzing the current conditions, challenges, and the road ahead.

Key words: Travel and tourism, COVID pandemic, lockdown, Indian tourism, recovery.

Introduction: Travel and tourism has been one of the biggest service industries for India. It is an integral part of the Make in India campaign of Government of India. It has helped in the economic growth and as well in the creation of employment opportunities. The scenario pre COVID was very encouraging to see as the tourism industry was structured. India's ranking in the Travel and Tourism Competitive Index (TTCI) of World Economic Forum moved from 52nd position in 2015 to 40th position in 2017. Further India climbed up to 34th rank in 2019. The contribution of the travel and tourism sector to the Indian GDP was around 6.8% in 2019 which was reduced to 5.5% in 2020 owing to the travel restrictions placed across the world.

Contribution of Travels & Tourism to Indian GDP

| Year | Employment (%) |
|------|----------------|
| 2019 | 6.8% |
| 2020 | 5.5% |

In 2020, nearly 32 million people were officially employed in the travel and tourism industry in India. This was a significant decrease by over 20 percent compared to the previous year. The travel industry was hit hard in 2020 due to travel restrictions during the coronavirus (COVID-19) pandemic.

IJSDR2302001 | International Journal of Scientific Development and Research (IJSDR) www.ijedr.org | 1

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| ISSN | 1006-6748 [High Technology Letters] | | |

High Technology Letters

ISSN NO : 1006-6748

Solvent-free synthesis of silatranes substituted five membered heterocyclic ring at axial position: One-pot reaction of 3-aminopropylsilatrane and alkynes or isothiocyanate in the presence of oxalyl chloride

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Abstract: Using green chemistry, silatranes possessing five-membered heterocyclic ring at axial position were synthesized via one-pot reaction of 3-aminopropylsilatrane1 and alkynes/isothiocyanate without solvent. In this section, silatranes 2-5 were synthesized by the reaction of 3-aminopropylsilatrane with phenyl acetylene, propargyl bromide, propargyl alcohol and phenyl isothiocyanate in the presence of oxalyl chloride. The optimal reaction condition for the best results was stirring the reaction mixture at 50 °C. The preliminary inspection about structures of silatranes, possessing unsymmetrical substituted urea and thiourea group in axial position was carried out by spectroscopic methods [FTIR, NMR (¹H, ¹³C) and mass spectroscopies].

Keywords: Silatrane, Five-membered heterocyclic ring, Green Chemistry, One-pot reaction

Introduction

To design and carry out chemical reactions with "green" experimental protocol is an enormous challenge that chemists have to tackle to improve the quality of the environment for present and future generations. For achieving this goal, the target areas are the exploration of alternative reaction conditions and reaction media to accomplish the desired chemical

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[VOLUME 28 ISSUE VII 2022 – High Technology Letters \(gjstx-e.cn\)](https://doi.org/10.37896/HTL28.07/6144)
<https://doi.org/10.37896/HTL28.07/6144>

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| 7 | Rupali Patil | वयसहाय्य ा बचत गट : महिला उद्यमशीलतेचे बदलते व प आणि महिलांचे स मीकरण | |
| ISSN | 2277-5730 [Ajanta - An International Multidisciplinary Quarterly Research Journal] | | |

VOLUME - XI, ISSUE - II - APRIL - JUNE - 2022
 AJANTA - ISSN 2277 - 5730 - IMPACT FACTOR - 6.306 (www.sjfactor.com) CC-14

१. स्वयंसहाय्यता बचत गट : महिला उद्यमशीलतेचे बदलते स्वरूप आणि महिलांचे सक्षमीकरण

सौ. रुपाली प्रशिल पाटील

सहाय्यक प्राध्यापिका, अर्थशास्त्र विभाग, विवा कॉलेज ऑफ आर्टस्, कॉमर्स अँड सायन्स विद्यर (पश्चिम)

सारांश

जगभरात गेल्या दोन दशकांमध्ये विशेषतः उदयोन्मुख अर्थव्यवस्थांमध्ये सूक्ष्म वित्ताचा विस्तार करण्यासाठी मोठ्या प्रमाणात प्रयत्न केले गेले आहेत. उद्योजकता आणि आर्थिक विकासाला चालना देण्याच्या दृष्टीने सूक्ष्म वित्ताचे योगदान महत्त्वपूर्ण आहे. उद्योजकतेचा विकास करणे आणि त्याद्वारे गरिबी कमी करण्यासाठी सूक्ष्म वित्ताची मदत होऊ शकते का या संदर्भात जागतिक व राष्ट्रीय पातळीवर शासकीय व खाजगी व्यक्ती व संस्थांकडून संशोधन हाती घेतले जाते. समाजातील दुर्बल व वंचित घटकांच्या विकासासाठी आशेचा किरण म्हणून सूक्ष्म वित्ताकडे पाहिले जाते.

सूक्ष्म वित्ता अंतर्गत कमी गुंतवणूक - कमी उत्पन्न- कमी गुंतवणूक या दुष्टचक्राचा नाश करून गरीब कुटुंबांना दारिद्र्यरेषेच्या वर आणण्यासाठी प्रयत्न केला जातो. यू.नोचे सेक्रेटरी मा. कोफी अन्नान यांनी २००९ हे वर्ष 'आंतरराष्ट्रीय सूक्ष्म वित्त वर्ष' म्हणून घोषित केले. दारिद्र्य निर्मूलन करणे, गरिबांसाठी चांगल्या आर्थिक सुविधांची निर्मिती करणे, या दृष्टिकोनातून सूक्ष्म वित्त वर्ष जाहीर करण्यात आले आहे. भारतात एकात्मिक ग्रामीण विकास योजना सर्वप्रथम सूक्ष्म वित्त पुरवठा करणारी योजना होती. तत्पूर्वी गरिबी निर्मूलन तसेच महिला सक्षमीकरणासाठी अनेक योजना राबविल्या गेल्या; परंतु मूल्यमापन पातळीवर त्या यशस्वी झाल्या नसल्याचे दिसून आले. त्या सर्व योजनांचे एकत्रीकरण करून १ एप्रिल १९९९ पासून स्वर्णजयंती ग्राम स्वरोजगार योजनेअंतर्गत स्वयंसहाय्यता बचत गटांना प्रोत्साहन देण्यास सुरुवात झाली. त्याद्वारे गरजू व दारिद्र्य रेषेखालील कुटुंबातील समासदांसाठी कर्ज व अनुदान योजना राबविली गेली. स्वयंसहाय्यता गट बचत संकलनाचे व वर्षानुवर्षे दारिद्र्यात खितपत पडलेल्या सदस्यांना कर्जासाठी मदत करणारे प्रभावी साधन मानले जाऊ लागले.

भारतात पतपुरवठ्याचे क्षितिज गेल्या तीस वर्षांत विस्तारले आहे. या अंतर्गत गरीब घटकांना विशेषतः ग्रामीण महिलांना कर्ज पुरवठा करण्यात आला. त्यामुळे रोजगार निर्मिती तर झालीच, पण समाजातील समस्यांचा अभ्यास करून व समाजाची गरज ओळखून समाजाला उपयुक्त अशा विविध वस्तूंचे उत्पादन करणारे अनेक बचत गट निर्माण झाले. त्यातून महिलांच्या अंगी नेतृत्व, सहकार्य वृत्ती, संभाषण कौशल्य, बचत व गुंतवणूकीचे योग्य नियोजन करणे, संघटन कौशल्य इत्यादी गुणांचा विकास होऊन त्यांच्या आत्मविश्वासात वाढ झाली. महिलांमधील उद्यमशीलतेचा विकास होऊन त्या

पेज १/Peer Reviewed Refereed and UGC Listed Journal No. : 40776

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| 1 | Mr. Shailesh Gurav | Efficient and Facile Synthesis of Benzimidazole Induced Schiff Bases and their Potent Antibacterial Activity and Computational Study | |
| ISSN | 0970-7077 [Asian Journal of Chemistry] | | |



Efficient and Facile Synthesis of Benzimidazole Induced Schiff Bases and their Potent Antibacterial Activity and Computational Study

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Received: 9 February 2021;

Accepted: 24 March 2021;

Published online: 5 June 2021;

AJC-20253

Synthesized benzimidazole induced Schiff base analogues were characterized by mass, ¹³C NMR, ¹H NMR and UV-visible spectroscopy. To get more information about binding mechanism, molecular docking studies were carried out and the obtained results concluded that the compounds could effectively bind with receptor. *In vivo* Antibacterial screening was carried out against four strains (*S. aureus*, *B. subtilis*, *P. aeruginosa* and *E. coli*) and exhibited good antibacterial activity. The gastrointestinal absorption (GIA) and brain penetration (BBB) was evaluated by The BOILED-Egg model, which showed that two compounds anticipated being effectively effluxed by the P-glycoprotein from central nervous system after penetration and can accounts for brain access and passive gastrointestinal absorption. Computational screening showed 0.55 bioavailability score for all synthesized compounds.

Keywords: Benzimidazole, Schiff base, Antibacterial activity, Gastrointestinal absorption, Brain penetration, Molecular docking.

INTRODUCTION

Benzimidazole is a privileged bicyclic ring system and its moieties are important class of heterocyclic compounds which are creating a interest among the researchers because of their wide scope of pharmacological activities [1-5]. The class of these molecules ends up being vital as they have various pharmacological properties including antibacterial [6,7], anti-fungal [8], analgesic [9], antioxidant [10,11], anti-inflammatory [12], anti-allergic [13] and antitumoral agent [14]. Various benzimidazole analogues have been found to possess biological activity as phosphodiester inhibitor [15], neuropeptide Y receptor and Y5-receptor antagonist [16]. On the other hand, the Schiff base and its derivatives possess broad spectrum of biological activities because of their structural likenesses with natural biological compounds [17]. Synthesis of Schiff base has received a lot of consideration attributable to differed biological activities displayed by number of its derivatives [18-22]. Attributable to the incredible biological and synthetic importance of this heterocyclic core, synthesis of benzimidazole and Schiff base derivatives has long been a region of intense development. In order to get more insight,

the computational investigations of synthesized molecules such as ADME [23,24], target prediction [25], *in silico* drug-likeness, pharmacokinetics, molecular docking [26-28] and *in silico*-based virtual screening tools [29,30] has become helpful and important for the additional investigation to improve activity.

With this consideration, it was decided to study benzimidazole induced Schiff bases, which are not yet investigated for their relative computational analysis. In the present work, benzimidazole induced Schiff bases were synthesized by efficient, facile route and characterized by spectroscopic techniques. The synthesized compounds were screened for ADME, target prediction, pharmacokinetics and *in silico* drug-likeness, *in vitro* Antibacterial activities were also evaluated by disc diffusion method. In order to explore binding interaction and activity, molecular docking has been carried out with target proteins of various bacterial strains.

EXPERIMENTAL

Evaluation of brain penetration (BBB) and gastrointestinal absorption (GIA): Two necessary pharmacokinetic researches to evaluate at various periods of the drug discovery

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Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number
<https://doi.org/10.14233/ajchem.2021.23163>

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| ISSN | 2456-236X [International Journal of Interdisciplinary Innovative Research & Development (IJIIRD)] | | |

International Journal of Interdisciplinary Innovative Research & Development (IJIIRD)
 ISSN: 2456-236X
 Vol. 06 Special Issue 01 | 2021

Physicochemical Parameter and Some Heavy Metals Analysis in Ground Water and Its Remediation

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ABSTRACT

Water is the most precious gift of nature and one of the vital elements involved in the existence and continuation of life. Groundwater is the primary source of water for human consumption as well as for agricultural and industrial uses in many regions all over the world. Ground water polluted by heavy metals becomes an environmental problem, though the metals are constituent of matter. Heavy metals have long been recognized as one of the most important pollutants in the waters because of their toxicity, mutagenic and carcinogenic effects in animals. They constitute the most widely distributed group of highly toxic and retained substances. Lime-soda process and ion exchange process are generally used for removal of hardness causing substances including heavy metals. Plant based technologies such as rhizofiltration are the most effective and environmentally friendly for removal of heavy metals. Rhizofiltration is a technique of utilizing plant root to absorb heavy metals from the ground water. In the present work ground water samples were collected from different villages of Parva river basin. Samples were analysed for physico-chemical parameters and some heavy metals like Cu, Fe, Cd, Pb, Mn, Zn, Cr, and Ni. Heavy metals are assessed before and after Lime-soda, Ion exchange and rhizofiltration treatment. The result of the study reveals that Rhizofiltration is potential technique for removal of heavy metals from ground water.

Keyword: Ground water physico-chemical parameter, Rhizofiltration, Heavy metals

1. INTRODUCTION

Water plays a vital role in the development of communities; hence a reliable source of water is essential for the existence of both human and animals [1]. Ground water is one of the major sources of drinking water in the study area hence it is important to assess the groundwater quality with respect to physico-chemical parameter and heavy metal contamination[2]. Ground water has been traditionally considered to be pure form of water because of its filtration through soil and its long residence time on the ground. However, ground water is not as pure as traditionally assumed as water is an excellent solvent and it can contain lots of dissolve chemicals [3]. Heavy metal contamination of ground, stream and river water ecosystem is a worldwide environmental problem [4] and between the wide diversity of contaminants affecting water resources, heavy metals receive particular concern considering their strong toxicity even at low concentrations [5]. Some heavy metals like Fe, Zn, Cu, Mg have been reported to be of no importance to man. In very small quantities, even Cr and Ni are required in the body. However, some other metals like As, Cd, Pb has been reported to have no known importance in human biochemistry and physiology, and consumption even at very low concentrations can be toxic. Even for those that have bio-importance, dietary intakes have to be within regulatory limits as excesses may result in poisoning or toxicity. Heavy metals are also known to be toxic to both humans and other living forms, with their accumulation over time causing damage to the kidney, liver, and reproductive system in addition to cancer [6]. During last few years, it is reported that the patients affected by water pollutants are facing serious health problems like kidney failure, hair loss and cardiovascular damage. If

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| 3 | Dr. Jayashri Naphade-Phirke | Rhizofiltration is Cost Effective and Eco- Friendly Method for the Remediation of Heavy Metals from Ground water | |
| ISSN | 2456-236X [International Journal of Interdisciplinary Innovative Research & Development (IJIIRD)] | | |

International Journal of Interdisciplinary Innovative Research & Development (IJIIRD)
 ISSN: 2456-236X
 Vol. 05 Special Issue 01 | 2020

Rhizofiltration is Cost Effective and Eco-Friendly Method for the Remediation of Heavy Metals from Ground Water

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Abstract

Water is the most precious gift of nature and one of the vital elements involved in the existence and continuation of life. Groundwater is the primary source of water for human consumption as well as agricultural and industrial uses in many regions all over the world. Ground water polluted by heavy metals becomes an environmental problem, though the metals are constituent of nature. Heavy metals have long been recognized as one of the most important pollutants in the waters because of their toxicity, mutagenic and carcinogenic effects in animals. They constitute the most widely distributed group of highly toxic and retained substances. Lime-soda process and ion exchange process are generally used for removal of hardness causing substances including heavy metals. Plant based technologies such as rhizofiltration are the cost effective and environmentally friendly for removal of heavy metals. Rhizofiltration is a technique of utilizing plant root to absorb heavy metals from the ground water. In the present work ground water samples were collected from different villages of Purna river basin. Samples were analysed heavy metals like Cu, Fe, Cd, Pb, Mn, Zn, Ni, and Ni. Heavy metals are assessed before and after Lime-soda, ion exchange and rhizofiltration treatment. The result of the study reveals that Rhizofiltration is potential technique for removal of heavy metals from ground water.

Key words: Ground water, Rhizofiltration, Heavy metals, Water pollution, Metal toxicity.

1 INTRODUCTION

Today water pollution is the biggest problem for human beings' characterization by deterioration of the water quality as a result of various human activities which makes water unfit for drinking and domestic purposes. Many toxic heavy metals have been discharged into the environment as industrial waste, causing serious soil and water pollution [1].

Ground water has been traditionally considered to be more pure of water because of its filtration

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| 4 | Dr. Jayashri Naphade | Dehydrogenation of Pyrazoline and its Derivatives using DDQ in DMF | |
| ISSN | 0363-8057 [GRADIVA REVIEW JOURNAL] | | |

GRADIVA REVIEW JOURNAL ISSN NO : 0363-8057

Dehydrogenation of Pyrazoline and its Derivatives using DDQ in DMF

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Abstract: Synthesis of pyrazoline derivatives is active field of research due to their pharmacological activities. In this study Substituted 4(5-phenyl-1(4-phenylthiazol-2-yl)-1H-pyrazol-3-yl) phenol were prepared. Pyrazoline was suspended in DDQ and DMF added to it. The mixture was refluxed for 1hr; cooled, diluted with water, the solid obtained was filtered, washed with Cold water and crystallized from ethanol to get pyrazoles. The same reaction was carried out in DDQ-DMF system affords pyrazoles. Structures of the synthesized compounds were confirmed from spectral analysis data, which were in line with the proposed structures.

Keywords: DDQ, Pyrazoline.

1. Introduction

Literature survey reveals the importance of chalcones and flavanones as a valuable starting material for the synthesis of heterocycles like pyrazolines, pyrazoles, isoxazoles, etc. Formation of pyrazolines have been reported^[1-3] by the action of hydrazine or phenyl hydrazine on chalcones and flavanones in solvents like DMSO, ethanol, etc.

Pyrazoles have been reported by oxidation of pyrazolines by chromic acid, potassium permanganate, silver nitrate, potassium ferricyanide, lead oxide and manganese dioxide Nitro pyrazoles have been synthesized from nitro pyrazolines using DMSO- I₂ as a solvent^[4]. Diversely substituted pyrazolines and their derivatives embedded with variety of functional groups are important biologically active agents and a huge amount of research activities have been directed toward this class of compounds^[5]. These compounds also show physiological activities^[6], antibacterial and antifungal^[7].

Various derivatives were prepared by the oxidation of pyrazolines using DDQ in DMF solvent^[8] by traditional method, i.e., by using gas burners for heating and condensers.

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|---|---|
| Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number | https://gradivareview.com/volume-7-issue-7-2021/DOI:10.37897.GRJ.2021.V7I7.21.287.3 |
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| Sr. No | Name of the Faculty | Title of the Paper | Year – 2021-22 |
| 5 | Dr. Jayashri Naphade | OVERVIEW ON COVID-19 (CORONAVIRUS DISEASE) | |
| ISSN | 2456-236X [International Journal of Interdisciplinary Innovative Research and Development] | | |

International Journal of Interdisciplinary Innovative Research & Development (IJIIRD)
 ISSN: 2456-236X
 Vol. 06 Special Issue 01 | 2021

OVERVIEW ON COVID-19 (Coronavirus Disease)

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ABSTRACT

Nowadays, the whole World is under threat of Coronavirus disease (COVID-19). The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus originated in bats and was transmitted to humans through yet unknown intermediary animals in Wuhan, Hubei province, China in December 2019. The disease is transmitted by inhalation or contact with infected droplets and the incubation period ranges from 2 to 14 d. The symptoms are usually fever, cough, sore throat, breathlessness, fatigue, malaise, among others. The disease is mild in most people; in some (usually the elderly and those with comorbidities), it may progress to pneumonia, acute respiratory distress syndrome (ARDS) and multi organ dysfunction. The ongoing COVID-19 pandemic has resulted in many fatalities and forced scientific communities to foster their Research and Development (R&D) activities. As a result, there is an enormous growth of scholarly literature on the subject.

Keyword: - COVID-19, SARS-CoV-2, WHO COVID-19 database

1. INTRODUCTION

In recent years, several new diseases came in different geographical areas, including Ebola virus, Zika virus, Nipah virus and coronaviruses (CoVs). But recently there was a new type of viral infection which emerged in Wuhan city of China, which was first detected in December 2019 and causes the highly infectious disease referred to as COVID-19. Many of the initial cases had a common exposure to the Huanan wholesale seafood market that also traded live animals. The surveillance system (put into place after the SARS outbreak) was activated and respiratory samples of patients were sent to reference labs for etiologic investigations. On December 31st 2019, China notified the outbreak to the World Health Organization and on 1st January the Huanan sea food market was closed. On 7th January, the virus was identified as a coronavirus that had >95% homology with the bat coronavirus and > 70% similarity with the SARSCoV [1]. COVID-19 has spread worldwide to become a global pandemic affecting more than 25 million people as of August 2020 and caused the death of more than 800,000 people worldwide [2].

COVID-19 is like Severe acute respiratory syndrome coronavirus (SARS-CoV) Virus in its pathogenicity and epidemiology. On 30th January 2020, World Health Organization (WHO) officially declared that the COVID -

ASD002

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Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

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Research Publication 2020-21

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|--------|--|--|----------------|
| 1 | Binita Thakkar | A Survey for Comparative Analysis of various Cryptographic Algorithms used to Secure Data on Cloud | |
| ISSN | 0974-3154 [International Journal of Engineering Research & Technology (IJERT)] | | |

Published by : <http://www.ijert.org> International Journal of Engineering Research & Technology (IJERT)
 ISSN: 2278-0181
 Vol. 9 Issue 08, August-2020

A Survey for Comparative Analysis of various Cryptographic Algorithms used to Secure Data on Cloud

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Abstract—Cloud computing is the recent trend for the growth in IT industry. We are able to store any amount of data on cloud today whether it is text, image, audio, and video and many more. Storing data on cloud is easy but it is very important that the data which we store on store is also secure. Many cryptographic algorithms have been implemented to maintain the privacy of data over cloud. In this paper, we will make a comparative analysis of various cryptographic algorithms used over cloud to secure data. This analysis will be made using various performance metrics.

Keywords— Cloud computing, symmetric algorithms, asymmetric algorithms

I. INTRODUCTION

Data is a small unit of information. It is a critical aspect from which information is created. Data can be any text, image, audio or video. It is very important to manage and store this data. Today, data is mainly stored on cloud. Data on cloud can be stored in various ways. But it is more important that data stored on cloud should be secure.

NIST defined cloud computing as “Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” [1]. Cloud computing has become one of the most emerging trend. This is because it provides many services to its customers and at a very low cost. The only issue with cloud computing is security of cloud. Security of data can be achieved by applying the principles of confidentiality, authentication, integrity, non-repudiation, access control and availability.

To maintain the privacy of data, principle of confidentiality is most important. Confidentiality ensures that the data is shared only by the sender and the intended recipient. This means, it is important that the sender uses some technique in which the data can be identified only by the receiver and not by any unauthorized user. The process of converting a readable message in a non-readable form is called encryption. The reverse process of converting back the non-readable message in the readable form is called decryption. Cryptography is defined as study of techniques to form a secure communication.

There are three ways of using cryptography: by converting plain text to cipher text, symmetric key algorithms and asymmetric key algorithms. Converting of plain text into cipher text can be done using substitution techniques in which a character in plain text can be replaced by any other character, number or symbol and using transposition techniques in which some permutations and combinations are used to encrypt the plain text characters.

Symmetric key algorithms are one in which same key is used for both encryption and decryption. There are many symmetric key algorithms like DES, triple DES, AES, Blowfish and IDEA. These algorithms works on different input size blocks and different input size keys. Asymmetric key algorithms use two keys, one for encryption and another different key for decryption. Various asymmetric algorithms like RSA and Diffie-Hellman are used.

II. LITERATURE REVIEW

P. Mell and T. Grance [1], defined cloud computing as a model of providing access to shared resources. They defined five characteristics of cloud as on-demand self-service, broad access network, resource pooling, rapid elasticity and measured service. They identified that a cloud model is based upon the three service models as Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS) and infrastructure-as-a-Service (IaaS). They also proposed that cloud basically works on any of the four deployment models-private cloud, public cloud, hybrid cloud or community cloud.

L. Alhenaki et al. [2] made a study on security in cloud computing. The study identified various security issues on cloud related to applications, data storage, management of client, operating systems used. The study also identified threats and attacks on cloud related to data loss, data breach, insider and API's. Solutions and countermeasures for the attacks were analyzed.

D. Dhaivat et al. [3] discussed various issues and threats on cloud based upon deployment model and service models. The authors identified issues like multi-tenancy risk, data and encryption, data leak risks, identity and access

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| 2 | Deepa Verma Nikhil Teli Gopal Chourasia Vikas Gupta | Unmodified Sugarcane Bagasse Waste Biomass as a Potential Source for Biosorption of Cd ²⁺ From Aqueous Solution | |
| ISSN | 2005-4262 [International Journal of Grid and Distributed Computing] | | |

International Journal of Grid and Distributed Computing
Vol. 13, No. 2, (2020), pp. 21-27

Unmodified Sugarcane Bagasse Waste Biomass as a Potential Source for Biosorption of Cd²⁺ From Aqueous Solution

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Abstract

Heavy metal pollutants released from industrial effluent into the water bodies are highly toxic, non-degradable, and accumulate in a living organism through the food chain thus posing a serious threat to mankind. The study describes the biosorption of Cd²⁺ ions from an aqueous solution using unmodified sugarcane bagasse (SCB). In the batch study, the influence of various process parameters inclusive of pH, contact time, adsorbent dose, agitation rate, and initial ion concentration has been evaluated. The equilibrium studies were systematically carried out at pH range (2-10), adsorbent dosage (0.1 gm-0.5 gm), initial Cd²⁺ ion concentration (2 ppm-10 ppm), contact time (20 min-120 min), agitation rate (0 rpm-160 rpm). The concentration of Cd²⁺ ions in the solutions before and after equilibrium was determined by measuring absorbance using Atomic Absorption Spectrophotometer (AAS). The optimum Cd²⁺ removal was observed at pH-9, initial ion concentration of 2 ppm, the contact time of 120 min, agitation rate of 80 rpm, and adsorbent dosage of 0.4 gm. The biosorbent was characterized by FTIR reveals the presence of hydroxyl, carboxyl, carbonyl, amide, and methoxy functional groups. All results showed that the SCB can be effectively considered as a promising cost-effective biosorbent for the removal of Cd²⁺ ions from aqueous solutions.

Keywords: Biosorption, Sugarcane Bagasse, Cd²⁺, Atomic Adsorption Spectrophotometer

Introduction

The release of heavy metals into aquatic ecosystems has become a major problem of concern in India over the last few decades. Unlike most organic pollutants that can be destroyed; toxic metal ions released into the environment often persist indefinitely, circulating and eventually accumulating throughout the food chain, thus posing a serious threat to mankind (Gupta et al., 2001). The heavy metal pollutants of concern include cadmium, lead, chromium, mercury, uranium, selenium, zinc, arsenic, gold, silver, copper, and nickel. These toxic constituents may be resulting from mining operations, sludge disposal, fly ash from incinerators, refining ores, the processing of radioactive materials, metal plating, or the manufacture of electrical equipment, paints, alloys, batteries, pesticides or preservatives (Liu et al., 2008). Among heavy metals cadmium is one of the major hazardous elements to human health. The major effects of cadmium poisoning are experienced in the lungs, kidneys, and bones (Igwe & Abia, 2007; Upendra, 2006).

Over a few decades, numerous approaches have been devised for the treatment and removal of heavy metals. The most commonly used techniques for removing metal ions from aqueous streams comprise ion exchange, chemical precipitation, reverse osmosis, lime coagulation, and solvent extraction (Moussavi & Barikbin, 2010). These commonly used technologies for removing metals are extremely expensive or complicated, particularly in solutions with less than 10 mg L⁻¹ of metal, they also generate other toxic wastes (sewage sludge) and in some cases, it is difficult to achieve and maintain strict regulatory requirements (Ajmal et al., 2003; Akzu, 2001; Fazal & Rafique, 2012). Hence a search for a low-cost and easily available adsorbent has led to the investigation of materials of biological origin as potential metal biosorbents.

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| 3 | Dr. Arti Dubey | क्यूमेरिन व्युत्पन्न के संश्लेषण की पीचमॉन अभिक्रिया में प्रयुक्त अम्लीय उत्प्रेरकों की दक्षता की तुलना | |
| ISSN | 2320-7736 [Vidyann Garima Sindhu] | | |

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क्यूमेरिन व्युत्पन्न के संश्लेषण की पीचमॉन अभिक्रिया में प्रयुक्त अम्लीय उत्प्रेरकों की दक्षता की तुलना

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शोध सार

पीचमॉन अभिक्रिया को मुख्य रूप से प्रतिस्थापित क्यूमेरिन के संश्लेषण के लिए प्रयोग किया जाता है जो कि उत्कृष्ट उत्पाद प्रदान करते हैं। अम्लीय उत्प्रेरक की उपस्थिति में प्रतिस्थापित फिनॉलो की अभिक्रिया बीटा-कीटो एस्टर से करवाई जाती है जिससे क्यूमेरिन प्राप्त होते हैं।

इस संश्लेषित अभिक्रिया द्वारा विभिन्न औषधीय व जैविक उपयोगी क्यूमेरिन व्युत्पन्न प्राप्त होते हैं। हमारे शोध कार्य में हमने विभिन्न अम्लीय उत्प्रेरकों के साथ विलायक मुक्त स्थिति में क्यूमेरिन व्युत्पन्न के संश्लेषण के लिए सूक्ष्म तरंग (माइक्रोवेव) विकिरण के साथ पीचमॉन अभिक्रिया का उपयोग किया। सूक्ष्म तरंग विकिरण के प्रयोग से विलायकमुक्त परिस्थितियों का कार्यान्वयन एक स्वच्छ संश्लेषित अभिक्रिया और बेहतर उत्पाद प्रदान करता है। संश्लेषित यौगिकों विभिन्न स्पेक्ट्रममिति तकनीकों द्वारा व्यवस्थित रूप से चित्रित किया गया है।

शोध कुंजी: पीचमॉन अभिक्रिया, धरेलू सूक्ष्म तरंग ओवन (माइक्रोवेव ओवन), अम्लीय उत्प्रेरक (ऑक्सालिक अम्ल, एम्बरलिट्ट-15 ड्राय, मॉन्टमोरीलॉनाइट के-10, तथा सिलिका बॉल)।

परिचय

विषमचक्रीय यौगिक कार्बनिक यौगिकों के सबसे बड़े और व्यापक स्तर का वर्ग है। विषमचक्रीय यौगिक में कार्बन व हाइड्रोजन के अतिरिक्त एक या एक से अधिक अन्य तत्व पाए जाते हैं। जिन्हें विषम परमाणु कहते

ISSN: 2320-7736 [जनवरी-मार्च, 2021] अंक-116

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| 1 | Dr.Arati Dubey | An overview on preparation and characterization of activated Jatropa Husk carbon | |
| ISSN | 2348-1269[INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR.ORG)] | | |

© 2019 IJRAR June 2019, Volume 6, Issue 2 www.ijrar.org [E-ISSN 2348-1269, P- ISSN 2349-5138]

An overview on preparation and characterization of activated jetropha husk carbon

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Abstract
Activated carbon is amorphous carbon which exhibit high degree of micro porosity and large surface area. Jetropha Curcus is an important plant for the production of biodiesel. In the production of biodiesel huge volume of jetropha husk is generated which are consider as biodiesel waste. Jetropha husk is efficient raw material for the preparation of activated carbon. This paper reviews 103 research papers from 1991 to 2017 on study of characteristics of activated carbon prepared from Jetropha husk. Different researcher focus on physico-chemical characterization of activated jetropha husk carbon using XRD, SEM, FT-IR and TGA analysis. Physical properties such as ash content, moisture content, volatile matter content, surface area, CHNS analysis, pH and porosity were studied and analyzed in detail by different author.

Keywords: Activated carbon jetropha husk (AJHC), biodiesel waste, chemical activation, characterization.

Introduction:
Activated carbon is a form of amorphous carbon with small, low volume pores that increase the surface area available for adsorption. Activated carbon is prepared by that organic substance which have high amount of carbon⁶⁷. Agricultural waste is one of the best choice because it contain high amount of carbon as well as its cost is low⁷⁰. Many researcher prepared activated carbon using various agricultural waste such as rice husk^{18, 19, 20, 21}, soyabean hull²², maize cob^{23,24,25,26}, almond and apricot shell²⁷, cajanias Cajan^{28,29,30}, sawdust^{31,32}, sugar-cane baggase^{33,34}, jetropha husk^{5,57}.

Jetropha Husk is poor in nutrients so that it cannot be used as agricultural fertilizers but it is rich in cellulose, hemicelluloses and lignin which is difficult to digest and degrade therefore converting this waste into valuable activated carbon is finest option⁷.

Jatropha husk is the waste product of jatropha curcas plant which is a soft weeded deciduous shrub is also known as ratanjyot²⁵, jamalgota³⁵, chandrajyot³⁵, physis nut^{36,82} etc. It is a wildy growing hardy plant, in arid and semi-arid regions of the country on degraded soils having low fertility and moisture³⁵ and can live for about 50 years⁷¹. It is a tropical plant that can be grown in low to high rainfall areas either in the farms as a commercial crop or on the boundaries as a hedge to protect fields from grazing animals and to prevent and control erosion^{26,72}. The crops of Jatropha curcus belongs to the family Euphorbiaceae, which is comprised of approximately 8000 species belonging to 321 genera⁴. Now a days these crop is planted as commercial crop because it is economically important in the production of oil which is an important replacement of petroleum based diesel fuel⁷³.

Preparation of activated carbon is completed in two steps that is carbonization of raw jetropha husk in an inert atmosphere and than activation of the carbonized material either by physical activation or chemical activation

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| 2 | Dr.Arati Dubey | Different types of peels, seeds and natural waste material used for the treatment of toxic ions in effluent | |
| ISSN | 2349-5162 [Journal of Emerging Technologies and Innovative Research (JETIR)] | | |

© 2019 JETIR June 2019, Volume 8, Issue 6 www.jetir.org (ISSN-2349-5162)

Different types of peels, seeds and natural waste material used for the treatment of toxic ions in effluent.

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Abstract- Growth of several industrialization has responsible for dumping of toxic metal ions into the environment. Copper, cadmium, lead, zinc, mercury, and chromium all toxic metals present in effluent. Various harmful metal ions entered into the water bodies through industrial activities. Different types of methods used for the treatment of toxic ions. Some methods are physiochemical or some natural methods. Physiochemical methods are coagulation, reverses osmosis, chemical precipitation etc. are used for the treatment of toxic ions. Different types of agricultural peels, fruits peels, industrial wastes etc. used for the removal of harmful ions. Adsorption is the best process for the treatment of toxic ions/metals. Two types of adsorbents are used in adsorption method like commercial adsorbents or low cost natural adsorbents. Low cost adsorbents are easily available and inexpensive for the removal of metal ions. This review paper will help for our research work to remove of some toxic ions from ultramarine blue industrial effluents through natural adsorbents.

Keywords: Industrialization, Treatment, Toxic metals, Adsorption, Effluent, Environment, Coagulation.

1. INTRODUCTION

Toxic metals have been excessively released into the environment due to the rapid industrialization and have created a major problem all around. Effluent produced industrial treatment plant contains significant toxic metal ions contaminants. Ultramarine blue industrial effluent is also responsible for the water and soil pollution because these industries produced every year large amount of toxic ions and these ions is harmful for our environment. Rapid industrialization has responsible for dumping of toxic metal ions into the environment¹. Various harmful metal ions entered into the water bodies by industrial. Adsorption, coagulation, reverses osmosis, chemical precipitation, nanofiltration, electrochemical treatment, ultra filtration, etc are physicochemical methods includes. One of this method adsorption is the most inexpensive and effective because of their relative low cost. For the removal of toxic metal ions from industrial effluent adsorption method is mostly used by many researchers. Adsorption is one of the safest, easiest and most cost-effective methods for the removal of these metals from industrial effluent. Throughout the food chain toxic metal ions are accumulating in living tissues and it is poisonous and harmful for all living beings and environment².

Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

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| 3 | Dr.Arati Dubey | One-pot synthesis of coumarin derivatives via microwave assisted Pechmann reaction and biological activity of substituted coumarin derivatives | |
| ISSN | 0975-0991 [Juni Khyat (UGC Care Group I Listed Journal)] | | |

Indian Journal of Chemical Technology
 Vol. 27, March 2020, pp. 166-173

One-pot synthesis of coumarin derivatives via microwave assisted Pechmann reaction and biological activity of substituted coumarin derivatives

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Received 15 March 2018; accepted 16 April 2019

Pechmann reaction is mainly used for the synthesis of substituted coumarins as it can be executed with straight forward primary resources and gives coumarin derivatives with excellent yields. In the present work coumarin derivatives have been synthesized by condensation of β -ketoesters and substituted phenols under microwave irradiation in solvent free condition in which oxalic acid is used as catalyst. Oxalic acid is found to be a potential environment friendly catalyst for synthesis of coumarins. The new method of synthesis described here offers a number of advantages of being convenient, safe, gentle, shorter reaction time, high yield, and cleanness as compared to the conventional methods. The synthesized compounds have been systematically characterized by IR and MS analyses. All products are examined for antimicrobial activity against the Gram positive (*Staphylococcus aureus* and *Bacillus subtilis*) and Gram negative (*Escherichia coli* and *Salmonella typhi*) bacteria and antifungal activity against two fungal species (*Aspergillus sp.* and *Fusarium graminearum*). All the compounds inhibited the growth of bacteria as well as fungi.

Keywords: Antimicrobial, Antifungal, Coumarins, One-pot Microwave irradiation, Oxalic acid, Pechmann condensation.

Coumarins are found under class benzopyrones of heterocyclic compounds and most of natural products contain this heterocyclic nucleus. Coumarin is a compound with comprehensive range of biological, pharmacological and various physiological activities.

water soluble catalyst is separated from insoluble products. In our work we used oxalic acid (as catalyst) for the synthesis of coumarins through Pechmann reaction. Biological evaluation of substituted coumarin derivatives was also done by

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| Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number | 10.56042/ijct.v27i2.21023 |
| Link to article/paper/abstract of the article | http://op.niscair.res.in/index.php/IJCT/article/view/21023 |

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| 4 | Dr. Sheetal Powar Palande | Study of Antifungal Activity of 2-Methoxy-6-[(1-Naphthalen-1-yl-Ethylimino)-Methyl]-Phenol and Its Transition Metal Complexes on <i>Aspergillus Niger</i> and <i>Candida Albicans</i> . | |
| ISSN | 2277-5730 [Organic Preparations and Procedures International The New Journal for Organic Synthesis] | | |

VOLUME - VIII, ISSUE - I, JANUARY - MARCH - 2019
 AJANTA - ISSN 2277 - 5730 -IMPACT FACTOR - 5.5 (www.sjifactor.com)

14. Study of Antifungal Activity of 2-Methoxy-6-[(1-Naphthalen-1-Yl-Ethylimino)-Methyl]-Phenol and its Transition Metal Complexes on *Aspergillus Niger* and *Candida Albicans*

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Abstract

Coordination complexes of transition metals with Schiff base ligand were synthesized. The spectral analysis, conductivity measurements and XRD analysis were used for elucidating the structure of ligand and metal complexes. The compounds were subjected for biological activity screening. Antimicrobial activity of the compounds has been studied for two fungi *Aspergillus niger* and *Candida albicans*

Keywords: Schiff bases, Metal Complexes, Conductivity measurements, XRD, Antifungal activity

Introduction

The importance of metal complexes as drugs, their role in the biological systems and in the biological action of certain drugs has been realized. They are based upon the drug certain physical properties, e.g., low dissociation constants resulting in tightly metal ions, special oxidation-reduction potentials, solubility and electron distribution. The majority of the important metal complexes are chelates¹. Studies on the relationship of metal complexes and biological response have been reported^{2,3}. The Schiff bases and their metal complexes are of biological importance. The Schiff bases possess various activities such as antibacterial activity, antifungal activity, anticancer activity, antitumor activity and antitubercular activity⁴. Metal complexes of the Schiff bases also show these activities. These complexes are often more active than the ligands due to complexation with less side effects. In the present work the Schiff bases have been

PART – XVII / Peer Reviewed Refereed and UGC Listed Journal No. : 40776

75

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| 5 | Dr. Arti Dubey | Overview of Adsorption Isotherm studies of heavy metals from wastewater using coal fly ash | |
| ISSN | 2278-4632 [“Overview of Adsorption Isotherm studies of heavy metals from wastewater using coal fly ash”] | | |

Juni Khyat
(UGC Care Group I Listed Journal)

ISSN: 2278-4632
Vol-10 Issue-6 No. 13 June 2020

Overview of Adsorption Isotherm studies of heavy metals from wastewater using coal fly ash

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Abstract: Heavy metals pollution in wastewater is a great environmental challenge. Several techniques and materials have been recently proposed in order to solution this problem, such as the adsorption process. Adsorption technology is currently being used extensively for the removal of heavy metals from aqueous solutions because it is a cleaner, more efficient and cheaper technology. Three kinetic mechanisms are used for adsorption on heterogeneous substrates as is the fly ash: pseudo-first order, pseudo-second order and intra-particle diffusion. The thermodynamic parameters such as the free energy ΔG° , enthalpy ΔH° and entropies ΔS° showed that the adsorption process is suitable, spontaneous and endothermic.

Key words: Heavy metals, fly ash, adsorption, kinetics, thermodynamics

INTRODUCTION

Fly ash (FA) is one of the major industrial wastes generated from power stations that cannot be cheaply disposed off. Recent research efforts have consequently focused on developing ways to make use of FA in applications that are friendly to the environmentally benign. Apart from its limited applications in cement and concrete industries, FA alternative use/reuse in environmental study takes advantage of its reasonable adsorptive property for water treatment. Limited studies have highlighted the need to improve FA adsorption capacity¹.

Conventional methods including, reverse osmosis², electro dialysis³, ion exchange⁴, chemical precipitation⁵, ultra filtration⁶ and adsorption are used for removal of heavy metal ions from wastewater. The adsorption method, among all above mentioned processes⁷. It is the most preferable one because it is economically advantageous, highly efficient and applicable⁸. Adsorption process gives an attractive alternative for the treatment of contaminated water. It remains an innovative and effective alternative treatment for heavy metals removal from wastewater⁹. Adsorption is efficient and reliable method for removal of heavy metals. It also

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https://junikhyatjournal.com/no_13_jun_20/9.pdf

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| Sr.No | Name of the Faculty | Title of the Paper | Year – 2019-20 |
| 6 | Dr. Sheetal Powar | Anti-tubercular Activity investigation of Schiff base 2-methoxy-6-{{[2-(2-methoxy-phenoxy)-ethylimino]-methyl}-phenol and its transition metal complexes. Powar et al., | |
| ISSN | 0976-9595 (Organic Preparations and Procedures International The New Journal for Organic Synthesis) | | |

Powar et al., J Adv Sci Res, 2020; 11 Suppl 2: 172-175 172



Journal of Advanced Scientific Research

Available online through <http://www.sciensage.info>

ISSN
0976-9595

Short Communication

ANTI-TUBERCULAR ACITVITY INVESTIGATION OF SCHIFF BASE 2-METHOXY-6-{{[2-(2-METHOXY-PHENOXY)-ETHYLIMINO]-METHYL}-PHENOL AND ITS TRANSITION METAL COMPLEXES

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ABSTRACT

Schiff base and its Coordination complexes of transition metals are synthesized. The characterization of these compounds is carried out by physical parameters and spectral analysis. Biological activity of the compounds has been studied for Antitubercular activity. The synthesized compounds are evaluated for their *in vitro* antibacterial activity against *Mycobacterium tuberculosis* H37Rv using the Alamar Blue susceptibility test and the activity is expressed as the minimum inhibitory concentration (MIC) in mg/mL.

Keywords: Schiff bases, Metal Complexes, Antitubercular activity, MIC.

1. INTRODUCTION

Schiff bases have been reported in the literature which possesses antimicrobial, anti-inflammatory, antitumor and anti-HIV activities [1, 2]. They have various antibacterial [3], antifungal [4], antimicrobial [5], anticonvulsant [6], anti HIV [7], anti-inflammatory and antitumor activities antitubercular activity [8]. Metal complexes of the Schiff bases also show these activities. The importance of metal complexes as drugs, their role in the biological systems and in the biological action of certain drugs has been realized. Studies on the relationship of metal complexes and biological response have been reported [9, 10]. Present work deals with evaluation of Antitubercular activity of the synthesized Schiff base ligand and its metal complexes.

2. MATERIAL AND METHODS

The chemicals used are 2-(2-Methoxy-phenoxy)-ethylamine (Merck, AR grade) and 2-Hydroxy-3-methoxy benzaldehyde (o-Vanillin) (Merck, AR grade), Ethyl alcohol (Merck, AR grade), Cobalt (II) chloride dihydrate (Sigma Aldrich), Nickel(II) chloride hexahydrate (Sigma Aldrich), Copper(II) chloride dihydrate (Sigma Aldrich), Zinc (II) chloride (Sigma Aldrich), Manganese (II) chloride tetrahydrate (Sigma Aldrich).

2.1.Synthesis of Schiff base ligand (MMPEMP) and the metal complexes

The Schiff Base ligand i.e. 2-Methoxy-6-{{[2-(2-methoxy-phenoxy)-ethylimino]-methyl}-phenol (Fig 1) was synthesized by condensing amine 2-(2-Methoxy-phenoxy)-ethylamine with o- Vanillin in equimolar proportions. To an ethanolic solution (10 ml) of the amine (0.01 mole), o- Vanillin (0.01 mole) in ethanol (10 mL) was added with stirring. The mixture was then refluxed for 30 mins. The reaction mixture was then cooled which immediately gave a precipitated product. The product then obtained was filtered, washed with ethanol and then dried. The crude product was then crystallized from aqueous ethanol to give a yield of 86%. The product was obtained as bright yellow colored solid with melting point 96°C.

2.2.Synthesis of metal complexes

The metal complexes were prepared by reaction of metal chlorides and the Schiff base ligand where Metal M= Mn(II),Co(II), Ni(II), Cu(II), Zn(II). The ligand and metal salt in the molar ratio of 2:1 was dissolved in ethanol and the reaction mixture was heated on water bath for about one hour. It was then cooled when colored solid separated out which was washed with ethanol and dried. All the complexes were colored and found to be thermally stable having melting points above 200°C [11, 12]. The reaction of formation of Schiff base is given in Fig 1.

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| Sr.No | Name of the Faculty | Title of the Paper | Year – 2019-20 |
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| 7 | Dr. Jayashri Naphadep-Phirke | Synthesis of Some Novel Chalcone by Green and Study of Antimicrobial Activity | |
| ISSN | 2456-236X (INTERNATIONAL JOURNAL OF INTERDISCIPLINARY INNOVATIVE RESEARCH & DEVELOPMENT) | | |

International Journal of Interdisciplinary Innovative Research & Development (IJIIRD)
 ISSN: 2456-236X
 Vol. 05 Special Issue 01 | 2020

Synthesis of Some Novel Chalcone by Green Methodology and Study of Antimicrobial Activity

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ABSTRACT

A series of chalcones (1-6) were prepared by Claisen-Schmidt condensation of p-hydroxy acetophenone with benzaldehydes in presence of aqueous solution of sodium hydroxide using microwave irradiations. The reaction is clean with shorter reaction time, mild reaction condition, eco-friendly, excellent yield. Variety of functional groups such as nitro, chloro, and ether survived under the reaction conditions. The structures of the novel synthesised chalcones have been established on the basis of their IR spectral data. These compounds were screened for their antibacterial activities against Staphylococcus aureus and Salmonella typhi
Keywords: Chalcones, Microwave Irradiation, Antimicrobial Activity

1. INTRODUCTION

Chalcones – one of the major classes of natural products with widespread distribution in fruits, vegetables, spices, tea and soy-based foodstuff, have been recently subjects of great interest for their interesting pharmacological activities¹. Chalcones are belonged to the flavonoid's family. A vast number of naturally occurring chalcones are polyhydroxylated in the aryl rings. The radical quenching properties of the phenolic groups present in many chalcones have raised interest in using the compounds or chalcone rich plant extracts as drugs or food preservatives. Chalcones are the aromatic ketones which belong to 1, 3-diaryl-2-propen-1-ones, which forms the central core for the synthesis of variety of important biologically active compounds. Chalcones are also key precursors in the synthesis of many biologically important heterocycles such as benzothiazepine², pyrazolines³, 1,4-diketone⁴ and flavones⁵. Some heterocyclic systems based on chalcone precursors are benzothiazepines, benzodiazepines, benzoxazepines, pyrimidines, pyrazoles, and oxazoles⁶. The compounds with the backbone of chalcone have been reported to exhibit a wide variety of pharmacological activity including antimalarial⁷, antibacterial⁸, antituberculosis⁹, anticancer¹⁰, anti-inflammatory¹¹, antifungal¹², antioxidant¹³, antileishmanial¹⁴. During the last few years the potential of s-triazine derivatives in agrochemical and medicinal properties have been subjected to investigation. It is found that substituted s-triazine derivatives are an important class of compounds having antibacterial, anticancer, antitumor, antiviral, antifungal & antimalarial activities^{15,16}. Many acetamido derivatives have been synthesized and have showed antibacterial activity and other activities too¹⁷. Chalcones are a class of compounds that provides an option of developing inexpensive, easily synthetic and therapeutic antibacterial agent.

2. MATERIALS AND METHODS

The all reagents used in the present study were of analytical grade. The melting points of the synthesized compounds were determined by open capillary tube method and are uncorrected. The ¹H-NMR spectra were recorded at 400 MHz at BRUKER NMR spectrophotometer in DMSO and chemical shifts are expressed in parts per million (δ) relative to tetramethylsilane.

3. GENERAL PROCEDURE FOR THE SYNTHESIS OF CHALCONES

An equimolar mixture of P-hydroxyacetophenone and substituted benaldehydes dissolved in minimum amount of ethanol and NaOH were placed in a conical flask. The conical flask was covered with a funnel and then the flask was taken in a domestic microwave oven. The reaction mixture was irradiated under 180 watt microwave radiation for 30 sec-2 min. The progress of the reaction was monitored by TLC (n-hexane: ethyl acetate, 7:1) after every 30 sec. The reaction mixture was cooled and the obtained solid was recrystallized by ethanol.

Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

[IJIIRD International Journal for Engineering & Science](http://ijiird.com/wp-content/uploads/ASCI004.pdf)
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| 1 | Basil D'Mello | Isolation of heterotrophic microalgae from hot springs for lipid production | |
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CrossMark

Journal of Experimental Biology and Agricultural Sciences, December - 2018, Volume - 6(6) page 1010 - 1014



Journal of Experimental Biology and Agricultural Sciences

<http://www.jebas.org>

ISSN No. 2320 – 8694

ISOLATION OF HETEROTROPHIC MICROALGAE FROM HOT SPRINGS FOR LIPID PRODUCTION

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Received – November 04, 2018; Revision – December 05, 2018; Accepted – December 10, 2018
 Available Online – December 15, 2018

DOI: [http://dx.doi.org/10.18006/2018.6\(6\).1010.1014](http://dx.doi.org/10.18006/2018.6(6).1010.1014)

KEYWORDS

Anxanochlorella pyrenoidosa

Heterotrophic

Lipid

Biodiesel

Hot springs

ABSTRACT

Biodiesel is an alternative to diesel fuel, which is produced from bio oils via transesterification. It is nontoxic, biodegradable and has the potential to replace the conventional diesel fuel. Microalgae can produce fatty acids called unsaturated lipids, which can be extracted and processed to form biofuel. The present study was aimed to isolate of heterotrophic microalgae from hot springs of Palghar, Maharashtra for lipid production. *Anxanochlorella pyrenoidosa* was isolated and tested for its lipid production ability. Results of study revealed that *A. pyrenoidosa* has the ability to produce about 11.56% lipid of its dry weight. Fatty acid profile of the extracted lipid showed the presence of C14:0, C16:0, C18:0, C16:1, C18:1, C18:2 and C18:3 fatty acids which make it a good biodiesel feedstock.

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Peer review under responsibility of Journal of Experimental Biology and Agricultural Sciences.

Production and Hosting by Horizon Publisher India [HPI]
 (<http://www.horizonpublisherindia.in/>)
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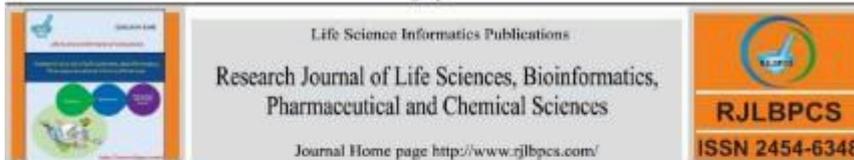
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| 2 | Basil D'Mello | Effect of temperature and ph variation on biomass and lipid production of <i>Auxenochlorella pyrenoidosa</i> | |
| ISSN | 2454-6348 (Research Journal of Life Sciences, Bio informatics Pharmaceutical and Chemical Sciences) | | |

D'Mello & Chemburkar RJLBPCS 2018 www.rjlbpcs.com Life Science Informatics Publications



Original Research Article DOI: 10.26479/2018.0406.29

EFFECT OF TEMPERATURE AND pH VARIATION ON BIOMASS AND LIPID PRODUCTION OF *AUXENOCHLORELLA PYRENOIDOSA*

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ABSTRACT: Algae are efficient producers of natural oils, sequester carbon dioxide thereby reducing greenhouse gases, and do not compromise a food stock or deplete soil nutrients. When put into nutrient starvation conditions, algae may switch carbon allocation from reproduction to oil production. Finding high lipid producing strains and selecting the appropriate culturing and processing conditions are critical to realize the potential and largescale adoption of advanced algal biofuels. The present study was aimed at studying the effect of temperature and pH variation on biomass and lipid production by a newly isolated microalga *Auxenochlorella pyrenoidosa* under autotrophic conditions. It was found that the optimum temperature for biomass and lipid production was 30°C at which the microalga produced 1.196 g/L of biomass and 4.6% lipid per gram of dry biomass in presence of nitrogen source and produced 0.691g/L of biomass and 9.6% lipid per gram of dry biomass in absence of nitrogen. The optimum pH for biomass production and lipid production was found to be 7. This thermotolerant strain can be further optimised for large scale lipid production.

KEYWORDS: *Auxenochlorella pyrenoidosa*, nitrogen starvation, lipid, biodiesel.

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Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

<http://dx.doi.org/10.26479/2018.0406.29>

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| 3 | Deepa Verma | Plants of the genus <i>Spinacia</i> : From bioactive molecules to food and phytopharmacological applications | |
| ISSN | 0924-2244 (Trends in Food Science & Technology) | | |



Trends in Food Science & Technology

Volume 88, June 2019, Pages 260-273

Review

Plants of the genus *Spinacia*: From bioactive molecules to food and phytopharmacological applications

Bahare Salehi^a, Tuqba Bayunegmez Turner^b, Adem Ozleyen^c, Gregorio Peron^d, Stefano Dall'Acqua^d, Jovana Rajkovic^e, Rabia Naz^f, Asia Nosheen^f, Fhatuwani Nixwell Mudau^g, Fabiana Labanca^h, Luigi Milella^h, Nunziata de Tammasiⁱ, Henrique Douglas Coutinho^j, Javad Sharifi-Rad^k, Deepa R. Verma^l, Miquel Martorell^m, Natália Martinsⁿ

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Abstract

Background

Spinacia plants, including the most recognized species of the genus *Spinacia oleracea* L. (spinach), have high nutritional value and high content in phytochemicals, such as flavonoids, polyphenols, carotenoids, and ascorbic acid. However, the amount of these phytochemicals depends on several factors, such as genotype, climatic conditions, and agronomic practices, harvesting, storage temperature and time.

Scope and approach

This review focus on the therapeutic role of *Spinacia* genus as well as its contribution as food in industry. A special emphasis is also given to its biological activities including antioxidant and antimicrobial effects. Finally, the clinical efficacy of *Spinacia* plants, the respective roles, and mechanisms of bioactive compounds on human health are covered.

Key findings and conclusions

<https://www.sciencedirect.com/science/art/abs/pii/S0924224418306769?via%3Dihub>

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Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

<https://doi.org/10.1016/j.tifs.2019.03.028>

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| 4 | Deepa Verma | Ethnobotany of the genus <i>Taraxacum</i> —Phytochemicals and antimicrobial activity | |
| ISSN | 1099-1573 (Phytotherapy Research) | | |
| <p>10/5/23, 10:55 PM Phytotherapy Research Medicinal Chemistry Journal Wiley Online Library</p> <p>< Back</p> <p>Phytotherapy Research / Volume 32, Issue 11 / p. 2131-2145</p> <p>REVIEW</p> <p>Ethnobotany of the genus <i>Taraxacum</i>—Phytochemicals and antimicrobial activity</p> <p>Mehdi Sharifi-Rad, Thomas H. Roberts, Karl R. Matthews, Camila F. Bezerra, Maria Flaviana B. Moraes-Braga, Henrique D.M. Coutinho, Farukh Sharopov ... See all authors</p> <p>First published: 24 July 2018 https://doi.org/10.1002/ptr.6157 Citations: 78</p> <hr/> <p>Abstract</p> <p>Plants belonging to the genus <i>Taraxacum</i> have been used in traditional healthcare to treat infectious diseases including food-borne infections. This review aims to summarize the available information on <i>Taraxacum</i> spp., focusing on plant cultivation, ethnomedicinal uses, bioactive phytochemicals, and antimicrobial properties. Phytochemicals present in <i>Taraxacum</i> spp. include sesquiterpene lactones, such as taraxacin, mongolicumin B, and taraxinic acid derivatives; triterpenoids, such as taraxasterol, taraxerol, and officinatrione; and phenolic derivatives, such as hydroxycinnamic acids (chlorogenic, chicoric, and caffeoyltartaric acids), coumarins (aesculin and cichoriin), lignans (mongolicumin A), and taraxacosides. Aqueous and organic extracts of different plant parts exhibit promising in vitro antimicrobial activity relevant for controlling fungi and Gram-positive and Gram-negative bacteria. Therefore, this genus represents a potential source of bioactive phytochemicals with broad-spectrum antimicrobial activity. However, so far, preclinical evidence for these activities has not been fully substantiated by clinical studies. Indeed, clinical evidence for the activity of <i>Taraxacum</i> bioactive compounds is still scant, at least for infectious diseases, and there is limited information on oral bioavailability, pharmacological activities, and safety of <i>Taraxacum</i> products in humans, though their traditional uses would suggest that these plants are safe.</p> | | | |
| Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number | | https://doi.org/10.1002/ptr.6157 | |

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| 5 | Deepa Verma | Matricaria genus as a source of antimicrobial agents: From farm to pharmacy and food applications | |
| ISSN | 0944-5013 (Science Direct) | | |

10/5/23, 10:58 PM Matricaria genus as a source of antimicrobial agents: From farm to pharmacy and food applications - ScienceDirect



Microbiological Research
Volume 215, October 2018, Pages 76–88

Matricaria genus as a source of antimicrobial agents: From farm to pharmacy and food applications

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<https://doi.org/10.1016/j.micres.2018.06.010>

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Abstract

Matricaria is a widespread genus of flowering plants of the family Asteraceae that grow in temperate regions of Europe, Asia, America and Africa. Some of the species are also naturalized in Australia. Some species of this genus such as Chamomiles are recognized medicinal plants and cultivated in several countries for commercial purposes: to obtain its blue essence, as herbal tea, and for pharmaceutical or cosmeceutical uses. The phytochemical composition of *Matricaria* spp. includes volatile terpenoids (e.g., α -bisabolol, bisabolol oxide A and B, β -trans-farnesene and chamazulene), sesquiterpene lactones such as matricin, and phenolic compounds (flavonoids, coumarins and phenolic acids). Their essential oil is obtained from the fresh or dried inflorescences by steam distillation, and additionally cohobation of the remaining water. The volatile composition of the essential oil, especially the content of the valuable components α -bisabolol and chamazulene, depends on the plant part, origin and quality of the source, genetic, and environmental factors. Moreover, other parameters, such as season of harvest and methods of extraction, can affect the extraction yield of the essential oils/extracts, their composition and, therefore, their bioactivity. Due to the importance of this genus and particularly *M. recutita* (*M. chamomilla*), this review focus on its cultivation, factor affecting essential oils' composition and their role in traditional medicine, as antibacterial agents and finally as food preservatives.

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| Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number | https://doi.org/10.1016/j.micres.2018.06.010 |
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| ISSN | 2582-2438 (Rheeda Online edition) 0971-2313 (Print edition) | | |



<https://dx.doi.org/10.22244/rheedeaa.2018.28.1.05>

A new variety of *Hibiscus hirtus* (Malvaceae), from Maharashtra, India

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Abstract

Hibiscus hirtus L. var. *inarticulatus* (Malvaceae), a new variety is described and illustrated from India. It differs from the typical form and *H. hirtus* var. *talbotii* in having 3-lobed lower leaves, lanceolate upper leaves and in the absence of articulation in the pedicels.

Keywords: *Hibiscus hirtus* var. *inarticulatus*, Maharashtra, new variety, Sanjay Gandhi National Park

Introduction

While studying the floristic diversity of Sanjay Gandhi National Park, Mumbai in Maharashtra, the authors collected an interesting specimen of *Hibiscus* sect. *Bombicella*, resembling *H. hirtus* L. var. *talbotii* Rakshit. Critical studies in comparison with relevant types and protologues revealed it to be a new variety of *H. hirtus* L., which is described here.

***Hibiscus hirtus* L. var. *inarticulatus* S. Dutta, H. Rodrigues & Kiran Chakral, var. nov. Fig. 1.**

Similar to *H. hirtus* var. *talbotii* but differs in having ovate, 3-lobed lower leaves (opposed to ovate-lanceolate, unlobed in var. *talbotii*), lanceolate upper leaves (opposed to ovate in var. *talbotii*) and in the absence of an articulation in the pedicel.

Type: INDIA, Maharashtra, Mumbai, Sanjay Gandhi National Park, January 2015, SD/HR/KC 1501 (Holotype, CAL; Isotypes, CALI, R.D. & S.H. National College Herbarium, Mumbai).

Subshrubs to 1.5 m tall. Stems terete, pubescent with stellate hairs intermixed with simple hairs; Lower leaves ovate, 3-lobed, upper ones lanceolate, 5.7–12.3 × 1.2–4.7 cm; venation multicostate, 3–5-nerved from base with a linear nectary at the base of the middle lower costate vein to 2/3 way

calyx, linear-lanceolate, calyx 5-fid; petals 5, white, rounded at apex; staminal column 1.1 cm long, shorter than petals, toothed, bent towards one-side, antheriferous throughout; anthers reniform, dense towards apex; pollen globose, panporate; ovary subglobose; stigmas five, capitate. Capsules sub-globose, young ones longitudinally 5-stripped, slightly puberulous. Seeds 1 or 2 per cell, reniform, densely clothed with long, silky hairs.

Flowering & fruiting: December – April.

Habitat: Open areas in deciduous forests.

Etymology: The varietal epithet refers to the inarticulate nature of the pedicel of this taxon.

Key to the varieties of *Hibiscus hirtus*

1. Pedicel not articulated *Hibiscus hirtus* var. *inarticulatus*
1. Pedicel articulated 2
2. Corolla brick red; pedicel articulated at or below the middle *Hibiscus hirtus* var. *hirtus*
2. Corolla red, white or orange; pedicel articulated above the middle *Hibiscus hirtus* var. *talbotii*

Note: *Hibiscus hirtus* was originally described by

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<https://dx.doi.org/10.22244/rheedeaa.2018.28.1.05>

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| 7 | Hensal Rodrigues Kiran Chakral | Comments on the Identity of Mangrove and Mangrove associates from Mumbai, India | |
| ISSN | 0250-9768 (Scientific Publishers) | | |



COMMENTS ON THE IDENTITY OF MANGROVE AND MANGROVE ASSOCIATES FROM MUMBAI, INDIA

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Abstract

The present paper attempts to establish the identity of dwarf *Avicennia* and *Acanthus* (Mangrove species), *Cistanche tubulosa* from saline habitat and *Clerodendrum inerme* (Mangrove associate), and describes two new taxa to the science, namely, *Avicennia marina* (Forssk.) Vierh. var. *acutissima* Stapf & Moldenke forma *pumila*, forma nov. (Avicenniaceae) and *Cistanche tubulosa* (Schenk) Hook.f. subsp. *palustris*, subsp. nov. (Orobanchaceae).

Key words: Mangrove habitat; New subspecies and forma; identity

Introduction

During the survey to document the mangroves and mangrove associates from Mumbai, India, 13 species of mangroves and 37 mangrove associates were recorded. The species of mangroves in order of their dominance are *Avicennia marina* (Forssk.) Vierh. var. *acutissima* Stapf & Moldenke, a dwarf *Avicennia*, *Ceriops tagal* (Pers.) C.E. Robin, *Sonneratia apetala* Buch.-Ham., *Aegiceras corniculatum* (L.) Blanco, *Bruguiera cylindrica* (L.) Blume and *Lumnitzera racemosa* Willd. The last-mentioned is a very rare mangrove in Mumbai with its confinement to Gorai, Borivali (West), Charkop and Kandivali (West). The ambiguity in the identity of the dwarf *Avicennia* and the holoparasite *Cistanche*, and names of *Acanthus ilicifolius* and *Clerodendrum inerme* collected from mangrove habitat formed the subject for the present investigation.

Methodology

Regular visits to the suburbs of various places of Mumbai such as Airoli, Bandra, Bhandup, Bhayender,

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Charkop, Gorai, Dahisar, Elephanta islands, Esselworld, Manori, Marve, Naigaon, Nerul, Vasai, Vikhroli, and Virar to collect and study the mangroves and their associates. These specimens were examined for their morphological characters using a stereo-dissection microscope. Herbarium vouchers were made. In order to identify the species properly, the protologues, type specimens, relevant literature and the specimens in CAL and BLAT were consulted.

Results

Through the study of mangroves within Mumbai, *Avicennia marina* (Forssk.) Vierh. var. *acutissima* Stapf & Moldenke forma *pumila* S. Dutta, K. Chakral & H. Rodrigues (forma nov.) of Avicenniaceae and *Cistanche tubulosa* (Schenk) Hook.f. subsp. *palustris* S. Dutta, H. Rodrigues & K. Chakral (subsp. nov.) of Orobanchaceae were found as new taxa and hence described. The taxa being usually identified and named as *Acanthus ilicifolius* L. (Acanthaceae) and *Clerodendrum inerme* (L.) Gaertn. (Verbenaceae) are corrected to *Dilivaria ilicifolia* (L.) Pers. and *Volkameria inermis* L., respectively.

1. Identity of dwarf *Avicennia*

A population of *Avicennia marina* (Forssk.) Vierh. is found towards the Arabian sea and is commonly known as dwarf variety of *Avicennia*. But, it is not a botanical name. Hence a detailed study of this population was under taken to decide its identity. The study revealed that this dwarf variety is an ecad. It closely resembles *Avicennia marina* var. *acutissima* Stapf & Moldenke ex Moldenke (1940) which was described based on the type

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Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

<https://www.scientificpubonline.com/journaldetails/journal-economic-taxonomic-botany/10/0>

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| ISSN | 2348-1269 (International Journal of Research and Analytical Reviews) | | |

[VOLUME 5 | ISSUE 3 | JULY - SEPT 2018] e ISSN 2348 - 1269, Print ISSN 2349-5138
<http://ijrar.com/> Cosmos Impact Factor 4.236

Effect of some Oxa-aza Heterocycles on Seed Germination of Bengal gram (*Cicer arietinum*) and Lady's finger (*Hibiscus esculentus*).

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Received: May 27, 2018

Accepted: July 17, 2018

ABSTRACT

Present investigation deals with bioassaying of synthesized Triazolobenzisoxazole compounds namely 1,2,4-triazolo-(3,4-b)1,2-benzisoxazole and 3-hydroxy-1,2,4-triazolo-(3,4-b)1,2-benzisoxazole. The compounds were used to find out their plant regulatory activity in the confined environment of laboratory. Experiment was undertaken to investigate their effect on germination of seeds of two plants viz. Bengal gram (*Cicer arietinum*) Lady's finger (*Hibiscus esculentus*).

Keywords: Oxa-aza Heterocycles, 1,2,4-triazolo-(3,4-b)1,2-benzisoxazole, 3-hydroxy-1,2,4-triazolo-(3,4-b)1,2-benzisoxazole, plant regulatory activity, seed germination.

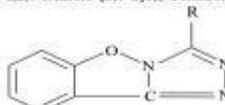
Introduction

In the biological process physiology of the plant, growth & development are related to the chemical reaction taking place in the plant bodies. From the earlier reports it is found that some of the fused triazole systems are very active as plant protective agents and as plant growth stimulants. Allen¹ reported wide applications of 3-amino 1,2,4-triazole. Amizol and some of its derivatives have been found to be useful as defoliant. The defoliating effect of this compound appears to be due to the destruction of chlorophyll². Much work was carried out on the chemical nature of auxins^{3,4,5}. Some derivatives of the following type Indole-3-acetaldehyde, Indole-3-pyruvic acid, Indole-3-acetonitrile, Indole-3-ethanol, indicated their close relationship to the parent structure Indoleacetic acid. The effect of Benzothiazolyl hydrazones and naphthathiazolyl hydrazones on seed germination was studied for the seeds of Wheat, Kakadi and Devdager⁶.

The synthesized compounds were evaluated for various types of bioassay screening. Studies were undertaken to observe the effect of the synthesized compounds on seed germination. For this purpose the seeds of Bengal gram and Lady's finger were selected. The choice of legume plant selected was based on the fact that gram is cultivated in 1 million acres in the State of Maharashtra and stands in 2nd in importance to the Tur (*Phaseolus vulgare*), these being very important sources of vegetable proteins. Lady's finger is selected as a typical vegetable commonly used in this part.

Experimental Procedure

Triazolobenzisoxazoles namely 1,2,4-Triazolo-(3,4-b)1,2-benzisoxazole⁷ analogue of 1,2,4-triazolo(3,4-b)1,2-benzothiazole⁸ and 3-Hydroxy-1,2,4-triazolo-(3,4-b)1,2-benzisoxazole were prepared⁹ (Fig 1).



R= H: 1,2,4-Triazolo-(3,4-b)1,2-benzisoxazole

R= OH: 3-Hydroxy-1,2,4-triazolo-(3,4-b)1,2-benzisoxazole

Fig 1. Structure of Triazolobenzisoxazoles

Ten seeds of each plant were soaked in 50 ml of 5 ppm solutions of the compounds for 4 hrs. The seeds were then spread on wet filter paper in petridishes. The Petri dishes and filter paper were sterilized before use. The filterpapers were moistened with solutions of the compounds. The experiment was conducted for seven days and percentage germination, shoot length, fresh weight and dry weight were measured. Carbohydrate content was estimated by anthrone method (Yemm and Willis, 1954) at the end of fourth day. A set of

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| ISSN | 2394-7780 (International Journal of Advance and Innovative Research) | | |

International Journal of Advance and Innovative Research
 Volume 5, Issue 3 (IV): July - September, 2018 ISSN 2394 - 7780

EFFECT OF SOME OXA-AZA HETEROCYCLES ON SEED GERMINATION OF TRITICUM AESTIVUM L. (WHEAT) AND CUCURBITA MAXIMA L. (CUCUMBER)

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ABSTRACT
 Present investigation deals with bioassaying of synthesized Triazolobenzoxazole compounds namely 1,2,4-triazolo-(3,4-b)1,2-benzoxazole and 3-hydroxy-1,2,4-triazolo-(3,4-b)1,2-benzoxazole. The compounds were used to find out their plant regulatory activity in the confined environment of laboratory. Experiment was undertaken to investigate their effect on germination of seeds of two plants viz. *Triticum aestivum* L. (Wheat) and *Cucurbita maxima* L. (Cucumber).

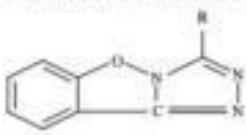
Keywords: 3-hydroxy-1,2,4-triazolo-(3,4-b)1,2-benzoxazole, plant regulatory activity, seed germination, 1,2,4-triazolo-(3,4-b)1,2-benzoxazole.

INTRODUCTION
 In the biological process physiology of the plant, growth & development are related to the chemical reaction taking place in the plant bodies. From the earlier reports it is found that some of the fused triazole systems are very active as plant protective agents and as plant growth stimulants. Allen¹ reported wide applications of 3-amino 1,2,4-triazole. Amizol and some of its derivatives have been found to be useful as defoliants. The defoliating effect of this compound appears to be due to the destruction of chlorophyll². Much work was carried out on the chemical nature of auxins^{3,4}. Some derivatives of the following type Indole-3-acetaldehyde, Indole-3-pyruvic acid, Indole-3-acetonitrile, Indole-3-ethanol, indicated their close relationship to the parent structure Indoleacetic acid. The effect of Benzothiazolyl hydrazones and naphthothiazolyl hydrazones on seed germination was studied for the seeds of Wheat, Kakadi and Devdager⁵. The compounds synthesized were evaluated for various types of bioassay screening. Hence, studies were undertaken to observe the effect of the synthesized compounds on seed germination. For this purpose the seeds of Wheat and Cucumber were selected.

EXPERIMENTAL

Materials and Physical measurements
 The chemicals and reagents used for the synthesis were obtained from commercial sources. Solvents were distilled from an appropriate drying agent. All other chemicals and solvents were of analytical grade.

Triazolobenzoxazoles namely 1,2,4-Triazolo-(3,4-b)1,2-benzoxazole⁷ analogue of 1,2,4-triazolo(3,4-b)1,2-benzothiazole⁸ and 3-Hydroxy-1,2,4-triazolo-(3,4-b)1,2-benzoxazole were prepared⁹.



R= H: 1,2,4-Triazolo-(3,4-b)1,2-benzoxazole
 R= OH: 3-Hydroxy-1,2,4-triazolo-(3,4-b)1,2-benzoxazole

Fig-1: Structure of Triazolobenzoxazoles

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| ISSN | 2349-5162 (Journal of Emerging Technologies and Innovative Research) | | |

© 2019 JETIR May 2019, Volume 6, Issue 5

www.jetir.org (ISSN-2349-5162)

PRODUCTION OF FUNGAL PIGMENTS AS POTENTIAL NATURAL COLORANTS FOR VARIOUS INDUSTRIAL APPLICATIONS

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Abstract: Natural colorants are preferred over synthetic colorants owing to their tremendous marketing potential and healthy image [kumar et al.]. Fungal pigment production offers higher yields, varied color range and independence over agro-climatic conditions, and thereby minimizing batch to batch variations. Pigment producing ability of filamentous fungi was tested. Five different lab strains of filamentous fungi were used in present study. Pigment production was assessed on five different solid media. Pigment producing ability was expressed in Sabouraud's dextrose agar and Czapek yeast extract agar, by two different fungal strains. One of them expressed pigment production in Czapek'sdox broth. Extraction of pigments was performed using polar and non-polar solvents from both solid and liquid media. One of the fungal strains produced extracellular pigment in solid media which was extracted in methanol, while intracellular pigments were extracted in hexane. Also, extracellular Polar pigments were produced in liquid media. Crude pigment extracts were characterized spectrophotometrically. The present study brought out two promising pigment producing fungal strains and their water soluble colorants. Further work is in progress in terms of toxicity evaluation of crude pigment extract and process optimization for optimal pigment production[Nielsen S. R.et al. 2002]

Index terms- Natural colorants, filamentous fungi, solid and liquid growth medium,pigment, polar and non-polar solvents.

Introduction: Natural colorants offer better alternatives for synthetic ones and have a broad spectrum of applications that include food, paint, cosmetics and textile industries. Natural colorants are healthier alternatives of synthetic colorants, owing to eventual harmful effects of synthetic colorants. The market for natural colorants is rising due to the healthier lifestyles and growing awareness of consumers[Mortensen A. et al. 2006]. Naturally derived colorants have the potential to overtake synthetic food colorants in market because of the demand for clean label ingredients. Among microbial sources of natural colorants filamentous fungi are preferred because of their ability to be grown easily under laboratory conditions unlike micro-algae, the growth of which is time consuming and have lower yields and/or productivity. Fungal pigment production offers advantage of minimal batch to batch variation, higher yields, extraordinary color range and independence over agro-climatic conditions compared to plant based pigments[Dufosse et al.]. *Monascus* is one of the best examples for fungi used in industrial pigment production, however their ability to coproduce a mycotoxincitrinin limits their use. Nevertheless, *Monascus* pigments have been successfully used as food colorants for hundreds of years [Dufosse et al. 2005]. Recent studies have brought out the potential of pigment producing genera other than *Monascus*[Jung H. et al.], the color hues of which resemble some of the commercially available plant based food colorants [Mapari et al. 2006].

Pigment producing ability of fungi is dependent on media and/or culture conditions. Submerged Liquid fermentation is preferred in industries due to easy product recovery and standardized culture conditions. Studying the morphology and pigment producing ability of microorganisms and substrate choice is equally important as they can be manipulated to get desired products, higher yields and convenient procedures. Present study was carried out to test the hypothesis that the pigment production by filamentous fungi can be regulated by changing media and/or culture conditions, and pigments of newer color hues with better functionality can be obtained.

Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

<https://www.jetir.org/papers/JETIR1905102.pdf>

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|---------------|--|--|-----------------------|
| Sr. No | Name of the Faculty | Title of the Paper | Year – 2018-19 |
| 11 | Dr.Arati Dubey | Fly ash as a adsorbent for removal of heavy metal : a review | |
| ISSN | 2348-1269 (INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR.ORG)) | | |

© 2019 IJRAR February 2019, Volume 6, Issue 1 www.ijrar.org (E-ISSN 2348-1269, P-ISSN 2349-5138)

FLY ASH AS A ADSORBENT FOR REMOVAL OF HEAVY METAL: A REVIEW

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Abstract: Adsorption is a fundamental process in the physicochemical treatment of wastewaters. The coal fly ash is a waste material that generate from industrial processes. It is a cheap, eco-friendly and bio degradable material. Long term exposure of human bodies to heavy metals susceptible to receives various infection and diseases from an environmental and economic perspective. Adsorption is acceptable process that can be applied in wastewater treatment, these waste materials pollute our environment or ecosystem and pose the problem of their disposal so "use waste to treat the water" is the concept to avoid the environment pollution. The application of available adsorption models such as the isotherm, kinetics and thermodynamics as well as the influence of parameter on metal adsorption by low cost adsorbent shall be reviewed to understand the adsorption mechanism of low-cost adsorbent. In this review study the chemical composition of different coal fly ash and fly ash for the removal of heavy metal ions are summarized.

Keywords: Fly ash, Heavy metals, Adsorption, Environment, Wastewater.

Introduction

Quality of water and management of waste is most important proposition in human life. Accretion of technologies in industrialization and urbanization lead to increase in percentage accumulation of waste all around the globe and release of heavy metal in the water streams from different activities such as industrial, agricultural and domestic¹.

Water is a basic source of life and thus is essential element to all living things on earth. Technological development and industrial activities cause heavy metal pollution is posing significant threats to the public health and environment because of its toxicity, non-biodegradability, bioaccumulation and persistent tendency through food chain².

Process of adsorption is operate in chemical, biological and physical system for the use of removing substances from any liquid or gaseous solution. Adsorption process involve separation of a substance from one phase accompanied by its concentration at the surface of another involves adsorption. Adsorption efficiency depends on activated carbon, temperature, pH and adsorbate. Heavy metals from industrial wastewater can be removed by adsorbent³. Heavy metals are toxic in nature therefore it is essential to remove from wastewater. Adsorption is very common method for removal of heavy metals from wastewater. So many researchers used fly ash as adsorbent for removal of organic material and heavy metals from wastewater⁴.

The aim and objective of this review paper is to provide fundamental information and literature in fly ash as a adsorbent for removal of heavy metals.

Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

<https://ijrar.org/papers/IJRAR19J2070.pdf>

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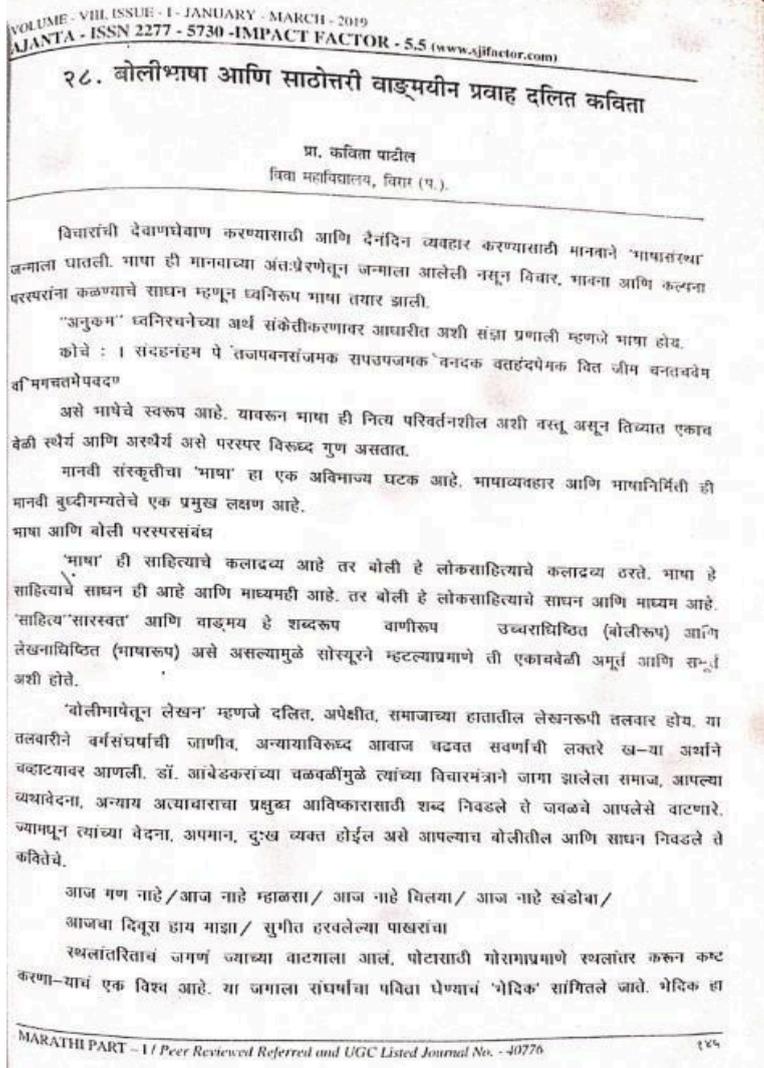
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| Sr. No | Name of the Faculty | Title of the Paper | Year – 2018-19 |
|--------|---|---|----------------|
| 12 | Kavita Patil | बोलीभाषा आणि साठोत्तरी वाङ्मयीन प्रवाह दलित कविता | |
| ISSN | 2277-5730 (AJANTA - AN INTERNATIONAL MULTIDISCIPLINARY QUARTERLY RESEARCH JOURNAL Volume - VII) | | |



Link to the recognition in UGC enlistment of the Journal / Digital Object Identifier (doi) number

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