



Synthesis of New Schiff Base of 1,3-Oxazine and 1,3-Thiazine Derivatives Derived from 4-Phenyl Substituted Chalcones and Evaluation of their Antibacterial Activity

ANUPAMA SHARMA, SARITA KHATURIA[✉] and HAR LAL SINGH^{*}

Department of Chemistry, Mody University of Science and Technology, Lakshmanagarh-332311, India

*Corresponding author: E-mail: hlsingh9@rediffmail.com

Received: 3 November 2020;

Accepted: 25 December 2020;

Published online: 16 February 2021;

AJC-20245

Oxazine and thiazine heterocycles have distinctive interests due to their important class of natural and non-natural products and exhibit high biological activities in the pharmaceutical and biological fields. This work was planned to synthesize Schiff base of 1,3-oxazine and 1,3-thiazine derivative from 4-phenyl substituted chalcones. The structures of the newly synthesized targeted compounds were established from UV, IR, ¹H NMR, ¹³C NMR and DFT calculations. The molecular properties HOMO-LUMO energy, energy gap, softness and hardness were calculated using DFT/B3LYP/6-311G (d,p) basis set. *in vitro* Antibacterial activities of Schiff bases of 1,3-oxazines and 1,3-thiazines derivatives were investigated against Gram-positive (*Staphylococcus aureus*) and Gram-negative bacteria (*Escherichia coli*) and compared with each other. It was found that thiazine derivatives showed higher activity.

Keywords: Schiff base, Chalcones, Spectral, DFT, Antibacterial studies.

INTRODUCTION

Chalcone compounds and their heterocyclic derivatives are known to possess important medicinal and pharmacological activities such as antibacterial, antifungal, anti-inflammatory, analgesic, antitubercular, antimalarial, antiviral, antioxidant, antiulcer and antihyperglycemic [1-4]. These properties of heterocyclic derivatives show great potential to be used as chemotherapeutic agents. Due to the increased resistance to antibiotics, there is a need to develop alternative medicines to fight the pathogenic microorganisms. In recent years there is immense focus on the medicinal properties (antifungal, antibacterial, cytotoxic, antiviral and analgesic) of the novel oxazine and thiazine derivatives of chalcones [5-7]. Oxazines and thiazines are heterocyclic compounds containing one nitrogen and one oxygen/sulfur in a six-membered ring. Three isomers are found depending on the relative position of the heteroatoms and double bonds [7].

Heterocyclic compounds are abundant in nature and have learned more significance because their structural subunits are exhibited in many natural products like vitamins, hormones, antibiotics, etc. 1,3-Thiazines-nitrogen and sulfur and 1,3-oxazine contains-nitrogen and oxygen in their six-membered

heterocyclic ring (N-C-S, N-C-O linkage). The heterocyclic compounds which contain nitrogen, sulfur and oxygen possess vast significance in the field of medicinal chemistry [8]. Derivatives of thiazine and oxazine have various activities such as antifungal, anti-inflammatory, antitubercular, antibacterial, analgesic, anticancer, etc. A new series of biologically important Schiff bases were synthesized and substituted with an aromatic aldehyde to give substituted chalcones [9]. The compound 4-(4-bromophenyl)-6-(*N,N*-dimethylaminophenyl)-*N*-[(*E*)(4-chlorophenyl)methylidene]-6*H*-1,3-oxazin-2-amine was screened for its antimicrobial activity against *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans* and were found to be very active. Some of the reported oxazine derivatives showing chemotherapeutic properties include benzo-1,3-oxazines, efavirenz, a trifluoromethyl-1,3-oxazin-2-one and naphth-oxazines [10-13]. Considering their antibacterial and antifungal activity, it would be exciting to explore more oxazines derivatives [11].

In present work, some new derivatives of Schiff bases derived from 1,3-thiazines, 1,3-oxazines are synthesized, characterized and also evaluated their potential as antibacterial agents and comparative kinetic stability. The derivative of chalcones is used as the starting material for the synthesis of thiazines,



Lead(II) Schiff Base Complexes: Design, Synthesis, Theoretical, Antibacterial and Docking Studies

ANUPAMA SHARMA^{1,*}, SHIVENDRA SINGH^{1,2,*} and HARLAL SINGH^{1,*}

¹Department of Chemistry, Mody University of Science and Technology, Lakshmangarh-332311, India
²Department of Applied Chemistry, Amity University Madhya Pradesh, Gwalior-474 015, India

*Corresponding author: E-mail: hlsingh9@rediffmail.com

Received: 24 November 2021;

Accepted: 11 January 2022;

Published online: 10 March 2022;

AJC-20738

This study presented the bioactive lead(II) compounds of oxazine and thiazine Schiff-bases using NMR (¹H, ¹³C), FT-infrared spectroscopy, UV-visible, molar conductance, elemental analysis and molecular weight. The molecular parameters *e.g.* bond length, bond angle, HOMO/LUMO energy gap and softness/hardness was calculated by DFT-B3LYP/Lan12dz basis set. According to the spectral data, the Schiff-base coordinated to the lead atom in bidentate mode. A theoretical DFT computational investigation was conducted to supplement the experimental data. The antibacterial activity of lead complexes against *E. coli* (-) and *S. aureus* (+) bacteria was determined by disc-diffusion method. Lead complexes of thiazine derivatives are more active than oxazine derivatives. In order to better understand the molecular interaction and binding mode of the drugs, a molecular docking study has been carried out on the protein 3q8u (NDK) from *S. aureus*. A docking investigation with the NDK protein (*S. aureus*) revealed that compound **1h** has the highest binding affinity (-8.18 Kcal/mol) among the eight ligands (**1a-h**).

Keywords: Lead(II) complexes, Schiff base, Spectral, Computational, Antibacterial, Molecular docking studies.

INTRODUCTION

Schiff bases containing sulphur, nitrogen and oxygen donor atoms are a fascinating class of organic compounds with both medicinal and non-medicinal properties that have gained popularity over the last decade [1-3]. The Schiff bases are synthesized by reacting an aldehyde/ketone with a primary amine [4]. Metal compounds containing Schiff base ligands have garnered extensive attention for their many applications in inorganic, metallo-organic and biological sciences [5,6]. They display a broad spectrum of chemical, optical and magnetic properties as a result of their modification with various ligands [7,8]. Due to their stability under a wide range of oxidative and reductive conditions, Schiff bases have been discovered to make a significant contribution to the coordination chemistry of main group/transition metals as chelating ligands [9].

Metal complexes of various geometries form when these ligands interact with metal ions and according to a literature review, these complexes may be more physiologically active, possessing antiviral, antimicrobial, anti-inflammatory, anti-cancer, antimalarial and antipyretic effects than free ligands

[10-12]. Moreover, the antimicrobial/bioactive characteristics of organic ligands can be significantly affected by metal-chelation, leading to the synthesis of a large number of metal-complexes in this field [13]. Bacterial infection and resistance to a wide variety of antibacterial treatments has become an increasingly serious concern in recent years [14,15]. While various classes of antibacterial medicines are already available, the majority of pathogenic bacteria have evolved strong resistance to them [16].

To combat this grave medical concern, new antibacterial medicines must be discovered or the bioactivity of already existing antibiotics must be boosted [17]. Metal-based antibacterial compounds are being investigated as a potential new therapeutic approach for developing new antibiotic drugs that can help control and inhibit bacterial strain growth [18,19]. Additionally, molecular docking was performed, as computational aided drug development is a valuable, quick and cost-effective strategy that has been shown to be more effective than wet lab drug discovery [20]. After docking the drug-like molecule to a protein target, a scoring function is used to determine the probability that the chemical will bind to the protein



New Complexes of organotin(IV) and organosilicon(IV) with 2-((3,4-dimethoxybenzylidene)amino)-benzenethiol: Synthesis, spectral, theoretical, antibacterial, docking studies

Anupama Sharma^a, Naveen Dhingra^b, Har Lal Singh^{a,*}, Sarita Khaturia^a, Uma Bhardawaj^b

^aDepartment of Chemistry, Mody University of Science and Technology, Lakshmangarh, Sikar, Rajasthan India

^bDepartment of Biosciences, Mody University of Science and Technology, Lakshmangarh, Sikar, Rajasthan India



ARTICLE INFO

Article history:

Received 30 January 2022

Revised 8 March 2022

Accepted 9 March 2022

Available online 11 March 2022

Keywords:

Organotin(IV)

Organosilicon(IV) compounds

Spectral

DFT

Antibacterial

Molecular docking

ABSTRACT

New series of dimethyl-, dibutyltin(IV), trimethylsilicon(IV), and phenylsilicon(IV) compounds with bidentate nitrogen and sulphur donor ligands have been synthesized with the 2-((3,4-dimethoxybenzylidene)amino)-benzenethiol (LH), in molar ratios of 1:1 and 1:2. For structure elucidation, all produced compounds were characterized using IR, UV-vis, elemental analysis, conductance measurements, NMR (¹H, ¹³C, ²⁹Si, ¹¹⁹Sn) spectroscopy techniques. The 2-((3,4-dimethoxybenzylidene)amino)-benzenethiol behaves as monofunctional bidentates, interacting with the tin and silicon atom via the thiolic-sulphur and azomethine-nitrogen atoms. Compound 1, 3, and 5 have a five-coordinated trigonal bipyramidal geometry surrounding the metal atoms, whereas Compound 2, 4, and 6 have deformed octahedral structures. The optimum geometrical parameters, including bond length, bond angles, HOMO, LUMO, electrophilicity index, chemical hardness, global softness, and Mulliken atomic charges, were determined using density functional theory-based methods (DFT). The studied compounds and their ligands were simultaneously evaluated for antibacterial activity *in-vitro* and compared to streptomycin. The binding affinity of compound with bulky group and hydrogen bond acceptor groups is more in comparison of other compounds. The structure activity relationship revealed that compounds with bulky and hydrogen bond acceptor group will enhance the antibacterial activity against *Staphylococcus aureus*.

© 2022 Elsevier B.V. All rights reserved.

1. Introduction

Coordination chemistry has grown exponentially as a result of the development in recent years of organic moieties containing a variety of donor atoms such as nitrogen, sulphur, and oxygen, and it multiplies exponentially when the ligands have pharmacological significance [1–3]. During the last few years, the different variety of nitrogen and sulphur containing ligands used to synthesize new coordination complexes has increased dramatically [4–8]. Antimicrobial activity of sulfur containing compounds and their metal complexes has been demonstrated to be highly dependent on their substituents [9,10]. Organic compounds having $-NC_6H_4S-$ moiety are well-known for their biological activity. The activity could be a result of the presence of multi coordination centres capable of forming stable chelates with the metal ions.

Organotin and organosilicon complexes have much more attention, due to extensively used in pharmaceutical, agricultural

and industrial applications [11–14]. Organotin complexes have long been recognised as biologically significant for their antifungal [15], antibacterial [16,17], antitumor [18,19], anti-inflammatory [20], anticancer [21,22], cytotoxic [23], antimalarial [24], and amoebic [25] actions.

Staphylococcus aureus nucleoside diphosphate kinase (Ndk) is considered to play an important role in production of NTPs and dNTPs which helps in cell division, DNA/RNA synthesis, signal transduction, bacterial growth and pathogenicity of bacteria. It is also reported that Ndk plays important role in human cancer metastasis and cell differentiation. So the dependency of bacterial Ndk for its metabolic pathways makes it an attractive target to develop the drugs [26].

Molecular docking is one of the extraordinary tools for computer aided drug designing. The general principle of the ligand-protein dock that governs the topmost binding of a ligand to a protein or nucleic acid target (3-dimensional structure). Hydrogen bonds, vander walls, and electrostatic interactions are examples of ligand-protein interactions. This principal provides a theoretical framework for designing the desired compound(s), which has the

* Corresponding author.

E-mail address: hlsingh9@rediffmail.com (H.L. Singh).

छात्र जीवन में अष्टांग योग द्वारा मानसिक एवं शारीरिक रचना तंत्र पर पड़ने वाले प्रभाव का संक्षिप्त मूल्यांकन

ममता गडवाल

पंजी. संख्या - 23619071

शोधार्थी - शिक्षा शास्त्र

श्री जगदीश प्रसाद झाबर मल टिबरेवाल विश्वविद्यालय - चुड़ैला (मुंझुनू) राजस्थान

शोध निर्देशक- डॉ. दुर्गालाल पारीक

एसो. प्रोफेसर - श्री जगदीश प्रसाद झाबर मल टिबरेवाल विश्वविद्यालय - चुड़ैला (मुंझुनू) राजस्थान

शोध सह निर्देशिका - डॉ. मनोज

प्राचार्या - कानोडिया बी. एड. कॉलेज - मुकुंदगढ़ (मुंझुनू) राजस्थान

सार-

योग तत्त्वतः बहुत सूक्ष्म विज्ञान पर आधारित एक आध्यात्मिक विषय है जो मन एवं शरीर के बीच सामंजस्य स्थापित करने पर ध्यान देता है। यह स्वस्थ जीवन – यापन की कला एवं विज्ञान है। योग शब्द संस्कृत की युज धातु से बना है जिसका अर्थ जुड़ना या एकजुट होना या शामिल होना है। योग से जुड़े ग्रंथों के अनुसार योग करने से व्यक्ति की चेतना ब्रह्मांड की चेतना से जुड़ जाती है जो मन एवं शरीर, मानव एवं प्रकृति के बीच परिपूर्ण सामंजस्य का द्योतक है। आधुनिक वैज्ञानिकों के अनुसार ब्रह्मांड की हर चीज उसी परिमाण नभ की अभिव्यक्ति मात्र है। जो भी अस्तित्व की इस एकता को महसूस कर लेता है उसे योग में स्थित कहा जाता है और उसे योगी के रूप में पुकारा जाता है जिसने मुक्त अवस्था प्राप्त कर ली है जिसे मुक्ति, निर्वाण या मोक्ष कहा जाता है। इस प्रकार, योग का लक्ष्य आत्म-अनुभूति, सभी प्रकार के कष्टों से निजात पाना है जिससे मोक्ष की अवस्था या कैवल्य की अवस्था प्राप्त होती है। जीवन के हर क्षेत्र में आजादी के साथ जीवन-यापन करना, स्वास्थ्य एवं सामंजस्य योग करने के प्रमुख उद्देश्य होंगे। योग का अभिप्राय एक आंतरिक विज्ञान से भी है जिसमें कई तरह की विधियां शामिल होती हैं जिनके माध्यम से मानव इस एकता को साकार कर सकता है और अपनी नियति को अपने वश में कर सकता है।

प्रस्तावना-

ऐसा माना जाता है कि जब से सभ्यता शुरू हुई है तभी से योग किया जा रहा है। योग के विज्ञान की उत्पत्ति हजारों साल पहले हुई थी, पहले धर्मों या आस्था के जन्म लेने से काफी पहले हुई थी। योग विद्या में शिव को पहले योगी या आदि योगी तथा पहले गुरु या आदि गुरु के रूप में माना जाता है। कई हजार वर्ष पहले, हिमालय में कांति सरोवर झील के तटों पर आदि योगी ने अपने प्रबुद्ध ज्ञान को अपने प्रसिद्ध सप्तऋषि को प्रदान किया था। सप्तऋषियों ने योग के इस ताकतवर विज्ञान को एशिया, मध्य पूर्व, उत्तरी अफ्रीका एवं दक्षिण अमरीका सहित विश्व के भिन्न – भिन्न भागों में पहुंचाया। रोचक बात यह है कि आधुनिक विद्वानों ने पूरी

दुनिया में प्राचीन संस्कृतियों के बीच पाए गए घनिष्ठ समानांतर को नोट किया है। तथापि, भारत में ही योग ने अपनी सबसे पूर्ण अभिव्यक्ति प्राप्त की। अगस्त नामक सप्तऋषि, जिन्होंने पूरे भारतीय उप महाद्वीप का दौरा किया, ने यौगिक तरीके से जीवन जीने के इर्द-गिर्द इस संस्कृति को गढ़ा।

योग करते हुए पित्रों के साथ सिंधु – सरस्वती घाटी सभ्यता के अनेक जीवाश्म अवशेष एवं मुहरें भारत में योग की मौजूदगी का संकेत देती हैं। योग करते हुए पित्रों के साथ सिंधु – सरस्वती घाटी सभ्यता के अनेक जीवाश्म अवशेष एवं मुहरें भारत में योग की मौजूदगी का सुझाव देती हैं। देवी मां की मूर्तियों की मुहरें, लैंगिक प्रतीक तंत्र योग का सुझाव देते हैं। लोक परंपराओं, सिंधु घाटी सभ्यता, वैदिक एवं उपनिषद की विरासत, बौद्ध एवं जैन परंपराओं, दर्शनों, महाभारत एवं रामायण नामक महाकाव्यों, शैवों, वैष्णवों की आस्तिक परंपराओं एवं तांत्रिक परंपराओं में योग की मौजूदगी है। इसके अलावा, एक आदि या शुद्ध योग था जो दक्षिण एशिया की रहस्यवादी परंपराओं में अभिव्यक्त हुआ है। यह समय ऐसा था जब योग गुरु के सीधे मार्गदर्शन में किया जाता था तथा इसके आध्यात्मिक मूल्य को विशेष महत्व दिया जाता था। यह उपासना का अंग था तथा योग साधना उनके संस्कारों में रचा-बसा था। वैदिक काल के दौरान सूर्य को सबसे अधिक महत्व दिया गया। हो सकता है कि इस समय की सभ्यता ने अपने सभ्यता के अनेक अवशेषों की सहायता से अभिव्यक्ति प्राप्त की। परंपरागत

ANALYSIS OF INDIAN NATIONAL EDUCATION POLICY 2020 TOWARDS ACHIEVING ITS OBJECTIVES

Mamta Garhwa, Research Scholar (Education)

Dr. D.L.Pareek, Research Guide (Education)

Dr. Manoj, Research Co-Guide (Education)

SJTT University, Churela (Jhunjhunu) Rajasthan

ABSTRACT:-As we know that the well defined and futuristic Education Policy is essential for a country at school and college levels because of education leads to economic and social progress. Various countries adopt different education systems by considering the tradition and culture and adopt different stages during their life cycle at school and college education levels to make it effective. Currently, Government of India announced its New Education Policy which is based on the recommendations of an Expert Committee headed by Dr. Kasturirangan, former Chairman of the Indian Space Research Organization.(ISRO) This paper highlights on various policies announced in the higher education system and compare them with the currently adopted system. Various innovations and predicted implementation of NEP-2020 on the Indian Higher Education System along with its merits are discussed. Finally, some suggestions are proposed for its effective implementation towards achieving its objectives.

INTRODUCTION:-India being a growing liberal country for educational reforms, currently has about 845 universities and approximately 40,000 Higher Education Institutions (HEIs) reflecting the overall high fragmentation and many small sized HEIs in the country which are affiliated to these universities. It is found that over 40% of these small sized Institutions are running single program against the expected reforms to a multi-disciplinary style of higher education which is an essential requirement for the educational reforms in the country for the 21st Century. It is also noted that over 20% of the colleges have annual enrollment less than 100 students making them non-viable to improve the quality of education and only 4% of colleges enroll more than 3000 students annually due to regional imbalance as well as the quality of education they offer. Some of the reasons found for the fragmentation of higher education system in India are:

- Early streaming of students in two different disciplines
- Lack of access to higher education especially in socio-economic disadvantaged areas which resulted in the current Gross Enrollment Ratio (GER) of 25% only.
- Lack of teacher and institutional autonomy to make innovations in higher education to attract many students for insufficient mechanism for career management and progression of faculty and institutional leaders.
- The lack of Research and innovation at most of universities and colleges.
- Sub-optimal levels of governance and leadership at Higher Education Institutions
- A corrupted regulatory system allowing fake colleges to thrive while constraining excellent innovative institutions.

It is predicted that India will be the third largest economy in the world by 2030-2032 with estimated GDP of Ten Trillion Dollars. It is evident that the Ten Trillion Economy will be driven by knowledge resources and not by the natural resources of the country. To boost the growth of the Indian education sector, the present Government decided to refurbish it by introducing a comprehensive National Education Policy 2020. This is in line with the Prime Minister's recent call on leveraging the fourth Industrial Revolution to take India to the new heights. The currently introduced National Education Policy 2020 envisions an India Centered Education System that contributes directly to transforming our nation sustainably into an equitable and vibrant knowledge society, by providing high quality education to all.

Publications

1. **Susheela Kumari**, Archana Choudhary and Saumi Ray, The functionality of the hybrid systems driven by molecular dimension of the guest copper Schiff-base complexes entrapped in Zeolite-Y, *Applied Organometallic Chemistry*, **2019**, 33 (3), e4765.
2. **Susheela Kumari**, Karthik Maddipoti, Bidisa Das and Saumi Ray, Palladium–Schiff Base Complexes Encapsulated in Zeolite-Y Host: Functionality Controlled by the Structure of a Guest Complex, *Inorganic chemistry*, **2019**, 58 (2), 1527-1540.
3. **Susheela Kumari**, Bidisa Das and Saumi Ray, An insight into the catalytic activity of palladium Schiff-base complexes towards the Heck coupling reaction: routes via encapsulation in zeolite-Y, *Dalton Trans.*, **2019**, 48, 15942–15954.
4. Archana Choudhary, **Susheela Kumari** and Saumi Ray, Tuning of Catalytic Property Controlled by the Molecular Dimension of Palladium–Schiff Base Complexes Encapsulated in Zeolite Y, *ACS Omega* **2017**, 2 (10), 6636-6645.
5. **Susheela Kumari** and Saumi Ray, Zeolite Encapsulated Ni(II) Schiff-Base Complexes: Improved Catalysis and Site Isolation, *New J. Chem* **2020**, 44, 14953-14963.
6. **Susheela Kumari** and Saumi Ray, Cobalt Schiff-base Complexes Encapsulated in Zeolite Y and their Catalytic Activity for the Degradation of Rhodamine B, *Inorg. Chem. Front.*, **2021**, 8, 1553-1566.



A Review on Nucleopolyhydroviruses (NPV) as Biological Control of Army Worm, *Spodoptera litura*

Zulnorain Sajid^{1*}, Muhammad Ramzan², Muhammad Mamoon Shafiq³,
Muhammad Usman³, Ghulam Murtaza³, and Vikas Pareek⁴

¹Department of Entomology, PMAS Arid Agriculture University, Rawalpindi, Pakistan

²State Key Laboratory for Biology of Plant Diseases and Insect Pests, Institute of Plant Protection,
Chinese Academy of Agricultural Sciences Beijing, 100193, China

³Department of Entomology, University of Agriculture Faisalabad

⁴Head & Assistant Professor, Department of Botany, Gramin Mahila PG College Sikar, Rajasthan, India

*Corresponding Author E-mail: ramzan.mnsua@gmail.com

Received: 17.11.2020 | Revised: 23.12.2020 | Accepted: 5.01.2021

ABSTRACT

The current review was written to give the detail information about Nucleopolyhydroviruses (NPV) that consider a major part of integrated pest management. The review of literature was collected from Google Scholar by giving different key words about Nucleopolyhydroviruses (NPV) against *Spodoptera litura*, previously published data on NPV and from well-known journal sites. Army worm, *Spodoptera litura* is a destructive pest of many agricultural and horticultural crops all over the world including Pakistan. Different management strategies are adopted to control this destructive pest in Pakistan. Among adopted strategies, insecticides are commonly used against this pest under laboratories as well as fields conditions. The excessive application of insecticides causes insecticides resistance and negative impact on environment resulting health problems (Ramzan et al., 2019c). The application of NPVs against insect pests is an alternative strategy to control pest population, reduce resistance issues, health problems and environmental pollution. The current review of literature shows that Nucleopolyhydroviruses has potential against insect pest population. The biological activity of nucleopolyhydroviruses should be tested against other lepidopteran insect pests that becoming primary pest of agricultural crops or invasive alien species especially Fall armyworm, *Spodoptera frugiperda*.

Keywords: Nucleopolyhydroviruses, Biological control, Invasive alien species, Resistance problems, Integrated pest management.

INTRODUCTION

1.1. Baculoviruses

The crop production decreases worldwide every year due to many factors like weeds, insect pests and pathogens i.e., viruses,

bacteria and fungi (Ramzan et al., 2019a). These issues mostly occur in tropical and subtropical where crop grown in monocultures.

Cite this article: Sajid, Z., Ramzan, M., Shafiq, M. M., Usman, M., Murtaza, G., & Pareek, V. (2021). A Review on Nucleopolyhydroviruses (NPV) as Biological Control of Army Worm, *Spodoptera litura*, Curr. Res. Agri. Far. 2(1), 30-39. doi: <http://dx.doi.org/10.18782/2582-7146.125>

Biocontrol Potential of Neem leaf Extract on Mortality of *Meloidogyne incognita*

Naresh Nayak¹, Subhash verma², Vikas Pareek³ and Mridula Khandelwal⁴

¹Department of Botany, Government College, Kota, Rajasthan, India

²Department of Botany, Government College, Kaladera, Rajasthan, India

Department of Botany, Graminmahila P.G Mahavidhyalaya, Sikar, Rajasthan, India

⁴Department of Botany, Aklank P.G. College, Kota, Rajasthan, India

(Received 13 August, 2022; Accepted 12 October, 2022)

ABSTRACT

Root-knot nematode *Meloidogyne incognita* is one of the widely distributed in India and most economically damaging genera in vegetable crops. Plant products are the safer alternative approaches to control root knot nematodes. An experiment was carried out in vitro to test the Neem leaf extract of aqueous, acetone and methanol extract. Different concentrations of shade-dried leaves of Neem were tested on mortality of *Meloidogyne incognita* juveniles. Increase in concentration and exposure period resulted in increased mortality rate of Juveniles of *M. incognita*. Methanol Neem leaf extract (5 ml concentration) proved to be the most effective among used aqueous, acetone and methanol neem leaf extract. After 48 hours exposure aqueous and methanol leaves extract showed 100% mortality while acetone neem leaves extract showed 100% mortality after 72 hours exposure of 5 ml concentration. Neemleaves 0.25 ml con. was the least effective among all con.

Key words: Aqueous, Acetone, Methanol, Mortality, *Meloidogyne incognita*, Plant extract

Introduction

The root-knot nematode *Meloidogyne incognita* is one of the major problems for the vegetable production area. Brinjal is every infected by root-knot nematodes. Chemical controls of nematodes are very expensive as well as developed problem of residual toxicity environmental pollution public health hazard even depletion of stratospheric zone (Wheeler *et al.*, 1979). Nematode management of this dreadful nematode through chemicals has adverse effects on the environment and hazardous to all living entities on the earth. As an alternative to chemical pesticides specially for the purpose of protecting crops against nematodes and also for the conservation of biodiversity, botanicals may stand as the most

promising source of bioactive products of plant origin. Extract of plant products contain nematicidal and antifeedant compounds. Thousands of plants possessing insecticidal properties are known today (Banerji *et al.*, 1985). Use of neem and neem products has been advocated for the management of root-knot nematodes by many workers (Dekha and Rehman, 1998; Jain and Gupta, 1988). Plant extracts having the nematicidal properties and they not only reduce the nematode population but also enhance the plant growth (Hussain *et al.*, 2011). The present investigation to study the nematicidal effect of neem plant (*Azadirachta indica*) leaves aqueous, acetone and methanol extracts on juveniles of *M. incognita*.

Prasad *et al.* (2002) observed that some plant extract were toxic to root-knot nematode and further

³Head

*Corresponding author's email: nayak.nema2009@gmail.com



Nutrients and Their Importance in Agriculture Crop Production: A Review

Muhammad Danish Toor¹, Muhammad Adnan^{2*}, Fazal ur Rehman³, Rohoma Tahir⁴,
Muhammad Sulaman Saeed⁵, Ahasan Ullah Khan⁶ and Vikas Pareek⁷

¹Department of Soil and Environmental Sciences, ²Department of Agronomy, ³Department of Plant Pathology,

⁴Department of Horticulture, College of Agriculture, University of Sargodha, Pakistan

⁵Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad, Pakistan

⁶Department of Entomology, Faculty of Agriculture, Sylhet Agricultural University, Sylhet, Bangladesh

⁷Head & Assistant Professor, Department of Botany, Gramin Mahila PG College Sikar, Rajasthan, India

*Corresponding Author E-mail: mughal3368@gmail.com

Received: 12.11.2020 | Revised: 27.12.2020 | Accepted: 5.01.2021

ABSTRACT

Plant growth and development are directly depended on the source of nutrients. Basically, plants need different type of nutrients which are categories into two groups i.e. macro nutrients and micro nutrients according to their requirements. These nutrients include Nitrogen (N), Phosphorous (P), Potassium (K), Calcium (Ca), Zinc (Zn), Iron (Fe), Boron (B), Sulphur (S), Magnesium (Mg) etc. In the plant body, many nutrients influence biochemical processes as well as provide resistance against diseases and finally disturb the quality of crops. According to fast increasing in the world population and the decreasing trend in yields of crop make food safety a main challenge. That's why balanced application of nutrients is very important to rise the crop yield and to attain the necessary increase in the production of food. Furthermore, nutrients play a significant role in fertility of soil and make it more productive for the growth of plant. This review article will discuss the recent information that concerning about the nutrients and their use in sustainable agriculture for the growth of plant.

Keywords: Sustainable Agriculture; Biochemical processes; Micro Nutrients; Macro Nutrients; Resistance.

INTRODUCTION

The world is facing a various concerning problems to get significant food in a sustainable manner, fulfilling the requirements of an increasing world population because of decreasing food resources (Rehman et al.,

2020a). Many countries are facing the problems nutrients deficiency (Saeed et al., 2020). Growth of plants influenced by a number of factors including water availability, temperature, availability of nutrients and light in the soil.

Cite this article: Toor, M. D., Adnan, M., ur Rehman, F., Tahir, R., Saeed, M. S., Khan, A. U., & Pareek, V. (2021). Nutrients and Their Importance in Agriculture Crop Production; A Review, *Ind. J. Pure App. Biosci.* 9(1), 1-6. doi: <http://dx.doi.org/10.18782/2582-2845.8527>



Aegle marmelos (Bael) Benefit for Health: A Review

Krishan Kumar Singh¹, Brahmanand Bairwa², Ravi Kumar Mahour² and Vikas Pareek³

¹Department of Horticulture, H.N.B. Garhwal University, Srinagar, Garhwal (Uttarakhand), India

²School of Agricultural Sciences, Career Point University, Kota, Rajasthan, India

³Head & Assistant professor, Department of Botany, Gramin Mahila PG College Sikar, Rajasthan, India

*Corresponding Author E-mail: forekrishna@gmail.com

Received: 15.11.2020 | Revised: 26.12.2020 | Accepted: 7.01.2021

ABSTRACT

Bael is a subtropical plant and grows as much as an altitude of 1200 m above sea level. It is the most important medicinal fruit crop of India. Bael cultivation in India is mainly done in the states of Uttar Pradesh, Uttaranchal, Jharkhand, Madhya Pradesh, Rajasthan. All the plant elements like leaves, roots, barks, seeds and fruits of Bael are necessary ingredients of many ancient formulations against numerous diseases. Bael fruits are rich source in vitamins, minerals and many types of nutrients. Candy, panjiri, toffee, jam, etc. products are prepared by the fruit. It may be used for the remedy of diverse problems in person such as, diabetes, liver toxicity, fungal infection, microbial infection, inflammation, pyrexia etc. The bael fruit pulp incorporates many practical and bioactive compounds which include carotenoids, phenolics, alkaloids, coumarins, flavonoids, and terpenoids and has innumerable conventional medicinal uses.

Keywords: *Bael, Rutaceae, Health Benefit, India.*

INTRODUCTION

Aegle Marmelos (Bael) is a subtropical plant, belong to Rutaceae family, chromosome number present in $2n = 18$. Fruits have been known in India since ancient times. The native place of the bael is considered to be India. Bael has a special place in the major fruits of India. Leaves are used as sacred imparting to 'Lord Shiva'. This fruit is produced in all parts of India. Bael cultivation in India is mainly done in the states of Uttar Pradesh, Uttaranchal, Jharkhand, Madhya Pradesh, Rajasthan. Bael is cultivated in Uttar Pradesh in Faizabad, Basti, Gonda, Mirzapur and

Etawah districts. In other countries mango cultivation can be done easily in parts of low rainfall (Sharma et al., 2007). Bael cultivation is mainly done in Sri Lanka, Pakistan, Bangladesh, Burma, Thailand, Malaysia, Cambodia, and other parts of South Asia. Bael has a special place in medicinal plants in India. Diseases are treated by chemical substances extracted from bael leaves, fruits and seeds (Maity et al., 2009). Vitamin C content material of fruit is also better than of apple. The ripe fruit is sweet, fragrant and really palatable being rather esteemed and eaten with the aid of using all instructions of people.

Cite this article: Singh, K.K., Bairwa, B., Mahour, R. K., & Pareek, V. (2020). *Aegle marmelos* (Bael) Benefit for Health: A Review, *Curr. Rese. Agri. Far.* 2(1), 17-20. doi: <http://dx.doi.org/10.18782/2582-7146.129>

**Ground water quality with special reference to fluoride: A Review**Pratibha¹, Priya Mathur¹, Dr. Deepak Pareek²¹ bxadaniap@gmail.com Dept. of Chemistry, JJT University, Jhunjhunu, Rajasthan, India¹ priya.mathur0968@gmail.com Dept. of Chemistry, Gramin Mahila PG College, Sikar, Raj.² sajitsarkar@jtu.ac.in Dept. of Chemistry, JJT University, Jhunjhunu, Rajasthan, India

Abstract: Water has very curial for all living beings. Ground water, surface water (rivers, streams and ponds), atmospheric water (rain-water, snow and hail) and springs are the main source of water available to the people in general. The qualities of water bodies vary widely depending on the location and environmental factors. For daily activities like drinking, washing, bathing, cooking and several other activities water is needed. Quality of underground water is major concern for drinking purpose. If the quality of water is not good then it becomes unfit for drinking and other activities. The quality of groundwater is generally described by chemical, physical and biological parameters. The groundwater analysis for physical and chemical properties is very important for Public health studies. Natural processes and human activities cause the changes in groundwater quality, directly or indirectly. The quality of water depends on industrialization, use of chemicals, fertilizers and pesticides for agriculture are causing deterioration of water quality and depletion of aquatic life. Due to use of contaminated water, human population suffers from water borne diseases.

Keywords: Underground water, Physiochemical parameters, Fluoride

Introduction :-Water is the most significant and fundamental common asset for life on earth. It is unreservedly accessible and most liberally accessible in nature. Although ground water commitment is just 0.6% of the all-out water assets on earth and it is likewise the significant wellspring of drinking water for country and urban populace also. In India, around 20 states have been related to issues of high fluoride focus in ground water assets. Country populaces who are chiefly rely upon underground water for drinking purposes and gravely influenced by fluoride pollution. [1-3] In most recent couple of years, urbanization, industrialization and much use of water assets have taken care of the debasement of water quality and decrease in per capita accessibility in a few nations being worked on and creating nations also. Because of different environmental factors either common or synthetic, the ground water is getting dirtied on account of removal of perilous squanders, fluid and strong squanders from businesses, sewage removal, surface impoundments and so on. During its unpredictable stream history, groundwater goes through different topographical arrangements prompting ensuing sully in shallow springs. Nearness of different contaminants like fluoride, arsenic, nitrate, sulfate, pesticides, other overwhelming metals and so forth in underground water has been accounted for from various pieces of India. [4] Ground water have always been the most important fresh water resources for drinking as well as industrialization purposes still most of the developmental activities are dependent upon them. Ground water finds multiple uses in every sector of development like agriculture, industry, transportation, aquaculture, public water supply etc. Ground water is a very important resource for irrigation and drinking purposes. It supports natural environments, including diverse flora and fauna. It also has an important role in recreational activities and in contributing to overall quality of life. Ground waters naturally contain a wide variety of substances, and human activities inevitably add to this mixture. Scientists have therefore developed specialized approaches to measuring quality. [5-6]

Review of literature

Savita et al (2020) carried out the hydrogeochemical investigations in the eight villages of Tosham Block; district Bhiwani, Haryana to recognize the mechanism and sources of enrichment of fluoride in the groundwater. On the basic of results obtained, they specified

Authorize the system to edit this file.

Authorize



Edit

Annotate

Fill & Sign

Convert

All





Physicochemical analysis of underground water of Buhana block of Jhunjhunu district, Rajasthan

Pratibha^{1*}, Dr. Deepak Pareek²

1. Research Scholar, Chemistry Department, JJT University, Jhunjhunu (Raj)

2. Professor, Chemistry, Shri J.J.T. University, Jhunjhunu (Raj.)

* Corresponding Author e-mail: budaniap@gmail.com

Abstract- Water is most common and most important compound on earth. In the villages of Buhana block of Jhunjhunu district is the major source of ground water are hand pumps, borewells, wells, and municipal tap water. The nature of drinking water is degrading continuously and physicochemical analysis and treatment is necessary if required before use for drinking purpose. Water samples were taken at 16 locations of 8 different villages of Buhana block of Jhunjhunu district Rajasthan and were subjected to physicochemical analysis. Before selection of sampling stations a survey of school children of the selected villages were carried. On the basis of survey it can be said that there is fluorosis problem with some other water born problems in the area. The result of pH was found to be in between 7.1 - 8.8, Electrical conductivity was found to be between 539-1430. The values recorded of chloride between 130-330, Sulfate 76-155, BOD 2.0-4.8 and COD 9-20mg/L. The values of fluoride was recorded between 0.5 -1.2mg/L. The seasonal variation is also tested for summer, winter and rainy season and analysis of fluoride is carried out in morning and evening times too. There is slight variation is seen in different season and samples taken in morning and evening times.

Keywords: Survey, Physicochemical analysis, Fluoride, Buhana, Seasonal variation

Introduction- It is imperative to understand that this earth is majorly defined by the environment it hosts which in itself is another difficult-to-comprehend entity that comprises of air, soil, plants, water, animals and natural resources which form the basic structure of any form of life or value adding entity on the earth. On the earth water is essential for every living being. It is an undoubted fact that water, though in abundance, is the most fascinating and important parameter for existence of living beings on this earth. The abundance of water which constitutes three-fourths portion of the earth defines the magnitude of its important for us. Human body in itself comprises of two-thirds portion as water which clearly states how important it is for us to sustain. Moreover the most important organs of our body, i.e. Heart and Brain are also 74% composed of water. Groundwater is the hidden reserves that are connected to the surface water.



Multi-disciplinary International Journal
Certificate of
Paper
Publication

Anthology

ISSN

2456-4397

SJIF

6.018

IJIF

4.02

RNI

UPBIL/2016/68067

Indexed

Google
Scholar

Anthology The Research

This is to certify that the paper titled..... हिंदी के सूफी प्रेमसंवादन काव्य
में लीकाचार



Author : संगीता गौरी

Designation : सहायक आचार्य

Dept. : हिंदी

College : ग्रामीण महिला महाविद्यालय, सीकर,
राजस्थान, भारत

has been published in our Peer Reviewed International Journal

vol. 5 issue 9 month December year 2020

The mentioned paper is measured upto the required.

Rajeev Misra

Dr. Rajeev Misra
(Editor/Secretary)

H-5

Dr. Asha Tripathi

Dr. Asha Tripathi
(Vice-President)

Social Research Foundation

Non Governmental Organisation

128/170, H-Block, Kidwai Nagar, Kanpur - 208011

(Call) 0512-2600745, 9335332333, 9839074762 (E-mail) socialresearchfoundation@gmail.com (Web) www.socialresearchfoundation.com

Multi-disciplinary International Journal
Innovation
The Research Concept

Certificate of Paper Publication

RNI

UPBIL/2016/68367

ISSN

2456-5474

SJIF - 6.122

IJIF-4.112

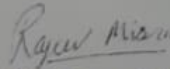
Indexed

Google
Scholar

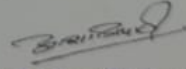
This is to certify that the paper titled
कुतुबन कृत मिरगावती में प्रेम का स्वरूप

Author : संगीता गर्वा
Designation : सहायक आचार्य
Dept. : हिंदी
College : ग्रामीण महिला स्नातकोत्तर महाविद्यालय, पं० दीनदयाल उपाध्याय
शेखावाटी विश्वविद्यालय, सीकर, राजस्थान, भारत

has been published in our *Peer-reviewed / Refereed International Journal*
vol.6.... issue1..... month February..... year2021.....
The mentioned paper is measured upto the required.


Dr. Rajeev Misra
(Editor/Secretary)


Dr. Ashok Kumar
President


Dr. Asha Tripathi
(Vice-President)

Social Research Foundation

Non Governmental Organisation

128/170, H-Block, Kidwai Nagar, Kanpur - 208011

Cell: 9872-2600745, 9335332333, 9839074762 | E-mail: socialresearchfoundation@gmail.com | Web: www.socialresearchfoundation.com

GMSS

www.gmss.com

www.gmss.com