



ಸಹ್ಯಾದ್ರಿ ವಿಜ್ಞಾನ ಕಾಲೇಜು, ಶಿವಮೊಗ್ಗ-577 203
(ಕುವೆಂಪು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ ಘಟಕ ಕಾಲೇಜು)

SAHYADRI SCIENCE COLLEGE, SHIMOGA-577 203

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Criteria -03

3.3.1. RESEARCH PAPERS PUBLISHED

DURING THE YEAR -2022

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during the years 2022

Sl. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Calendar Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
							Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
2022									
1	Characterization and biochemical activities of novel functional antimicrobial peptide (AMP) from <i>Trichogramma chilonis</i>	Sunil S V Dr. B T Prabhakar	Biotechnology	Biomedicine	2022	0970-2067	https://www.cabidigitallibrary.org/action/doSearch?do=Bio+medicine	https://www.cabidigitallibrary.org/doi/full/10.5555/20230160281	YES(Scopus)
2	Anti-inflammatory activity of quercetin-3-rhamnopyranosyl-(1-6) glucopyranoside isolated from <i>Delonix elata</i> against Freund's complete adjuvant induced inflammation in rats.	Pradeepa K, Krishna V and Naveen Kumar K J.	Biotechnology	Indian Journal of Natural Products and Resources.	2022	0976-0512	https://www.bing.com Indian Journal of Natural Products and Resources (IJNPR) [Formerly Natural Product Radiance (NPR)] (niscar.res.in)	http://nopr.niscares.in/handle/123456789/60271	YES
3	Synthesis of silver nanoparticles using the seed extract of <i>Ensete superbum</i> and their antibacterial activity assessment.	Arunodaya H S, Pradeepa K and Naveen Kumar K J	Biotechnology	Indian Journal of Natural Products and Resources.	2022	0976-0512	http://op.niscares.in/index.php/IJNPR	http://op.niscares.in/index.php/IJNPR/article/view/42154	YES
4	Biogenic Collagen-Nano ZnO Composite Membrane as Potential Wound Dressing Material: Structural Characterization, Antibacterial Studies and In Vivo Wound Healing Studies	Chandraprabha, M.N., Krishna, R.H., Samrat, K. Pradeepa, K., Patil, N.C., and Sasikumar, M.	Biotechnology	Journal of Inorganic and Organometallic Polymers and Materials,	2022	1574-1451	Home Journal of Inorganic and Organometallic Polymers and Materials (springer.com)	https://doi.org/10.1007/s10904-022-02351-8	YES(Scopus)
5	Antiproliferative pharmacophore azo-hydrazone analogue BT-1F exerts death signalling pathway targeting STAT3 in solid tumour	Dr. B T Prabhakar	Biotechnology	Pharmacological Reports	2022	1734-1140	https://link.springer.com/journal/43440	https://link.springer.com/article/10.1007/s43440-021-00345-w	YES(Scopus)
6	Characterization of antioxidant, anti-cancer, and immunomodulatory functions of partially purified garlic (<i>Allium sativum</i> L.) lectin	Dr. B T Prabhakar	Biotechnology	Biomedicine	2022	0970-2067	https://www.cabidigitallibrary.org/action/doSearch?do=Bio+medicine	https://pubs.semanticscenario.org/03907eb583839360c5c6d654e907afca7fea982f.pdf?_gl=1*_pdw4hb*_gcl_a_uMjA2ODI2NTgyNC4xNzI1OTQ1MzM5*_ga*MTUwOTYyNTQ2My4xNzA3ODAxNzY4*_ga_H7P4ZT52H5*_MTcyNjA0MDAzNS42LjAuMTcyNzA3ODAxNzY4*_ga_H7P4ZT52H5	YES(Scopus)
7	A systems biology investigation of curcumin potency against TGF- β -induced EMT signalling in lung cancer	Dr. B T Prabhakar	Biotechnology	3Biotech	2022	2190-5738	https://link.springer.com/journal/13205	https://link.springer.com/article/10.1007/s13205-022-03360-7	YES(Scopus)

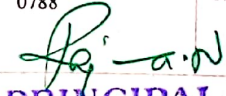
07/813205-022-03360-7

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8	Corosolic Acid Inhibits Secretory PhospholipaseA2IIaas an Anti-Inflammatory Functionand Exhibits Anti-Tumor Activity in Ehrlich Ascites Carcinoma Bearing Mice	Dr. B T Prabhakar	Biotechnology	Journal of Inflammation Research	2022	1178-7031	s.com/journal-of-inflammation	ps://pubmed.ncbi.nlm.nih.gov/3661994	YES(Scopus)
9	Phytochemical investigation and invitro antioxidant activity of Adenocalymmaalliaceum	Dr. Pallavi M, Nethravathi A M	Biotechnology	Neuroquantology	2022	1303-5150	https://www.neuroquantology.com/archives.ph	https://www.neuroquantology.com/open-access/PHYTOCHEMICALINVESTIGATIONANDIN%2502VITROANTI-OXIDANTPOTENTIALSOFAdenocalymmaalliaceum_9975/	YES(Scopus)
10	Hepatoprotective effect of Adenocalymmaalliaceum leaves extract against ethanol induced toxicity in HepG2 cell line	Dr. Pallavi M	Biotechnology	Neuroquantology	2022	1303-5150	https://www.neuroquantology.com/archives.ph	https://www.neuroquantology.com/open-access/HEPATOPROTECTIVE+EFFECT+OF+ADENOCALYMMMA+ALLIACEUM+LEAVES+EXTRACT+AGAINST+ETHANOL+INDUCED+TOXICITY+IN+HepG2+CELL+LINE 5626/	YES(Scopus)
11	Synthesis and pharmacological activities of 1-(1-naphtho[2,1-b]furan-2-yl)ethylidene (arylsubstituted) thiosemicarbazide derivatives and 1-(1-naphtho[2,1-b]furan-2-yl)ethylideneamino)-2-thioxoaryl substituted imidazolidin-	K.P Latha	Chemistry	Indian Journal of Chemistry	2022	2583-1321	http://op.niscpr.res.in/index.php/IJC/index	http://op.niscpr.res.in/index.php/IJC/article/view/63646	YES(Scopus)
12	Synthesis, characterization, and antibacterial Activities of naphtho[2,1-b]furan derivatives	K.P Latha	Chemistry	Rasayan Journal of chemistry	2022	0976-0083	http://www.rasayanjournal.com/	http://doi.org/10.31788/RJC.2022.1548052	YES
13	Design, spectral, thermal, DFT studies, antioxidant and molecular docking studies of pyrazole-based schiff base ligand and its metal (II) complexes.	Yuvaraj TCM	Chemistry	Materials Today: Proceedings	2022	2214-7853	https://www.sciencedirect.com/journal/materials-today-proceedings	https://doi.org/10.1016/j.matpr.2021.10.354	YES(Scopus)
14	Synthesis, spectral characterization, electrochemical studies of pesticide and biological evaluation of Transition metal complexes of azo dye derived from substituted phenyl pyrazole .	Malathesh Pari, Vittala rao	Chemistry	Journal of the Indian Chemical Society	2022	0019-4522	ect.com/journal/journal-of-the-i	https://doi.org/10.1016/j.jics.2022.100788	YES(Scopus)


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15	Tangent-hyperbolic nanoliquid flow in a microchannel, thermal and irreversibility rate analysis	Dr.Venkatesh P	Mathematics	Waves in Random and Complex Media Taylor & Francis	2022	1745-5049	https://www.tandfonline.com/journals/twrm20	https://doi.org/10.1080/17455030.2022.2108157	YES(Scopus)
16	Effect of NP shapes on Ag/kerosene and Ag/water hybrid nanofluid flow in suction/injection process with nonlinear-thermal-radiation and slip condition; Hamilton and Crosser's model	Dr.Venkatesh P	Mathematics	Waves in Random and Complex Media Taylor & Francis	2022	1745-5049	https://www.tandfonline.com/journals/twrm20	https://doi.org/10.1080/17455030.2021.2022813	YES(Scopus)
17	Mixed convective flow of Casson nanofluid in the microchannel with the effect of couple stresses:Irreversibility analysis	Felicitia, B. J. Gireesha, B. Nagaraja, P. Venkatesh and M.R. Krishnamurthy	Mathematics	International Journal of Modelling and Simulation	2022	0228-6203	https://www.tandfonline.com/loi/tjms20	https://doi.org/10.1080/02286203.2022.2156974	YES(Scopus)
18	Time Reliant Flow of Casson Nanofluid with Gyrotactic Microbes through the Contracting/Dilating Walls of the Microchannel Impelled by Chemical Reactions	F. Almeida, P. Venkatesh , B. J. Gireesha	Mathematics	Brazilian Journal of Physics	2022	0103-9733	http://www.springer.com/physics/journal/13538/	https://doi.org/10.1007/s13538-022-01136-1	YES(Scopus)
19	Magnetohydrodynamic flow of a micropolar nanofluid in association with Brownian motion and hermophoresis: Irreversibility analysis	Felicitia Almeid, Bijjanal Jayanna Gireesha, Puttaswamy Venkatesh	Mathematics	Heat Transfer	2022	2832-8469	https://asmedigitalcollection.asme.org/heattransfer	http://dx.doi.org/10.1002/htj.22773	YES(Scopus)
20	An efficient p-TSA catalyzed synthesis of some new substituted-(5-hydroxy-3-phenylisoxazol-4-yl)-1,3-dimethyl-1H-chromeno[2,3-d]pyrimidine-2,4(3H,5H)-dione/3,3-dimethyl-2H-xanthen-1(9H)-one scaffolds and	S.H. Sukanya , Talavara Venkatesh*, S.J. Aditya Rao, AnupPandith	Chemistry	Journal of Molecular Structure	2022	0022-2860	https://www.sciencedirect.com/journal/journal-of-molecular-structure	https://doi.org/10.1016/j.molstruc.2022.133587	YES(Scopus)
21	Study on phenology of some Papilionoid Tax (Papilionoideae-Leguminosae)	Rachitha C J Krishna Swamy K	Botany	The Journal of Plant Science Research	2022	0976-3880	https://www.printspublications.com/journal/thejournalofplantscienceresearch12818263520674149434	https://www.printspublications.com/journal/thejournalofplantscienceresearch12818263520674149434#previous	YES
22	Isolation, molecular characterization and myochemical anlysis of Aspergillus quadrilineatus	Shaila M Nafeesa Begum	Botany	Journal of Plant Science Research	2022	0970-2539	https://www.printspublications.com/journal/thejournalofplantscienceresearch12818263520674149434	https://openurl.ebsco.com/EPDB%3Aged%3A13%3A7371949/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Aged%3A161946869&url=	YES

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23	Diversity of rhizosphere mycobiota of Some Oil Yielding Crops in Davanagere region of Karnataka, India	Shaila M and Nafeesa Begum	Botany	Journal of Mycopathological research	2022	0971-3719	https://imskolkata.org/index.php	https://imskolkata.org/article1/011-06-22.pdf	YES
24	SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF SOME NOVEL BISHETEROCYCLIC MOIETIES	Thippeswamy A, Prabhakar W. Chavan	Chemistry	Ymer	2022	0044-0477	https://ssag.se/publikationer/ymer/	https://ymerdigital.com/uploads/YMER210529.pdf	YES (Scopus)
25	SYNTHESIS OF AND CHARACTERIZATION OF INDOLYL-1,8-NAPHTHYRIDIN-3-CARBONITRILES MOIETIES	Usharani, Prashant C. Hanamshetty, Balaji Biradar, Prabhakar W. Chavan	Chemistry	International Journal of Food and Nutritional Sciences	2022	2320-7876	https://www.ijfans.org/about	https://www.ijfans.org/issue-content/synthesis-of-and-characterization-of-indolyl-1-8-naphthyridin-3-carbonitriles-moities-5501	YES
26	Effect of Ce ³⁺ Substitution on Sr ²⁺ ; Structural and Magnetic Properties of Nanocrystalline SrFe ₁₂ O ₁₉ Hexaferrites Prepared by Self-Propagation Method Using Mixed Fuels	J Lakshmikantha, G Krishnamurthy , BM Nagabhushan, C S Naveen, E Melagiriappa	Chemistry	Journal of Superconductivity and Novel Magnetism	2022	1557-1947	https://link.springer.com/journal/10948	https://doi.org/10.1007/s10948-022-06223-7	YES(Scopus)
27	Dielectric properties and magnetic behavior OF Gd ³⁺ substituted M-type SrFe ₁₂ O ₁₉ nanoferrites by auto combustion method using urea and citric acid mixtures as a dual fuel	J Lakshmikantha, G Krishnamurthy , B M Nagabhushan, E Melagiriappa	Chemistry	Journal of Solid State Chemistry	2022	1095-726X	https://www.sciencedirect.com/journal/journal-of-solid-state-chemistry	https://doi.org/10.1016/j.jssc.2022.123465	YES(Scopus)
28	Structural elucidation, voltammetric detection of dopamine, molecular docking and biological inspection of novel 4-aminoantipyrine derived Schiff bases in Co (II), Ni (II) and Cu (II) complexes	N Ranjitha, G Krishnamurthy , H S Bhojya Naik, Malathesh Pari, Lubna Afroz, K R Sumadevi, M N Manjunatha	Chemistry	Inorganica Chimica Acta	2022	1873-3255	https://www.sciencedirect.com/journal/inorganica-chimica-acta	https://doi.org/10.1016/j.ica.2022.121191	YES(Scopus)
29	Synthesis, structure, thermal, magnetic, dielectric properties of Ce ³⁺ doped M-type SrFe ₁₂ O ₁₉ and electrochemical determination of L-cysteine	J Lakshmikantha, G Krishnamurthy , R HanumanthaNaya k, Malathesh Pari, N Ranjitha, Nagaraj Naik	Chemistry	Inorganic Chemistry Communications	2022	1387-7003	https://www.sciencedirect.com/journal/inorganic-chemistry-communications	https://doi.org/10.1016/j.inoche.2022.110175	YES(Scopus)

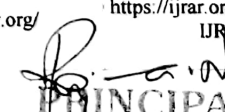
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30	Design of an efficient three component one-pot synthesis of -1,2,3,4-tetrahydro-4-oxo-6-(5-substituted 2-phenyl-1H-indol-3-yl)-2-thioxopyrimidine-5-carbonitrile as antimicrobial and antitubercular agent	Walmik, Prabhaker	Chemistry	Indian Journal of Chemistry	2022	NA	http://op.niscair.res.in/index.php/IJC/index	http://op.niscair.res.in/index.php/IJC/article/view/67200	NO
31	Phytoremediation of sewage and pond water by canna indica L	Rachitha C J, Sudakara H N and Krishnaswamy K	Botany	International Journal of Research and Analytical Reviews	2021	2348-1269	http://ijrar.com/	https://ijrar.org/viewfull.php?&p_id=IJRAR22D1672	NO
32	In vitro micropropagation techniques for (Musa spp) Banana grand-9 variety	Ramesh C K	Biotechnology	Research & Reviews in Biotechnology & Biosciences	2022	2321-8681	https://biotechjournal.in/images/paper_pdffiles/In%20-62b55c4c1e8c5.pdf	https://biotechjournal.in/images/paper_pdffiles/In%20-62b55c4c1e8c5.pdf	NO
33	Effect of integrated nutrient management on growth and yield attributes of yardlong bean (Vigna unguiculata subsp. Sesquipedalis(L.) verdc.)	M.Manjesh, H.N. Ramesh Babu , Nagarajappa Adivappar And Rajeshwari. N	Botany	J.Farm.Sci.	2022	0972-1061	https://epubs.icar.org.in/index.php/JFS	https://www.myresearchjournals.com/index.php/JFM/article/view/13059	NO
34	Assesment of physical and functional properties of finger millet grain varieties	Srusti S.N.R Ramesh Babu H.N Rajeshwari,N Kshemma E	Botany	International Journal of Chemical Studies	2022	2321-4902	https://www.chemijournal.com	https://www.chemijournal.com/archives/2022/vol10issue5/P	NO
35	Assay of antimicrobial activity of Sidaacuta (brum.f) by well diffusion method.	T J Nalini Ramesh Babu H.N Rajeshwari,N K Y Prathiba Keshamma E	Botany	International journal of current microbiology and applied sciences	2022	2319-7706	http://www.ijcmas.com/	https://doi.org/10.20546/ijcmas.2022.1109.021	NO
36	Analysis of Physico chemical properties of soil from Groundnut crop fields in Central Dry Zone of Davanagere District, Karnataka	Shaila M Nafeesa Begum	Botany	INDIAN JOURNAL OF APPLIED AND PURE BIOLOGY	2022	0970-2091	https://biology-journal.org/	http://biology-journal.org/journal/volume37/issue73/ijapb37-1-27.html	NO
37	Comparative study of vermicompost and DAP on the growth of Corianderum Sativam seed	Dr.NagarajParisara	Environmental science	Indian Journal of applied and pure biology	2022	0970-2091	https://biology-journal.org/	http://www.biology-journal.org/fulltext/v37i2/ijapb37-2-18.pdf	NO

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							Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
38	Importance of Bio Control Agents and Chemical Pesticides on the Yield of Crops in Shivamogga District	Dr.NagarajParisara	Environmental scien	Indian Journal of Natural Sciences	2022	0976-0997	https://tnsroindia.org.in/journals.html	https://tnsroindia.org.in/JOURNAL/issue74/ISSUE%2074%20OCTOBER%202022%20-%20FULL%20TEXT%20PART%20%2001.pdf	NO
39	Aquatic bird diversity in water bodies of Shivamogga district Karnataka	Dr.NagarajParisara	Environmental science	Indian Journal of applied and pure biology	2022	0970-2091	https://biology-journal.org/	http://biology-journal.org/journal/volume37/issue75/ijapb37-3-3.html	NO
40	Fish composition in a fresh water body of Shivamogga taluk-a case study in sogane tank	Dr Ashashree H M	Zoology	Indian Journal of applied and pure biology	2022	0970-2091	https://biology-journal.org/	https://biology-journal.org/journal/volume37/issue75/ijapb37-3-12.html	NO
41	Study on hydrobiology in relation to	Dr Ashashree H M	Zoology	Indian Journal of applied and pure biology	2022	0970-2091	https://biology-journal.org/	https://biology-journal.org/journal/volume37/issue73/ijapb37-1-11.html	NO
42	Hydrological characteristics in relation to fish composition in Tammadihalli tank of Bhadravathi taluk, Karnataka	Dr Ashashree H M	Zoology	Indian Journal of applied and pure biology	2022	0970-2091	https://biology-journal.org/	https://biology-journal.org/journal/volume37/issue74/ijapb37-2-12.html	NO
43	Avian species assemblage across a rural urban gradient in and around shivamogga, Karnataka	Dr.K.L Naik	Zoology	J bio & env.sci.	2022	2220-6663	www.innspub.net	https://innspub.net/avian-species-assemblage-across-a-rural-urban-gradient-in-and-around-shivamogga-karnataka/	NO
44	Insect composition and seasonal variations of Physico-Chemical parameters in purple Tank of Shivamogga District, Karnataka	Dr Ashashree H M	Zoology	Indian journal of Natural Sciences	2022	0970-2091	https://tnsroindia.org	https://tnsroindia.org.in/JOURNAL/issue70/ISSUE%2070%20FEB%202022%20FRONT%20PAGE%20PART%20-1.pdf	NO
45	Immunoglobulin E Specific to Carbohydrate Determinants and Its Relevance in Legume Allergic Cross-reactivity	Dr. B T Prabhakar	Biotechnology	Asian Journal of Immunology	2022	NA	https://journalaji.com/index.php/AJI/index	https://journalaji.com/index.php/AJI/article/view/80	NO
46	Diversity of macrofungi in Theirthahalli taluk of Shimoga district, Karnataka	Begum N, Abrar S and Krishnappa M	Botany	IJBPAS	2022	2277-4998	https://www.ijbpas.com/	https://doi.org/10.31032/IJBPAS/2022/11.7.6223	NO
47	Entonaema liquescens Moller, a new report to India	Nandan Patel K J , Kantharaja R, Krishnappa M, Krishna V	Botany	Funguy, In: Zoo's Print	2022	0973-2543	https://zoosprint.org/index.php/zp	https://zoosprint.org/index.php/zp/article/view/7479	NO
48	Edible fruit diversity in Shimogga district central Western ghats, Karnataka	Sowmya Hegde Krishna Swamy K	Botany	International journal of research and analytical reviews	2022	2348-1269	https://ijrar.org/	https://ijrar.org/viewfull.php?p_id=IJRAR22D1642	NO


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Research article

Characterization and biochemical activities of novel functional antimicrobial peptide (AMP) from *Trichogramma chilonis*

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ABSTRACT

Introduction and Aim: The antimicrobial peptides (AMPs) are generally found in invertebrates, mammals, birds, plants and insects. AMPs produced by insect parasitoids contribute to innate immunity to resist infection due to lack of adaptive immunity. *T. chilonis* is one of the most effective endoparasitoid wasps for controlling lepidopterous insects. Several attempts have been made to isolate, characterize and develop a commercially viable product of AMPs from various insect sources. The present study aimed to characterize AMP from *T. chilonis* for potential antimicrobial and anti-cancer properties.

Methods: AMP was identified through *T. chilonis* transcriptome sequence and designed *in silico* and synthesized. Its purity was quantified using RP-HPLC, and the mass identified by mass spectrophotometry. LC/MS-MS was employed to predict the sequence and the BLAST program used to compare the sequence. AMP was tested for haemolytic activity and antimicrobial activity. Two pathogenic bacteria and fungal strains were used and IC₅₀ values and MIC values were predicted against microbial strains.

Results: Synthetic peptide was found to be 95% homogenous with molecular weight of 3.48 kD. The peptide was identified to be a novel antimicrobial peptide consisting of 33 amino acid residues, and has a low computed instability index of -0.155 with high hydrophobic ratio of 27.27%. The antimicrobial activity revealed that *T. chilonis* antimicrobial peptide (TC-AMP) strongly inhibits the growth of selected human bacterial and fungal pathogens. While the haemolytic assay showed that the peptide did not obliterate human RBC *in vitro*. TC-AMP also showed an efficient inhibition of angiogenesis by *in vivo* model as evident by inhibition of vascularization.

Conclusions: AMP derived from the parasitoid has a potent antibiotic and anti-angiogenesis property. The peptide can be used as a potential antimicrobial and anticancer drug in near future with more detailed studies on its targeted applications.

Keywords: *Trichogramma chilonis*; insect peptide; angiogenesis; antimicrobial peptide (AMP).

INTRODUCTION

The egg parasitoid *Trichogramma* is a well-known biological control agent against many agricultural insect pests (1-2). The research on *Trichogramma chilonis* (*T. chilonis*) has primarily focus on studies related to increasing parasitism rate and mass rearing (3). To date, there are very limited investigations on biochemical characterization and molecular mechanism of parasitoid actions of *T. chilonis* as it's too small (0.2~0.4 mm) for experimental studies (4). Insects are known to synthesize antimicrobial peptides as part of the immune response to resist infection by microorganisms (5). Insects express the antimicrobial peptides in response to high ecological characteristics and are contemplated to be ingenious sources for

biologically active antimicrobial peptide (AMP) molecules. The AMPs known from insects are cationic in nature with proven growth inhibitory action against pathogenic fungi, parasites, virus and bacteria. In addition, these AMPs were reported to exhibit ant-cancer property against various tumour cells (6).

Generally antimicrobial peptides (AMPs) can be majorly grouped into four different families: cysteine-rich/Knottin peptides (e.g. defensins), glycine-rich peptides (e.g. serrulin), α -helical peptides (e.g. cecropins) and proline-rich peptides (e.g. colostrinin). Most insect originated AMPs are antifungal peptides characterized heretofore are of 4-6 kilo Dalton cysteine-equilibrated molecules, with structures comprise of α -helix with a β -sheet, antiparallel β -



Anti-inflammatory activity of quercetin-3-rhamnopyranosyl-(1-6) glucopyranoside isolated from *Delonix elata* against Freund's complete adjuvant induced inflammation in rats

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Delonix elata L. has been used for the treatment of pain and joint stiffness in the traditional medicines of Chitradurga District, Karnataka, India. In the present study, the anti-inflammatory activity of quercetin-3-rhamnopyranosyl-(1-6) glucopyranoside (QRP) isolated from *D. elata* stem bark extract was carried out against Freund's complete adjuvant (FCA) induced inflammation in rats. The anti-inflammatory activity was evaluated by various methods such as radiographic analysis of hind paws, measurement of paw volume, joint diameter assessment, erythrocyte sedimentation rate, serum nitrites concentration, myeloperoxidase activity, the activity of lysosome enzymes (acid phosphatase, β -glucuronidases and collagenolytic enzymes) and histological observations. Indomethacin was used as the standard drug. QRP showed significant attenuation in paw oedema of FCA-induced rats. Biochemical analysis in QRP treated animals revealed a significant reduction in the levels of erythrocyte sedimentation rate, serum nitrites concentration, myeloperoxidase activity, lysosome enzyme activities as compared to control animals. Results obtained in biochemical assays were supported by the histological observations. The present investigation demonstrated promising anti-inflammatory activity of quercetin-3-rhamnopyranosyl-(1-6) glucopyranoside and it could be the principal compound in *D. elata* stem bark extract. Thus, this study provides the scientific basis for the ethnomedicinal uses of *D. elata* for joint problems.

Keywords: Anti-inflammation, *Delonix elata*, Freund's complete adjuvant, Indomethacin, Radiographic analysis.

IPC code; Int. cl. (2021.01)- A61K 36/00, A61K 36/48, A61K 135/00, A61P 29/00

Introduction

Inflammation plays a significant role in the pathogenesis of various diseases like atherosclerosis, rheumatoid arthritis, asthma, and cancer. Non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used therapeutics for the treatment of inflammatory diseases. However, these NSAIDs exhibit various side effects like gastrointestinal ulcers, haemorrhage, and renal damage induced by long-duration administration which limits their usage for the treatment of chronic inflammation diseases¹. Thus, the development of new anti-inflammatory agents with reduced side effects is a matter of pressing concern.

Medicinal plants have been the main remedy to treat various ailments for a long time and nowadays, many drugs have been developed from traditional

medicine. Research into natural compounds found on their ethnopharmacological information has provided significant contributions to drug development and has paved the way for new pharmacological tools². Studies using *in vivo* models of inflammation have led to the identification of a variety of natural extracts with proven anti-inflammatory activities³⁻⁶. Although the anti-inflammatory functions of natural extracts were initially described, it was the key role of follow-up phytochemical and pharmacological studies that led to the identification and characterization of a variety of natural active compounds.

Delonix elata L. belongs to the family Caesalpiniaceae and is found in India's dry forests. Traditional medical practitioners residing in the villages of Chitradurga, Karnataka (India) have been using leaves and stem bark extracts of *D. elata* for curing pain and joint problems. In previous studies, authors reported the wound healing activity of *D.*

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Synthesis of silver nanoparticles using the seed extract of *Ensete superbum* and their antibacterial activity assessment

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Seeds of *Ensete superbum* have been used in Ayurvedic medicine to treat kidney stones and diabetes. The current work report the synthesis and characterization of silver nanoparticles (AgNPs) and their antibacterial property. The synthesis of AgNPs was done by mixing silver nitrate solution with aqueous *E. superbum* seed extract. The pale-yellow colour of the seed extract was changed to deep brown due to the reduction of silver ions to AgNPs, under ambient conditions. The characterization of AgNPs was carried out by UV-Visible spectroscopy, TEM, XRD, and FTIR. The peak absorbance of the UV-Vis spectra was at 420 nm confirming the formation of AgNPs. TEM showed the existence of spherical and hexagonal-shaped nanoparticles. XRD results show that the AgNPs were face-centered cubic (fcc) lattices. FTIR analysis established a link that the presence of different classes of compounds viz. flavonoids, alkaloids, saponins, and terpenoids in *E. superbum* seed extract is responsible for the reduction and stabilization of AgNPs. The current study aims to point out the application of AgNPs as an antibacterial agent against *S. typhi*, *P. aeruginosa*, *K. pneumoniae*, and *V. cholerae*, using the well diffusion method. The AgNPs effectively inhibited bacterial growth against *P. aeruginosa* and *S. typhi*.

Keywords: Antibacterial activity, *Ensete superbum*, Musaceae, Seed extract, Silver nanoparticles.

IPC code; Int. cl. (2021.01)-A61K 36/00, A61K 131/00, A61P 31/00

Introduction

Nowadays, researchers show a great interest in synthesizing metal and metal oxide nanoparticles (NPs) using plant extract. They are environment-friendly, stable, clinically adaptable, biocompatible, and cost-effective. Among metal NPs¹, silver nanoparticles (AgNPs) are gaining enormous interest in the research community due to their wide scope of application in microbiology, pharmacology, and parasitology. Biogenic synthesis of AgNPs using plant extract as a reducing agent and their antibacterial activity is widely reported².

Plant seed extracts are well established for the biosynthesis of nanoparticles. To date, various seed extracts have been utilized for the biosynthesis of AgNPs. Several plant seed extracts such as *Durio zibethinus*³, *Tectona grandis*⁴, *Persea americana*⁵, and *Trigonella foenum-graecum*⁶ produced AgNPs with high antimicrobial activities. Several plant seeds such as *Nigella arvensis*⁷, Linseed⁸, *Embelia ribes*⁹,

*Melissa officinalis*¹⁰ are used for the synthesis of spherical shape AgNPs.

Ensete superbum (Roxb.) Cheesman. (Musaceae Family) is commonly known as wild banana. It is found in the Western Ghats of India. The plant is well documented for culinary (vegetables and fruits) and multiple medicinal requirements of the local people, traditional healers, and many communities of India and Ethiopia¹¹. Seeds and pseudostem of *E. superbum* are reported to be used for the treatment of diabetes, debility, calculi, measles, leucorrhoea, stomachache, chickenpox, smallpox, and child delivery-related pain in Ayurveda¹¹. Fruits are used for the treatment of burning sensation and kidney stones by the communities in the Western Ghats, Shimoga region, Karnataka¹². People of coastal Karnataka utilize stems, fruits, and seeds for food purpose¹³. TLC study of the seeds and pseudostem of *E. superbum* has revealed the presence of carbohydrates, flavonoids, alkaloids, saponins, and terpenoids^{14,15}. Chroman derivative (C₁₆O₄H₂₂) and tetrahydro-β-carboline were isolated from *E. superbum* seed and pseudostem^{16,17}. Seeds contain fatty oil, proanthocyanidin, triterpenoid esters,

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Biogenic Collagen-Nano ZnO Composite Membrane as Potential Wound Dressing Material: Structural Characterization, Antibacterial Studies and In Vivo Wound Healing Studies

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Abstract

The practical applicability of collagen, a natural polymer, as a wound dressing material is hindered due to its reduced stability and poor mechanical strength. The present work demonstrates enhanced mechanical strength and improved bioactivity of biogenic nano-ZnO incorporated collagen membrane (nano-bio-composite membrane) compared to bare collagen membrane. Nano-ZnO was prepared by biogenic approach using pomegranate peel extract. Collagen was isolated from *Labeo rohita* fish scales by acid extraction method. Nano ZnO was incorporated into collagen membrane using melt casting method. The bio-composite membrane was characterized by XRD, SEM, color elemental mapping and FTIR. Agar well diffusion and disc diffusion methods were used to screen the antibacterial activity against Gram positive and Gram negative bacteria. In vivo wound healing activity of the nano-bio-composite membrane was tested on Albino rats that were subjected to excisional and incisional wounds and results were compared with control and bare collagen membrane. Antibacterial activity of nano-bio-composite membranes against both Gram positive and Gram negative bacteria were enhanced when compared to that of bare collagen membrane. The nano-bio-composite membrane exhibited enhanced wound healing activity on both incisional and excisional wounds. The nano-bio-composite membrane treated group exhibited higher wound contraction, enhanced rate of epithelialization and excellent tensile strength restoration of healing skin, which was comparable to that of standard group. The obtained results inferred the fabricated nano-bio-composite membrane, with enhanced bioactivity and mechanical strength, can be a potential dressing material for wound care.

Keywords Biogenic collagen · Nano ZnO · Nano-bio-composite membrane · Antibacterial · In vivo wound healing

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1 Introduction

Effective wound healing requires faster healing process with minimal scar formation [1]. Wound dressing material itself sometimes causes infection, due to the interface between dressing material and wound exudates, and existence of non-sterile conditions. Commercially available wound dressing materials have drawbacks such as, poor mechanical strength; non-porous nature; adherence nature on to the wound surface; causes trauma while being peeled off; and poor antimicrobial activity [2]. Effective wound care management relies on the right choice of the dressing material and designing of wound dressing material is hence an area of active research. Optimum design of wound dressing material should be such that the dressing material must heal the wound faster, maintain optimum conditions needed, maintain moist environment, have good swelling ability and act as antimicrobial agent.

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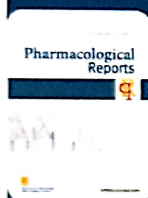
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Antiproliferative pharmacophore azo-hydrazone analogue BT-1F exerts death signalling pathway targeting STAT3 in solid tumour

Article | Published: 10 January 2022

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Abstract

Background

Anomalous activation of intra-cellular signalling cascades confers neoplastic properties on malignant cells. The JAK2/STAT3 proteins play a pivotal role in the pathogenesis of most of the solid malignancies. The over expression of STAT3 in these tumours results in an evasion of apoptosis and thereby pathogenesis. Hence, strategy to target STAT3 to regress tumour development is an emerging new concept. As an approach, anti-neoplastic drug, Azo-hydrozone analogue, BT-1F with potential anti-proliferative effect was evaluated to demonstrate its capacity to counteract STAT3 signal with mechanistic approach.

Research article

Characterization of antioxidant, anti-cancer, and immunomodulatory functions of partially purified garlic (*Allium sativum* L.) lectin

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ABSTRACT

Introduction and Aim: The metabolic and oxidative stress induces highly reactive free radicals that are known to harm normal physiology and play a role in the development of cancer. Elevated levels of these free radicals contribute to excessive neovascularization leading to angiogenesis mediated cancer progression. Targeting these free radicals through dietary source is important strategy in regulation of cancer. *Allium sativum* L. (*AsL*) garlic has important multi pharmacological properties. On the other hand, dietary lectins are proven to be the best anti-cancer molecules. The study presents investigation that focus to assess the antioxidant, immunomodulatory and anticancer activities of partially purified garlic lectin (PPAsL).

Materials and Methods: Fresh garlic bulbs were processed and evaluated for lectin induced HA activity. Further the garlic lectins (*AsL*) were partially purified by ammonium sulphate precipitation and dialysis and analyzed through SDS-PAGE. Further lectins were characterized by producing Anti-*AsL* polyclonal antibodies and purification by affinity chromatography. Pharmacological evaluations of the lectins were assessed through antioxidant, anti-proliferative and antiangiogenic mediated anti-cancer activity.

Results: Lectin positive activity was confirmed by HA activity and partial purification lectin identified ~12kDa protein having Glc/Man glycan specificity. The polyclonal antibodies raised against PPAsL, confirmed that it has potent immunogen. Pharmacological evaluation confirmed that PPAsL has potent antioxidant, antiangiogenic and antiproliferative effect both *in-vitro* and *in-vivo*.

Conclusion: PPAsL is potent antioxidant, anti-proliferative and anti-cancer molecule. The dietary recommendation of the garlic lectin is an important therapeutic strategy against the cancer.

Keywords: Immunostimulatory; neovascularization; antioxidant; anti-angiogenic; anti-cancer.

INTRODUCTION

The molecules with antioxidants property are considered to have a vital role in physiological defense mechanism against free radicals induce oxidative damage. These oxidants are catastrophic by-products raised through aerobic metabolic activity during normal energy deriving reactions of the cells. Antioxidants can neutralize and prevent oxidative damage that causes various inflammatory stress and degenerative diseases. Uptake of various types of antioxidants through diet can maintain the normal physiological functions of living system. Several edible fruits and vegetables are abeyant to decrease the hazardous effect of several diseases, like inflammation and cancer (1). The lectins present in the dietary constituents were known to have antioxidant property providing with possible

protective role in disease tolerance (2). Elevated expression of free radicals induced such as peroxides contribute to neovascularization and thereby increase progression of the malignancy. Comprehensive studies have emphasized the vital interrelationship among immunomodulatory and angiogenesis. Substantial evidence from many experiments demonstrates that T-cells are the key for anti-angiogenic immune response. This recommends the conjugative approach embracing immunostimulatory and anti-angiogenic aspects has convincing immunotherapeutic strategies for treating cancer (3, 4) with immunostimulatory, anti-angiogenic dietary constituents.

In the last decades, dietary lectins with specific glycan binding potential have gained an importance as indispensable tools in biology research. Lectins have



A systems biology investigation of curcumin potency against TGF- β -induced EMT signaling in lung cancer

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Abstract

Curcumin (diferuloylmethane) is bioactive phenolic compound which exerts diverse antimetastatic effect. Several studies have reported the antimetastatic effect of curcumin by its ability to modulate the epithelial-to-mesenchymal transition (EMT) process in different cancers, but underlying molecular mechanism is poorly understood. EMT is a highly conserved biological process in which epithelial cells acquire mesenchymal-like characteristics by losing their cell–cell junctions and polarity. As a consequence, deviation in cellular mechanism leads to cancer metastasis and thereby death. In this perspective, we explored the antimetastatic potential and mechanism of curcumin on the EMT process by establishing in vitro EMT model in lungs cancer (A549) cells induced by TGF- β 1. Our results showed that curcumin mitigates EMT by regulating the expression of crucial mesenchymal markers such as MMP2, vimentin and N-cadherin. Besides, the transcriptional analysis revealed that the curcumin treatment differentially regulated the expression of 75 genes in NanoString nCounter platform. Further protein–protein interaction network and clusters analysis of differentially expressed genes revealed their involvement in essential biological processes that plays a key role during EMT transition. Altogether, the study provides a comprehensive overview of the antimetastatic potential of curcumin in TGF- β 1-induced EMT in lung cancer cells.

Keywords EMT · TGF- β · Curcumin · NanoString · PanCancer · PPI · Metastasis

Vladimir Potemkin: Deceased.

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Introduction

Epithelial-to-mesenchymal transition (EMT) is a highly conserved and complex biological process by which epithelial cells undergo modifications acquiring mesenchymal-like phenotypes by losing cell–cell junctions and polarity (Kalluri and Weinberg 2009). The reverse process of EMT is known as mesenchymal-to-epithelial transition (MET), where mesenchymal cells dedifferentiate back to epithelial cells (Singh and Settleman 2010). Both EMT and MET processes are playing a pivotal role in the normal and pathophysiological processes such as normal embryogenesis in the formation of mesoderm and neural crest cells, formation of the placenta, development of fibroblasts, tissue fibrosis, wound healing and cancer metastasis (Kalluri and Weinberg 2009). During the EMT process, cuboidal epithelial cells acquire motile elongated fibroblast-like (or spindle-like) mesenchymal morphology; as a result, cells detach from the epithelial basement lining. Down the process, a series of post-EMT events could be found in human cancers, where detached cells undergo

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Corosolic Acid Inhibits Secretory Phospholipase A₂Ila as an Anti-Inflammatory Function and Exhibits Anti-Tumor Activity in Ehrlich Ascites Carcinoma Bearing Mice

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Background: Inflammation is generally connected to tumour progression and development. The secretory phospholipase A₂Ila (sPLA₂Ila) is an important inflammatory enzyme that catalyse the hydrolysis of membrane phospholipids into arachidonic and lysophosphatidic acid, which are the precursors for production of a lot of pro-inflammatory mediators like prostaglandins, prostacyclins, thromboxanes, leukotrienes and platelet activating factors, which involved in the proliferation, migration, invasion, and metastasis. Therefore, investigating safe and effective sPLA₂Ila inhibitors as a therapeutic agent to treat cancer is indeed in need.

Methods: Anti-inflammatory function of corosolic acid was evaluated by docking it with sPLA₂Ila enzyme, sPLA₂Ila inhibition, calcium and substrate concentration-dependent assays; intrinsic fluorescence and UV-CD analysis; neutralisation of sPLA₂Ila induced indirect hemolytic and edema. Evaluated the anticancer activity of corosolic acid by MTT assays and caspase-3 expression; the anti-tumour activity by EAC-induced cell line and interleukin 6 expression.

Results: The corosolic acid inhibits sPLA₂Ila activity to 82.21±2.82%. The inhibition was evaluated by increasing calcium from 2.5 to 15 µM and substrate from 20 to 120 nM, it did not affect the level of inhibition. Corosolic acid altered the intrinsic fluorescence and UV-CD spectra of sPLA₂Ila enzyme, indicating the direct interaction. It neutralised sPLA₂Ila induced hemolytic activity from 97 ±1.23% to 15.75±1.44% and edema from 171.51±2.39% to 119.3±2.6%. Further, as antiproliferative activity, corosolic acid reduced the PC3 cell viability from 99.66±0.57% to 23±2.64% and suppressed LPS-induced IL-6 level from 94.35±2.2% to 34.36±2.4%. It increased mean survivability time from 30 to 38 days and displayed the drug-like qualities.

Conclusion: All the experimental results have proven the corosolic acid as an anti-inflammatory and anticancer molecule that may further be used to develop it as a drug.

Keywords: corosolic acid, antioxidant, secretory phospholipase A₂ Ila inhibition, caspase 3, IL-6, prostate cancer, EAC, ADME-toxicity, Anti-inflammatory

Introduction

Inflammation generally promotes or suppresses the tumour progression.¹ Neoplasia initiates the inflammation-related pathway (intrinsic pathway) that leads to the development of the microenvironment and inflammatory reactions (extrinsic pathway) that

PHYTOCHEMICAL INVESTIGATION AND IN-VITRO ANTIOXIDANT POTENTIALS OF *Adenocalymma alliaceum*

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ABSTRACT

Screening of antioxidant potential in different extracts of *Adenocalymma alliaceum* leaves were analysed by free radical scavenging activity. Aqueous, hexane and methanolic extracts of *Adenocalymma alliaceum* leaves (AAAE, AAHE and AAME) were determined using various *in vitro* radical scavenging activities viz., DPPH, superoxide anion, nitric oxide, hydroxyl, iron chelating and reducing power assays at different concentrations. Phytochemical constituents, total polyphenolic and total flavonoid content of each of the extracts were determined. AAME showed high free radical scavenging activity as evidenced by the low IC₅₀ values in DPPH (142.05 µg/mL), superoxide (133.14 µg/mL), nitric oxide (161.05 µg/mL), hydroxyl (145.47 µg/mL) and in ferrous ion chelating (152.94) assays than AAAE and AAHE. In addition, the high reducing ability was reported in AAME followed by AAAE and AAHE. Furthermore, the total polyphenolic and total flavonoid content of the extracts were found to be high in AAME of 310.88±0.217 µg gallic acid equivalent per mg of extract and 86.98±0.012 µg quercetin equivalent per mg of extract respectively followed by AAAE and AAHE. *Adenocalymma alliaceum* could be used as available source of natural antioxidants, which might be helpful in preventing or reducing the progress of oxidative stress and the disorders associated with free radicals induced tissue damage.

Keywords: Polyphenolics, Flavonoids, *Adenocalymma alliaceum*, Antioxidants, Free radicals

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INTRODUCTION

Free radicals are responsible for more than a hundred human disorders, including atherosclerosis, arthritis, ischemia, liver disease, and reperfusion injury to multiple tissues, damage to the central nervous system, gastritis, and cancer. (Kumpulainen and Salonen, 1999; Pallavi et al., 2017). Free radicals play a significant role in the aetiology of age-related disorders such as hypertension, atherogenesis, Alzheimer's, and Parkinson's disease. (Adefegha and Obboh, 2011). Several commercially available synthetic antioxidants, such as tertiary butyl hydroquinone (TBHQ), butylated hydroxytoluene (BHT), propyl gallate (PG), and butylated hydroxyanisole (BHA), have shown efficacy in preventing oxidative damage brought on by free radicals in the human body. (Issa et al., 2006; Kaliora et al., 2006).

Nowadays, the use of synthetic antioxidants is limited because of their toxicity and harmful effects on human health. (Sasaki et al. 2002; Bajpai et al. 2014). Important metabolites found in medicinal plants, which have the potential to have anti-inflammatory, antibacterial, antioxidant, and anticancer properties, are abundant in these plants. (Hernandez et al. 2000; Polya, 2003; Maruthanila et al., 2014).

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HEPATOPROTECTIVE EFFECT OF ADENOCALYMMMA ALLIACEUM LEAVES EXTRACT AGAINST ETHANOL INDUCED TOXICITY IN HepG2 CELL LINE

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ABSTRACT

The *in vitro* Hepatoprotective effect is studied by ethanol-induced toxicity in HepG2 cell lines. The cytotoxic and hepatoprotective effects of hexane, methanol and aqueous extracts (AAHE, AAME and AAAE) of leaf of *Adenocalymma alliaceum* was evaluated by measuring cell viability; activities of lactate dehydrogenase (LDH), alanine aminotransferase (ALT) and aspartate aminotransferase (AST). A significant ($P < 0.001$) decrease was observed in LDH, ALT and AST release from HepG2 cells treated with different concentration of AAHE, AAME and AAAE in the presence of ethanol and compared to that of ethanol treated cells. Furthermore, a significant increase in cell viability was also observed in HepG2 cells treated with AAHE, AAME and AAAE in the presence of ethanol and compared to that of ethanol induced liver toxicity ($p < 0.001$). Among the three test extracts of *Adenocalymma alliaceum*, AAME (*Adenocalymma alliaceum* methanol extract) at 100 µg/ml was found to exhibit higher hepatoprotection than AAHE and AAAE. The results suggest that the different extracts (AAHE, AAME and AAAE) of *Adenocalymma alliaceum* exerts hepatoprotective activity against ethanol induced liver toxicity in HepG2 cell lines by decreasing the activity of hepatic enzymes such as LDH, ALT and AST and increasing the viability of cells which are comparable to that of standard drug Silymarin.

Keywords: Hepatoprotective, *Adenocalymma alliaceum*, Silymarin, HepG2

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Synthesis and pharmacological activities of 1-(1-naphtho[2,1-*b*]furan-2-yl)ethylidene(arylsubstituted)thiosemicarbazide derivatives and 1-(1-naphtho[2,1-*b*]furan-2-yl)ethylideneamino)-2-thioxoarylsubstituted imidazolidin-4-one derivatives

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Some new naphtho[2,1-*b*]furan derivatives containing carbothiamide group and imidazolidine heterocycle have been synthesized. Antimicrobial and pharmacological activities of the synthesized compounds have been carried out. The newly synthesized compounds have been characterized by IR, ¹H NMR and mass spectral studies.

Keywords: Naphtho[2,1-*b*]furan, carbothiamide, imidazolidin, antimicrobial, pharmacological activities

Carbothioamides exhibit high range of biological activities including anti TB¹, antioxidant², antiulcer³, and anticancer⁴⁻⁶ activities. Naphtho[2,1-*b*]furan derivatives were known to show various biological⁷ and pharmacological activities⁸⁻¹¹.

Imidazolidins are important heterocycles found in many biologically active compounds. They exhibit high range of biological activities including anticonvulsant¹², antihypertensive¹³ and antiulcer^{14,15} activities. Naphtho[2,1-*b*]furan derivatives were known to show various biological and pharmacological activities. Imidazoliolone moiety plays a vital role in medicinal chemistry. Hence it was thought to synthesize aryl derivatives of Naphtho[2,1-*b*]furan carbothioamide and naphtho[2,1-*b*]furan derivatives with imidazolidine ring by simple method and screened them for pharmacological activities.

Results and Discussion

Carbothioamides and imidazolidins found to show a wide range of biological and pharmacological activities. In view of this we synthesized 1-(1-naphtho[2,1-*b*]furan-2-yl)ethylidene(arylsubstituted) thio semicarbazide derivatives and 1-(1-naphtho[2,1-*b*]furan-2-yl)ethylideneamino)-2-thioxoarylsubstituted

imidazolidin-4-one derivatives starting from 2-hydroxy-1-naphthaldehyde **2** with the use of chloroacetone, hydrazine hydrate and various aryl isothiocyanates by following simple reaction methods.

The compound 1-(naphtho[2,1-*b*]furan-2-yl)ethanone **3** was synthesized by condensing 2-hydroxy-1-naphthaldehyde **2** with chloroacetone in presence of potassium carbonate in acetone. The compound **3** on treatment with hydrazine hydrate in presence of catalytic amount of acid produced 1-(1-naphtho[2,1-*b*]furan-2-yl)ethylidene)hydrazine **4**. The compound **4** on treatment with 4-methylphenylisothiocyanate in DMF produced **5f**. Similar method was employed to get compounds **5(a-e)** from **4** with phenyl isothiocyanate, 4-fluorophenyl isothiocyanate, 3-chlorophenylisothiocyanate, 4-nitrophenylisothiocyanate and benzylisothiocyanate. The selection of arylisothiocyanates was based on electron withdrawing and electron donating groups/which could enable to study structure activity relationship during the evaluation of pharmacological activities. The compound **5a** on treatment with chloroacetyl chloride in 1,4-dioxan medium produced **6a**. Similar method was employed to get compounds **6(b-f)** from **4** with chloroacetyl chloride. The newly synthesized compounds were evaluated for

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SYNTHESIS, CHARACTERIZATION, AND ANTIBACTERIAL ACTIVITIES OF NAPHTHO[2,1-*b*]FURAN DERIVATIVES

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ABSTRACT

The naphthofuran and its derivatives are important biological compounds so we have focused on the synthesis of naphthofuran derivatives. The synthesized compounds of ethyl 1-(acetylamino)-5-nitronaphtho[2,1-*b*]furan-2-carboxylate (3), and *N*-[2-(hydrazinylcarbonyl)-5-nitronaphtho[2,1-*b*]furan-1-yl]acetamide (4) used for the synthesis of *N*-(2-[[2-(2-benzylidenehydrazinyl)carbonyl]-5-nitronaphtho[2,1-*b*]furan-1-yl]acetamide compounds of four derivatives 5 (a-d) and 1-acetamido-5-nitro-*N*-(5-oxo-2-phenylthiazolidin-3-yl)naphtho[2,1-*b*]furan-2-carboxamide compounds of four derivatives 6 (a-d). The prepared compounds were confirmed by FTIR NMR, and mass methods. The prepared naphthofuran derivatives used for the *antibacterial* activity versus both Gram(+ve) and Gram(-ve) bacteria show excellent results. Therefore the synthesized compounds are used for further *antibacterial* studies in the medical field.

Keywords: Naphthofuran, Antibacterial, Heterocyclic, Biological Activity, Naphthol.

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INTRODUCTION

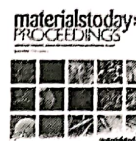
In medicinal chemist, nitrogen, oxygen, and sulfur-containing heterocycles are important f compounds. The naphthofuran is an organic derivative formed from the naphthalene ring into a heterocyclic furan ring.¹ Naphthofuran molecule has good structural moieties so it is used in important natural biological products and shows good biological and pharmacological activities.²⁻⁴ Therefore, an attempt has been made to synthesize various novel *N*-substituted naphthofuran carboxamides carrying naphthofuryl rings and to study their antibacterial activities. So that we selected the naphtho[2,1-*b*]furan derivatives are chosen in the research work. Many synthetic compound with furan ring skeleton correlated with novel biological activities like *antibacterial*, *antifungal*⁵⁻⁷, *antitumor*⁸⁻⁹, *antiviral*¹⁰, *anti-trypanosomal*, *cytotoxicity*¹¹, and *anthelmintic*.¹² Thiazole is yet another major class of five-membered heterocyclic ring systems. Various naphtho [2,1- *b*]furan derivatives are fused with thiazole moiety and have been prepared and studied for many biological and pharmacological activities such as *antibacterial*, *antifungal*, *diuretic*, *anthelmintic antimicrobial*, *analgesic*, and *anti-inflammatory*.¹³

In this present work in order to study the various antibacterial activities we have described the synthesis of new naphthofuran derivatives of compound (3), and compound (4) used for the synthesis of *N*-(2-[[2-(2-benzylidenehydrazinyl)carbonyl]-5-nitronaphtho[2,1-*b*]furan-1-yl]acetamide compounds of four derivatives 5 (a-d) and 1-acetamido-5-nitro-*N*-(5-oxo-2-phenylthiazolidin-3-yl)naphtho[2,1-*b*]furan-2-carboxamide compounds of four derivatives 6 (a-d). The prepared compounds were confirmed by NMR, FTIR, and mass, methods. The prepared naphthofuran derivatives were used for the antibacterial activity versus both Gram(+ve) and Gram(-ve) bacteria shows excellent results.



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Design, spectral, thermal, DFT studies, antioxidant and molecular docking studies of pyrazole-based schiff base ligand and its metal (II) complexes

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ABSTRACT

Metal (II) complexes of Co(II), Ni(II), Cu(II), and Zn(II) with schiff base derived from pyrazole were synthesized and investigated by elemental analysis, magnetic susceptibility, thermogravimetric, IR-spectra, and UV-visible spectroscopy. The Ni (II) and Cu (II) complexes have square planar geometry, while the Co (II) and Zn(II) complex has a distorted trigonal-bipyramidal geometry and octahedral geometry. The kinetic parameters of order of decomposition process, activation energy, and frequency factor were determined using thermogravimetric analysis data. Additionally DFT Studies were performed to investigate the molecular level (Optimization geometry, HOMO, LUMO, Molecular electrostatic potential) understanding of the compounds, the schiff base and metal (II) complexes are screened for antioxidant activity, results shows highest scavenging activity towards Cu(II) complex. Further in addition to this molecular docking studies were performed with protein receptor PDB: 3MNG exhibits highest binding interactions with all the metal (II) complexes.

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1. Introduction

Pyrazoles are important nitrogen heterocyclic compounds because their 1,2-diazine unit would provide endogenous bridging between two comparable or unique transition or inner transition metal ions. Pyrazole derivatives are well-known in the literature as major physiologically active heterocyclic chemicals. Due to their wide range of possible biological effect and pharmacological effect, these compounds are the topic of several research studies. [1]. The pyrazole nitrogens' nucleophilicity and steric accessibility are expected to be supplemented by appropriate ring substitutions [2], particularly at the 3 and 5 positions. A new class of antibacterial drugs known as thiazolyl-pyrazoline and morpholinoquinoline clubbed pyrazoline has recently been discovered. [3,4]. 2-Pyrazolines have antioxidative and clastogenic properties [5], and pyrazoline derivatives with various substitutions demonstrate

electroluminescence and photoluminescence in OLEDs. With transition metal complexes like copper, the combination of thiosemicarbazone, semicarbazone, and pyrazoline fragments has gotten a lot of interest are reported in the literature [6,7]. Because coordination complexes can directly affect the 3d-structure of DNA through the binding of the nucleotide's N-7 nitrogen, they are known to be employed as potential pharmacological components in cancer therapy. The nucleophilicity and labiality of the ligand, as well as the type of the metal ion, determine a compound's capacity to bind and cleave DNA. Non-covalent interactions such as electrostatic, intercalative, and groove binding are used by metal complexes to bind to DNA, preventing the cell from replicating further. The infected cell eventually dies as a result of this replication inhibition.

In the present study, We have synthesized biologically active nickel (II), cobalt (II), copper (II), and zinc (II) complexes from condensing 5-chloro-3-methyl-1-phenyl-1H-pyrazole-4-carbaldehyde and thiosemicarbazide and structurally characterized using a number of physicochemical and spectroscopic approaches. The Electronic, magnetic, and TGA experiments were used to explore the

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Synthesis, spectral characterization, electrochemical studies of pesticide and biological evaluation of transition metal complexes of azo dye derived from substituted phenyl pyrazole

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Highlights

- Ligand and metal complexes were characterized via different spectral techniques.
- The electrocatalytic activity of Co complex was studied by CV using modified GCE for various concentration of pesticide.
- Novel, 3d metal chelates were synthesized and characterized by physico-chemical methods.
- The antimicrobial, antioxidant and cytotoxicity studies of ligand and metal complexes were performed.

Abstract

Diazotization of p-nitro aniline followed by coupling with 3-methyl-1-phenyl pyrazole to procure biologically active azo-dye ligand 3-methyl-4-[(*E*)-(4-nitrophenyl) diazenyl]-1-phenyl-1*H*-pyrazol-5-ol (NDP) and also the array of transition metal complexes of aforementioned azo-dye ligand has been carried off along with the use of metal complex to detect pesticides electrochemically. Structural verification of synthesized compounds was carried out via ¹H and ¹³C NMR along with the percentage of C,H,N, molecular weights, Infra-red, UV-Visible spectra and molar conductance of ligand and its complexes was observed. Also TGA, P-XRD and CV measurements were noted. An antimicrobial potency was evaluated by well diffusion method and antioxidant efficacy by DPPH technique. Molecular docking studies was used and MTT tests were conducted on MCF-7 and Hela cell lines to investigate anticancer potency. Upon utilizing physical and spectroscopic techniques to characterize the novel azo-dye ligand and its transition coordinated compounds justified the bi-dentate nature of ligand. Further CV measurements showed that the synthesized Co(II) complex exhibited excellent electrocatalysis properties for the electrochemical sensing of pesticide (Ammonium salt of glyphosate 71% SG) with wider linear range of 0.1 μM–0.8 μM and detection limit 0.033 μM. Mn(II) and Co(II) complex displayed good anti-microbial activity along with cytotoxic potency whereas Co(II) and Cu(II) compounds indicated good anti-oxidant activity. Thus, NDP and its complexes being structurally supported via spectral data and CV studies affirms that Co(II) is strongly useful in detecting pesticide. And lastly it was found that all metal complexes have admirable bioefficacy when compared to ligand.

Graphical abstract



Tangent-hyperbolic nanoliquid flow in a microchannel, thermal and irreversibility rate analysis

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ABSTRACT

The objective of the current investigation is to examine the influence of buoyancy force, heat source, Brownian motion, thermophoresis, chemical reaction, transverse magnetic field and convective boundary condition on flow of tangent-hyperbolic nanofluid through an upright microchannel. The nonlinear partial differential equations are changed into ordinary differential equations by means of similarity transformations. The RK45 method along with the shooting technique is used to solve the fluidic system numerically. The Buongiorno model is considered to observe the influence of thermophoresis, Brownian motion and chemical reaction with mixed convection. Graphical and numerical illustrations are presented to visualize the behavior of different parameters of interest on velocity, temperature, concentration and entropy generation of the flow system. The substantial findings of this study have been recorded as the amplification in the thermal and solutal Grashof number causes an increment in the flow rate in a channel, the thermal energy builds up with Brinkman number and heat source parameter, another significant outcome of the present analysis is that there is a downfall in the concentration field with the strengthening of thermophoresis parameter.

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KEYWORDS

Hyperbolic tangent nanofluid; Brownian motion; thermophoresis; chemical reaction; mixed convection

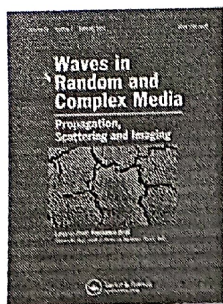
Nomenclature

f	dimensionless velocity
f'	axial velocity (m/s)
n	power law index
g	gravitational force (m/s^2)
T	temperature of the fluid (K)
T_∞	ambience temperature (K)
T_w	injected hot fluid temperature (K)
p	pressure (kg/m s^2)
$(C_p)_p$	heat capacitance of the nanofluid (J/kg/K)
Q_0	heat source co-efficient ($\text{W/m}^2 \text{K}$)
D_B	Brownian motion co-efficient
D_T	thermophoresis co-efficient

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Effect of NP shapes on Fe_3O_4 – Ag/kerosene and Fe_3O_4 – Ag/water hybrid nanofluid flow in suction/injection process with nonlinear-thermal-radiation and slip condition; Hamilton and Crosser's model

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Mixed convective flow of Casson nanofluid in the microchannel with the effect of couple stresses: irreversibility analysis

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ABSTRACT

The current cutting-edge modelling involves mixed convection and couple stress influences on the velocity and thermal distribution of the flow of Casson nanomaterial in possession of microchannel. This study elucidates the mass and heat transport of Casson nanomaterial in the upright microchannel in the existence with non-linear thermal radiation, Brownian motion and thermophoresis. Along with the flow, the particle size effects are also taken into consideration. The channel walls facilitate the sucking/injecting the fluid into the microchannel. Viscous dissipation and buoyant forces are deliberated in the study. Slip regime and convective conditions are taken at the boundaries. By making use of velocity and thermal profile, the entropy produced and dominance of heat or fluid friction irreversibilities are analyzed. The obtained equations are non-dimensionalized using non-dimensional entities and further solved using Runge-Kutta Fehlberg 4–5th order procedure together with shooting technique. Illustrations of the graph exemplify the outcomes of the work. The impact of couple stress parameter depicts the depletion of velocity profile as the couple stress takes into consideration the size effect of the particle, which enhances viscosity and hence declines velocity of the flow. The irreversibility in the channel can be achieved to be least when the thermal and solutal Grashof number is kept low.

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KEYWORDS

Casson nanomaterial; couple stress; mixed convection; Brownian motion; thermophoresis; slip regime

1. Introduction

Latest technology and industries involve most of the processes where mixed convection which is a result of simultaneous presence of forced and free convection is practiced. Examples are electrical apparatus cooled using fans, heat-exchangers kept in a lower velocity atmosphere, to cool the nuclear reactor when there is emergency shutdown. Hayat et al [1] inquired the similar flow but over a nonlinearly stretched sheet. Abbasi et al [2] looked into dually stratified flow of Maxwell nanomaterial by production or absorption of heat. Their result summarize that Deborah number magnifies the temperature. Idowu et al [3] investigated the Casson fluid flow in annular geometry under non-linear convection effect. Shamshuddin et al [4] computed radiative-reactive mixed convective viscoelastic nanofluid flow and thermal-solutal transport over a stretching sheet.

Non-Newtonian fluid exploration is acknowledged to be in focus from the decades as it has uses in plenty of areas. Casson fluid because of its rheological qualities is brought down under non-Newtonian fluid. Attia and Sayed-Ahmed [5] explored MHD flow for a conducting Casson fluid flowing in a rectangle-shaped channel. Khan et al [6]

reported Casson fluid flow accompanied with chemical reactions. There is upsurge in concentration by escalating the Schmidt number -was attained from their results. Nagaraja and Gireesha [7] also contributed for the study of same fluid but over a curved sheet that is likely stretched. Casson parameter shows that prominent impact on velocity is claimed by their work. Electroosmotic flow in a microchannel for a flow of third grade fluid was carried out by Nazeer et al [8]. Their work is a useful tool to design lab on a chip biomedical and thermal microfluidic device. Further Shamshuddin et al [9] and Punith Gowda et al [10] looked into the flow of Casson fluid under different circumstances.

Kalteh [11] independently investigated nine different nano-sized particles with base liquids in a microchannel. Their conclusion highlights that coefficient of heat transport is high for H_2O -diamond and less for $H_2O - SiO_2$. Abdollahi et al [12] investigated transport of heat in microchannel that has fins projected longitudinally. Increment in the volume fraction of the nano-sized particle and decrement in its diameter results into low value of Nusselt number. Rashidi et al [13] scrutinized the flow of Casson

Time-Reliant Flow of Casson Nanofluid with Gyrotactic Microbes through the Contracting/Dilating Walls of the Microchannel Impelled by Chemical Reactions

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Abstract

The study divulges the flow of Casson nanofluid in the channel possessing contracting/dilating walls in existence with two prominent slip mechanisms namely Brownian motion and thermophoresis. The motile microbes are left to dwell in the nanofluid. The top wall is pervious and enlarging or shrinking whereas bottom wall is impervious. Buongiorno's model is made use of. The impact of heat source, magnetic field and radiation is accounted in the study. The equations so accomplished are non-linear and hence are solved by making use of Runge–Kutta–Fehlberg method. The outcomes are worth noticing that magnification of Casson parameter has resulted in augmentation of the velocity at the centre and depletion of the velocity at the channel enclosures. We have attained that bioconvection Lewis number escalates the density of motile microbes but the bioconvection Peclet number diminishes the microorganism density. When the wall dilates, both nanoparticle concentration and microorganism density decline. Comparison between the current numerical method and the former published outcomes is in fair agreement.

Keywords Bioconvection · Microchannel · Motile microorganisms · Casson nanofluid · Brownian motion · Thermophoresis

Abbreviations

A	Injection co-efficient (ms^{-1})
a	Distance between walls (m)
$\dot{a}$	Time-dependent rate (m/s)
b	Chemotaxis constant
B_0	Magnetic field intensity (Am^{-1})
C	Fluid concentration (mol/m^3)
C_p	Specific heat at constant pressure ($Jkg^{-1}K^{-1}$)
C_1	Bottom wall concentration (mol/m^3)
C_2	Top wall concentration (mol/m^3)
C_0	Reference concentration (mol/m^3)
D_B	Brownian motion co-efficient (m^2s^{-1})

D_T	Thermophoresis co-efficient (m^2s^{-1})
D_n	Microorganisms species diffusivity (m^2s^{-1})
K_1	Chemical reaction rate
K^*	Mean absorption co-efficient (m^{-1})
k	Thermal conductivity ($Wm^{-1}K^{-1}$)
Kr	Chemical reaction parameter
Le	Lewis number
Lb	Bioconvection Lewis number
M	Magnetic parameter
Nt	Thermophoresis parameter
Nb	Brownian motion parameter
N	Density of microorganisms (kgm^{-3})
N_1	Microorganism density at the bottom wall (kgm^{-3})
N_2	Microorganism density at the top wall (kgm^{-3})
p	Pressure ($kgm^{-1}s^{-2}$)
Pr	Prandtl number
Pe	Peclet number
Q^*	Heat source co-efficient ($Wm^{-2}K^{-1}$)
Q	Heat source parameter
q_r	Radiative heat flux (Wm^{-2})
Re	Reynolds number
Rd	Radiation parameter
T	Temperature of the fluid (K)
T_1	Bottom wall temperature (K)

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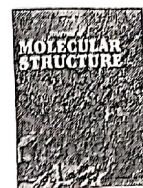
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An efficient *p*-TSA catalyzed synthesis of some new substituted-(5-hydroxy-3-phenylisoxazol-4-yl)-1,3-dimethyl-1*H*-chromeno[2,3-*d*]pyrimidine-2,4(3*H*,5*H*)-dione/3,3-dimethyl-2*H*-xanthen-1(9*H*)-one scaffolds and evaluation of their pharmacological and computational investigations

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ABSTRACT

We have developed an easy and efficient protocol for the synthesis of a series of some novel substituted-(5-hydroxy-3-phenylisoxazol-4-yl)-1,3-dimethyl-1*H*-chromeno[2,3-*d*]pyrimidine-2,4(3*H*,5*H*)-dione/3,3-dimethyl-2*H*-xanthen-1(9*H*)-one derivatives (4a-j) via *p*-TSA catalyzed reaction of 1,3-dimethylbarbituric acid/dimedone, substituted salicylaldehyde/2-hydroxy-nepthaldehyde and 3-phenyl-5-isoxazolone was administered in refluxed temperature in the presence of aqueous ethanol. All the obtained compounds were evaluated for their therapeutic effect using pharmacological and computational investigations, and structures were confirmed using analytical and spectroscopic techniques. Absorption spectra were recorded in six different solvents such as polar protic, polar aprotic, and nonpolar solvents, λ_{max} of all the compounds are appeared at bathochromic shift towards the longer wavelength due to the $\pi-\pi^*$ & $n-\pi^*$ transitions. The results of pharmacological investigations revealed that the compounds 4c, 4e, and 4h possess excellent cytotoxicity efficacy, and compounds 4c, 4d, 4h, and 4i have shown better anti-TB efficiency. The SAR study shows the importance of the electron-withdrawing group and additional phenyl nucleus enhancing the biological potency of the compounds. The results of the *in silico* molecular docking studies revealed that the compounds 4c and 4h effectively interacted with P38 MAP kinase (-10.9 kcal/mol) and InhA-Enoyl-Acyl Carrier Protein Reductase (-11.0 kcal/mol), respectively. Further, the molecular dynamics (MD) simulation studies revealed that the compounds 4c and 4h stabilized the macromolecular structures in terms of RMSD, RMSF, the Radius of gyration, and SASA compared to their unbound and standard compound bound structures. DFT study suggested that the compounds are chemically and biologically more reactive due to less energy gap.

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1. Introduction

Multi-component reactions (MCRs) afford an exceptionally valuable tool within the field of synthetic chemistry, also as medicinal chemistry. These reactions are characterized by their convergence, simplicity of implementation, high yield, effectiveness, reducing waste, and atom economy. Insight of increasing knowledge within the synthesis of fused heterocyclic compounds. The progress of the

latest and unnaturally valuable multi-component reactions remains a challenge along with academic and industrial research [1-4].

Previous reports revealed that isoxazole is an important heterocyclic nucleus, commonly found in various pharmacologically active natural products, clinical drugs, and lead compounds [5]. Isoxazole derivatives are paid attention in the development of heterocyclic chemistry due to their broad spectrum of biological activities such as antimicrobial [6], anticancer [7], anti-HIV [8], anti-tuberculosis [9], anti-inflammatory [10], neuroprotective [11], anti-diabetic [12] and antidepressant activities [13]. On the other hand, isoxazole and its derivatives have also been recognized as important and useful synthons in organic synthesis [14,15] and as organic materials in optoelectronics [16,17]. Because of its

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Study on Phenology of Some Papilionoid Taxa (Papilionoideae- Leguminosae)

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Phenology emphasizes the significant timing of biological events occurring in an annual cycle of the plant and explains seasonal aspects of an ecological phenomenon. The current work describes the phenological studies of Papilionoideae taxa in Hosadurga and Holalkere taluks of Chitradurga districts (Karnataka, India). Different phenophases like leafing, flowering, fruiting, and leaf fall were observed for 52 species that belong to 34 genera of Papilionoideae taxa. Investigation of important phenophases clearly showed the peak period of different phenophases and helped to understand how it differs from region to region and also with environmental changes and economic concerns of that area. The obtained database can be utilized for further conservation and biodiversity maintenance in that region.

Keywords: Papilionoideae taxa, Leguminosae, Phenology, Leafing, Flowering and Fruiting.

INTRODUCTION

The study of the time of repeating biological occurrences in the world, the causes of their timing in terms of biotic and abiotic influences, and the interrelationship between phases of the same or distinct species are known as modern phenology (Brian J. S, et al., 2018). These events are commonly triggered by environmental cues and therefore well-suited to understanding how temporal and spatial variation may affect the plant life cycle (Lima D. F et al., 2021). The Phenology of plants is a key regulator of ecosystem processes and biosphere feedback to the climate system (Isabelle chuine and Jacques reghiere, 2017). Changes in Phenological events i.e., the timing of specific life-history events are used widely to assess the responses of different organisms to climate change (Davis. C et al., 2015). With 730 genera and approximately 19,400 species in the world, Leguminosae is the third biggest land plant family after Orchidaceae and Asteraceae (Mahbubu Rahman A. H. M. et al., 2015).

Various regions in Karnataka have also been studied phenologically, example, Karnataka's grasslands (Ashwini H, S. et al., 2014), Karnataka's western ghats (Shivaprasad. D et al., 2014), Bhadra wildlife sanctuary (Nanda. A et al., 2014), etc. In the case of the Chitradurga district, no such

phenological studies of Papilionoideae taxa have been conducted. Currently, Hosadurga and Holalkere taluks (subdivisions of the district) of Chitradurga district of Karnataka state of India are investigated floristically (Figure 1).

MATERIALS AND METHODS

Hosadurga taluk covers approximately 1450 square kilometers and is located between 13° 47' 52"N latitude and 76° 17' 4" E longitudes, while Holalkere taluk covers approximately 1100 square kilometers and is located between 14° 3' 1.46"N latitude and 76° 10' 52.70" E longitudes. Chitradurga falls inside the South-Eastern cool and equitable maidan zone, according to the state's physio-agronomic categorization. The forests range from dry deciduous to scrub, with an undulating chain of hills covered in red sand, deep black, and red loamy soils (Holalkere). Temperatures range from 15 to 37 degrees Celsius, with an average annual rainfall of 744 millimeters. In Hosadurga and Holalkere, the average rainfall is 602.8 mm and 463.4 mm, respectively. During the monsoon, the relative humidity is high, ranging from 70 to 75 percent. The relative humidity is low in the rest of the year, especially during the summer month, and can drop to less than 30% in the afternoons (Basavarajappa H. T et al., 2016; Munjunatha M. C et al., 2017).

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Principal

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Isolation, Molecular Characterization and Mycochemical Analysis of *Aspergillus quadrilineatus*

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Secondary metabolites of microbial origin, either as pure compounds or crude extracts, provide opportunities for new drug development because of their chemical diversity. The aim of the present study is to isolate Molecular characterization and extract the bioactive compounds from the fungus of *A. quadrilineatus* (OL979151) in the rhizospheric soil of sunflower and mustard crop fields in Davanagere region. Dilution plate technique was used to isolate the rhizosphere fungi. The total genomic DNA was extracted from isolate of *Aspergillus quadrilineatus* based on Cetrinide Tetradecyl Trimethyl Ammonium Bromide (CTAB). Mass production of the fungal mat of *A. quadrilineatus* was established on potato dextrose broth medium. The dried methanol extract of fungus was subjected to HR-LCMS analysis; Methanol extract of *A. quadrilineatus* fungus shows that the compounds Amobarbital, Pirbuterol, Bambuterol, Cilazaprilat, Oxotremorine, Aminopyrine and Oryzanol as the major constituents. The compounds exhibit analgesic, anti-inflammatory, and antipyretic properties and various therapeutic uses.

Keywords: *Aspergillus quadrilineatus*, Methanol extract, HR-LCMS, Rhizosphere.

INTRODUCTION

Soil is the major component of earth's ecosystem which comprises of organic matter, minerals, gases and large number of micro and macro organisms (Chandrasekhar et al., 2014). Microorganisms are helpful in increasing the soil fertility and plant growth as they are involved in several biochemical transformation and mineralization activities in soils (Turukmane et al., 2018). Rhizosphere is the narrow zone of soil surrounding the root where microbe population are stimulated by root activities. Rhizosphere is known to be a hotspot of microbial activities (Chandrasekhar et al., 2014). The microorganisms in the rhizosphere play a great biological role in the growth of host plant. Microorganisms in the rhizosphere complete both chemical and physical modifications to the soil profile in and around rhizosphere that affect plants. This occurs through the defence mechanism provided by the rhizosphere microbial communities against pathogens or through providing nutrition to the plant by their role in mineralization of different organic

compounds (Raha and Shagufta, 2019). Plant age as well as plant type are influential in exudates release and impact on microflora in rhizosphere zone (Deshmukh et al., 2013).

Secondary metabolites are compounds produced by an organism that are not required for primary metabolic processes. In soil habitat, fungi compete against different other microorganisms and may induce antimicrobial production. Filamentous fungi contaminated with broad spectrum antibiotics, inhibited by antibiotic resistant bacteria are able to produce the secondary metabolites. Many species of fungi including *Penicillium*, *Aspergillus*, *Cladosporium* and Yeasts which were reported only to be the food are tremendous sources of industrially important enzymes and secondary metabolite production (Adeel Rafiq et al., 2018). Filamentous fungi are the major source of microbial natural products. Fungi provide a plentiful and diverse source of unique and often bioactive metabolites, and they have produced a number of medicinally important compounds (Karen et al., 2013). Fungi are


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Diversity of rhizosphere mycobiota of some oil yielding crops in Davanagere region of Karnataka, India

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The present investigation was carried out with the rhizosphere mycobiota of selected oil yielding crops like Groundnut, Mustard and Sunflower in Davanagere region. The rhizosphere soil samples were randomly collected from oil yielding crop fields of Davanagere region. Physico-chemical parameters were analysed using standard procedures. Rhizosphere mycobiota (fungi) was isolated on different culture media, viz., Potato Dextrose Agar and Martins Rose Bengal Agar media supplemented with 1% Streptomycin, from the collected soil samples using dilution plate technique. A total of 165 colonies were isolated, about 38 species belonging to 14 genera. Maximum number of fungal colonies belonging to Ascomycetes and few to Zygomycetes. The rhizosphere mycobiota including *Alternaria* sp., *Aspergillus* (8 spp.), *Cladosporium cladosporoides*, *Colletotrichum* spp., *Curvularia* (4 spp.), *Fusarium* (7 spp.), *Mucor flavus*, *Penicillium* (3 spp.), *Rhizopus* (3 spp.), *Chaetomium* (2 spp.), *Macrophomina phaseolina*, *Talaromyces stipitatus*, *Trichoderma* (3 spp.) and *Trichothecium roseum* were identified. Physicochemical analysis revealed that soil is rich in mycoflora due to acidic pH, rich organic matter and optimum moisture content. Among the isolates the *Aspergillus* species was dominant of selected oil yielding crop fields of Davanagere region due to their sporulation ability. The percentage occurrence of the mycobiota was statistically evaluated.

Key words: *Aspergillus*, Davanagere, mycobiota, oil yielding crops, rhizosphere

INTRODUCTION

Rhizosphere is the narrow zone of soil surrounding the root where microbe population are stimulated by root activities. (Chandrasekhar *et al.* 2014). The rhizosphere is a hot spot of microbial interactions as exudates released by plant roots are a main food source for microorganisms and a driving force of their population density and activities. The term 'rhizosphere', since its inception the fungal development in that zone has fostered interest (Deshmukh *et al.* 2013). The rhizosphere is a micro ecological zone in direct proximity of plant roots. It is functionally defined as the particulate matter and microorganism that cling to roots after being gently shaken in water. The theoretical extent of the rhizosphere is dependent on the zone of influence of the plant roots and associated microorganisms. The rhizosphere is a metabolically busier, faster moving, more competitive environment than the surrounding soil.

Fungus also protects plants by supplying a protective health to supply both water and phosphorus to the plant roots during droughts. In plants, exudates can be a healing and defensive response to repel insect attack, or it can be an offensive habit to repel other incompatible or competitive plants (Turukmane *et al.* 2018). Fungi are present in the soil depend on many environmental factors such as the amount and type of nutrients, moisture, aeration, pH and temperature etc.

Davanagere region is an agricultural and food treasury of Karnataka state located in central part of Northern Karnataka. It is the heart of Karnataka. The region is primarily agrarian in character and more than 75% of population depending directly or indirectly on agriculture for their livelihood. The district occupies the total geographical area 5913.4 sq.km. In this district consist of different types of soil like, Black & Red soil, Red Sandy soil mixed with clay soil and patches of black soil and Black Cotton soil. This region comprises different type of soil which is suitable for growing the major oil

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SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF SOME NOVEL BIS-HETEROCYCLIC MOIETIES

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ABSTRACT

In the present investigation malonyl dihydrazide 2 served as key intermediate for the synthesis of novel malonyl bis(3-methyl-4,5-dihydro-5-oxo-1-yl) pyrazoline moieties 3-6 were synthesized. The structures of these compounds were confirmed by their elemental analysis, IR, ¹H, ¹³C NMR and mass spectral data. All the newly synthesized compounds were screened for their antioxidant and antimicrobial activities. The antioxidant activity results the compound 6a showed good RSA (61.41, 71.53, 73.82 & 81.70%) at concentrations 25, 50, 75 & 100 µg/mL. Antibacterial activity fig 2, Compound 6 displayed moderate activity against all tested microorganisms. Antifungal activity fig 3, compound 6 have shown to possess moderate antifungal activity against both fungi, A.niger and C.albicans.

Keywords: Synthesis, bis-heterocycles, pyrazole moiety, antioxidant, antimicrobial activities



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SYNTHESIS OF AND CHARACTERIZATION OF INDOLYL-1,8-NAPHTHYRIDIN-3-CARBONITRILES MOTIFS

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Abstract:

In the present study novel synthesis of 2-amino-4-(2-methoxynaphthyl-6'-yl)-6-(4-chlorophenyl)-pyridin-3-carbonitriles **1a** and (5'-chloro-2'-phenyl-1*H*-indol-3'-yl)-acrylonitrile **2a** underwent cyclization in presence of metallic sodium in refluxing 1,4-dioxane to afford 4-amino-5-(2'-methoxynaphthyl-6'-yl)-7-(4-chlorophenyl)-2-(5'-chloro-2'-phenyl-1*H*-indol-3'-yl)-1,8-naphthyridin-3-carbonitrile (**3a-i**) in good yield. The structures of all these unknown compounds have been confirmed with the help of physical data and spectral data like IR, ¹H NMR and mass spectroscopy.

Keywords: Synthesis, Indole, 1,8-Naphthyridine derivatives

Introduction

Among all the nitrogen containing heterocycles, the 1,8-naphthyridine scaffold has recently gained an immense amount of curiosity from numerous researcher across fields of medicinal chemistry and drug discovery¹⁻⁶. This is new attention can be also it's ascribed to its versatility synthesis, its creativeness and the variety of biological activities it has exhibited⁸⁻¹⁰. Over the past half-decade, numerous diverse biological evaluations have been conducted on 1,8-naphthyridine and its derivatives in a quest to unravel novel pharmacological facets to this scaffold.

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Effect of Ce^{3+} Substitution on Sr^{2+} ; Structural and Magnetic Properties of Nanocrystalline $\text{SrFe}_{12}\text{O}_{19}$ Hexaferrites Prepared by Self-Propagation Method Using Mixed Fuels

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Abstract

The nanocrystalline $\text{Sr}_{(1-x)}\text{Ce}_x\text{Fe}_{12}\text{O}_{19}$ ($x = 0.00 < x < 0.09$) strontium M-type hexaferrites (SrM-HFs) were prepared by self-propagation method using mixed fuels. The structure, morphology, and composition were analyzed by X-ray diffractometer (XRD), field emission scanning electron microscopy (FE-SEM) technique, and energy dispersive X-ray analysis (EDAX), respectively. Vibrating sample magnetometer (VSM) instrument was used for the determination of magnetic properties of each prepared sample. XRD peaks reveal nanocrystalline nature with a hexagonal single phase magnetoplumbite-like crystal structure. The FESEM micrograph shows accumulation of hexaferrite nanocompact magnetic aggregation. In addition, the size of the particles reduced with the increase in of Ce^{3+} ion content. The VSM analysis confirmed that SrM-HFs are hard magnetic in nature. Moreover, it is observed that the saturation magnetization and magnetic parameters of strontium ferrites decrease with the increase of the content of Ce^{3+} ion. In addition, Ce^{3+} substituted $\text{SrFe}_{12}\text{O}_{19}$ are most useful for magnetic recording and memory devices.



Dielectric properties and magnetic behavior OF Gd^{3+} substituted M-type $SrFe_{12}O_{19}$ nanoferrites by auto combustion method using urea and citric acid mixtures as a dual fuel

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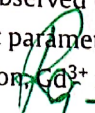
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Highlights

- Nanostructured $Sr_{(1-x)}Gd_xFe_{12}O_{19}$ nanoferrites were prepared by auto combustion method using urea and citric acid mixtures as a dual fuel.
- It is observed that the dielectric constant (ϵ'), loss tangent ($\tan\delta$), decrease and AC conductance (σ_{ac}) increases with increasing frequency.
- The VSM studies are measured at RT and confirmed that hard magnetic nature of $SrFe_{12}O_{19}$ with increase in Gd^{3+} ion content. Super exchange interaction, single domine particle structure and noncolinear three sub-lattice model.

Abstract

Nanosized M-type hexaferrites $Sr_{(1-x)}Gd_xFe_{12}O_{19}$ ($x=0.00$; $0.01 < x < 0.09$; insteps of 0.02) have been synthesized by auto combustion method using urea and citric acid mixtures. Influences of Gd^{3+} ions substitution on structural, electrical and magnetic properties of $Sr_{1-x}Gd_xFe_{12}O_{19}$ nanoferrites were investigated by XRD, FTIR, FESEM, LCR meter and VSM techniques. The PXRD studies confirmed the formation of single phase lattice whereas as the sample with $x=0.09$ exhibits about 5% of secondary phase. It was found that the lattice parameter increased with increasing in Gd^{3+} ion content. FTIR spectra have shown two absorption bands. The dielectric parameters were described based on the Maxwell–Wagner's two layer model. It is observed that the dielectric constant (ϵ'), the loss tangent ($\tan\delta$), decrease whereas the AC conductivity (σ_{ac}) increases with increasing applied field frequency. Moreover, the vibrating sample magnetometer (VSM) analysis confirmed that M-SrHF's are hard magnetic in behavior. It was observed that the values of saturation magnetization (M_s), remanence magnetization (M_r), coercivity (H_c) and magnetic parameters of strontium ferrites decrease with the increase of the dopant Gd^{3+} in strontium ferrites. In addition, Gd^{3+} substituted $SrFe_{12}O_{19}$ are most useful for magnetic recording media and electro-magnetic devices.


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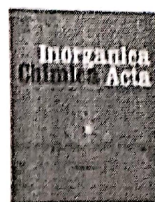
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Structural elucidation, voltammetric detection of dopamine, molecular docking and biological inspection of novel 4-aminoantipyrine derived Schiff bases in Co (II), Ni (II) and Cu (II) complexes

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ABSTRACT

1,5-dimethyl-2-phenyl-4-((E)-(4-phenyl-1H-pyrazol-3-yl) methylidene) amino)-1, 2-dihydro-3H-pyrazol-3-one (UPD) is a new ligand that has been synthesized along with its Co (II), Ni (II), and Cu (II) complexes. ¹H, ¹³C, IR, UV-visible, mass spectra, magnetic susceptibility, TGA, SEM and PXRD analysis/method have all been employed to study as well as to investigate the structures of synthesized substances. Octahedral geometries have been suggested for Co (II) and Cu (II) complexes based on spectral evidence, whereas Ni (II) complexes showcase square pyramidal geometry. The redox behavior of MWNT-(Co(DPD)₂Cl₂)/GCE complex was evaluated via cyclic voltammogram, it was noticed that the physico-chemical characterization of modified electrode displayed admirable results with a long linear range 0.2–1.5 μM/L, sensitivity 1.65 μAμM⁻¹cm⁻² and the found limit of detection is 0.066 μmolL⁻¹. The modified electrode performed better, was more stable and demonstrated remarkable reusability and replicability. The antibacterial activities of the ligand and its metal complexes were investigated through the agar well diffusion method against *S. aureus*, *B. licheniformis*, *A. Sp* and *P. aeruginosa* as well as antifungal *P. expansum*, *A. flavus* strains. Furthermore, the antioxidant and cytotoxic activity on three different cell lines (Hela, Hep G2 and P53) have been studied where Co(II), Ni(II) complexes were seen to have fine cytotoxicity against individual cancerous cell lines. Molecular docking was carried out on the active site of 2VPF and revealed good results.

1. Introduction

Schiff bases are chemically receptive and essentially diverse chemicals that are frequently made via condensation of an aldehyde and a ketone with essential amines. The metal complexes of Schiff base derivatives are crucial for material synthesis, photochemistry, catalysis and biological systems[1], which have been identified for facilitating the synthesis of stable metal complexes with large restorative applications of all metals.[2] One such heterocycle is 4-aminoantipyrine; it is a pyrazolone derivative and has an array of biological activities like antimicrobial, painkiller and antiviral activities. Various derivatives of antipyrine were utilized as pain-relieving anti-inflammatory and anti-cancer agents.[3].

Based on which we have used the synthesis of Schiff base ligand which was procured from the reaction between 4-aminoantipyrine and substituted benzaldehyde and its metal complexes with Co (II), Ni (II) and Cu (II) metal ions. Additionally, biological potentiality of ligand and its metal complexes was also tested. The binding affinity of the ligand and its metal complexes with the target protein was determined via molecular docking approach. A CV study was conducted to recognize the applications of modified electrodes for the better detection of DA.[4–11].

With the goal of a new hydrazine Schiff base that could serve as promising material in cytotoxic applications, we presenting the synthesis and characterization of 1,5-dimethyl-2-phenyl-4-((E)-(4-phenyl-1H-pyrazol-3-yl) methylidene) amino)-1, 2-dihydro-3H-pyrazol-3-one (DPD) and its Co(II), Ni(II) and Cu(II) complexes. Also, all compounds

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Short communication

Synthesis, structure, thermal, magnetic, dielectric properties of Ce³⁺ doped M-type SrFe₁₂O₁₉ and electrochemical determination of L-cysteine

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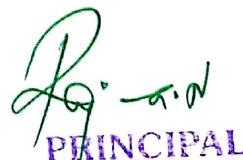
Highlights

- Nanostructured Sr_(1-x)Ce_xFe₁₂O₁₉ nanoferrites were prepared by auto combustion method with dual fuel (urea and glycine).
- The dielectric properties of all the samples have been measured using LCR meter at room temperature and electrochemical studies was using by cyclic voltammetry at RT.
- The XRD patterns and IR spectra confirmed the formation of hexagonal structure.
- The dielectric parameters decreases while AC conductivity increases with frequency. At a particular frequency, the dielectric constant, dielectric loss real part and imaginary part of impedance increases, attain maximum, then begins to decrease with increase in composition.
- The SrHF's/GCE electrode showed impressive results including increased sensitivity, limit of detection, higher concentration range, stability, and reproducibility properties.

Abstract

Cerium substituted SrFe₁₂O₁₉ with the nano composition of Sr_(1-x)Ce_xFe₁₂O₁₉ ($x=0.00, 0.01, 0.05$ and 0.09) have been prepared using auto-combustion technique with dual fuel. The PXRD images confirmed a single-phase hexagonal crystalline structure similar to a magnetoplumbite for all samples. Fourier transform infra-red spectroscopy (FT-IR), field emission-scanning electron spectroscopy (FE-SEM), elemental mapping (EDS) were used to examine the structure and morphology of the samples. The temperature dependent hexagonal phase formation and percentage weight loss was studied by thermogravimetric and differential thermal analysis (TG-DTA). Vibrating sample magnetometer (VSM) analysis confirmed that M-SrHF's are hard magnetic in nature and super paramagnetic, these are measured at room temperature. It was found that, with the increase of the dopant Ce³⁺ in strontium ferrites, the values of saturation magnetization (M_s), remanence magnetization (M_r), coercivity (H_c) and magnetic parameters of strontium ferrites decrease. The electrochemical behavior of the SrHF's electrode and the electro-oxidation of L-cysteine was investigated using of cyclic voltammetry (CV). The best voltammetric response has been observed for a SrHF's electrode in buffer solution at pH of 7.0 with an acquisition and scan rate of 50 mVs⁻¹. The dielectric properties are measured in LCR meter and described based on the Maxwell-Wagner's two layer model. The electron hopping between Sr²⁺ and Sr³⁺, as well as Fe³⁺ and Fe²⁺ ions on B-sites, drives the conduction mechanism in these ferrites, these nano hexaferrites which shows its suitability in various technological applications.

Graphical abstract



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Design of an efficient three component one-pot synthesis of -1,2,3,4-tetrahydro-4-oxo-6-(5-substituted 2-phenyl-1*H*-indol-3-yl)-2-thioxopyrimidine-5-carbonitrile as antimicrobial and antitubercular agent

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In the present study, a novel, rapid, improved and eco-friendly synthesis of indolyl-pyrazolo-pyrimidine derivatives **4a-c** by using conventional method *via* one-pot multi-component reaction has been described. The structures of all these unknown compounds have been confirmed with the help of physical and spectroscopic techniques like IR, ^1H and ^{13}C NMR and mass spectrometry and these newly synthesized compounds have been evaluated for *in vitro* antimicrobial and antitubercular and antioxidant activities. The results reveal that compound **4a** exhibits promising antimicrobial, antitubercular and antioxidant properties when compared to the standard drugs.

Keywords: Indole, Pyrazole, Pyrimidin-2-one, Antimicrobial activity, Antitubercular activity

Heterocyclic compounds have been proved to be the most useful ones due to their possible practical applications, their diverse structural patterns and wide range of biological activities such as antibacterial and antifungal activities¹⁻⁶. One-pot multi-component organic reactions (MCORs) are important and attractive due to the formation of multi-bonds in one pot, high atom economy, mild and simplified conditions, facile execution and generation of complex product from a single operation process to available starting materials. MCORs are now being tuned for synthesizing various heterocyclic compounds due to their diverse biological activities^{7,8}.

The indole derivative has been reported to possess a wide variety of biological activities *viz.*, anti-inflammatory^{9,10}, anticonvulsant¹¹, cardiovascular¹², antibacterial¹³, COX-2 inhibitor¹⁴ and antiviral¹⁵. The significant contribution of many derivatives of indole in the development of medicinal chemistry is well recognized. Serotonin, known for its vasoconstrictor principle¹⁶, plays a vital role as neurotransmitter and in psychosis. Pyridine is used as a pioneer for pharmaceuticals, agrochemicals and it is used as organic solvent and reagent. It plays a key role in mobilize both chemical and biological systems. Fused pyrimidines have also been attracted considerable interest in medicinal chemistry research due to their

versatility and a broad bioactive potential. Compounds containing fused pyrimidine ring has attracted much attention of researcher due to their wide range of biological activities particularly in cancer and virus research¹⁶. Also substituted pyrimidine at position-2 or -4 with an amino group are known as pharmacophores in several structure based drug design approaches in medicinal chemistry¹⁷.

In addition to this, various analogs of pyrimidines have been found to posse's antibacterial¹⁸, antifungal¹⁹, antileishmania²⁰, anti-inflammatory²¹, analgesic²² activities. Many thienopyrimidines are found to exhibit a variety of biological activities, including anti-inflammatory²³, antimicrobial²⁴, and analgesic²⁵ properties. In view of the above observations and in continuation of our research on the synthesis of biologically active molecules²⁶⁻³³. Encouraged by the diverse biological activities of indole and pyrazole and pyrimidine heterocyclic compounds and it was decided to prepare a new series of indolyl-pyrazolo-pyrimidine derivatives **3a-c**. Literature survey revealed that incorporation of different groups in one frame *i.e.*, indole, pyrazole and pyrimidin-2-one, heterocycles it may leads enhanced antimicrobial, antitubercular and antioxidant activities.

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Phytoremediation of sewage and pond water by *Canna indica* L.

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ABSTRACT

In the current study phytoremediation of sewage and a pond water was carried out by using *canna indica*, a setup was maintained to treat the water samples and periodically water quality parameters was analysed for every 15 days and recorded the result that was found to be increasing in some parameters and some was decreasing which favors growth of organisms and started developing good water quality. Importantly BOD, DO and COD was measured and found to be significant. However, most of the water quality parameters do not exceeded the WHO standards for drinking water quality. The results of physicochemical analysis have proved that *Canna indica*.L is suitable for phytoremediation.

Key words: Phytoremediation, *Canna indica*, BOD, COD, DO.

INTRODUCTION

Sewage treatment (or domestic wastewater treatment, municipal wastewater treatment) is a type of wastewater treatment which aims to remove contaminants from sewage to produce an effluent that is suitable for discharge to the surrounding environment or an intended reuse application, thereby preventing water pollution from raw sewage discharges. Sewage contains wastewater from households and businesses and possibly pre-treated industrial wastewater. There are a high number of sewage treatment processes to choose from. These can range from

decentralized systems (including on-site treatment systems) to large centralized systems involving a network of pipes and pump stations (called sewerage) which convey the sewage to a treatment plant (Atta Ullah Khan 2021).

Natural wastewater treatment systems are biological treatment systems that require no or very little electrical energy; instead, they rely on entirely natural factors such as sunlight, temperature, filtration, adsorption, sedimentation, biodegradation, etc., to treat wastewater. They utilize naturally occurring physicochemical and ecological processes in removing pollutants from

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In vitro* micropropagation techniques for (*Musa spp*) Banana grand-9 variety.Mahanthesh Kumar, G. T^a, Dr. K.M. Satish^a, Dr. Ramesh C K^b^a Department of Biotechnology, University of Agriculture and Horticultural Sciences, College of Agriculture Navile, Savalanga Road, Shivamogga-577204, Karnataka, India^b Department of Biotechnology, Sahyadri Science College, Kuvempu University, Shivamogga-577203, Karnataka, India

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Abstract

It investigated the possibility of clonal banana propagation by tissue culture. Shoot tips isolated from the rhizomes were found to be sufficient for the *in vitro* development of plantlets. Excised shoot tips formed only one plantlet with the youngest leaves, but shoot tips regenerated several plantlets with several older sheathing leaf bases enclosing the axillary buds. A new crop of multiple shoots was produced by individual shoot lets, when separated and sub-cultured. The plantlets collected from both forms of ex-plants were successfully transplanted and matured into the soil. Shoot cultures are grown on MS (Murashige and Skoog) medium, supplemented with 30 g/l sucrose, 4.5 mg/l BA (6-benzyladenine) and 0.5 mg/l IAA (indole-3-acetic acid). In comparison with the culture medium on which shoot-tips are maintained, a tenfold decrease in cytokinin content (0.5 mg/l BA) induces regeneration of rooted plants. In contrast, adding 4.5 mg/l BA to the culture medium results in suppression of the apical dominance in shoot-tip cultures and a reduction of corm and leaf tissue between meristematic tissue.

Keywords: In vitro, Grand-9, micropropagation, Tissue culture, Murashige and Skoog.

Introduction

In recent years, clonal propagation of horticulturally important plants through shoot tip and apical meristem culture has significantly advanced (Murashige, 1974,

1978). However, (RODRIGUEZ W, et al., 1985) research on the clonal propagation by tissue culture of tropical fruit crops is very scarce and needs to be intensified. The

Effect of integrated nutrient management on growth and yield attributes of yardlong bean
(*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc.)

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Abstract: The present experiment was conducted during Kharif 2020-21 and 2021-22 at Zonal Agricultural and Horticultural Research Station, Shivamogga, Karnataka, to evaluate the effect of Integrated Nutrient Management on growth and yield of underexploited vegetable crop yardlong bean cv. Arka Mangala under naturally ventilated polyhouse. The experiment was laid out in randomized complete block design (RCBD) with three replications and eight treatments viz. T₁ - 100 % Recommended Dose of Fertilizer (RDF-25:75:60 NPK, kg ha⁻¹), T₂ - 100 % RDF + Effective Microbial Consortia (EMC)+ Vegetable Special (VS), T₃ - 125 % RDF, T₄ - 150 % RDF, T₅ - 175 % RDF, T₆ - 125 % RDF + EMC+ VS, T₇ - 150 % RDF + EMC+ VS, T₈ - 175 % RDF+EMC+ VS. The integrated treatment combinations involve both organic and inorganic source of nutrients which significantly influenced the growth and yield attributes. The results from the pooled data of two year revealed that, all the growth and yield traits were markedly influenced by the integrated nutrient management practices. Among different treatments, significantly higher plant height (247.96 cm), number of primary branches (8.54), initiation of flowering (38.29 days), to fifty per cent flowering (43.48 days), to first harvest (52.83 days), number of pods per plant (25.17), pod length (74.56 cm), pod girth (3.98 cm), average pod weight (35.54 g), yield per plant (664.17 g) and higher pod yield per 1000 m² (2171.96 kg) were recorded with treatment 150 % RDF + EMC+ VS. Thus Integrated Nutrient Management practices increased the growth and yield attributes of Yardlong bean and among compared treatments, T₇ - 150 % RDF + Effective Microbial Consortia (EMC)+ Vegetable Special (VS), found to achieve the maximum productivity of Yardlong bean. The evaluation of production economics revealed that growing of Yardlong bean with said treatment (T₇) could be the most remunerative option with a highest benefit: cost of 3.15.

Key words: Bio fertilizers, EMC, Integrated nutrient management, Rhizobium, Yardlong bean

Introduction

Yardlong bean (*Vigna unguiculata* subsp. *sesquipedalis* L. Verdc.) is a member of the Fabaceae family. It is an important leguminous vegetable and mostly cultivated in China, Southeast Asia, Central and West Africa (FAO 1993; Piluek 1994). The Yardlong bean is considered to be one of the popular vegetable crops in Indonesia, India Thailand, Philippines, Taiwan and China (Rachie 1985). It is one of the most nutritious leguminous vegetable crop. It is a rich and inexpensive source of vegetable protein. Fresh pods are used as a green vegetable. The pods are rich in calcium, phosphorus, sodium, and potassium and also fair amounts of vitamin A, thiamine and ascorbic acid are present (Piluek, 1994).

It enriches soil fertility by fixing atmospheric nitrogen. Because of its quick growth habit it has become an essential component of sustainable agriculture. The factors attributed for low yield of Yardlong bean is mainly growing of Yardlong beans under less fertile soil with low inputs or improper application of fertilizers. Now a days increasing cost of inorganic fertilizers and reduction in soil health with chemical fertilizers, it is essential to replace inorganic fertilizers through organic for sustainable agriculture. Organic sources of the plant nutrients have been reported to improve growth, yield and soil fertility status. Reliance on the increased use of chemical fertilizers and associated hazards put back attention on organic sources which are effective in promoting health and productivity of the soil. Integrated management of chemical fertilizers and organic wastes may be an important strategy for sustainable production of

crops. This may not only improve the efficiency of chemical fertilizers along with their minimal use in crop production besides increasing crop yield and improving available major and minor nutrients (Rautaray *et al.*, 2003).

Over the years inorganic fertilizers have been widely used worldwide to support and optimize the growth of vegetables. However, the use of organic fertilizer has gained more importance globally in the last few decades, due to efforts made for the conservation of agriculture. Organic fertilizers have been shown to help preserve natural resources and reduce degradation of ecosystem (Mader *et al.* 2002; Francis and Daniel, 2004).

In commercial agriculture, the use of chemical fertilizers cannot be ruled out completely. However, there is a need for integrated use of alternate sources of nutrients for sustaining the crop productivity. The integration of organic and inorganic sources of plant nutrients has proved superior to individual components with respect to growth, yield and quality of pulses. In this context the study will include integration of different levels of organic and inorganic fertilizers for getting high productivity in Yardlong bean which inturn helps the farmers to get higher returns.

Material and methods

The experiment was conducted to study the effect of integrated nutrient management on growth and yield attributes of Yardlong bean during Kharif 2021 and 2022 at ZAHRS, Shivamogga, Karnataka, India. The location situated at 13° 58'

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Assessment of Physical and functional properties of finger millet grain varieties

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Abstract

The current study aimed to determine the physical properties of finger millet (FM) cultivars (GPU-48, Indaf-7, ML-365, MR-1 and MR-6). The moisture content; dimensional properties such as length, width, thickness, geometric mean diameter, and arithmetic mean diameter; physical properties such as one thousand (1000) sample weight, bulk density, true density, porosity, sphericity, aspect ratio, surface area, and sample volume; functional properties such as water absorption capacity (WAC), dispersibility, and viscosity were determined. Scanning electron microscopy (SEM) analysis of FM cultivar varieties were also evaluated. Results revealed that ML-365 cultivar was higher than other samples in moisture content, width, thickness, geometric mean diameter, arithmetic mean diameter, surface area and sample volume. Data showed that MR-6 was higher in viscosity cold paste and viscosity cooked paste than in other FM cultivars. SEM findings revealed that starch granules of raw FM flours had oval/spherical and smooth surface. In conclusion study findings are important for agricultural and food engineers, designers, scientists and processors in the design of equipment for FM grain processing. Results are likely to be useful in assessing the quality of grains used to fortify FM flour.

Keywords: Finger millet, physical properties, dimension properties, functional properties

Introduction

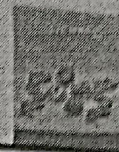
Millet is a small seeded grasses that grow on dry zones as rain fed crops, under marginal conditions of soil fertility and moisture. Millets are one of the oldest foods known to humans and probably the first cereal grain to be used for domestic purposes. The millets can be classified broadly into two types for convenience namely, major and minor millets based on their seed size. Major millets include sorghum (*Sorghum vulgare*), finger millet (*Eleusine coracana*) and pearl millet (*Pennisetum glaucum*), while minor millets include little (*Panicum miliare*), proso (*Panicum miliaceum*), kodo (*Paspalum scrobiculatum*), Italian or foxtail (*Setaria italica*) and barnyard millet (*Echinochloa frumentacea*). Small millets are small grained cereals and are the staple food of the millions inhabiting the arid and semiarid tropics of the world. Millets are distributed in most of the Asian. Finger millet belongs to the family Poaceae and is more commonly known as ragi or madua in India, rapoko in South Africa and daga in Ethiopia^[1, 2]. Globally, 12% of the total millet area is under finger millet cultivation, covering more than 25 countries of Africa and Asia^[3]. It forms a predominant essential food for people living on marginal lands and with limited economic resources. An agronomically sustainable crop, it can grow on marginal lands, high altitudes and can easily withstand drought and saline conditions, requires little irrigation and other inputs and yet maintain optimum yields. From the nutritional perspective, finger millet is considerably rich in minerals and its micronutrient density is higher than that of the world's major cereal grains; rice and wheat^[4, 5]. A few varieties of finger millet are sporadically grown and consumed in some parts of India. Therefore, to make people aware about the quality parameters of these millets as compared to other cereal grains, the present study was designed with the following objective, viz., to determine the moisture, physical and functional properties of the varieties of finger millet grains.

Materials and Methods

Sorting of finger millet grains

Mixed grain cultivars were purchased from Southern dry zone of Karnataka India. Foreign materials were removed from the grains by immersion in clean water. Finger millet varieties GPU-48, Indaf-7, ML-365, MR-1 and MR-6 were used.

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Original Research Article

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Assay of Antimicrobial Activity of *Sida acuta* (Burm. F.) by Well Diffusion Method

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ABSTRACT

Keywords

Antifungal, agar-well diffusion assay
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Sida acuta is a shrub indigenous to pantropical regions. *Sida acuta* belongs to the mallow family, Malvaceae. The plant is widely used for its various pharmacological properties. Therefore, in the current study antifungal activity for leaf, stem and root extracts of *Sida acuta* were carried out. Ethanol (50%) was used successively for extraction of active principles from the dried powdered leaves, stem and root. The antifungal screening was done with two plant pathogens viz. *Claviceps purpurea* MTCC 2334 and *Macrophomina phaseolina* MTCC 10576 as test microorganisms. In the agar-well diffusion assay, highest zone of inhibition in diameters were recorded with leaf ethanol extracts of *S. acuta*. Among the plant extracts, leaf has shown better inhibitory activity against the test organisms followed by stem and root. Both microorganisms were markedly affected by all the three extracts under study. Findings of this study, therefore, showed that all parts of *S. acuta*, particularly the leaf, possessed antifungal property, and hence which can be used in development of fungicide.

Introduction

Macrophomina phaseolina is an important soil-borne plant pathogen that causes diseases over 500 plant species including economically important crops such as legumes, sunflower, cotton, sorghum and vegetables. Generally, it causes charcoal rot disease in various crops; it also causes other diseases such as seedling and stem blight, damping off and

wilt. It has vast distribution in tropical and subtropical countries (Shifa *et al.*, 2018). *Claviceps purpurea* is a phytopathogenic fungus infecting a broad range of grasses including economically important cereal crop plants. The fungus infects exclusively the young ovaries of the host plants. After successful colonization the ovary is replaced by fungal mycelium and production of conidia begins. The infection cycle ends with the formation

Analysis of Physico chemical properties of soil from Groundnut crop fields in Central Dry Zone of Davanagere District, Karnataka

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Abstract

Assessment of physico-chemical parameters in soil samples are collected from three Groundnut (*Arachis hypogaea* L.) crop fields in central dry zone (Jagaluru, Davanagere & Harihara) of Davanagere district was studied. The soil characterization was carried out for physical parameters like soil colour was determined by visual observation and particle size distribution of soil samples were analysed by International pipette method and the chemical parameters were analysed by using standard procedures. The results obtained showed that concentration of physico-chemical parameters varied in different soil samples. Statistical test of significance using Pearson correlation revealed that there are significant differences at ($r > 0.05$ and < 0.01) between the values of physico-chemical parameters in soil samples obtained from all the sampling sites of Ground nut field. This soil study is considered as a good source of soil nutrient management and this information will help farmers to solve the problems related to soil nutrients and amount of which fertilizer to be used for the increasing the effective growth of the groundnut crop.

Soil is a thin layer on the surface of earth and it constitutes the minerals, organic matter gases, decaying plant and animal matter etc. Soil play a crucial role in delivering a variety of ecosystem it also act as a medium that can supports plant growth and it modulates water, nutrients and pollutant transport¹⁵. At microscopic level it performs the ecological important function is that help in sustaining a diverse and dynamic microbial activity. Soil characterization is to evaluate the fertility status of the soils of an area or region is an

important aspect in context of sustainable agricultural production. The Productivity of agricultural soil depends largely on its physicochemical properties. The soil condition is important because it is a universal medium for plant growth, which supplies essential nutrients to the plants. The several elements known to be essential for plant growth, macronutrients (N, P, and K) and micronutrients (Zn, Fe, Cu, and Mn) are an important soil element that controls the soil fertility¹⁶. Oil seed crops generally are one of the most

Comparative study of Vermicompost and DAP on the growth of *Coriandrum sativum* seed

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Abstract

In this comparative study, the growth rate of coriander seed (*Coriandrum sativum*) is observed by using DAP and vermicompost. In vermicompost soil, the plant height is 5 cm at the interval of 22nd day. In DAP, the plant height is 4 cm at the interval of 22nd day. Therefore, the growth of coriander seed in vermicompost is highest than the DAP manure. Vermicompost may show the good growth than DAP. Vermicompost soil shows more microbial activity resulting in additional nutrients for plant growth which ultimately resulting in more growth. Similarly, by adding DAP, it increases the soil pH and the plant could not give better growth. By using vermicompost the life of living beings can be saved and also increases the soil fertility.

Vermicompost is derived from a latin term "vermis" method worms. Vermicompost is the made from the decomposition process the usage of numerous species of worms usually *Eisenia fetida*, *Eudrilus eugeniae* and different earthworm to produce an aggregate of decomposing veggies or meals waste bedding substances and vermicompost is referred to as vermicomposting. Vermicompost consists of water-soluble nutrient and is an fantastic nutrient rich organic fertilizers and soil conditioners, that's used in framing and small scale sustainable natural farming¹. Vermicomposting is increasingly turning into popular as an organic farming and solid waste management approach and it produces vital bio fertilizers, vermin compost and vermin wash³. Vermicompost is an natural manure

produced because the vermicast by way of earthworm feeding on biological waste fabric; plant residues⁸ and it's far one of the quality supply of vitamins improves the bodily and chemical homes of vegetation¹⁰. The vermicompost is wealthy in NPK and micronutrients^{6,9}. Vermicompost and Biofertilizer are also beneficial substitutes to inorganic fertilizers which improves the soil first-rate. Biofertilizers are residing organisms that have an potential to mobilize vitamins from unusable shape via organic manner and these groups of microorganisms may also either restore atmospheric nitrogen or solubilise insoluble phosphorus and lead them to be had for vegetation.

Coriandrum sativum L is one of the


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RESEARCH ARTICLE

Importance of Bio Control Agents and Chemical Pesticides on the Yield of Crops in Shivamogga District

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ABSTRACT

Biological control agents is defined broadly because the "use of plant or modified organisms, genes, or gene merchandise" to reduce the consequences of pests and illnesses. Chemical insecticides are artificial ones used to govern the pests. Physical control is using tillage, open-subject burning, heat treatment, and other physical strategies, normally to do away with pests or separate them from the crop. Chemical control is using synthetic chemical insecticides to dispose of pests or lessen their consequences. Anchal Sharma reported that many approaches to biological manage can be categorized conventionally as regulation of the pest population, exclusionary systems of protection (a living barrier of microorganisms on the plant or animal that deters infection or pest attack) and systems of self-defense. The agents of organic manipulate include the pest- or disease-agent itself, antagonists or plant enemies, or the plant or animal managed or manipulated to protect itself. Principles of plant health care are presented, understand the production limits of the agro-environment, rotate the vegetation, maintain soil natural grasp, use easy planting material, plant properly-tailored, pest resistant cultivars, decrease environmental and dietary stresses, maximize the effects of useful organisms and shield with pesticides as essential.

Keywords: Plant diseases, fungi, bacteria, Chemical pesticides, bio-control agents.

INTRODUCTION

The problems of insects-pests are one of the major constrains for achieving higher production and better income. Problems are there for all crops and especially acute in commercial crops. India loses about 30% of its crops due to pests and diseases every year. The use of pesticides has certainly contributed in crop protection thus, minimizing yield losses with the introduction of intensive cropping, the use of insecticides and pesticides have increased manifolds to control harmful pests such as insects, nematodes, disease, weeds etc. during the past 3-4 decades.



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Aquatic Bird Diversity in the water bodies of Shivamogga District, Karnataka

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Abstract

In this study, a total of 19 bird species are identified in the 4 villages pond, namely Gowdan kere, Kavvalli kere, Pumpas kere, Halsuru kere, There are 6 migratory bird, Endangered birds 3, however species diversity was not uniform across the study area the high disparity in species counts from 3 areas could be an effect of both habitat differences and heterogeneity and inconsistent sampling effort. Identified species namely squacco heron, purple heron, Indian pond heron, little egret, Ibis, Great egret, Grey heron, Great cormorant, lesser whistling duck, Australian swamp hen, grey headed swamp hen, goose bid black petrel, mallard, etc.. These four study sites presently face relatively small amount of Anthropogenic pressure from surrounding settlement because of low human density, large portion of study area, the local people dislike it as it does not support any cattle palatable plants which restrict them from grazing in these areas.

Birds are generally utilized as signs of environment integrity. The latest research examine freshwater biodiversity because the maximum threatened of all styles of diversity and wetlands are discovered to be the richest sites by means of holding foremost proportion of the existing avifauna⁷. Wetlands may be seen as natural ecological islands of freshwater habitats surrounded by using terrestrial habitats^{23,39}.

Aquatic birds are feathered bipedal warm blooded animals known for their ecological, economical, ethical, medicinal and scientific value. They constitute one of the

diverse and large number of useful creature among the living being and treasure of biodiversity among the living being and treasures of biodiversity. Aquatic birds' feather show different life style hence considered as bio tools for exploring problems and evaluate environmental quality of aquatic ecosystem. In India more than 1340 species of birds have been identified of all 130 species are depend on aquatic or more semi aquatic ecosystem and constitute the most visible sigma of variety of the life forms in It lands. Wetland are most productive, biologically diverse and very important role in flood control, aquifer, recharge nutrients absorption and erosion

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**Fish composition in a Fresh water body of Shivamogga
taluk, Karnataka: A Case Study in Sogane Tank**

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Abstract

The present study was undertaken to study the fish diversity of Sogane tank of Shivamogga, Karnataka. About 19 fish species were identified in this tank which were represented by 5 orders, 10 families and 16 genera. The family Cyprinidae dominated by 09 species followed by Siluridae with 02 species in this tank. Among fish orders, 09 species belong to Cypriniformes, 05 species to Siluriformes, 03 species to order Perciformes and ultimate 1 species to orders Osteoglossiformes and Cyprinodontiformes respectively. According to Biodiversity status of fishes is concerned 01 species belonged to Endangered; 03 species included under Lower risk - least concern; 08 belongs to Lower risk-near threatened; 05 included as vulnerable and 02 species are categorized as Not assessed. The study of fish fauna of an aquatic body is useful for planning of fisheries improvement. The water quality of this tank was analyzed to study its influence on fish.

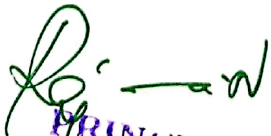
The nature has endowed with a wealth *ie.*, biodiversity and its environment, that's essential for the lifestyles to maintain on this earth. Biodiversity is the range and variability of flora, animals and microorganisms in its environment. India is endowed with a considerable expanse of open inland water. There are about 31,53,366 hectare reservoirs, 2,02, 213 hectare lakes, 2200, 000 hectare ponds, besides 29, 000 km duration of rivers²¹. India represents approximately 11.72% of fish species consisting of 23.96% genera, 57% families and 80% orders of the arena⁶. There

are about 2,500 species of fishes in India, of which 930 belong to freshwater, 1,570 species are marine⁷.

Fishes exhibit great variety in terms of their morphology, habitat and biology⁸. Fish can be used for ecological assessments in any respect stages of organic employer, assessment methods are available at the levels of ecosystem, populations, individuals, organs and at the cell and molecular stages⁹. Besides to these credit, fishes are taken into consideration as one of the important protein rich meals source some

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**Studies on Hydrobiology in relation to Occurrence and
distribution of Molluscs in Fish ponds at National
Fish Seed Farm, Karnataka**

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Abstract

This article deals with the distribution and variety of aquatic molluscs in relation to physico-chemical parameters of mature fed fish rearing ponds of National fish farm of Karnataka, India for the duration of April to September 2021. A total of 17 species and 14 genera belonging to 8 families of molluscs were identified. Numerical abundance of total population registered $2100 \pm 75/m^2$ to $4500 \pm 155/m^2$. The genus composition of molluscs during this period comprised of *Filopaludina* (40%), *Indo planorbis* (5%), *Lymnaea* (12%), *Campeloma* sp. (5%), *Lamellidens* (1%), *Viviparus* (5%), *Radix* sp. (5%), *Melanoides* sp (5%), *Thiara* (2%), *Bellamyia* (12%), *Margaritifera* (1%), *Idiopoma* sp (2%) and *Gyraulus* sp (5%) respectively. Gastropoda constitute 83.33% and Bivalve contribute 16.67% respectively. *Filopaludina* species showed dominant followed by *Bellamyia* and *Lymnaea* with 12%. Total aquatic molluscs showed seasonal variation being peak density in summer while, minimum in winter. Among families, Lymnaeidae consists of 5 species followed by Viviparidae with 4 species. Planorbidae, Thiaridae and Unionidae consists of 2 species each and rest of the families having 01 species each respectively. Regarding water quality, water temperature, phosphate and dissolved organic matter have significant effect on species composition and seasonal abundance.

The community of organisms residing on bottom of a water frame represent an vital element of natural food of bottom residing fishes¹⁰. The productiveness of benthos as an entire, is related with the fish production and numerous change strategies of water in water-soil interface. except, benthic organisms are properly signs of water first-

class and eutrophication and might integrate adjustments which mirror the traits of now not simplest the sediment but also the water column²⁷.

In waste water ponds, sedimentation of particulate organic matter of effluent on pond bottom increases the natural content


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Hydrological Characteristics in relation to Fish composition in Tammadihalli tank of Bhadravathi Taluk, Karnataka

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Abstract

Assessment of physico-chemical and fish composition characteristics of water in two sampling sites in Tammadihalli tank of Bhadravathi taluk, Karnataka was analysed during March to November 2017. This water body is situated 26 Km away from Shivamogga district of Karnataka. The main aim of this study is to understand the hydrological characteristics of tank water and to search out the suitability of water for drinking and fisheries. Several parameters like pH, water temperature, total alkalinity, total hardness, acidity, calcium, magnesium, electrical conductivity, phosphate, nitrate, dissolved oxygen, biochemical oxygen demand, total dissolved solids, turbidity, chloride and sulphate were analysed as per standard method and compared with WHO and BIS standards. The current study revealed that the water has pH (6.9 - 7.5), water temperature (23 - 34.5° C), electrical conductivity (101 - 138 μ mhos / cm), total dissolved solids (50.5 - 79 mg/l), turbidity (89 - 222 NTU), acidity (5.01 - 7.2 mg/l), alkalinity (62.2 - 73.5 mg/l), dissolved oxygen (2.84 - 6.8 mg/l), biochemical oxygen demand (2.2 - 2 mg/l), total hardness (49.84 - 59.5 mg/l), calcium (13.45 - 28.5 mg/l), magnesium (10.45 - 17.25 mg/l), chloride (39.5 - 49.7 mg/l), sulphate (39.05 - 51.35 mg/l), phosphate (0.02 - 0.06 mg/l) and nitrate (0.03 - 0.08 mg/l). In this tank few indigenous and exotic fishes were recorded. Water quality in Tammadihalli tank is influenced by hydrology, topography and other environmental factors, which cause variations in nutrients. The physico-chemical analysis of water samples from this tank showed that the water is within the safe limits of drinking, irrigation and fisheries. Hence, the current water body is included under moderately mesotrophic category.

Water quality is that the physico-chemical and biological profile of water⁵ it's a measure of the condition of water relative to the wants for human necessity or function¹⁶ the foremost common standards wont to assess water quality relate to drinkable, irrigation, fisheries, safety of human contact and for the health of ecosystems.

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RESEARCH PAPER

Avian species assemblage across a rural urban gradient in and around Shivamogga, Karnataka

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Article published on December 08, 2022

Key words: Urbanisation, Feeding guilds, Box-plot, Synanthropic species

Abstract

Human-induced activities play a prime role in determining the avian species diversity. Urbanization directly affects the distribution of the avian species because it results in habitat fragmentation which results in the loss of avian dependent habitats. Diversity of birds and their status were examined in the different sites along the rural urban gradient. A total of 108 avian species belonging to 16 orders and 47 families were recorded in 5 study sites. Significant variation in bird species richness was observed across the rural urban gradient sites ($F= 5.59$, $P= 0.00149$, $df= 5$). Feeding guilds were observed in different sites. Box-plot showed the dominance of carnivorous guilds across the five study sites. Urban 1 site was dominated with omnivorous guilds and rests of the sites were dominated with Carnivorous feeding guilds. Synanthropic species was found to be declining in the population at highly urbanized area. Specialist species were completely absent in the urbanised sites and are only found to be restricted to the rural sites.

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Immunoglobulin E Specific to Carbohydrate Determinants and Its Relevance in Legume Allergic Cross-reactivity

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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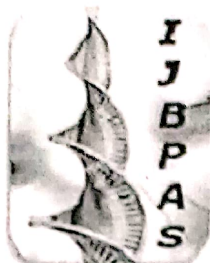
Review Article

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ABSTRACT

A glycol-related Immunoglobulin E (IgE) reactivity has been demonstrated in most allergen sources, especially in the plant kingdom. Recent progress in glycobiology has allowed a clear classification of these glycan-epitopes. Unlike classical peptide chain-based epitopes, glycoepitopes can share significant structural homologies beyond the limits of protein families. These glycon epitopes are thus prone to extensive cross reactive and occurs in proteins as distinct as pollen and Hymenoptera venoms. Because a monovalent IgE-binding domain may have low clinical reactivity and sometimes may share with protein epitope to induce allergic symptoms. Many of these glycoepitopes behave as "pan-epitopes" leading to extensive cross-reactivity in serum-based assays, glycol epitopes, and cross-reactive carbohydrate (CCD) are classically considered as a potential source of positive *in-vitro* results without clinical significance. Reports

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DIVERSITY OF MACROFUNGI IN THIRTHAHALLI TALUK OF SHIMOGA DISTRICT, KARNATAKA

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ABSTRACT

Thirthahalli taluk supports rich and diverse fungal fruitbodies with a total of 48 macrofungal species (38 genera, 28 families) found fruiting on soil and wood. In total, 10 morpho-groups were identified. The macrofungal diversity was examined based on sporocarp inventories over a year. The sporocarps encountered were collected and analyzed for their identity. The field expeditions were carried out from January to December 2019 in a 50 x 20 m transect. The families Agaricaceae, Polyporaceae and Xylariaceae. Psathyrellaceae and Tricholomataceae dominated the macrofungal communities during 2019 having the greatest number of species. The species belonged predominantly to the genera *Conocybe*, *Coprinellus*, *Coprinus*, *Daldinia*, *Hygrocybe*, *Ischnoderma*, *Lepiota*, *Phellinus*, *Polyporus* and *Xylaria*. More number of sporocarps and species were found in the month of August 2019, probably indicating rainfall to be important for the development of fruitbodies. Mulching and moisture content of substratum play very important role in the growth of macrofungi. The present work will serve as a good basis in native forest types for further studies in order to enrich the information on diversity of macro-mycobiota in India.

Keywords: Mushrooms, Sporocarps, Basidiomycete, Dominance, Abundance

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Entonaema liquescens Moller, a new report to India

Entonaema A. Moller is one of the poorly understood genera of family Xylariaceae belonging to Ascomycetes (Rogers 1982). Members of *Xylaria* are major saprophytes found on the dead and decaying parts of the plants (Patel et al. 2018). Western Ghats of Karnataka, India is characterized by the diversity in floristic entities including macro fungi. Survey was conducted Aug–Oct 2019 in central Western Ghats region of Karnataka at Jambekoppa forest locality to explore *Xylaria* members. During the study, an interesting fungi belonging to family Xylariaceae was collected and characterized as *Entonaema liquescens* Moller.

Sporocarp were studied in their natural habitat for their morphology, including colour, size and shape. Geographical ranges were recorded using Garmin 650 GPS. Sporocarp were collected carefully and brought to laboratory using paper bags. Stereo microscope was used to observe the surface of collected species. Anatomical characters like size and shape of perithecia, asci and ascospores were studied using binocular compound microscope. By compelling all the morphological, anatomical characters as well as compared to the standard monographs, the species was identified (Rogers 1981; Leacock 2018).

***Entonaema liquescens* Moller, MB#183350 = *Xylaria splendens* Berk. & M.A. Curtis,**

Journal of the Linnean Society. Botany 10: 382 (1869) [MB#189690]

Stromata globose or cerebriform are irregular shaped with short basal connective attached to the substrate, filled inside with watery liquid and becomes hollow on maturity. 1–12 cm diameter × 1–6 cm height; surface of the stroma generally bright-yellow coloured or light-yellow coloured, surface of stroma will lose their colour if handled when it is young, below the coloured conidial deposits are dark surface characterized by the dotted ostiolar openings.

Stroma is characterized by inner gelatinous layer and core is filled with watery liquid which comes out and collapses if we puncture the stromata. Perithecia 0.3–0.5 mm diameter. Asci consists of eight ascospores, measuring 120–150 µm in length. Apical ring turns blue while treated with the Melzers reagent. Ascospores dark brown, ellipsoid with blunt ends, with straight germ slit 11–11.5 × 5–6 µm in size.

***Entonaema liquescens* Moller**, found on unknown dead trees and branches. Place of collection: Jambekoppa forest locality (14.103 N, 75.142 E), Shivamogga District, Karnataka State, India. Date of collection: 30 August 2019. Collector: Nandan Patel K.J and Krishnappa M. Herbarium samples have been deposited in the Departmental

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Edible fruit diversity in shimogga district central western ghats, karnataka.

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Abstract: Rural communities in the Western Ghats region continue to collect and consume many edible wild fruit plants as a food source. This study was an account of the traditional knowledge and use of wild edible fruit plants by local people in the Western Ghats region. The study was conducted in Shimogga district present in the Central Western Ghats region in the month of June to October and visited most of the forest area, nursery, home gardens and collected total thirty four edible fruit yielding plant species in the study region, in which family Rutaceae comprises 4 edible fruit species and family Myrtaceae, Annonaceae, Anacardiaceae contain 3 fruits in each families and 02 fruit yielding species have been documented from Oxalidaceae, Moraceae and other 14 belongs to different type of families. Among these 34 species 08 species are wild and other 26 species are cultivated either in the home gardens or in nurseries.

Keywords: Edible fruit, Western Ghats, Wild fruits, Shimogga district.

INTRODUCTION

Biodiversity is defined as the variability among living organisms from all sources including among other things, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species between species of ecosystem, forests are renewable encompassing millions of living organisms both plant and animals living in perfect harmony with nature. Plants are the producers of the ecosystem it stores its reserve food in different organs like stem, root, and fruit. Some plants provide useful fruits in terms of medicine, food, fiber etc. among these diversities of fruits based on its utility, fruit as a source of food gained its importance since from the beginning of the civilization. A fruit is a mature,