



3.3.1.1. Number of research papers in the journals notified on UGC care year wise during the last five year 2021-2022

| Sl. No. | Title of paper | Name of the Author/s | Department of the teacher | Name of the Journal | Year of publication | ISSN Number | Web Link of the Title/abstract page of the Journal |
|---------|--|--|---------------------------|---|---------------------|----------------------|---|
| 1 | "In Silico Characterization of a Transcript Code Based Screening of Antimicrobial Peptide from <i>Trichogramma chilonis</i> ". | Sunil s v | Biochemistry | International Journal of Peptide Research and Therapeutics.Springer Nature. | 2021 | 15733149 15733904 | https://doi.org/10.1007/s10989-021-10295-9 |
| 2 | Characterization and biochemical activities of novel functional antimicrobial peptide (AMP) from <i>Trichogramma chilonis</i> ". | Sunil s v | Biochemistry | Biomedicine | 2022 | 0970 2067 | https://doi.org/10.51248/v42i5.1946 |
| 3 | Anti-hyperlipidemic effects of citrus fruit peel extracts against high fat diet-induced hyperlipidemia in rats | Prof. Ramesh C K Dr. Pallavi M Nethravathi A M | Biotechnology | International Journal of Research in Pharmaceutical Sciences. | 2021 | 0975- 7538 | https://ijrps.com/index.php/home/article/view/2 |
| 4 | Bioactive Isolates of Morus Species as Antibacterial Agents and their in-silico Profiling | Prof. Ramesh C K | Biotechnology | Letters in Drug Design & Discovery | 2021 | 1570- 1808 | https://www.researchgate.net/publication/346703155 |
| 5 | Oral therapeutic proteins: a review on current strategies, challenges, and development, | Prof. Ramesh C K Dr. Pallavi M Nethravathi A M | Biotechnology | Review article: Bulletin of Environment, Pharmacology and Life Sciences | 2021 | 2277- 1808 | https://www.researchgate.net/publication/351 |
| 6 | In vitro micropropagation techniques for (<i>Musa spp</i>) | Prof. Ramesh C K | Biotechnology | Research & Reviews in | 2022 | 2321- 8681 | https://biotechjournal.in/images/paper_pdffiles |


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| | Banana grand-9 variety. | | | Biotechnology & Biosciences | | | /ln%20-62b55c4c1e8c5.pdf |
| 7 | Targeting HIF-1 α by newly synthesized Indolephenoxyacetamide (IPA) analogs to induce anti-angiogenesismediated solid tumor suppression | Dr. B T Prabhakar | Biotechnology | Pharmacological reports | 2021 | 17341140 | https://link.springer.com/article/10.1007/s43440-021-00266-40 |
| 8 | modulation of DNA damage response by targeting ATM kinase using newly synthesized di-phenoxy acetamide (DPA) analogs to induce anti-neoplasia | Dr. B T Prabhakar | Biotechnology | Pharmacological reports | 2021 | 17341140 | https://pubmed.ncbi.nlm.nih.gov/3390 |
| 9 | In Silico Characterization of a Transcript Code Based Screening of Antimicrobial Peptide from Trichogramma chilonis | Dr. B T Prabhakar | Biotechnology | International Journal of Peptide Research and Therapeutics | 2021 | 15733149 | https://link.springer.com/article/10.1007/s10989-021-10295-9 |
| 10 | Synthesis, Structure Analysis, DFT Calculations and Energy Frameworks of new Coumarin Appended Oxadiazoles, to Regress Ascites Malignancy | Dr. B T Prabhakar | Biotechnology | Journal of Molecular Structure | 2021 | 0022-2860 | https://www.sciencedirect.com/science/article/abs/pii/S0022286021022 |

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| | by Targeting VEGF Mediated Angiogenesis | | | | 1 | | 936 |
| 11 | Antiproliferative pharmacophore azo-hydrazone analogue BT-1F exerts death signalling pathway targeting STAT 3 in solid tumour | Dr. B T Prabhakar | Biotechnology | Pharmacological reports | 2 0 2 2 | 1734 1140 | https://link.springer.com/article/10.1007/s43440-021-00345-w |
| 12 | Anti-neoplastic pharmacophore benzophenone-1 coumarin (BP-1C) targets JAK2 to induce apoptosis in lung cancer | Dr. B T Prabhakar | Biotechnology | Apoptosis | 2 0 2 1 | 1360 8185 | https://link.springer.com/article/10.1007/s10495-021-01699-5 |
| 13 | Immunoadjuvant and Humoral Immune Responses of Garlic (Allium sativum L.) Lectins upon Systemic and Mucosal Administration in BALB/c Mice | Dr. B T Prabhakar | Biotechnology | Molecules | 2 0 2 2 | 1420 - 3049 | https://pubmed.ncbi.nlm.nih.gov/35209158/ |
| 14 | Characterization of antioxidant, anti-cancer, and immunomodulatory fun | Dr. B T Prabhakar | Biotechnology | | | | https://biomedicineonline |

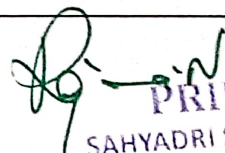
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| | ctions of partially purified garlic (<i>Allium sativum</i> L.) lectin | | | Biomedicine | 2 0 2 2 | 0970206 7 | e.org/index.php/home/article/view/1862 |
| 15 | A systems biology investigation of curcumin potency against TGF- β -induced EMT signalling in lung cancer | Dr. B T Prabhakar | Biotechnology | 3Biotech | 2 0 2 2 | 2190 - 5738 | https://link.springer.com/article/10.1007/s13205-022-03360-7 |
| 16 | Immunoglobulin E Specific to Carbohydrate Determinants and Its Relevance in Legume Allergic Cross-reactivity | Dr. B T Prabhakar | Biotechnology | Asian Journal of Immunology | 2 0 2 2 | | https://www.researchgate.net/publication/364360210_Immunoglobulin_E_Specific_to_Carbohydrate_Determinants_and_Its_Relevance_in_Legume_Allergic_Cross-reactivity |
| 17 | Characterization and biochemical activities of novel functional antimicrobial peptide (AMP) from <i>Trichogramma chilonis</i> | Dr. B T Prabhakar | Biotechnology | Biomedicine | 2 0 2 2 | 0970206 7 | https://biomedicineonline.org/index.php/home/article/view/1946 |

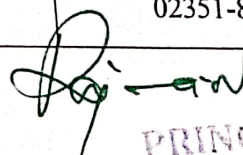
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| 18 | Fabrication and characterization of hydrogel films using A mylitta regenerated silk fibroin with Poly vinyl alcohol for biomedical uses | Dr. B T Prabhakar | | Research journal of Biotechnology | 2 0 2 2 | 0973 - 6263 | https://www.researchgate.net/publication/367292669_Fabrication_and_characterization_of_hydrogel_films_using_A_mylitta_regenerated_silk_fibroin_with_Poly_vinyl_alcohol_for_biomedical_uses |
| 19 | Corosolic Acid Inhibits Secretory Phospholipase A2IIa as an Anti-Inflammatory Function and Exhibits Anti-Tumor Activity in Ehrlich Ascites Carcinoma Bearing Mice | Dr. B T Prabhakar | Biotechnology | Journal of Inflammation Research | 2 0 2 2 | 11 78- 70 31 | https://pubmed.ncbi.nlm.nih.gov/36619941/ |
| 20 | Biogenic Collagen-Nano ZnO Composite Membranes Potential Wound Dressing Material: Structural Characterization, Antibacteri | Dr. Pradeepa K | Biotechnology | Journal of Inorganic and Organometallic Polymers and Materials | 2 0 2 2 | 1- 16 | https://link.springer.com/article/10.1007/s10904-022-02351-8 |

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| | alStudiesand InVivoWound HealingStudies. | | | | | | |
| 21 | Anti- inflammatoryactivity ofquercetin-3- rhamnopyranosyl-(1- 6)glucopyranosideisolated from Delonixelataagainst | Dr.PradeepaK | Biotechnology | Indian Journalof NaturalProduct s andResources | 2 0 2 2 | 15 6- 16 2 | http://op.niscpr.res.in/index.php/IJNPR/article/view/50806 |
| 22 | Synthesis of silvern nanoparticles using the seed extractofEnsetesuperbuma ndtheir antibacterialactivityassess ment. Indian Journal ofNaturalProductsand Resources | Dr.PradeepaK | Biotechnology | Indian Journalof NaturalProduct s andResources | 2 0 2 2 | 20 6- 21 2 | https://nopr.niscpr.res.in/handle/123456789/60264 |
| 23 | The Gag Reflex: AHurdle in Dentistry- LiteratureReview | Dr.PallaviM | Biotechnology | Journal ofPharmaceutic alResearch International | 2 0 2 | 24 56- 91 | http://stmopenlibrary.com/id/eprint/281/ |

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| | alStudiesand InVivoWound HealingStudies. | | | | | | |
| 21 | Anti- inflammatoryactivity ofquercetin-3- rhamnopyranosyl-(1- 6)glucopyranosideisolated from Delonixelataagainst | Dr.PradeepaK | Biotechnology | Indian Journalof NaturalProduct s andResources | 2 0 2 2 | 15 6- 16 2 | http://op.niscpr.res.in/index.php/IJNPR/article/view/50806 |
| 22 | Synthesis of silvernanoarticles using the seed extractofEnsetesuperbuma ndtheir antibacterialactivityassess ment. Indian Journal ofNaturalProductsand Resources | Dr.PradeepaK | Biotechnology | Indian Journalof NaturalProduct s andResources | 2 0 2 2 | 20 6- 21 2 | https://nopr.niscpr.res.in/handle/123456789/60264 |
| 23 | The Gag Reflex: AHurdle in Dentistry- LiteratureReview | Dr.PallaviM | Biotechnology | Journal ofPharmaceutic alResearch International | 2 0 2 | 24 56- 91 | http://stmopenlibrary.com/id/eprint/281/ |

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| 24 | Comparative Study of Drug Likeness and Pharmacokinetic Properties of Synthetic Antiviral Drugs to that of Remdesivir: In-silico Approach | Dr. Pallavi M | Biotechnology | Journal of Pharmaceutical Research International | 1 2 0 2 1 | 19 24 56- 91 19 | https://journaljpri.com/index.php/JPRI/article/view/6823 |
| 25 | Antiproliferative effects of Artabotrys odoratissima fruit extract and its bioactive fraction through upregulation of p53/γH2AX signals and G2/M phase arrest in MIA PaCa-2 cells | Dr. Pallavi M | Biotechnology | Anti-Cancer Agents in Medicinal Chemistry | 2 0 2 2 | 18 75- 59 92 | https://pubmed.ncbi.nlm.nih.gov/35105296/ |
| 26 | Evaluation of Antimutagenic Potential of Chrozophora Rottleria against Ems Induced Mutagenicity in Mice | Dr. Pallavi M | Biotechnology | International Journal of Pharmaceutical and Biosciences | 2 0 2 2 | 0975 - 6299 | https://www.researchgate.net/publication/358157783 |
| 27 | Phytochemical investigation | | Biotechnology | | | | |

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| | n and invitro antioxidant activity of Adenocalymma alliaceum | Dr. Pallavi MNethravath iam | | Neuroquantology | 2 0 2 2 | 1303 - 5150 | https://www.neuroquantology.com/datacms/articles/20221129082811aamNQ66765.pdf |
| 28 | Hepatoprotective effect of Adenocalymma alliaceum leaves extract against ethanol induced toxicity in HepG2 cell line | Dr. Pallavi M | Biotechnology | Neuroquantology | 2 0 2 2 | 1303 - 5150 | https://www.researchgate.net/publication/362278846_6_ |
| 29 | Assesment of physical and functional properties of finger millet grain varieties | Srusti S.N.R Ramesh Babu H.N Rajeshwari,N Kshemma E | B o t a n y | International journal of chemical studies | July 2022 | 2349- 8528 | <u>Assessment of Physical and functional properties of finger millet grain varieties (chemijournal.com)</u> |
| 30 | A field study on evaluation of different varieties of traditional storage practices of finger millate (<i>Eleucinacoracana(L.)</i>) in southern dry zone of Karnataka for seed traits. | Srusti S.N.R Ramesh Babu H.N Rajeshwari,N Kshemma E | B o t a n y | International journal of all research education and scientific methods | November 2021 | 2455- 6211 | ijirt.org/master/publishedpaper/IJIRT153320_PAPER.pdf |
| 31 | Isolation and identification of some fungal pathogens from | Sowmya G H | Botany | International journal of Botany studies | October 2021 | 2455- 541X* | (PDF) Isolation and |

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| | solanaceous vegetable crops of Chithradurga district, karnataka | Rajeshwari,N Ramesh Babu H.N | | | | | identification of some fungal pathogens from Solanaceous vegetable crops of Chitradurga district, Karnataka (researchgate.net) |
| 32 | Impact of conventional storage system on germination and storage fungi of paddy in Chikkamagaluru, Karnataka . | T V Sunilm Kumar, Rajeshwari,N Ramesh Babu H.N M Krishnappa | Botany | International journal of Botany studies | September 2021 | 2455-541X | 6-4-250-124.pdf (botanyjournals.com) |
| 33 | GCMS identification of bio active components of leaf extract of <i>Sidaacuta</i> (brum.f) | Nalini T J, Keshamma E Ramesh Babu H.N Rajeshwari,N And Sridhar B T | Botany | International journal of herbal medicine | 2021 | 2394-0514 | www.florajournal.com/archives/?year=2021&vol=9&issue=4&part=a&ArticleId |
| 34 | GCMS identification of stem extract of <i>Sidaacuta</i> (brum.f) | T J Nalini Keshamma E Ramesh Babu H.N Rajeshwari,N And Sridhar B T | Botany | International journal of current microbiology and applied sciences | 2021 | 2319-7706 | GC-MS Identification of Stem Extract of <i>Sida acuta</i> (Burm.f) (ijcmas.com) |
| 35 | Assay of antimicrobial activity of <i>Sidaacuta</i> (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 | Assay of Antimicrobial Activity of <i>Sida acuta</i> (Burm. F.) by Well Diffusion Method (researchgate.net) |
| 36 | Effect of integrated nutrient management on growth and yield attributes of yardlong bean (<i>Vigna unguiculata</i> subsp. <i>sesquipedali</i>) | M Manjesh Ramesh Babu H.N, Nagarajappaadivappa r and | Botany | Journal of farm science | 2022 | 0972-1061 | WWW.uasd.edu |

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| | <i>s (L.)verdc.)</i> | Rajeshwari,N | | | | | |
| 37 | Diversity of rhizosphere mycobiota of Some Oil Yielding Crops in Davanagere region of Karnataka, India | Shaile M and Nafeesa Begum | Botany | Journal of Mycopathological research | 2022 | ISSN: 0971-3719 | https://imskolkata.org/pdf/june22/11.%20saila.pdf |
| 38 | Phenology of the Genus <i>Crotalaria</i> L. (Fabaceae-Papilionoideae) of Holalkere, Hosadurga and Chitradurga Taluks of Chitradurga District, Karnataka, India | Rachitha C J and Krishnaswamy K | Botany | Plant Science Today | 2021 | 2348-1900 | https://www.researchgate.net/publication/360398249_Phenology_of_genus_Crotalaria_L_Fabaceae_Papilionoideae_of_Holalkere_Hosadurga_and_Chitrahitra |
| 39 | Studies on the Phenology of some terrestrial orchids of western Ghats India | SoumyaMahabalesh waraHegde and Krishnaswamy K | Botany | Plant Science Today | 2021 | 2348-1900 | https://horizonpublishing.com/journals/index.php/PST/article/view/1233 |
| 40 | Comparitive anatomy of leaf in four <i>Nervilia</i> species (Orchideaceae) from Shimoga District. Central Westrenghats Karnataka. | SoumyaMahabalesh waraHegde and Krishnaswamy K | Botany | ANVESAK | 2021 | 0378-4568 | https://horizonpublishing.com/journals/index.php/PST/article/view/1233 |
| 41 | Anatomical adaptation in Roots of four <i>Nervilia</i> species (Orchideaceae). | SoumyaMahabalesh waraHegde and Krishnaswamy K | Botany | Annals of Biology | 2021 | 235-241 | (PDF) Anatomical Adaptations in Roots of Four <i>Nervilia</i> Species (Orchidaceae) (researchgate.net) |
| 42 | Mega sporogenesis and development female gametophytes in <i>Geodorumdensiflorum</i> (LAM) SCHLTR. | SoumyaMahabalesh waraHegde and Krishnaswamy K | Botany | The Orchid Society of India | 2021 | 0971-5371 | https://orchidsocietyindia.org/wp-content/uploads/2022/05/Hegde-and-K-Krishnaswamy1_9_21.pdf#:~:text=Geodorum%20 |
| 43 | Diversity and distribution of genus <i>Hebinaria</i> Willd. (Orchideaceae) from Shimoga District, Karnataka. | SoumyaMahabalesh waraHegde and Krishnaswamy K | Botany | The Orchid Society of India | 2021 | 0971-5371 | 235-241.pdf |

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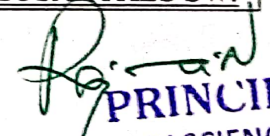
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| 44 | Terrestrial Orchid Diversity in sharavathi river vallyof Shimoga District. Karnataka, IN. | SoumyaMahabalesh waraHegde and Krishnaswamy K | Botany | International Journal of Arts,Science and Humanity | 2021 | 2582-0397 | https://www.researchgate.net/publication/351624569_Terrestrial_Orchid_Diversity_in_Sharavati_River_Valley_of_Shimoga_District_Karnataka_India#:~:text=Extensive%20field%20surveys%20during%202018-2020%2C%20 |
| 45 | Chemical composition and antimicrobial activity of essential oils of leaves of Rapaneawightiaana | Manasa CR, Ravi Kiran S, Ravi Kumar BS and Krishnaswamy K | Botany | Journal of adv. Scitific research | 2021 | 0976-9595 | 47344 |
| 46 | Taxonomic diversity and distribution of trees and their regeneration status in Sringeri forest range of Westen Ghats | AnushreeHebbar K and Krishnaswamy K | Botany | International Journal of Arts,Science and Humanity | 2021 | 2582-0397 | ://www.researchgate.net/publication/358890540_Taxonomic_Diversity_and_Distribution_of_Trees_and_their_Regeneration_Status_in_Sringeri_forest_range_Western_ghats_Karnataka |
| 47 | ComparitivePhenological study of the Genus Rhynchosialoureiro and StylosantheswHolalkere, Hosadurga and Chitradurga Taluks of Chitradurga District, Karnataka, India | Rachitha C J and Krishnaswamy K | Botany | Journal of adv. Scitific research | 2021 | 0976-9595 | (PDF) COMPARATIVE PHENOLOGICAL STUDIES OF THE GENUS RHYNCHOSIA LOUREIRO AND STYLOSANTHES SW. |

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| | | | | | | | IN HOSADURGA AND HOLALKERE THALUKS OF CHITRADURGA DISTRICT, KARNATAKA (researchgate.net) |
| 48 | Phytoremediation of sewage and pond water by canna indica L. | Rachitha C J, Sudakara H N and Krishnaswamy K | Botany | IJRAR | 2021 | 2348-1269 | ttps://www.researchgate.net/publication/365317318_Issue_4_wwwijrarorg_E-ISSN_2348-1269_P-ISSN_2349-5138_IJRAR22D1672 |
| 49 | Field survey on assessment of traditional storage practices of Finger Millate(<i>Eleucinacoracana</i> (L.)) in southern dry zone of Karnataka for seed traits. | Srusti S.N.R Ramesh Babu H.N Rajeshwari,N Kshemma E | Botany | International journal of innovative research in technology | November 2021 | 2349-6002 | Research Paper on Field Survey on Assessment of Traditional Storage Practices of Finger Millet [<i>Eleusine coracana</i> (L.)] in Southern Dry Zone of Karnataka for Seed Traits. IJIRT.org apply for ugc care approved journal, UGC Approved Journal, ugc approved journal, ugc approved list of journal, ugc care journal, care journal, UGC-CARE list, New UGC-CARE Reference |

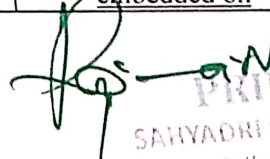
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|----|---|-----------------|-----------|------------------------------|----------------------|------------------|---|
| 50 | Synthesis of reduced graphene oxide decorated with Sn/Na doped TiO ₂ nano composite: a photocatalyst for Evans blue dye degradation | Krishnamurthy G | Chemistry | Emergent Materials | 4(2), 457-468 (2021) | [ISSN 2522-574X] | https://www.springer.com/journal/42247 |
| 51 | Photocatalytic degradation of eriochrome black-T and evan's blue dyes under the visible light using PVA capped and uncapped Ag doped Zn nanoparticles | Krishnamurthy G | Chemistry | Emergent Materials | 4(2), 447-456 (2021) | [ISSN 2522-574X] | https://www.springer.com/journal/42247 |
| 52 | Palladium metal embedded on mesoporous graphene oxide as | Krishnamurthy G | Chemistry | Materials Today: Proceedings | 46, 2874-2879, | | <u>Palladium metal embedded on</u> |

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| | an efficient heterogeneous catalyst for Suzuki coupling reaction | | | | 2021 | | <u>mesoporous graphene oxide as an efficient heterogeneous catalyst for Suzuki coupling reaction - ScienceDirect</u> |
| 53 | Optical and antibacterial evaluation of biofunctionalized Cu: ZnS nanoparticles | Krishnamurthy G | Chemistry | Emergent Materials | 3, 937-946, 2021 | | <u>Optical and antibacterial evaluation of biofunctionalized Cu:ZnS nanoparticles SpringerLink</u> |
| 54 | Influence of concentration of poly(vinylpyrrolidone) on Copper doped ZnS nano particles. | Prabhakar W. Chavan | Chemistry | Journal of Scientific Research, BHU, Varanasi | 65(8), 64-68 (2021) | [ISSN 0447-9483] | |
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| 56 | Synthesis, Optical, Photocatalytic and Electrochemical Properties of Cobalt Doped ZnS Nanoparticles | Prabhakar W. Chavan | Chemistry | Asian Journal of Chemistry | 33(10),2446-2454 (2021) | [ISSN 0970-7077] | https://asianjournalofchemistry.co.in/user/journal/ArticleByYear.aspx?VolumeId=33&VolumeYear=2021 |
| 57 | Synthesis of Reduced Graphene Oxide decorated with Sn/Na doped TiO2 nanocomposite: A Photocatalyst for Evans blue dye Degradation | Prabhakar W. Chavan | Chemistry | Emergent Materials | 4(2), 457-468 (2021) | [ISSN 2522-574X] | https://www.springer.com/journal/42247 |
| 58 | 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 agents | Prabhakar W. Chavan | Chemistry | Asian Journal Pharm Clinical Research | 14(1), 94-97 (2021) | [ISSN: 0974-2441] | https://innovareacademics.in/journals/index.php/ajpcr/index |

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3.3.1.1. Number of research papers in the journals notified on UGC care year wise during the last five year 2021-2022

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|----|---|---------------------|-----------|------------------------------------|-------------------------|------------------|---|
| 59 | Photocatalytic Degradation of Eriochrome Black-T and Evan's Blue Dyes Under the Visible Light using PVA Capped and Uncapped Ag doped ZnS nanoparticles | Prabhakar W. Chavan | Chemistry | Emergent Materials | 4(2), 447-456 (2021) | [ISSN 2522-574X] | https://www.springer.com/journal/42247 |
| 60 | Synthesis, Optical, Photocatalytic and Electrochemical Properties of Cobalt Doped ZnS Nanoparticles | Prabhakar W. Chavan | Chemistry | Asian Journal of Chemistry | 33(10),2446-2454 (2021) | [ISSN 0970-7077] | https://asianjournalofchemistry.co.in/user/journal/ArticleByYear.aspx?VolumeId=33&VolumeYear=2021 |
| 61 | Synthesis, characterization, and antibacterial Activities of naphtho[2,1-b]furan derivatives | K.P Latha | Chemistry | Rasayan Journal of chemistry | 15(4), 2477-2484, 2022 | ISSN: 0974-1496 | Microsoft Word - 39 Vol.15. No.4, 2477-2484. Oct. - Dec., 2022. RJC-8052 (rasayanjournal.co.in) |
| 62 | Synthesis and pharmacological activities of 1-(1-naphtho[2,1-b]furan-2-yl)ethylidene) (ary substituted) thiosemicarbazide derivatives and 1-(1-naphtho[2,1-b]furan-2-yl)ethylideneamino)-2-thioxoaryl substituted imidazolidin-4-one derivatives. | K.P Latha | Chemistry | Indian Journal of Chemistry | 61(2), 537-543 2022 | ISSN: 0975-0983 | http://op.niscpr.res.in/index.php/IJC/article/view/63646 |
| 63 | 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 | 54 (2022) 646-655 | ISSN 2214-7853. | https://doi.org/10.1016/j.matpr.2021.10.354 2214-7853/2021 |
| 64 | Structural Characterization, DFT, Molecular Docking and Cytotoxic Studies of Metal (II) Complexes Derived from Thiosemicarbazide | Yuvaraj TCM | Chemistry | Asian Journal of Chemical Sciences | 11(2): 33-45, 2022; | ISSN: 2456-7795 | DOI: 10.9734/AJOCS/2022/v11i219119 |
| 65 | Synthesis, characterization, DFT | Yuvaraj TCM | Chemistry | International | 3(2021) 11- | ISSN: | http://dx.doi.org/10.33545/26 |

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3.3.1.1. Number of research papers in the journals notified on UGC care year wise during the last five year 2021-2022

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| | studies. antibacterial, cytotoxic and molecular docking studies of 3-chloro-1-[(6-nitro-1, 3-benzoxazol-2-yl) amino]-4-phenylazetid-2-one derivatives | | | Journal of Chemical and Biological Sciences | 19 | 2664-6773 | 646765.2021.v3.i2a.29 |
| 66 | Synthesis, Characterization and Electrochemical Sensor based upon novel Schiff base metal Complexes derived from the drug flufenamic acid for the determination of uric acid and Their Biological applications. | Malathesh Pari | Chemistry | Biointerface Research in Applied Chemistry | 11(4), 11390 – 11403 (2021) | | 20695837114.11390114.03.pdf (biointerfaceresearch.com) |
| 67 | Investigation on Co(II), Ni(II), Cu(II), and Zn(II) complexes derived novel N-(3-hydroxybenzoyl) thiophene-2-carbohydrazide: Structural characterization, Electrochemical Detection of Biomolecules, Molecular Docking and Biological evaluation | Malathesh Pari | Chemistry | Journal of Emergent Material | 5, 1133–1155 (2022) | | doi.org/10.1007/s42247-021-00312-4 |
| 68 | Synthesis, spectral characterization, electrochemical studies of pesticide and biological evaluation of Transition metal complexes of azo dye derived from substituted phenyl pyrazole . | Malathesh Pari | Chemistry | Journal of the Indian Chemical Society | 99 (2022) 100788 | | Doi.org/10.1016/j.jics.2022.100788 |
| 69 | Contextualizing Political Identity in Susan Abulhawa's Morning in Jenin and The Blue Between Sky and water | Dr. M. Ibrahim Khalilulla | e n g l i s | Journal of Publication Rabindra Bharati University | 2021 | ISSN:0972-7175 A Peer Reviewed Journal | Vol:XXII, No.9(1).2021, UGC Care Approved, Peer Reviewed and Referred Journal |

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| 70 | Kuvempu's Shrudra Tapasvi:A Voice of Subaltern | Bhaskara T.P | h e n g l i s h | Journal of Publication Rabindra Bharati University | 2021 | ISSN:0972-7175 A Peer Reviewed Journal | Vol:XXII, No.9(1).2021.UGC Care Approved , Peer Reviewed and Referred Journal |
| 71 | Importance of Bio Control Agents and Chemical Pesticides on the Yield of Crops in Shivamogga District | Dr.NagarajParisara | E n v i r o n m e n t a l s c i e n c e | Indian Journal of Natural Sciences | 2022 | 0976-0997 | https://tnsroindia.org.in/journals.html |
| 72 | Comparative study of vermicompost and DAP on | Dr.NagarajParisara | Environmen | Indian Journal of applied and pure | 2022 | 0970-2091 | https://biology-journal.org/ |

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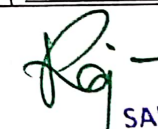
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| | the growth of Corianderum Sativam seed | | tal science | biology | | | |
| 73 | Aquatic bird diversity in water bodies of Shivamogga district Karnataka. | Dr.NagarajParisara | Environmen tal science | Indian Journal of applied and pure biology | 2022 | 0970-2091 | https://biology-journal.org/ |
| 74 | Comparison analysis of IGE and blood histamine levels – correlation during allergic sensitization in atopc and non-atopic population | Dr.NagarajParisara | Environmen tal science | Indian Journal of applied and pure biology | 2023 | 0970-2091 | https://biology-journal.org/ |
| 75 | Immunoglobulin E specific to carbohydrates determinants and its relevance in legume allergic cross reactivity | Dr.NagarajParisara | Environmen tal science | Asian journal of Immunology | 2022 | | https://journalaji.com/index.php/AJI/abstracting-indexing |
| 76 | Variation in the Electrical conductivity between Moringa Oleifera and Santalum Album | Mohanasha K.M | Electronics | International Journal Of Creative Research Thoughts (IJCRT) | 03-05-2021 | ISSN: 2320-2882 | 2021 IJRCT/Volume 9, Issue 5 May 2021/ISSN:2320-2882 |
| 77 | Effect of NP shapes on Fe_3O_4 on 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 | Dr.Venkatesh P | Mathematic s | Waves in Random and Complex Media Taylor & Francis | 2022 | 1745-5030 | <u>Paper1</u> <u>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: Waves in Random and Complex</u> |

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3.3.1.1. Number of research papers in the journals notified on U.G. over year wise during the last five year (2015-2021)

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|----|---|---------------------------------|--------------|--|----------------|----------------|--|
| 78 | Darcy Forchheimer Convective Flow of Casson nanofluid in the Microchannel, Buongiorno Model | Dr. Venkatesh P | Mathematical | Journal of Research & Management (JRM) | 2021 | 1991-1999 | Volume 14, No. 5 Mathematical Year Journal of Research & Management Journal of Research & Management Volume 14, No. 5 Dr. Venkatesh P 2021 |
| 79 | Dynamics of hybrid nanofluid through a semi spherical porous fin with internal heat generation | Dr. Venkatesh P | Mathematical | Journal of Differential Equations in Applied Mathematics (Publisher: Elsevier) | 2021 | 1444-1450 | Year Journal of Differential Equations in Applied Mathematics Volume 27, No. 10 2021 |
| 80 | Compressed Flow of Hybridized Nanofluid Entwined Between Two Rotating Plates Exposed to Radiation | Dr. Venkatesh P | Mathematical | Journal of Nanoparticles (Publisher: American Scientific Publishers) | 2021 | 2499-2504 | Year Compressed Flow of Hybridized Nanofluid Entwined Between Two Rotating Plates Exposed to Radiation Volume 1, No. 1 American Scientific Publishers |
| 81 | Germicidal Properties of Biosynthesized Gold Nanoparticles from Streptomyces sp. PRO 15 | K.M. Prashanth and R. Onkarappa | Microbiology | Bioscience Biotechnology Research Communications | September 2021 | 1113-1119 | https://doi.org/10.21769/bbr.210113 |
| 82 | "Urdu Ki Nayi Bastika Bakamal Shayar-Kamal Azhar" | Dr. Syed Sanaulla | Urdu | Sabaq-e-Urdu | April 2021 | ISSN 1521-1511 | 30-33 |
| 83 | "Urdu Novel aur Samaji Masail" | Dr. Syed Sanaulla | Urdu | Peshrafi New Delhi | June 2021 | 1349-1437 | 20-22 |
| 84 | "Peeche Wohkya Hatega Jo Had se badanaho - Mirza" | Dr. Syed Sanaulla | Urdu | Sabaq-e-Urdu | June 2021 | ISSN 1521-1511 | 121-123 |

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3.3.1.1. Number of research papers in the journals notified on UGC care year wise during the last five year 2021-2022

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|----|---|---------------------------------|--------------|--|----------------|----------------|--|
| 78 | Darcy-Forchheimer Convective Flow of Casson nanofluid in the Microchannel: Buongiorno Model | Dr.Venkatesh P | Mathematics | JNCE Journal of Engineering & Management (JJEM) | 2022 | 2582-0079 | Media: Vol 0, No 0 (tandfonline.com) Paper2 Darcy-Forchheimer Convective Flow of Casson nanofluid in the Microchannel: Buongiorno Model (jnncce.ac.in) |
| 79 | Dynamics of hybrid nanofluid through a semi spherical porous fin with internal heat generation | Dr.Venkatesh P | Mathematics | Partial Differential Equations in Applied Mathematics (Publisher: Elsevier) | 2021 | 2666-8181 | Paper4 www.sciencedirect.com/science/article/pii/S2666818121000796 |
| 80 | Compressed Flow of Hybridized Nanofluid Entwined Between Two Rotating Plates Exposed to Radiation | Dr.Venkatesh P | Mathematics | Journal of Nanofluids (Publisher: American Scientific Publishers) | 2021 | 2169-432X | Paper5 Compressed Flow of Hybridized Nanofluid Entwined Between Two Rota...: Ingenta Connect |
| 81 | Germicidal Properties of Biosynthesised Gold Nanoparticles from <i>Streptomyces</i> sp. PRO 15 | K.M. Prashanth and R. Onkarappa | Microbiology | Bioscience Biotechnology Research Communications | September 2021 | 1118-1123 | http://dx.doi.org/10.21786/bbr.c/14.3.32 |
| 82 | “Urdu Ki Nayi Bastika Bakamal Shayar-Kamal Azhar” | Dr. Syed Sanaulla | urdu | Sabaq-e-Urdu | April 2021 | ISSN 2321-1601 | 31-33 |
| 83 | “ Urdu Novel aur Samaji Masail” | Dr. Syed Sanaulla | Urdu | Peshraflth New Delhi | June 2021 | 2349 - 3437 | 20-22 |
| 84 | “Peeche Wohkya Hatega Jo Had se badanaho – Mirza | Dr. Syed Sanaulla | Urdu | Sabaq-e-Urdu | June 2021 | ISSN 2321-1601 | 120-123 |

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| | YasYagana Changezi | | | | | | |
| 85 | Distribution of blood groups and haemoglobin percentage among the students of government science college, Chitradurga, Karnataka, India. | Dr.K.L.Naik | Zoology | Uttar Pradesh journal of zoology | 2021 | 0256-971X(P) | https://mbimph.com/index.php/UPJOZ/article/view/2261 https://upzs.in/ |
| 86 | Determining the Morphometric traits of Apis dorsata worker bees Jogimatti forest and Chitradura, Karnataka, India | Dr.K.L.Naik | Zoology | Uttar Pradesh journal of zoology | 2021 | 0256-971X(P) | https://mbimph.com/index.php/UPJOZ/article/view/2254 https://upzs.in/ |
| 87 | A study on butterfly biodiversity of Jogimatti forest, Chitradura, Karnataka, India | Dr.K.L.Naik | Zoology | Uttar Pradesh journal of zoology | 2021 | 0256-971X(P) | https://mbimph.com/index.php/UPJOZ/article/view/2157 https://upzs.in/ |
| 88 | Comparative bio-efficacy of insecticides against shot-hole borer, <i>Xylosandrus compactus eichhoff</i> (coleopteran: Scolytidae) infesting robusta coffee | Dr.K.L.Naik | Zoology | <i>J.Exp.Zool.India</i> | 2021 | 0972-0030 | DocID: https://connectjournals.com/03895.2021.24.1445 https://connectjournals.com/toc2.php?abstract=3368402H_1445A.pdf&&bookmark=CJ-033215&&issue_id=&&yaer=2021 |
| 89 | SEASONAL INCIDENCE OF RICE LEAF FOLDER, <i>CNAPHALOCROCIS MEDINALIS</i> (GUENEE) IN SHIVAMOGGA REGION, KARNATAKA | Dr.K.L.Naik | Zoology | <i>J.Exp.Zool.India</i> | 2021 | 0972-0030 | DocID: https://connectjournals.com/03895.2021.24.175 https://connectjournals.com/achivestoc2.php?fulltext=3308601H_175-178.pdf&&bookmark=CJ- |

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| | | | | | | | 033215&&issue_id=01&&year=2021 |
| 90 | Evaluation of bio-agents against Ambrosia fungal symbiont associated with coffee shot-hole borer, Xylosandrus compactus Eichoff. | Dr.K.L.Naik | Zoology | J. Mycopathol. Res. | 2021 | 0971-3719 | imskolkata.org/pdf/june21/15)%20Full%20lenght%20Uma.pdf |
| 91 | Some biological aspects of cyprinid fishes, Pethia ticto, systomus sarana and puntius sophore from India: An overview | Dr Ashashree H M | Zoology | International journal of Entamology Research | 2021 | 2455-4758 | https://www.entomologyjournals.com/archives/2021/vol6/issue6/6-6-20 |
| 92 | 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.in/JOURNAL/issue70/ISSUE%2070%20FEB%202022%20FRONT%20PAGE%20PART%20-1.pdf |
| 93 | Induced Breeding of Fringed Lipped Peninsula Carp, Labeo fimbriatus at Bhadra Fish Seed Farm, Karnataka: A Case Study | Dr Ashashree H M | Zoology | Indian journal of Natural Sciences | 2022 | 0970-2091 | www.tnsroindia.org.in/journal/issue69/vol.12/Decem2021/pdf |
| 94 | Limnological study of Hosahalli Pond in Shivamogga district, Karnataka | Dr Ashashree H M | Zoology | International journal of Entamology Research | 2022 | 0970-2091 | https://www.cabdirect.org/cabdirect/abstract/20103124729 |
| 95 | Study on hydrobiology in relation to occurrence and distribution of molluscs in fish ponds at National Fish Seed Farm Karnataka | Dr Ashashree H M | Zoology | Indian J. Applied & Pure Bio. Vol. 37(3), 725 | 2022 | 0970-2091 | https://biology-journal.org/journal/volume37/issue73/ijapb37-1-11.html |
| 96 | Hydrological characteristics in relation to fish composition in Tammadihalli tank of Bhadravathi taluk, Karnataka | Dr Ashashree H M | Zoology | Indian J. Applied & Pure Bio. Vol. 37(3), 725 | 2022 | 0970-2091 | https://biology-journal.org/journal/volume37/issue74/ijapb37-2-12.html |

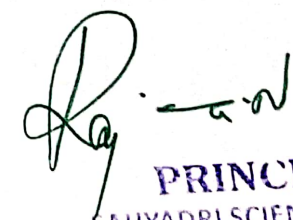
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3.3.1.1. Number of research papers in the journals notified on UGC care year wise during the last five year 2021-2022

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| 97 | Fish composition in a fresh water body of Shivamogga taluk-a case study in sogane tank | Dr Ashashree H M | Zoology | Indian J. Applied & Pure Bio. Vol. 37(3), 725-731 (2022). | 2022 | 0970-2091 | https://www.cabdirect.org/cabdirect/abstract/20103124729. https://biology-journal.org/journal/volume37/issue75/ijapb37-3-12.html |
| 98 | Ground water quality in relation to Health hazards in Shivamogga Taluk of Karnataka | Dr Ashashree H M | Zoology | Indian J. Applied & Pure Bio. Vol. 37(3), 725-731 (2022). | 2022 | 0970-2091 | https://biology-journal.org/journal/volume37/issue75/ijapb37-3-20.html |


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In Silico Characterization of a Transcript Code Based Screening of Antimicrobial Peptide from *Trichogramma chilonis*

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Abstract

Antimicrobial peptides (AMPs) from insects possess potent antimicrobial properties against various microbial related diseases. *Trichogramma chilonis* is a type of egg endoparasitoid wasp, well known as a biological control agent for pests that express various proteins to sustain and grown in host egg. In the present study, the bioinformatics analysis was attempted to identify *T. chilonis* transcript through sequence and phylogenetic analysis that clustered the transcript to Alo2 protein. Simultaneously the parasitoid egg homogenate was screened and subjected to antimicrobial property against pathogenic bacteria and fungal strains. Further, the similarity linkage clustering was identified the knottin motif at both sequence as well as structure level for Alo2. In silico physicochemical characteristics analysis of knottin motif has revealed approximate molecular weight of 6515.76 Da, theoretical Isoelectric point (pI): 7.55 and an aliphatic index: 63.06, instability index: 32.71, and grand average of hydropathicity (GRAVY): 0.547. Based on in silico results, Alo2 protein/knottin motif, was confirmed, which present in *T. chilonis* and the antimicrobial screening of *T. chilonis* protein homogenate exhibited significance growth inhibitory activity against gram positive, gram negative bacterial and fungal pathogens. The study results conclude that Alo2 protein resemble as an AMP that may express in the parasitoid egg as host defense protein and may involved to combat invading microbial pathogens and could regulate host defense mechanism during its development in host egg.

Keywords Antimicrobial peptide · *Trichogramma chilonis* · Transcriptome analysis · Comparative modeling

Abbreviations

| | | | |
|--------|------------------------------------|--------------------|------------------------------|
| μl | Micro liter | Mg/ml | Milligram per milliliter |
| AI | Aliphatic index | mM | Millimolar |
| AMP | Antimicrobial peptides | nm | Nanometer |
| bp | Base pair | pI | Isoelectric point |
| CFU/ml | Colony forming unit per milliliter | <i>T. chilonis</i> | <i>Trichogramma chilonis</i> |
| D | Dimensional | TM protein | Transmembrane protein |
| Fig | Figure | v/v | Volume/volume |
| II | Instability index | Wt/v | Weight/volume |

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Research article

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

Shimoga V. Sunil¹, Hulikal S. Santosh Kumar², Siddanakoppalu N. Pramod³, Betadthunga T. Prabhakar⁴, Mahanthesh B.N. Naika⁵, Thippande G. Thippeswamy⁶, Pathappa Niranjana¹

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³Department of Studies in Food Technology, Davangere University, Shivagangotri, Davangere, 577002, Karnataka India

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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 -

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Anti-hyperlipidemic effects of citrus fruit peel extracts against high fat diet-induced hyperlipidemia in rats

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Atherogenic Index,
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ABSTRACT

The anti-hyperlipidemic effects of ethanolic extracts of orange, pomello, lime, citron and sour orange fruit peels (250 and 500 mg kg⁻¹, i.p) were tested in high fat diet-fed rats. The ethanolic extracts of lime and sour orange peels (250 and 500 mg kg⁻¹, i.p) showed potent anti-hyperlipidemic effects, as evident by the decreases in total cholesterol (TC), triglycerides (TG), LDL-C, and VLDL-C, in addition to the increases in HDL-C levels. Besides, lime and sour orange peels (250 and 500 mg kg⁻¹) extract significantly decreased LDL-C/HDL-C ratio, while lime, sour orange and pomello peel extracts markedly decreased atherogenic index. Remarkably, lime peel extract followed by sour orange and orange at 500 mg kg⁻¹ dose improved hepatic architecture to near normal with less deposition of fat globules and fewer sinusoids. Altogether, lime and sour orange peel extracts were found to be effective against hyperlipidemic parameters such as TC, TG, LDL-C, VLDL-C, and TC/HDL-C and LDL-C/HDL-C ratios, and atherogenic index, in addition to the increased levels of HDL-C. Thus, lime and sour orange peel extracts could be natural supplement in the management of hyperlipidemia and associated diseases.



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INTRODUCTION

Hyperlipidemia leading to atherosclerosis, coronary heart diseases and cerebral vascular diseases has been ranked as one of the major risk factors for death worldwide (Nelson, 2013; Yu *et al.*, 2000). The diets rich in calories, saturated fats and cholesterol, genetic status and lifestyle contribute to hyperlipidemia. It is characterized by the elevated levels of fatty substances in the blood, including very-low-density lipoprotein (VLDL), low-density lipoprotein (LDL) and triglyceride (TG)-rich lipoprotein,

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RESEARCH ARTICLE

Bioactive Isolates of *Morus* Species as Antibacterial Agents and their *in-silico* ProfilingS.J. Aditya Rao^{1,4}, T.M. Venugopal², N.D. Jayanna³, M. Paramesha⁴ and C.K. Ramesh^{1,*}

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Abstract: Background: The genus *Morus* is one of the rich sources of phytomedicine and considered a beneficial natural source for drugs with potential antimicrobial effect under the traditional system of medicine.

Introduction: In the present study, three bioactive compounds isolated from the leaves of two species of genus *Morus* and their antibacterial effect against selective pathogens were assessed.

Methods: The inhibitory effects of the three molecules isolated were assessed for their minimum inhibition concentration (MIC) and minimum bactericidal concentration (MBC) against selected pathogens. The *in-silico* studies provided the toxicity profile and the binding interactions with glucosamine-6-phosphate synthase for all the isolates.

Results: Among the three compounds tested, cathafuran-B showed a prominent bacteriostatic and bactericidal effect, which is supported by the results of *in-silico* analysis suggesting that cathafuran-B could be a potential glucosamine-6-phosphate synthase inhibitor.

Conclusion: The biomolecule isolated from less explored *Morus laevigata* exhibiting higher antibacterial effect among the compounds tested warranted opening a new prospect in phytomedicinal research for exploring its pharmacological properties and lowering the utilization load present on highly explored *Morus alba*.

Keywords: Bacteriostatic, docking, natural products, CHARMM, glucosamine-6-phosphate synthase, *Morus*.

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1. INTRODUCTION

For over three billion years, nature has been carrying out its own combinatorial chemistry [1] and plant chemicals have evolved in response to the needs and challenges of the plant environment [2]. Ethnobotanical and traditional usage of medicinal plants serves as a source of information for the isolation of active compounds as direct therapeutic agents (D-tubocurarine from *Chondrodendron tomentosum*), as the drug lead for semi-synthesis (diosgenin from *Dioscorea floribunda*), the model drug for new synthetic drugs (cocaine from *Erythroxylum coca*), for the synthesis of local anesthetics, and lastly as taxonomic markers for identification and classification [1, 3]. Mulberry leaves are one such exemplary source which are being consumed in Korea and Japan in different food products like noodles, cakes, and tea as nutraceuticals supplement and also to treat diabetes mellitus [4, 5].

Several new approaches have been adopted in the process of drug discovery, and computational methods have been implemented in the traditional methods of drug discovery [6]. In the preceding decade, several attempts have been made using *in-silico* toxicology and pharmacology in search of a potential drug candidate for synthetic as well as plant-derived compounds [7]. Improvements in isolation techniques, high-throughput screening, generation of large numbers of samples to meet the demands of pharmacology still remained the bottleneck in preclinical and clinical studies of the drug development pipeline [2, 8].

In search of a potent antimicrobial drug, molecular mechanisms in bacterial cells can be exploited and target molecules can be identified to inhibit a specific function. Glucosamine-6-phosphate synthase (GlcN-6-P) is one such enzyme involved in building macromolecules required for cell wall assemblies, such as chitin, mannoproteins, and peptidoglycan in fungi and bacterial cells. The role of Glucosamine-6-phosphate synthase is critical for the survivability of these microorganisms. So far, several inhibitors of both natural and synthetic origin have been reported with antibacterial

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Oral therapeutic proteins: a review on current strategies, challenges, and development

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ABSTRACT

Oral therapeutic proteins represent an extinguish class of macromolecules that could be used as pharmaceutical agents due to their proven pharmacological properties. These exist as an array of compounds with variable structures and functions. Oral therapeutic proteins could be used as an efficient replacements of chemotherapeutics as they originate from biological sources, hence project the minimal risk of adverse and toxic effects. Due to the complex structure of proteins their functional modification proves to be an obscure process, where the risk of losing the pharmacological potential is present. In addition, delivery systems also play a significant role in the treatment and subsequent pharmacological effect. In the vista, oral delivery proves to be feasible due to the protein structure related issues being faced in other delivery systems like parenteral, nasal, ocular, and trans-mucosal etc. However, oral delivery method too is facing the hurdles of its own kind. Proteins ingested are susceptible to the physicochemical parameters of gastrointestinal tract, where they get denatured. Also, they sometimes get acquainted with immune response if the host body treats them as abnormal and foreign. Oral proteins mainly face three kinds of barriers namely biochemical, mucus, and epithelial barrier. However, the research has been managed to enhance the oral protein delivery, despite the presence of these barriers. Apart from structural modifications to proteins, absorption enhancers, enzyme inhibitors, mucoadhesive polymeric systems, and particulate carrier systems are also used to overcome these barriers. Furthermore, few systems like microparticles, microspheres, nanoparticles, lipid-based delivery systems, polymeric nanoparticles, and inorganic nanoparticles have also been used. This review focuses the current perspectives and challenges faced in the field of oral therapeutic proteins. It also emphasizes on the methods being followed in the current scenario to enhance the pharmacological efficiency of oral therapeutic proteins.

Key words: Oral therapeutic proteins, drug delivery systems, oral delivery, barriers, nanoparticles

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INTRODUCTION

Proteins and peptides are important building blocks of all living organisms and have emerged as a very promising class of therapeutic entities in recent times [1]. Protein therapeutics can also be assembled based on their molecular types that comprise antibody-based drugs, anticoagulants, blood factors, bone morphogenetic proteins, engineered protein scaffolds, enzymes, Fc fusion proteins, growth factors, hormones, interferons, interleukins, and thrombolytics. Sometimes they are also categorized on molecular mechanism of their activity for example mAbs which bind non-covalently to target, enzymes which interact covalently, serum albumin which exerts its activity without specific interactions and so on [2, 3].

Blohm *et al.* identified therapeutic proteins as proteins or polypeptides that are potentially appropriate as a therapeutic drug that can be used in treatment because of their native role in the human body. These may be mutagenesis or proteolysis-prepared derivatives, hybrid proteins, protein aggregates or other molecular conjugates [4, 5]. Although the rationale behind functional properties of therapeutic proteins has been defined, novel insights could always be found as a part of incessant research on pathogenic diseases like diabetes and cancer [6, 7]. The use of therapeutic proteins in the treatment of diseases has many benefits over traditional drugs because they perform a highly complex and diverse range of body

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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



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Targeting HIF-1 α by newly synthesized Indolephenoxyacetamide (IPA) analogs to induce anti-angiogenesis-mediated solid tumor suppression

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Abstract

Background Hypoxic microenvironment is a common feature of solid tumors, which leads to the promotion of cancer. The transcription factor, HIF-1 α , expressed under hypoxic conditions stimulates tumor angiogenesis, favoring HIF-1 α as a promising anticancer agent. On the other hand, synthetic Indolephenoxyacetamide derivatives are known for their pharmacological potentiality. With this background here, we have synthesized, characterized, and validated the new IPA (8a–n) analogs for anti-tumor activity.

Methods The new series of IPA (8a–n) were synthesized through a multi-step reaction sequence and characterized based on the different spectroscopic analysis FT-IR, ¹H, ¹³C NMR, mass spectra, and elemental analyses. Cell-based screening of IPA (8a–n) was assessed by MTT assay. Anti-angiogenic efficacy of IPA (8k) validated through CAM, Rat corneal, tube formation and migration assay. The underlying molecular mechanism is validated through zymogram and IB studies. The in vivo anti-tumor activity was measured in the DLA solid tumor model.

Results Screening for anti-proliferative studies inferred, IPA (8k) is a lead molecule with an IC₅₀ value of 5 μ M. Anti-angiogenic assays revealed the angiopreventive activity through inhibition of HIF-1 α and modulation downstream regulatory genes, VEGF, MMPs, and P53. The results are confirmative in an in vivo solid tumor model.

B.T. Prabhakar and Shaukath Ara Khanum contributed equally.

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Targeting HIF-1 α by newly synthesized Indolephenoxyacetamide (IPA) analogs to induce anti-angiogenesis-mediated solid tumor suppression

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Abstract

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Modulation of DNA damage response by targeting ATM kinase using newly synthesized di-phenoxy acetamide (DPA) analogs to induce anti-neoplasia

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Abstract

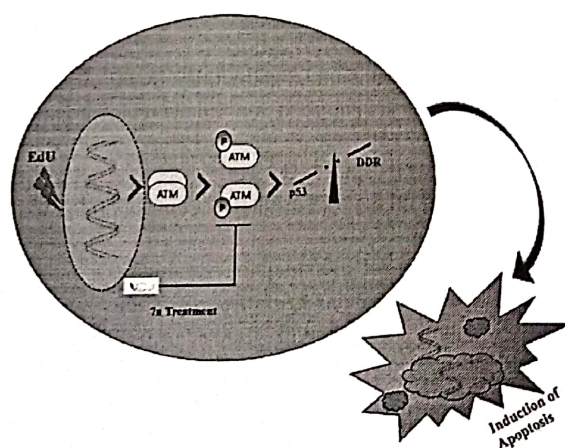
Background Imbalance and instability in the structure of the DNA have become major characteristics of cancer. In response to DNA damage, DNA damage response (DDR) protein, ataxia telangiectasia mutated (ATM), plays a pivotal role in the modulation of regulatory regions responsible for inhibition of apoptosis, thereby neoplastic progression.

Methods A new series of DPA (7a–t) were synthesized, characterized. Anti-proliferative studies to identify the lead compound were carried out by LDH and MTT assay. Apoptosis/DNA damage was measured through FACS, Annexin-v staining, TUNEL and Comet assay. Elucidation of molecular mechanism through immunoblot and further validation of the drug effect through in vivo approaches.

Results Initial in vitro anti-proliferative screening of Compounds DPA (7a–t) against multiple cancer cell lines identified Compound DPA (7n) as a potent cytotoxic molecule with IC₅₀ value of 4.3 μM. Down the line, in vitro and in vivo evaluation of Compound DPA (7n) inferred that it has apoptotic inducing potentiality. Further, evaluation of molecular mechanism inferred that Compound DPA (7n) effectively modulates ATM phosphorylation only, eventually altering downstream signalling pathways.

Conclusions Compound DPA (7n) emerged as a potent proapoptotic and anti-neoplastic agent by inhibiting ATM kinase activity both in vitro and in vivo. The conferring results ascertain that the drug could be developed as a new ATM kinase inhibitor with anti-cancer capacity.

Graphic abstract



Shaukath Ara Khanum and B. T. Prabhakar contributed equally.

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In Silico Characterization of a Transcript Code Based Screening of Antimicrobial Peptide from *Trichogramma chilonis*

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Abstract

Antimicrobial peptides (AMPs) from insects possess potent antimicrobial properties against various microbial related diseases. *Trichogramma chilonis* is a type of egg endoparasitoid wasp, well known as a biological control agent for pests that express various proteins to sustain and grown in host egg. In the present study, the bioinformatics analysis was attempted to identify *T. chilonis* transcript through sequence and phylogenetic analysis that clustered the transcript to Alo2 protein. Simultaneously the parasitoid egg homogenate was screened and subjected to antimicrobial property against pathogenic bacteria and fungal strains. Further, the similarity linkage clustering was identified the knottin motif at both sequence as well as structure level for Alo2. In silico physicochemical characteristics analysis of knottin motif has revealed approximate molecular weight of 6515.76 Da, theoretical Isoelectric point (pI): 7.55 and an aliphatic index: 63.06, instability index: 32.71, and grand average of hydropathicity (GRAVY): 0.547. Based on in silico results, Alo2 protein/knottin motif, was confirmed, which present in *T. chilonis* and the antimicrobial screening of *T. chilonis* protein homogenate exhibited significance growth inhibitory activity against gram positive, gram negative bacterial and fungal pathogens. The study results conclude that Alo2 protein resemble as an AMP that may express in the parasitoid egg as host defense protein and may involved to combat invading microbial pathogens and could regulate host defense mechanism during its development in host egg.

Keywords Antimicrobial peptide · *Trichogramma chilonis* · Transcriptome analysis · Comparative modeling

Abbreviations

| | |
|--------|------------------------------------|
| μl | Micro liter |
| AI | Aliphatic index |
| AMP | Antimicrobial peptides |
| bp | Base pair |
| CFU/ml | Colony forming unit per milliliter |
| D | Dimensional |
| Fig | Figure |
| II | Instability index |

| | |
|--------------------|------------------------------|
| Mg/ml | Milligram per milliliter |
| mM | Millimolar |
| nm | Nanometer |
| pI | Isoelectric point |
| <i>T. chilonis</i> | <i>Trichogramma chilonis</i> |
| TM protein | Transmembrane protein |
| v/v | Volume/volume |
| Wt/v | Weight/volume |

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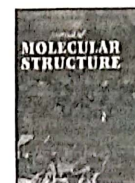
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Synthesis, structure analysis, DFT calculations and energy frameworks of new coumarin appended oxadiazoles, to regress ascites malignancy by targeting VEGF mediated angiogenesis



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ABSTRACT

Ascites malignancy is a frequent cause of morbidity and presents significant management problems which occur in many cancers. Angiogenesis plays a major role in the prognosis of ascites tumor through Vascular Endothelial Growth Factor (VEGF). Inhibition of VEGF is one of the key strategies in the regression of ascites tumor. The aim of the study is to synthesize a novel class of VEGF inhibitors for therapeutic intervention against ascites tumor malignancy. As an approach, a new series of 1, 3, 4-oxadiazole derivatives, containing coumarin-3-substituted aryl and heteroaryl moiety (**7a-l**) were synthesized in a multi-step process. The structures of these compounds were characterized by IR, ¹H, ¹³C, NMR, mass spectra and elemental analyses. The newly synthesized molecules were subjected to cell-based screening against multiple cell lines such as ACHN, A375, SIHA, Skov3, and EAC through MTT and Trypan blue assay, and identified compound (**7k**) with IC₅₀ -9 μM was identified as lead bioactive molecule. Further, VEGF induced non tumorigenic CAM and RAT corneal assay revealed angiopreventive efficacy of compound (**7k**). The *in-vitro* studies proved the inhibition of VEGF expression and relative MMP expression, and as a consequence, migration and invasion behavior were also altered. Further, the *in-vivo* ascites tumor model revealed VEGF mediated suppression of ascites malignancy without inducing any significant toxicological side effects. In conclusion, the compound (**7k**) has been identified as a new class of VEGF inhibitor which could be translated for therapeutic applications. Further the molecular geometry of potent compound (**7k**) has been obtained by density functional theory (DFT) using B3LYP/6-311 G (d,p) basis sets, and the spectra of FT-IR in the range of (400–4000 cm⁻¹), ¹H NMR and ¹³C NMR data were also computed and compared to the experiment data. Besides, frontier molecular orbitals (FMOs) through the investigation of highest occupied molecular orbitals (HOMO) and the lowest- unoccupied molecular orbitals (LUMO). The lowermost concentration of electron density on LUMO level compared to the HOMO level, as well as lesser energy gap value denote the ease of electrons transportation that reflecting higher reactivity of the compound (**7k**) compared to other compounds.

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1. Introduction

Angiogenesis, a biological process involved in the sprouting and formation of the vascular tree from the pre-existing blood vessel plays a key role in both physiological and pathological processes [1]. Tumor angiogenesis promotes the establishment of tumor growth and metastasis extensively by activating series of complex and multistep processes including basement membrane degradation, migration, proliferation, tube formation, and matura-

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

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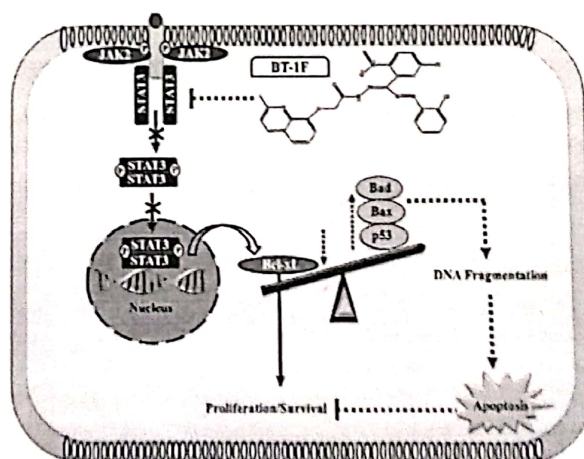
Abstract

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.

Methods Cell based screening for cytotoxicity was performed through MTT, LDH and Trypan blue. The BT-1F induced anti-clonogenic property by clonogenic assay. The apoptotic capacity was examined by crystal violet staining, flow cytometry, Annexin-FITC, DAPI and TUNEL assay. The altered signalling events were studied using immunoblot. The drug-induced anti-tumour effect was evaluated in an in-vivo solid tumour model and molecular interaction was further validated by in-silico studies.

Results The BT-1F exerts chemo-sensitivity specifically against EAC and A549 cells without altering its normal counterpart. The anti-proliferative/anti-clonogenic effect was due to the induction of apoptosis through inhibition of STAT3^{Tyr705} signal. Eventually downstream signalling proteins p53, Bax, Bad and Bcl-xL were significantly altered. Further in-vivo experimental results validated in-vitro findings. The computational approaches assures the BT-1F efficiency in binding with STAT3. **Conclusion** Systemic validation of STAT3 target drug, BT-1F in in-vitro, in-silico and in-vivo models has promising strategy for solid cancer treatment.

Graphical abstract



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Anti-neoplastic phramacophore benzophenone-1 coumarin (BP-1C) targets JAK2 to induce apoptosis in lung cancer

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Abstract

Reigning of the abnormal gene activation associated with survival signalling in lung cancer leads to the anomalous growth and therapeutic failure. Targeting specific cell survival signalling like JAK2/STAT3 nexus has become a major focus of investigation to establish a target specific treatment. The 2-bromobenzoyl-4-methylphenoxy-acetyl hydra acetyl Coumarin (BP-1C), is new anti-neoplastic agent with apoptosis inducing capacity. The current study was aimed to develop antitumor phramacophore, BP-1C as JAK2 specific inhibitor against lung neoplastic progression. The study validates and identifies the molecular targets of BP-1C induced cell death. Cell based screening against multiple cancer cell lines identified, lung adenocarcinoma as its specific target through promotion of apoptosis. The BP-1C is able to induce, specific hall marks of apoptosis and there by conferring anti-neoplastic activity. Validation of its molecular mechanism, identified, BP-1C specifically targets JAK2^{Tyr1007/1008} phosphorylation, and inhibits its downstream STAT3^{Tyr705} signalling pathway to induce cell death. As a consequence, modulation in Akt/Src survival signal and altered expression of interwoven apoptotic genes were evident. The results were reproducible in an in-vivo LLC tumor model and *in-ovo* xenograft studies. The computational approaches viz, drug finger printing confers, BP-1C as novel class JAK2 inhibitor and molecular simulations studies assures its efficiency in binding with JAK2. Overall, BP-1C is a novel JAK2 inhibitor with experimental evidence and could be effectively developed into a promising drug for lung cancer treatment.

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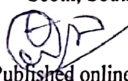
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Immunoglobulin E Specific to Carbohydrate Determinants and Its Relevance in Legume Allergic Cross-reactivity

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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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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

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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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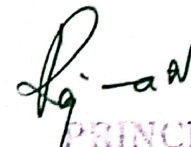
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Introduction

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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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 glyco-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 glycan epitopes are thus prone to extensive cross reactivity 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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Immunoglobulin E Specific to Carbohydrate Determinants and Its Relevance in Legume Allergic Cross-reactivity

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Authors' contributions

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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 glycan 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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Research article

Characterization and biochemical activities of novel functional antimicrobial peptide (AMP) from *Trichogramma chilonis*Shimoga V. Sunil¹, Hulukal S. Santosh Kumar², Siddanakoppalu N. Pramod³, Betadthunga T. Prabhakar⁴, Mahanthesh B.N. Nalka⁵, Thippande G. Thippeswamy⁶, Pathappa Niranjana¹¹Department of PG Studies and Research in Biochemistry, ²Department of PG Studies and Research in Biotechnology and Bioinformatics, Kuvempu University, Shankarghatta, 577 451, Karnataka, India³Department of Studies in Food Technology, Davangere University, Shivagangotri, Davangere, 577002, Karnataka India⁴Department of PG Studies and Research in Biotechnology, Sahyadri Science College, Shivamogga, Karnataka, India⁵Department of Biotechnology and Crop Improvement, KRC College of Horticulture, Arabhavi, 591218, UHS Bagalkot, Karnataka, India⁶Department of Studies and Research in Biochemistry, Tumkur University, Tumkur-572103, Karnataka, India

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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 -

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Article

Fabrication and characterization of hydrogel films using A. mylitta regenerated silk fibroin with Poly vinyl alcohol for biomedical uses

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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

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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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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 (QRPG) 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. QRPG showed significant attenuation in paw oedema of FCA-induced rats. Biochemical analysis in QRPG 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.

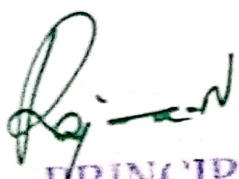
Medicinal plants have been the main remedy to treat various ailments for a long time and nowadays, many drugs have been developed from traditional

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 Caesalpinaceae 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,

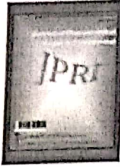
*Melissa officinalis*¹⁰ are used for the synthesis of spherical shape AgNPs.

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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The Gag Reflex: A Hurdle in Dentistry– Literature Review

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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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ABSTRACT

Gagging reflex poses a hurdle in numerous dental procedures. It causes discomfort for the patient, extended procedure time for the clinician, compromised quality of treatment and along with a lot of physiological discomfort for both. The normal gag reflex is protective in nature, but few individuals elicit extreme response, leading to problems during the treatment procedures. It is extremely important for the clinician to identify the cause and severity of the condition so that it can be decided whether the patient can handle standard treatment techniques or whether alternative methods must be considered. There is no universal solution for successfully managing the gagging patient. Various modalities can be used according to the doctor's assessment and patient's conditions in order to control the gag reflex so that the patient can be comfortable and cope with the dental treatment. A wide range of management solutions are available, and many cases need a

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Comparative Study of Drug Likeness and Pharmacokinetic Properties of Synthetic Antiviral Drugs to that of Remdesivir: In-silico Approach

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RESEARCH ARTICLE

Antiproliferative Effects of *Artabotrys odoratissimus* Fruit Extract and its Bioactive Fraction through Upregulation of p53/ γ H2AX Signals and G2/M Phase Arrest in MIA PaCa-2 CellsMeghana Pargi¹, Sandeep Kumar Jain Raviraj¹, Prashanth Narayanappa¹, Santhosh Kumar J Urumarudappa², Pallavi Malleshappa³ and Kumaraswamy Honnenahally Malleshappa^{1*}

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Abstract; Background: *Artabotrys odoratissimus* (Annonaceae) is a medicinal and ornamental plant widely cultivated in Southeast Asia for its famous ylang ylang essential oil. The fruits of this plant are used for health benefits, but very little is studied about the bioactive principles, their role in regulating oxidative stress and tumour progression.

Objective: The study aimed to evaluate the antiproliferative effects of fruit extract of *Artabotrys odoratissimus* and its bioactive fraction using cell-based assays.

Methods: The free radical scavenging and antiproliferative effects of *Artabotrys odoratissimus* fruit ethyl acetate (FEA) extract and its bioactive fraction were evaluated using cell viability assays, colony formation assay, double staining assay, reactive oxygen species (ROS) assay, comet assay, cell cycle analysis, and western blotting.

Results: The extract showed phenolic content of 149.8 ± 0.11 μ g/mg Gallic acid equivalents and flavonoid content of 214.47 ± 4.18 μ g/mg Quercetin. FEA showed an IC₅₀ value of 76.35 μ g/ml in the ABTS assay and an IC₅₀ value of 134.34 \pm 7.8 μ g/ml on MIA PaCa-2 cells. The cells treated with 125 μ g/ml and 250 μ g/ml FEA showed increased apoptotic cells in Double staining assay, DNA damage during comet assay, enhanced ROS, and cell cycle arrest at G2M phase at 125 μ g/ml and 250 μ g/ml. The active fraction AF5 showed an IC₅₀ value of 67 \pm 1.26 μ g/ml on MIA PaCa-2 cells during MTT assay, display of potential antiproliferative effects, and showed a marked increase in the expression of γ H2AX and p53.

Conclusion: These results prove that the fruit extract and the bioactive fraction demonstrate oxidative stress-mediated DNA damage, leading to apoptosis in the MIA PaCa-2 cell line.

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Keywords: *Artabotrys odoratissimus*, DNA damage, pancreatic cancer, oxidative stress, ROS, bioactive.

1. INTRODUCTION

Phytopharmaceuticals from medicinal plants are used in Complementary therapies in combating various types of cancer [1]. Chemoprevention by phytoconstituents is an emerging strategy and is considered an economical, safe, and accessible approach in cancer therapy [2]. Further, around half of presently existing drugs are naturally derived or mimetics, and in cancer therapeutics, this exceeds more than 60% [3].


Oxidative stress and redox signalling are linked with the genesis of cancers, and the reactive oxygen intermediates can affect the phenotypic behaviour of cancer cells and their sensitivity to therapeutic interventions [4]. ROS-driven oxidative stress initiates the progression of cancer, and ROS attenuation can be used as a strategy for treating the disease [5]. Pancreatic cancer is a highly aggressive, deadly disease, and in contrast to other types of cancer,

targeted therapies have failed to show potential activity either alone or in combination with chemotherapy. Hence, medicinal plants with significant anti-oxidative potential might have better effects in treating cancers. In this study, we are evaluating the anti-oxidant and anti-cancer effects of the ethnomedicinal plant *Artabotrys odoratissimus*.

A. odoratissimus is a climbing shrub largely cultivated in Southeast Asia for medicinal and ornamental purposes. The most prominent ylang ylang essential oil from this woody shrub is used in perfumery and cosmetic industries, including soaps, skin lotions, detergents, and a flavouring agent in the food industry [6]. *A. odoratissimus* is used in treating malaria, scrofula, and cholera in traditional medicine [7]. The fruits are eaten by indigenous people for promoting health benefits [8]. In this study, radical scavenging activities of Fruit Ethyl acetate extract were evaluated using various biochemical assays. The extract and the bioactive fraction were further assessed for anti-proliferative activities with cell-based assays and immunoblotting.

Both the extract as well as the bioactive fraction showed remarkable anti-proliferative effects on the Pancreatic cancer cell line

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Evaluation of Antimutagenic Potential of *Chrozophora Rottleri* against Ems Induced Mutagenicity in Mice

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Abstract: The natural medicinal plant compounds derived from numerous plant extracts are being gradually used to treat a wide variety of clinical diseases. *Chrozophora rottleri* is a natural therapeutic herb belonging to *Euphorbiaceae* family, which is commonly called Suryavarti. Various studies reported that this medicinal plant has a wide variety of medicinal values, including antimicrobial, antioxidant, antifungal, and antispasmodic activity. Still, there is no report about antimutagenic and mutagenic activity. The aim of the study is to determine the antioxidant and antimutagenic effects of *C. tinctoria* extracts. On that account, the current study is to isolate compounds from various solvents of *Chrozophora rottleri* leaves extracts. The obtained extracts were preliminary subject to phytochemical screening to identify various phytoconstituents and further EMS (Ethyl Methane sulfonate) induced bone marrow chromosomal aberration which has been used to evaluate the in vivo antimutagenic potentials of the extracts. The results reveal that all the extracts of *C. rottleri* at 250mg/kg body weight (1/10th of LD50) shows a significant reduction in cell aberration whereas in methanol extract which is capable of imparting significant protection against mutagenicity induced by EMS as evidenced by the reduction in the percentage of aberrations compared to chloroform and petroleum ether extracts. Therefore, from these studies, it can be concluded that *C. rottleri* possesses prominent antimutagenic potential which may be attributed to antioxidant constituents such as phenolics, flavonoids, terpenoids, steroids, glycosides, alkaloids, and carotenoids present in the extracts.

Keywords: *Chrozophora rottleri*, Antimutagenic activity, EMS, Bone marrow, Chromosomal aberration assay

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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

2505

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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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GC-MS identification of bioactive components of leaf extract of *Sida acuta* (BURM. F)

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BT

Abstract

Present study was designed to conduct with main purpose to determine bioactive components of aqueous (aq.) leaf extract of *Sida acuta* by GC-MS analysis and characterization. In the present study identified 9,12,15-Octadecatrienoic acid ethyl ester (Z, Z, Z), 4-hydroxy-*o*-methylacetophenone, 1,3-Propanediol, 2-(hydroxymethyl)-2-nitro, 9,12,15-Octadecatrienoic acid ethyl ester (Z, Z, Z), alpha-tocopherol & beta-D-mannoside, 1-(+)-Ascorbic acid 2,6-dihexadecanoate, 3-Deoxy-D-mannonic lactone, Hexadecanoic acid and 2-hydroxy-1-(hydroxymethyl) ethyl ester as predominant compounds present in the aq. leaf extract of *Sida acuta* through GC-MS analysis and characterization. In conclusion, all parts of the *Sida acuta* are used for therapeutic purposes, but the leaves are the most widely used and hence, further *in-vitro* and *in-vivo* research investigations are recommended to evaluate the pharmacological activities prevailing compounds identified in aq. leaf extract of *Sida acuta*.

Keywords: *Sida acuta*, Leaf, GC-MS, Antimicrobial, Anti-cancer

1. Introduction

Aspects of the modern lifestyle, such as smoking, overconsumption of alcohol and fast foods with excessive colorants and chemical preservatives place severe oxidative stress on cells and body systems leading to the production of free radicals. These free radicals cause oxidative damage to lipids, proteins and nucleic acids which leads to diseases such as atherosclerosis, cancer, diabetes, inflammation, Alzheimer's and other degenerative diseases [1]. Many plant secondary metabolites are potential free radical scavengers, including flavonoids, anthocyanins, carotenoids, dietary glutathione, polyphenols, vitamins and endogenous metabolites. Free radical scavengers are antioxidants that accept electrons from the free radicals produced *in-vivo* or *in-vitro*. Rutin, morin, quercetin (flavonoids), naringenin (flavone), catechin (flavonol), retinol, tocopherol (vitamins), and curcumin (polyphenol) are well-studied plant derived secondary metabolites that possess anti-cancer, free radical scavenging, anti-ulcer and antimicrobial activities. Flavonols are related to catechins, quercetin, kaempferol, and their glycosides are found in beverages such as green and black teas and red wines. Quercetin occurs in onions and apples, while berries contain myricetin and quercetin. These dietary compounds protect against oxidative stress. Many active pharmaceuticals have been derived from plant secondary metabolites, such as vinca alkaloids and taxol, which effectively treat cancers [2]. Since the beginning of human civilization, medicinal plants have been used by mankind for their nutritional and therapeutic values. Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources. Many of these isolations were based on the uses of these agents in traditional medicine. *Sida acuta* Burm. f (Malvaceae) is one of those plants currently used by indigenous people for the management of some health problems. This plant is an erect, branched small perennial herb or small shrub of about 1.5m height [3]. The bark is smooth, greenish, the root is thin, long, cylindrical and very rough; leaves are lanceolate, nearly glabrous, peduncles equal to the petioles, the flowers are yellow, solitary or in pairs; seeds are smooth and black [4, 5]. It grows abundantly on cultivated fields, waste areas and roadsides in Cameroon, where it is called "sengh" in the Western part of the country. Its common name is Sida. Once the plant becomes established, it is very competitive, holding and denying sites to other plants. The plant can be propagated both by seed and stem cuttings. All parts of this tree, including leaves, bark, root, seeds and flower are used in folkloric medicine. *Sida acuta* is regarded as astringent, tonic, useful in urinary diseases treatment (diuretic) and also blood disorders (stops bleeding), bile, liver and nervous diseases treatment (sedative) in Indian traditional medicine [3, 6]. In Mexico, smoked as marijuana substitute, and it is also used to treat asthma, renal inflammation, colds, gonorrhoea,

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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

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.

Keywords

Antifungal, agar-well diffusion assay
C. purpurea,
M. phaseolina

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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



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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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, needs etc. during the past 3-4 decades,



42471

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 residues² 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

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, holver 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

*Assistant Professor & Chairman

Comparison and analysis of IgE and blood histamine levels: its correlation during allergic sensitization in atopic and non-atopic population

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Abstract

Independent and inter-dependent troupe of histamine- an inflammatory immune mediator together with Immunoglobulin E (IgE) and mast cells shoulder the responsibility of clinical allergic sensitization in atopic population which ends-up in the severe anaphylactic and acute allergic reactions. Histamine with their receptors (H1R-H4R) plays a significant managerial role in several allergic diseases. In this study an emphatic effort has been employed to screen, evaluate and compare to understand the serum and plasma histamine levels in atopic and non-atopic populations and in turn correlated with total IgE levels to understand interrelation of IgE with histamine content during allergic reactions. The atopic and non-atopic subjects were selected based on subjective case histories and were analysed for blood Eosinophilic count, Total IgE levels and plasma and serum histamine levels. Leukocyte isolation, rat peritoneal exudate mast cells isolation and histamine release quantification and their HPLC screening, finally correlating the total IgE with Histamine released were assayed by comparing the values obtained with atopic, non-atopic samples and with known standard values of histamines, leukocytes, eosinophil's of Normal healthy people.

Key words : IgE, Blood histamine, Allergic sensitization, HPLC screening.

Compressed Flow of Hybridized Nanofluid Entwined Between Two Rotating Plates Exposed to Radiation

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The existing work unveils the mixed convection squeezed flow of MHD hybridized nanofluid amid two plates of the channel that is rotating vertically depending upon time. The fluid is sucked/injected through the channel extremes. The hybrid nanofluid anticipated here is composed of Graphene oxide and Molybdenum disulphide with the hybrid base fluid comprised of water and ethylene glycol. The scrutiny is carried out in the presence of thermal radiation and heat source. The acquired equations are numerically computed with the aid of Runge Kutta Fehlberg 4–5th order method. The entropy behavior and Bejan number are examined utilizing graphs. The novelty of the work lies in perceiving which shape of nanoparticle has better tendency in escalating the heat transport and whip up the efficiency of the channel. The flow repercussion so obtained are emphasized for both hybrid and nano phase. On enlarging squeezing parameter, velocity escalates whereas for large values of rotating parameter velocity diminishes. The temperature is highest for blade structured and least for brick shaped nanoparticles. Heat generation/absorption parameter plays a crucial role in controlling the heating and cooling process. Higher value of this parameter augments the thermal profile. Bejan number is least for blade structured nanoparticles.

KEYWORDS: Squeezing Flow, Rotating Channel, Hybrid Nanofluid, Heat Source, Thermal Radiation.


1. INTRODUCTION

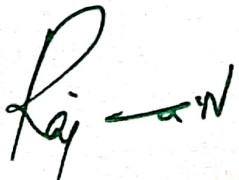
Biggest advancement in the ground of transfer of heat enhancement is the flow of nanofluid. The pitfall of low thermal capability of base fluid has given an idea of adding nano-sized particles to base fluid which enables them to be thermally potential. Two or more nano range particles in the fluid are of high potential and efficient in heat transfer enrichment. Rudraswamy et al.¹ gave away the outcomes for consequence of chemical reaction upon stagnation-point flow over a stretchable sheet placed in an inclined position. Bahiraei and Heshmatian² have given a note on characteristics of second law analyzed for hybrid nanofluid flow. They have shown that heat sinks can be cooled by enhancing velocity. Xu and Sun³ have considered the model of hybrid nanofluid flow in a microchannel. Sindhu and Gireesha⁴ have studied convective flow of hybridized

nanofluid through microchannel by considering nonlinear heat flux. They have established that the velocity satisfies $U_{(C_{60}T_{10})_{(water)}} > U_{(C_{60}T_{10})_{(water)}} > U_{(C_{70}T_{10})_{(water)}}$. Ghadikolaei and Gholinia⁵ have conducted a study on influence of H_2 bond on hybrid nanofluid. They have unveiled that a strong hydrogen bonding magnifies the thermal profile. Kumar et al.⁶ have given an approach towards enhanced transfer of heat in hybridized ferromagnetic nanofluid flow. They have shown that radiation parameter influences heat transfer enrichment.

The fluid is known to squeeze or compress when two plates are brought close to each other. Many studies are done on the squeezed flow significantly. Munawar et al.⁷ studied the compressing flow in a lower stretching porous channel. Freidoonimehr et al.⁸ analytically investigated the 3D squeezed flow of nanofluid in channel. Mahanthesh et al.⁹ characterized the 3D squeezed nanofluid flow entwined in a channel that rotates. Ghadikolaei et al.¹⁰ studied squeezing flow of $C_2H_2O_2$ -CNTs in channel whose plates are stretchable. They have found the oscillating nature of the velocity field, due to the variations in the rotating parameter. Abdullah et al.¹¹ have conducted a

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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

Millets are 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*), Italianor 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 dagusa 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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Field Survey on Assessment of Traditional Storage Practices of Finger Millet [*Eleusine coracana* (L.)] in Southern Dry Zone of Karnataka for Seed Traits

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Abstract - The present study was conducted with the main purpose to assess the traditional storage practices being practiced in southern dry zone of Karnataka viz. Mysuru, Mandya, Hassan, Tumkur & ChamaraJanagara districts and to identify the best storage practices being followed in these districts. Field survey was undertaken during work period in major finger millet [*Eleusine coracana* (L.)] growing region of all five districts of Southern Dry Zone of Karnataka. Information was documented by using Participatory Rural Appraisal (PRA) technique like observation and discussion. The survey was continued for different stages of crop and season (Kharif, Rabi and summer) for collecting the sample to assess the safe storage method. During the Survey it was observed that the Traditional storage structure practices to identify and gather description that are prevalent in the five viz. Mysuru, Mandya, Hassan, Tumkur & ChamaraJanagara districts of Southern Dry Zone of Karnataka. The data on various methods was collected by contacting the respondents through one-to-one interaction and group discussion methods, the indigenous technologies used by dry land farmers for storage of seed were documented. Findings of our study revealed that hagevu, metal bin and gunny bag type of traditional storage practices being followed for the storage of finger millet in southern dry zones of Karnataka viz. Mysuru, Mandya, Hassan, Tumkur & ChamaraJanagara districts. Precautionary measures before storage, during storage, and after receipt of grains highlighted in our study were being practiced by farmers in these regions to ensure protection from spoilage of grains. It was demonstrated through our field study that traditional technical skill teaches us how best the utilization of natural sources could be useful for storage and protection of life of grains or seeds.

Index Terms - Finger millet [*Eleusine coracana* (L.)], Traditional storage, Hagevu, Metal bins, Gunny bag.

I.INTRODUCTION

Agriculture is the backbone of Indian economy that plays a vital role in its development. Almost 54.6% of the engaged directly or indirectly in agriculture and allied activities. In coarse cereal crop, Finger millet crop is one of the major crops and its production is not only in terms of food security, but also in creating better nutrient for people.

Finger millet [*Eleusine coracana* (L.)] is one of the most important millet crops belonging to family *Poaceae* and sub family *Chloridoideae*.¹ Finger millet is originally native of the Ethiopian highlands and was introduced into India approximately 4000 years ago.² Finger millet is considered to be of Indian or African origin. It is cultivated widely in East Africa and tropical Asia, mainly in the rainy slopes. It is also cultivated in the upland area of the Himalayas at an elevation of 2,300 m. India is the largest cultivator of finger millet, which is primarily grown in the states of Karnataka, Tamil Nadu, Andhra Pradesh, Orissa, Maharashtra, Uttar Pradesh, Bihar and Gujarat. These eight states together account for more than 95 per cent of the total area under cultivation and more than 98.13 per cent of the total finger millet production in the country. Among the Indian states that produce finger millet, Karnataka is the largest producer, accounting for 58% of the country's production. It is main dietary component in dry land region of southern Karnataka

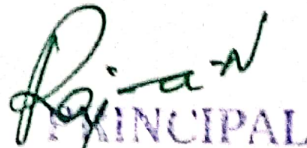
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Isolation and identification of some fungal pathogens from Solanaceous vegetable crops of Chitradurga district, Karnataka

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Abstract

The present work deals with the isolation and identification of pathogenic fungi. The fungal isolates were *Fusarium oxysporum*, *Fusarium solani*, *Fusarium incarnatum*, *Caryospora cassicola*, *Colletotrichum gloeosporioides*, *Alternaria spp.*, *Cladosporium cladosporoides*, *Mucor flavus*, *Trichoderma spp.* and *Aspergillus Niger*. These were isolated from Solanaceous vegetable crops like chilli, tomato and brinjal and were identified on the basis of colony morphology and microscopic examination on PDA medium. The morphological characteristics of these fungal elements showed various kinds of spores which was identified up to genus/species level. Out of 10 isolated fungi, all were pathogenic except *A. Niger* and *Trichoderma spp* which are saprophytes.

Keywords: isolation, identification, fungal pathogen, vegetable crops

Introduction

Vegetables are most important components of human food since they provide proteins, Vitamins, Carbohydrates and some other essential macro and micro nutrients required by the human body. Fungal diseases cause huge losses to vegetables during cultivation, transportation and storage. Phytofungal pathogens cause serious problems for the agricultural crops including vegetables. The plant is highly affected by adverse climatic conditions. The warm and cool climatic conditions provide an ideal condition for the development of many foliar, stem and soil-borne plant diseases. Fungal diseases are a major limiting factor for vegetable that cause serious yield reduction leading to severe economic losses (Pavankumar *et al.*-2018). In addition, many also produce mycotoxins, which are harmful to humans and livestock and causes a number of diseases like rusts, smuts, rots and downy mildew. Plants are infected by different kinds of microbial pathogens and the required inoculum for infection is present in the soil, water and air, in addition to plant host. Whatever may be the source of inoculum, the susceptible plant species or crop varieties may exhibit clear visible local symptoms in or on the tissues where infection is initiated. If the pathogen is able to find favourable conditions for further development, systemic symptoms are induced in tissues or organs far away from the point of pathogen entry into the plant. When the symptom of infection is not expressed externally, it is termed as latent infection. Some fungal pathogens infecting unripe fruits do not induce any visible symptom as they remain dormant. Detection of microbial pathogens refers to the process of establishing the consistent presence of a particular target organism(s) within the plant or in its environments, irrespective of the development of visible symptoms in the plant suspected to be infected by the pathogen(s) in question. Diagnosis, on the other hand relates

to the identification of the nature and cause of the disease Problem under investigation (Digambar and Sahera-2016)^[2]. Chitradurga district falls in central eastern parts of the state and covers a total geographical area of 8388 sq. kms. The district is divided into 6 Taluks, namely Chitradurga, Hiriur, Hosadurga, Holalkere, chalakere and Molakalmuru. It lies in the central dry agro climatic zone. The average temperature during the summer reach up to 42°C and minimum during winter can be 12°C. Major part of the land is utilized for the agricultural purpose which includes Rabi, kharif and other agricultural plantation. The water bodies cover an area of 384.9 sq. km which is comparatively low area with agricultural land, hence the people of this district depends on rainfall for growing the crops.

The vegetable crops are attacked by many fungal, viral, bacterial, nematodal and some other diseases leads to loss in quality and yield. Out of these diseases fungi causes more loss in field condition and post-harvest condition (Salau and Shehu-2015)^[6]. Present investigation aims at identification of the fungi from the plants showing symptoms and were identified based on their morphological characters.

Materials and Methods

Study site and sample collection

Field survey was done in major vegetable growing regions of Chitradurga District from September to November 2020 to estimate the fungal diseases. A purposive and randomized sampling method is used for survey and collection of samples (Zainab and Shinkafi-2016)^[8]. The fungal pathogens were able to infect various plant organs such as roots, stems, leaves, flowers and fruits. The infected part shows visible characteristic symptoms like spots, blights, wilts, rots etc. Plant parts with visible symptoms were collected from different vegetable crops in the field

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Impact of conventional storage system on germination and storage fungi of paddy in Chikkamagaluru, Karnataka

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Abstract

Practice of suitable method of storage benefited to maintain the highest germination ability even to the duration of six months up to 90%. Paddy stored for a year good in quality for consumption and flour. Conventional structures recorded were constructed with locally available plant wood, bamboo, mud, coconut jute. As insect protector plant leaf, sugarcane, paddy husk was selected which been in use traditionally. Storage fungi infestation rate was found increased more in 9 to 12 months storage time. Insect's damage was more in Panatha, although this structure had good protection against rodents and cold. SB and sand method test results was calculated and analyzed for samples, stored for three different storage period in three different storage structures.

Keywords: conventional storage, paddy germination, paddy fungi, storage fungi, paddy storage

Introduction

Rice (*Oryza sativa* L.) the name represent more than twenty species in the grass family. Twenty percent of the world's population consumes rice as food in daily routine in 2012 by Kim *et al.*, (2012) [9] but now in matter of nine years it increased to half of the world population (Kaur and Gill 2020) [7]. Production and consumption happen more in Asia (Cho *et al.*, 2016) [3]. Antioxidants of rice valuable in controlling the threat of diabetes (type2), cardiovascular problem and cancer (Kaur and Gill 2020) [7]. Starch is one of the major component of rice (kalita *et al.*, 2017) [7]. By Starchy endosperm activity paddy can germinate in low oxygen level even when submerged (Lee 2009) [9] this ability promoted for its cultivation globally. Quality and quantity of agriculture produce can be sustained to long period by following suitable storage method. Effectiveness of particular storage practice showed its impact on stored product. Eco-friendly storages were beneficiary to stored seeds, humans and nature. Farmers financial balance depend upon good, low cost and long lasting storages (Hengsadeeikul and Nimityongskul 2004) [6]. Evading of chemicals or high-tech storage system and artificial treatment for drying and cooling will decrease the storage cost (Adhikarinayake *et al.*, 2006) [1]. Quality of stored content has to be maintained for complete utilization of total produced. To avoid influence of non chemical storage method, its better switch to conventional structures which build by using plant materials, cement and mud. By following these structures farmer will become self dependent, cost can be minimized and increase farmers earnings during off season also (Wasala *et al.*, 2016) [13]. These conventional structure was found in Chikkamagaluru region are so eco-friendly and very much sustainable for many years even during adverse environment conditions. This study was conducted on paddy samples stored in these structures for deferen time period to know their impact.

Collected paddy samples were analyzed for its viability by using Standard Blotter (SB) method and also observed common storage fungi. It was observed in result paddy stored were viable with good percentage and less affected by storage fungi. Consumption rate of this paddy was up to remarkable level and even for sowing. Chikkamagaluru region is one of the more rain fall region of Karnataka, even with these conditions mentioned conventional storage methods are very effective and safer.

Materials and method

Field work

Personal visit lead us to derive about paddy stored structure in chikkamagaluru region of Karnataka. We were interacted many farmers in many villages across. Found huge number of farmers who following conventional storage from several generations. The technology of construction had been passing from generation to generation some important regularly practicing structures were recorded and collected the seed samples.

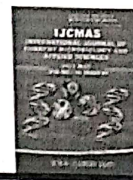
Conventional storage structures observed

Sustainable conventional storage structures recorded are

1. circular bamboo chamber named kanaja constructed by bamboo, by preparing small strips of few inches with two to three meters in length were fabricate as wall of the chamber, finally turn into cylinder like structure, required size cylinder can be made normally we observed had the of capacity 5-6 tons.
2. Rectangular storage made by using cement and brick called Panatha was one of the very common systems followed by many farmers. Wall of the chamber constructed by brick and cement and plastered by cement or mud. The size of Panatha generally up to 6-8feet.
3. Jute bag prepared by coconut jute in different sizes -25, 50, 100 & 200kg

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Original Research Article

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GC-MS Identification of Stem Extract of *Sida acuta* (Burm.f)

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ABSTRACT

Extracts of *Sida acuta* can be effectively employed as antimicrobial agents specifically antifungal to control growth and colonization on commercially important plants like Sorghum species. Furthermore, stem part of *Sida acuta* plant has less studied and hence, it is important to isolate phytoactives from stem extract of *Sida acuta*. Hence, the present study was designed to conduct with main objective to determine bioactive components of aqueous (aq.) stem extract of *Sida acuta* by GC-MS analysis. The fresh stem parts of *Sida acuta* collected was subjected aqueous extraction by successive extraction with water. In the present study we identified 9, 12, 15-Octadecatrienoic acid, ethylester, (Z, Z, Z), gamma-Sitosterol, 1-(+)-Ascorbicacid2, 6-dihexadecanoate, 9, 12-Octadecadienoicacid(Z, Z), 4-Hydroxy-2-methylacetophenone, 1, 3-Propanediol, 2-(hydroxymethyl)-2-nitro, Stigmasterol and Trilinolein as predominant compounds present in the aq. stem extract of *Sida acuta* through GC-MS analysis and characterization. In conclusion, this is the preliminary study wherein we identified eleven bioactive compounds in aq. stem extract of *Sida acuta* and hence, further *in-vitro* and *in-vivo* research investigations are recommended to evaluate the pharmacological activities of prevailing compounds identified in aq. stem extract of *Sida acuta*.

Keywords

Sida acuta, Stem, GC-MS, Antimicrobial, Antifungal, Anti-inflammatory


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Introduction

Since the beginning of human civilization, medicinal plants have been used by mankind

for their nutritional and therapeutic values. Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated


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Effect of Integrated Nutrient Management on growth and yield of yardlong bean (*Vigna unguiculata* (L.) walp. ssp. *sesquipedalis* verdc.)

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ABSTRACT

The present investigation was carried out during Rabi season of 2018-19 to evaluate the effect of various sources of nutrients including organic, inorganic and biofertilizers on growth and yield of yardlong bean (*Vigna unguiculata* ssp. *sesquipedalis*) cv. Arka Mangala. As regards the growth parameters the maximum vine length (2.61m), number of primary branches (7.60), terminal leaf length (16.57 cm), number of nodes per plant (19.37), were reported by application of 75% RDN through inorganic + biofertilizers (Rhizobium + PSB). In respect of yield per hectare and over all yield contributing factors, such as number of cluster per plant (48.30), pods per cluster (3.93), pod length (62.08 cm), pod girth (24.87 cm), pod yield (14.26 t/ha) and seeds per pod (15.06) recorded significantly higher in the treatment of 75% RDN through inorganic+25% RDN through vermicompost + biofertilizers (Rhizobium + PSB). Thus growth and yield may be improved by integrated use of organic and inorganic sources of nutrients.

KEY WORDS: Yardlong bean, RDN, Rhizobium, Phosphate solubilizing bacteria, Vermicompost

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I. INTRODUCTION

Yardlong bean (*Vigna unguiculata* ssp. *sesquipedalis* (L.) verdc.) is a distinct form of cowpea and it belongs to the family leguminosae, chromosome number $2n=22$ and originated from Central Africa. It is cultivated mainly for its crisp and tender green pods which are consumed both fresh as well as in cooked form. Yard long bean belongs to sub family – Papilionaceae it is viny, indeterminate in growth habit, leaves are trifoliolate and green in color. Flowers are of papilionaceous type with violet color. Pods are long, slender and pendent with sparsely arranged bold seeds. Considering the nutritive value, 100 g of green pods of yard long bean contain energy (34.00 Kcal), protein (4.20 mg), calcium (110.00 mg), iron (4.70 mg), vitamin A⁺ (2.40 mg), vitamin „C⁺ (35.00 mg) and is also good source of lysine (Anon; 2006).

Yardlong bean highly responsive to fertilizer application. The dose of fertilizer depends on the initial soil fertility status and moisture conditions. Although yardlong bean being a legume is capable of fixing atmospheric nitrogen, it responds to small quantity of nitrogenous fertilizers applied as starter dose. Application of 20-30 kg N/ha has been found optimum to get better response. In terms of significance, phosphorus is most indispensable mineral nutrient for better root growth and development and thereby making them more efficient in biological nitrogen fixation (BNF). Use of biofertilizers can have a greater importance in increasing fertilizer use efficiency. Indian soils are

characterized poor to medium status with respect to nitrogen and available phosphorus. The use of organic manures (vermicompost FYM, neemcake) will help in improving the efficiency of inorganic fertilizers. The present investigation was undertaken with a view to study the effect of integrated nutrient management on growth and yield of yardlong bean.


II. MATERIALS AND METHODS

The experiment entitled studies on integrated nutrient management in yardlong bean was carried out at College of Horticulture, Venkataramannagudem, Andhra Pradesh during 2018-19. Geographically it is situated between 16.83° N latitude and 81.5° E longitude at an altitude of 34 m above the mean sea level. The climate of venkataramanna gudem is characterized by three distinct season hot and dry summer from March to May, warm humid and rainy monsoon from June to October and mid cold winter from November to February. The soil was loamy sand in texture with good water holding capacity. The soil pH (6.98), EC was (0.26 dsm⁻¹), organic carbon (0.34%), available nitrogen (140.0 kg/ ha), available phosphorus (41.0 kg P₂O₅/ ha) and potassium (175.0 kg K₂O/ha) content. The experiment was arranged in a randomized complete block design and replicated three times. Treatments included T₁-75% RDN through inorganic+25% RDN through vermicompost+

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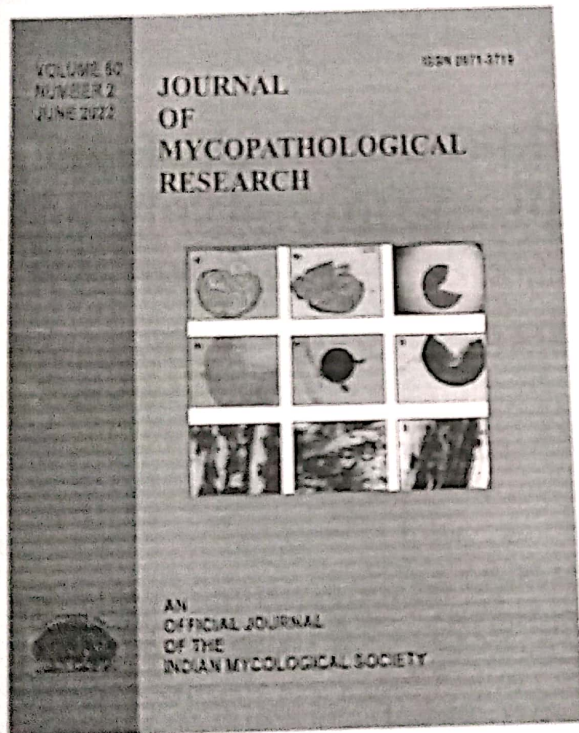
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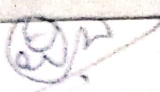
Diversity of rhizosphere mycobiota of some oil yielding crops in Davanagere region of Karnataka, India

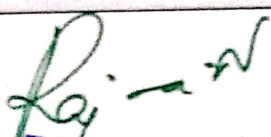
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SHIMOGA, Karnataka State.



RESEARCH ARTICLE

Phenology of the Genus *Crotalaria* L. (Fabaceae-Papilionoideae) of Holalkere, Hosadurga and Chitradurga Taluks of Chitradurga District, Karnataka, India

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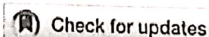
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Abstract

The present study describes detailed distribution of the genus *Crotalaria* L. in a natural habitat. This research is carried out by extensive field survey and observation across all the 3 taluks of Chitradurga, area is botanized for *Crotalaria* species in all seasons and critically analysed the phenological features of all the documented species during the study period 2018-2021. We have recorded 11 species of *Crotalaria*, *Crotalaria calycina* Schrank., *Crotalaria globose* Wight & Arn, *Crotalaria goreensis* Guill. & Perr., *Crotalaria hebecarpa* (DC.) Rudd. *Crotalaria juncea* L., *Crotalaria orixensis* Willd., *Crotalaria pallida* Aiton., *Crotalaria prostrata* Willd., *Crotalaria pusilla* DC., *Crotalaria retusa* L., and *Crotalaria varicosa* Polhill. Data obtained through this research is the basis for the study of further characterisation of *Crotalaria* species; this research describes the importance of phenology in taxonomy and the behaviour biology of the *Crotalaria* species, as they are economically important group.

Keywords

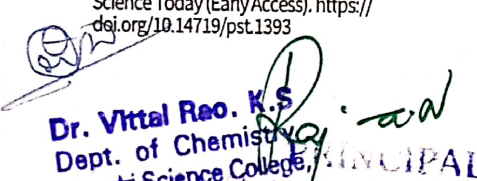
Phenophases, Papilionoideae, Taxonomy, *Crotalaria*, Chitradurga

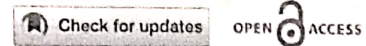
Introduction

Phenology is a branch of biology that studies the effects of seasons, climates and species on each other. The leafing, blooming and fruiting seasons of plants are timed to coincide with the moulting, mating and migration of the animals they support. Charles Morrens, a Belgian botanist, coined the term Phenology in 1853 (1). In Phenology, as in all environmental studies, quantitative methodologies are used to measure and describe the occurrence of events and patterns in the natural world. It is very interesting to note that when phenophases occur, their duration, and the space of transitions between phenophases, and these observations can occur on a variety of biological and geographic scales (2).

Taxonomic History of the Genus *Crotalaria* L.

There are 147 Genera, 805 species, 33 subspecies, 155 variations and 14 forms in the Fabaceae family (3). *Crotalariaeae* (Benth.) Hutch. (Fabaceae) is the largest tribe in the genistoid alliance, with 16 genera and 1204 species (51 % of genistoid legumes). With 702 species, the genus *Crotalaria* L. accounts for more than half of the tribe's diversity (4). *Crotalaria* was initially described by Carolus Linnaeus, who identified 13 species in his Species


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RESEARCH ARTICLE

Studies on the phenology of some terrestrial orchids of Western Ghats, India

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ABSTRACT

The present paper describes the distribution, natural habitat and phenology of some terrestrial orchids in Shimoga district, Karnataka. The phenophases viz., leafing, flowering, fruiting, fruit dehiscence are observed for 25 orchid taxa belonging to 13 genera in Shimoga district. They are *Dienia ophrydis* (J. Koenig) Seidenf., *Disperis zeylanica* Trimen., *Epipogium roseum* (D. Don) Lindl., *Eulophia spectabilis* (Dennst.) Suresh., *Geodorum densiflorum* (Lam.) Schltr., *Habenaria crinifera* Lindl., *Habenaria elwesii* Hook f., *Habenaria furcifera* Lindl., *Habenaria grandifloriformis* Blatt. & Mc Cann., *Habenaria heyneana* Lindl., *Habenaria longicorniculata* J. Graham., *Habenaria multicaudata* Sedgw., *Habenaria plantaginea* Lindl., *Liparis deflexa* Hook f., *Liparis odorata* (Willd) Lindl., *Malaxis versicolor* (Lindl.) Abeyw., *Nervilia concolor* (Blume) Schltr., *Nervilia crociformis* (Zoll. & Moritzi) Seidenf., *Nervilia infundibulifolia* Blatt. & Mc Cann., *Nervilia plicata* (Andrews) Schltr., *Pecteilis gigantea* (Sm.) Raf., *Peristylus plantagineus* (Lindl.), *Peristylus spiralis* A. Rich., *Satyrium nepalense* D. Don, *Zeuxine longilabris* (Lindl.) Trimen. Phenology is the timing of plant life cycle events. Regular field visits were carried to observe the different life events. Most of the terrestrial orchids complete their life cycle in April to September or October month. The present research gives additional phenological aspects of terrestrial orchids in Shimoga district. Vegetative phenology is important to understand the ecology and instinct history of a plant species and may help to develop the conservation strategies of endangered species.

Introduction

The Orchidaceae is one of the largest families of flowering plants represented by 25000-35000 species distributed in 600-800 genera in the world (1). In India, Orchidaceae is represented by about 152 genera and 1300 species (2), in which 84 species in 30 genera are endemic to Western Ghats (3). Family Orchidaceae in the state of Karnataka is represented by 203 species belonging to 59 genera, of which 17 species are terrestrial orchids in Shimoga district (4). The Biodiversity rich Western Ghats represents 300 species out of which 84 species under 30 genera are endemic and 15 species are endangered (5).

The orchid plants show the wide distribution in varied, climatic, edaphic, topographical situations and proved their successful adaptability. Orchids are attracting the plant explorers and taxonomic workers in Karnataka (6-9). Observations were also on 15 terrestrial orchids in Shimoga district (10).

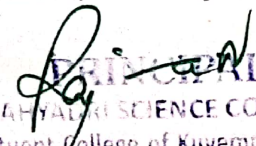
Orchids are mainly categorized into two types terrestrial and epiphytic forms, terrestrial orchids grow on the ground while epiphytic ones grow on tree

trunks or other substratum. Usually almost all orchids are associated with endophytic symbiotic fungus mainly in their roots. The terrestrial forms include those which inhabit the forest floor that is they grow under the shady environment. Terrestrial orchid are found to grow in various forest types such as scrub jungles, dry deciduous forests, moist deciduous forests, semi-evergreen as well as in evergreen forests. Orchids are distributed from sea level 1500 m altitudes with rainfall ranging from 60-300 cm. The maximum numbers of terrestrial orchids are found in evergreen and semi-evergreen forests of the Western Ghats.

Plant phenology is the timing of major events in the life history of the plant with reference to seasons (11, 12). The phenology study deals not only the vegetative and reproductive phase corresponding to the climate and seasonal changes of a particular area but also determines the degree of reproductive synchrony with other plant species (10, 13). The phenology is a key tool for the plant management, conservation of species, floral biology, estimation of reproductivity and regeneration (14, 17). Flowering

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COMPARATIVE ANATOMY OF LEAF IN FOUR *NERVILIA* SPECIES (ORCHIDACEAE)
FROM SHIMOGA DISTRICT, CENTAL WESTERN GHATS, KARNATAKA.

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ABSTRACT

The present study compared leaves of Terrestrial Orchidaceae member i.e four different species of *Nervilia* (*Nervilia concolor* (Blume) Schltr., *Nervilia infundibulifolia* Blatt & Mc Cann, *Nervilia crocififormis* (Zoll & Moritzi) Seidentf, *Nervilia plicata* (Andrews) Sehtre), analyzing the anatomical and morphological characteristics from an ecological point of view. The plants were collected at different region from Shimoga district. Material was fixed in FAA solution. Transverse sections were obtained by freehand sections. The prominent characteristics of the terrestrial *Nervilia* group presented homogenous mesophyll, covered by uniseriate epidermis and covered by thin cuticle; leaf vascular region is inconspicuous in all four species. Anatomical characters were common in four different *Nervilia* species, have evolved with the number of adaptations to different environmental conditions during the evolutionary process.

Keywords: Leaf anatomy, *Nervilia* sp, Anatomical Character, Terrestrial Orchids.

1. INTRODUCTION

The Orchidaceae is one of the largest and widespread families of flowering plants. The Orchidaceae have about 28,000 currently accepted species, distributed in about 763 genera of which 20% are terrestrial orchids. Although its flowers present a relatively uniform structure, the organization of vegetative parts are notably variable among species [1]. Such features allow the family to thrive in different environments, and increase the number of its different growing forms [2]. During evolutionary process, the orchids have become adapted to distinct environments, so that they may be classified into epiphytes, terrestrial, saprophytes or lithophytes [3]. These environmental variations contribute for structural alternations in vegetative organs [1]. Typically orchids occupy big selection of habitats to satisfy their requirements of light, temperature and water [4-6]. Studies in vegetative anatomy were utilized in the classification of orchidaceae member. Anatomical data is mainly utilized in orchid taxonomy [7]. Orchid anatomical studies were carried out by [8-11]. *Nervilia* Comm. ex Gudich. Is a group of terrestrial orchid genus comprising about 70 species distributed in most of the countries [12-14].

Nervilia are commonly known as shield orchids. Plants were widely distributed across most of the areas. Plants are terrestrial, perennial, deciduous, sympodial herbs with an oval to almost spherical tuber and has some short adventitious roots. One or two flowers are borne on an erect, fleshy, leafless flowering stem. When flowering the plants lack leaves but a single erect or ground hugging leaf develops after the flower has fully opened, short flowering phase is temporally separated from the leafing phase [15]. The leaves are usually wrinkled or crumpled with distinct, fan like veins. The flowers are often short lived lasting for only a few days. The sepals and petals are similar, but the labellum is prominent and often composed of three lobes.

LEAF Orchids have simple leaves with parallel veins. The leaves are varied in size, shape and general appearance. Most of the times leaf characters help in identification of species. Generally the structure, shape, and size of orchid leaves depend on the habitats in which they grow. Identification of genus *Nervilia* is bit tricky when this species is in leaves four different species of *Nervilia* are identified with the help of their leaf characters [16]. *Nervilia concolor* (Blume) Schltr. Petiole 7-10cm long, leaf blades are not lying flat on the ground. *Nervilia infundibulifolia* Blatt. & Mc Cann petiole are 3-6cm long, leaf blade lying flat on the ground, greenish yellow in colour locally common in shades.

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