

**National Conference
on**

**“Global Climate Change: Concerns and
Solutions”
(GCCCS-2019)
(February 15-16, 2019)**



Organized by

Environmental Sustainability Management Cell

MAHARSHI DAYANAND UNIVERSITY

ROHTAK-124001

HARYANA, INDIA

(NAAC Accredited 'A' Grade University)

**National Conference
on**

**“Global Climate Change: Concerns and
Solutions”**

(GCCCS-2019)

(February 15-16, 2019)

Organizing Committee:

Patron-in-Chief: Prof. Rajbir Singh (Vice Chancellor)

Patron: Prof. Pushpa Dahiya (Dean Faculty of Life Sciences)

Convener: Prof. Rajesh Dhankhar (Coordinator, ESM Cell)

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Dr Krishna Kant Sharma, Deptt. of Microbiology, M.D.U., Rohtak

Dr Rachna Bhateria, Deptt. of Environmental Sciences, M.D.U., Rohtak

Joint Organizing Secretary:

Dr. Sunil Kumar, Deptt of Environmental Sciences, M.D.U., Rohtak

Message



Dr. (Mrs.) Rajesh Dhankhar
Professor
Department of Environmental Science
M.D.University, Rohtak

It is a matter of immense pleasure for me to give a message for everyone through this contemporary Environmental Sustainability Management Cell of Maharshi Dayanand University, Rohtak.

Maharshi Dayanand University realizes sustainable and holistic waste management essential in reducing its environmental footprint and providing a safe and healthy work environment for teaching and non-teaching employees, students, and visitors. The environmental sustainability management (ESM) cell has been established to recognize and solve the problems arising from human impact on the campus environment, which retroacts onto human society by having a negative impact on human values such as good health or the 'clean and green' environment. Environmental sustainability management cell was established in 2018 with a mission to build an environmentally sustainable society through pursuit of teaching research and extension activities.

This national conference on “Global Climate Change: Concerns and Solutions” is a perfect platform for environmentalists, researchers, scientists, decision makers and students to come together, compare findings, and discuss the science of the future. Its purpose is to draw attention towards adverse effects of global warming. It aims at developing solutions for a sustainable future that could withstand the impacts of climate change. Global environment challenges such as global warming, ozone layer depletion and green house effects have posed a serious threat to the existence of mankind. With this fear engulfing everyone, environmental sustainability has become the talk of every environmental and political forum.

I extend my hearty welcome to the invited distinguish speakers and the young aspirants to this two days national conference on “Global Climate Change: Concerns and Solutions”. I am also deeply thankful to Indian Metrological Department, Ministry of Earth Sciences for providing financial support for this seminar, Honourable Vice chancellor of M.D. University, Rohtak for making this event possible, and everyone who is part of this occasion.

I hope that conversation of this conference would definitely direct the participants, especially students towards a successful journey of their academic career.

S. No.	Title
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1. Climate change: Shobha saini, Saini institute of girl's education, Rohtak.
2. Management of paddy waste by manure technology Simran, Vineeta Hooda, Deptt. Of Botany, M.D.University, Rohtak
3. Greener approach towards the synthesis of Nanoparticles and their enhanced activity, Tanya Dhanda A, Tamanna MalikA and V.K.MadanA, Department of Chemistry, CCSHAU, Hisar, 125004, Haryana, India
4. Hydrochemical characterisation of groundwater near khanak stone mining area Haryana, Anjali Yadav, Ritu Yadav, Sandeep Kumar, Sujata, Anita Singh¹, Somvir Bajar, Department of Environmental Sciences, Central University of Haryana, Mahendergarh
5. Statistical screening of nutrient and environmental factors to enhance methane oxidation using waste dumpsite soil as biocover , Somvir Bajar, Anita Singh, C.P. Kaushik, Anubha Kaushik, Department of Environmental Science and Engineering, Guru Jambheshwar University of Science and Technology, Hisar.
6. Management of environment pollution by producing microbial phytases using agriculture residues Pragya and Bijender Singh, Department of Microbiology. Maharshi Dayanand University, Rohtak.
7. Environmental changes and their effects on agriculture in Haryana Annu, Department of Zoology, MDU
8. Biosynthesis and characterization of silver nanoparticles by *Pseudomonas pseudoalcaligenes*, Hari Mohan, Enakshi, Samander Kaushik, Kamla Chaudahary and Minakshi, Center of Medica biotech, MDU, Rohtak.
9. Impact of synthesis parameters on in vitro anti-fungal activity of copper nanoparticles synthesized using *Azadirachta indica* aqueous leaf extract, Manjeet Kaur, Department of Biotechnology, MDU Rohtak.
10. Optimization of laccase production from thermophilic fungus *Thermoascus aurantiacus* by statistical approach, Anita Singh, Somvir Bajar, Department of Environmental Sciences, Central University of Jammu, Jammu and Kashmir.
11. Fabrication of SnO₂-CNT nanocomposite-based sensor for detecting pesticide, Vikas Dhull,, Department of Biotechnology, University Institute of Engineering & Technology.
12. Global warming a big concern, Sonali Verma, Jyoti Yadav and Ranjana Jaiwal, Department of Zoology, M. D. University, Rohtak.
13. Production and application of xylanase from thermophilic mould *Myceliophthora thermophila* in saccharification of agricultural residues , Seema Dahiya and Bijender Singh, Dept. of Microbiology, MDU Rohtak.

14. Climate change and the laws in India: a critical appraisal, Dr Jitender singh Dhull, Dept of Law, MDU
15. Climate Change: Role of Indian Judiciary, Kritika Nagpal, Research Scholar, Faculty of Law, MDU Rohtak.
16. Xylanase production by *Trichoderma atroviride* AD-130 using Saccharum munja as substrate, Anil Kumar^a, Joginder Singh^b, Rajesh Dhankhar^c, ^a Pt. N. R. S. Govt. College, Department of Botany, Rohtak.
17. Removal of phenolic pollutants from water using immobilized enzymes, Jagdeep Singh, Seema, Rajeev Kumar Kapoor Research Scholar, Department of Microbiology, M.D.U, Rohtak.
18. Association between occupational lead exposure and metabolic characteristics, Dr. Promilla Ahlawat, Dr. Vineeta Shukla and Dr. Rajeev Sen, Department of Zoology, M D University, Rohtak.
19. Bioremediation of pulp and paper industry effluents, Savita Sihag, Sheetal Guru Jambheshwar University of Science & Technology, Hisar.
20. Utilization of aquatic plants for heavy metal removal by adsorption process, Asha and Sunil Kumar, Department of Environmental Sciences, M.D.University, Rohtak.
21. Chemical pretreatment and saccharification of rice straw for bioethanol production, Anu and Bijender Singh, Department of Microbiology, Maharshi Dayanand University Rohtak.
22. Nanotechnology for water treatment, Asha, Department of Basic and Applied Sciences, Bhagat Phool Singh Mahilla Vishawavidyalaya.
23. Applications of nanotechnology in environment sustainability, Neelam Yadav, Surender Singh Yadav, Anil Kumar Chhillar, Centre for Biotechnology, Maharshi Dayanand University, Rohtak.
24. Climate change, Dr. Sushila Dabas, Associate Professor & HOD of Botany, A.I.J.H.M.College
25. Statistical modelling of lead biosorption process in aqueous medium by *Aspergillus Niger* using Response Surface Methodology, Renu Dhaka and Rachna Bhatia Department of Environmental Sciences, Maharshi Dayanand University Rohtak.
26. Vermicomposting as a process for management of sewage sludge and organic waste as an application for soil, Savita and Rajesh Dhankhar, Department of Environmental Science, Maharshi Dayanand University, Rohtak.
27. Recent advancement in genomic characterization using Y STRs, Shivkant Sharma, Lokesh Kumari, Dr. Ritu Yadav, Department of Genetics, M.D.University.
28. Impact of ozone depletion on environment & human beings, Sudesh Kumari and Pushpa Dahiya. Department of Botany M.D.University,Rohtak
29. Advancements in wastewater management from industrial effluents, Jalaj Kumar Gour, Manoj Kumar Singh, Vipul Chaudhary, Department of Biochemistry, Faculty of Science, University of Allahabad, Uttar Pradesh, India.
30. ABSTRACT, Dr. Parveen Rani ,Associate Professor, Govt PG College for Women, Rohtak

31. Climate change in India: Causes and solution, Kiran, Law department, Mdu Rohtak.
32. Screening of phosphate solubilizing endophytic bacteria from nodules and roots of *Cicer arietinum* and *Pisum sativum*, Rajat Maheshwari, Namita Bhutani, Anu, Pooja Suneja*, Department of Microbiology, Maharshi Dayanand University, Rohtak.
33. E-waste management: problems and solutions, Ritu Jakhar, Alka Khichi, Mehak Dangi, Centre for Bioinformatics, Maharshi Dayanand University, Rohtak.
34. Cost effective xylanase production using Sugarcane bagasse and its application in saccharification, Alokika and Bijender Singh, Laboratory of Bioprocess Technology, Department of Microbiology, Maharshi Dayanand University Rohtak-
35. Air pollution tolerance index (apti) of plant species growing roadside of sector -9 gurugram (haryana), Nancy, Nitin Chauhan, Archana Sharma, Abhishek Swami, Department of Environmental Science, SGT University.
36. Biofortification of vitamin E by engineering genes involved in tocopherol biosynthesis for enhanced production under global climate change, Manish Sainger, Sonia Kapoor and P.K. Jaiwal' Deptt. of Biotechnology, UIET, M.D.University, Rohtak
37. Climate change and its impact on environment and human health, Pradeep and Pardeep Kumar, Department of Geography, M.D.University, Rohtak.
38. Climate change cause high but predictable extinction risk, Partibha and Pushpa Dahiya, Department of Botany, Maharshi Dayanand University, RohtaK
39. Impact of climate change on indian agricultural sector, Dr. Anju Sigroha, Department of Management Studies, Deenbandhu Chotu Ram University of Science and Technology, Sonipat.
40. Environmental damage: a negative externality key to present and future of Environmental Crisis, Nidhi katyal, Research scholar, Department of Chemistry, BMU, Rohtak
41. Biosorption of heavy metals from microbial biomass: A Review, Deepak Kumar and Sunita Arya, c. r. college of education, Rohtak.
42. Enviornmental Pollution, Dr. (Mrs.) Promila, Assistant professor,, V.B. College of Education, Rohtak.
43. Transition towards environmental sustainability: coordinated approaches, Dr. (Mrs.) Sarita Dahiya, Assistant professor-III, MDU,, Department of education, Rohtak
44. E- Waste management, Priyanka Verma, Kritika Sharmaand Shikha Yashveer, Department of Molecular Biology, Biotechnology and Bioinformatics, CCS HAU, Hisar.
45. Abstract, Prince and Shishram, M.Com, Department Of Commerce, Kuk.
46. Effects of Salicylic Acid alleviating salt stress in mungbean, *Vigna radiata* (L) Wilzek, Preeti, Asha Sharma, Department of Botany, Maharshi Dayanand University, Rohtak.
47. Environment pollution due to solid waste, Pooja and Rajvir Singh, Department of Chemistry, CCS Haryana Agricultural University, Hisar.
48. Enviornmental sustainability in India, Dr. Anju Sigroha and Ms Pooja, Department of Management Studies Deenbandhu Chotu Ram University of Science and Technology, Sonipat

49. Rural waste water treatment through constructed wetlands: A Review, Vishal and Sunil kumar, Department of Environmental Sciences, MDU Rohtak
50. Studies of Cobalt(II) and Copper(II) complexed with tellurium containing 12-membered tetraazamacrocyclic ligands, Nitu Sehrawat, Bharati Vidyapeeth's College of Engineering, Paschim Vihar, New Delhi
51. International environmental law: an effective tool to proscribe global climate change, Himanshu Jangra, Faculty of Law, M.D. University, Rohtak.
52. LAMP assay targeting the *pstS1* and *mpt-64* gene for rapid diagnosis of osteoarticular tuberculosis, Anish Khan, Raj Singh and Promod Mehta, Centre for Biotechnology, Maharshi Dayanand University, Rohtak.
53. Genetic engineered *Camelina sativa* for improved heavy metal tolerance against environmental pollutants, Sapna bhoria, Dr.P.K.Jaiwal, Centre for biotechnology, M.D.U.Rohtak.
54. Development of edible vaccine against rotavirus infection in plants, Pooja Malik, Dr. Darshna Chaudhary, Centre for biotechnology, Maharshi Dayanand University, Rohtak.
55. Statistics in nutritional sciences, Baishali Mishra and Alisha, Department of Mathematics and Statistics, CCS Haryana Agricultural University, Hisar.
56. Photocatalytic dye degradation under visible light irradiation, Tamanna Malik, Sandeep Kumar and Ashok K. Ganguli, Department of Chemistry, Indian Institute of Technology, Hauz Khas, New Delhi,
57. Phytoremediation of heavy metal in soil and water, Anil kumar, Hanuman, Shruti, Jyoti, Anita, Gayatri & S.S.Yadav, Department of Botany, Maharshi Dayanand University, Rohtak..
58. Probiotic bacteriocin as alternative to clinical antibiotics, Manoj Kumar Yadav and Santosh Kumar Tiwari, Department of Genetics, Maharshi Dayanand University, Rohtak Haryana.
59. Ramping up of green and renewable solar energy systems: a review, Rashmi Agrawal, Dr. Sunil Kumar, Department of Environmental Sciences, Maharshi Dayanand University, Rohtak.
60. Renewable energy: a panacea to mitigate pollution, Abhishek, Amrender Rao, Neetu and Surender S. Yadav, Department of Botany, Maharshi Dayanand University, Rohtak.
61. Effect of acid rain on soil biological and chemical environment: A review, Divya Gaur and Ganpat Louhar, Department of Soil Science, CCSHAU, Hisar.
62. Removal of brilliant green dye from waste water using gram shell as an adsorbent, Sonia Rani and Sudesh Choudhar, Centre of Excellence of Energy Studies and Environment Management, DCRUST, Murthal.
63. Stubble burning- a pernicious practice, Nitin Chauhan, Department of Environmental Science, SGT University, Gurugram.,
64. Vegetation based climate change mitigation and adaptation strategies, Shruti, Jyoti, Gayatri, Anita, Anil, Hanuman and S.S.Yadav*, Department of Botany, Maharshi Dayanand University, Rohtak.

65. Wasteland reclamation, Gayatri, Jyoti, Shruti, Anita, Anil, Hanuman & S.S.Yadav, Department of botany, Maharshi Dayanand University, Rohtak.
66. Water pollution: Sources, effects, control and management, Dr. Sunita Arya, Associate Professor, C.R. College of Education, Rohtak
67. Effect of salinity stress on physiological and biochemical aspects of Wheat genotypes, Bhavini Chopra* Dr. Asha Sharma*, *Deptt. Of Botany, M.D. University, Rohtak.
68. E-waste: an emerging challenge in India , Vinay Malik¹ Department of Zoology, MDU,
69. Production of laccase isoenzymes from *Ganoderma lucidum* using agricultural waste and their application in Dye decolorization, AkshayShankar, Amit Kumar, Khuswant and Krishna Kant Sharma*, Laboratory of Enzymology and Recombinant DNA Technology, Department of Microbiology, Maharshi Dayanand University, Rohtak.
70. Water fluoridation: a review on the health effects, Bhajan Lal Mehra* and Sunil Kumar, Department of Environmental Sciences, M. D. University, Rohtak.
71. Role of greenhouse gases on climate change, Manju Bala*, University Institute of Engineering and Technology, M.D. University, Rohtak.
72. Bioremediation of pulp and paper industry effluents, Savita Sihag, Sheetal; Guru Jambheshwar University of Science & Technology, Hisar.
73. A review on polymer nanocomposites as technological tool in material science, Rimmy and Dr. Rachna Bhateria* , Department of Environmental Sciences, MDU, Rohtak-
74. Economic prediction and consequence of climate change, Mousumi Priyadarshini, Sourav Ranjan Pradhan Department of Agricultural Economics, CCS, Haryana Agriculture University.
75. A study of wastewater treatment units operating at different pressures, Rajeev Kumar Kapoor* and Sanjay Kumar, Department of Microbiology, Maharshi Dayanand University, Rohtak.
76. Organic micro pollutants removal in Drinking Water by Ion exchange, Seema Bhayana, University Institute of Engineering & Technology, Maharshi Dayanand University, Rohtak.
77. Decolourization of commercial dyes using purified low redox bacterial laccases, ShrutiAhlawat¹, Deepti Singh¹, Jugsharan Singh Virdi² and Krishna Kant Sharma^{1*}, Laboratory of Enzymology and Recombinant DNA Technology, Department of Microbiology, Maharshi Dayanand University, Rohtak.
78. Consolidated bioprocessing of microbes for bioethanol production, Meenakshi Suhag^a, Anil Kumar^b and Joginder Singh^c ^aInstitute of Environmental Studies, Kurukshetra University, Kurukshetra-136119, Haryana, India..
79. Distribution of algal species in sewage irrigated soil, Lalita Rana*, Rajesh Dhankhar, Deptt. Of Environmental Science, Maharshi Dayanand University, Rohtak.
80. Groundwater analysis of urban and suburban regions in the vicinity of gurugram city, Ritu Vashishtha, Tarun Gaur, Annu Yadav, Kajal Goyal, Vikram Mor, Manbir Singh, Department of Environmental Science, SGT University, Gurugram.

81. Effect of salinity stress on chickpea (*Cicer arietinum* L.) genotypes, ¹Rita and ¹Sunder Singh Arya, Department of Botany Maharshi Dayanand University, Rohtak
82. Enzymatic delignification of rice straw using laccase isozymes overcomes the excessive use of chemicals: Green approaches towards environmental sustainability, Sonu and Krishna Kant Sharma*, Laboratory of Enzymology and Recombinant DNA Technology, Department of Microbiology, Maharshi Dayanand University, Rohtak.
83. Solid waste management, Vandana Singhal, Postal Address: House No. 309, Sector-19, Faridabad.
84. Pioneer ideas for reducing carbon emission other than renewable, Mr. Rajesh Kumar¹, Dr. Aman Ganesh², Dr. Vipin Kumar, University Institute of Engg. & Technology, M D U Rohtak.
85. Abstract, *Dr. Parveen Rani, Associate Professor, Govt PG College for Women, Rohtak.
86. Role of nature in environmental protection, Suman Kumari , Department of Food Technology, Maharshi Dayanand University, Rohtak, Haryana.
87. Agricultural biomass burning: emissions and impacts on air quality, health and climate in india, Preeti Vijarniya, Poonam Yadav, Rajesh Dhankhar, Department of Environmental Science, M.D.U, Rohtak.
88. Air pollution tolerance index (apti) of plant species growing roadside of sector -9 gurugram (haryana), Nancy Khatana, Archana Sharma, Nitin Chauhan, Abhishek Swami, Department of Environmental Science, SGT University, Gurugram.
89. Environmental sustainability: a juducual approach, Manu Ahlawat, Research Scholar, Department Of Law, M.D.U Rohtak.
90. Hydrazide derivatives: An overview of their inhibition activity against acid corrosion of mild steel in acidic medium, Suresh Kumar*, Hari Om¹, Research Scholar, Department Of Chemistry, M.D.U Rohtak.
91. Role of aquatic plants in waste water purification, Ranjeet Tanwar* and Manvender Singh*, Department of Biotechnology, UIET, MD University, Rohtak.
92. Impact of stubble burning on human health and its management, Amrita kumara, Hindu Girls College, Sonapat,
93. Impact of global climate change on genetic diversity, Jyoti, Shruti, Anita, Gayatri, Anil, Hanuman & S.S.Yadav., Department of Botany, Maharshi Dayanand University, Rohtak.
94. Air quality status in indoors at residentail sites of urban area in Indiam Rajbala ¹ Soni* , Rajesh Dhankhar, Deptt. of Environmental Science Vaish College of Engg., Rohta, Maharishi Dayanand University, Rohtak.
95. Use of biowaste material for oligosaccharide production, Punit Kumar, Biotechnology Branch, University Institute of Engineering and Technology, MDU Rohtak, Haryana.
96. Waste management: It's disposal, recycling and composting, Dr. Seema Singh, Asstt. Prof, IMSAR, M.D.University, Rohtak
97. Effects of heavy metal pollution on soil microbial population: a review, Ganpat Louhar¹* and Divya Gaur², *Division of Soil Science and Agricultural Chemistry, IARI, New Delhi.

98. Climate change: A major concern in potato cultivation, BichhinnaMaitri Rout, Mousumi Priyadarshini, Department of Vegetable Science, CCS, Haryana Agriculture University
99. Remediation of methyl red by immobilized yeast biosorbent, Sunil Chhikara, Assistant Professor, University Institute of Engineering & Technology, Maharshi Dayanand University, Rohtak.
100. The undesirable impacts of pesticides on human health and the environment, Rajnigodara*, Preeti dhanker¹ and Sushil². *Department of chemistry, CCS HAU, Hisar, 125004, Haryana\
101. Environmental governance in India: Role of supreme court, Dr. SONU, Asst. Prof., Faculty of Law,,MDU, Rohtak.
102. ICT increase job for youth by incorporating indigenous knowledge in agriculture for benefit of farmer and environment, Poonam Sharma, Govt. College, Badli (Jhajjar)
103. Prioritizing Climate Change Adaptation Needs for Food Security, Vidya.R and Bichhinamaitrirout, Department of vegetable science, CCS Haryana Agricultural university, Hisar
104. Identification of Homogeneous Rainfall Regions in Haryana, Mohit Nain&B.K. Hooda, Department of Mathematics and Statistics, CCS HAU, Hisar
105. Common principal components and cluster analysis approach for identification of homogeneous rainfall stations in Haryana, *Mohit Nain, B.K. Hooda, Department of Mathematics and Statistics, College of Basic sciences and Humanities, CCS Haryana Agriculture University, Hisar.
106. Green Synthesis of platinum nanoparticles using fungusFusariumoxysporumand its antimicrobial activity, Khushbu Gupta¹, Tejpal Singh Chudawat². ²Department of Applied Sciences, The North Cap University, Sector 23-A Gurugram
107. E- waste management, PriyankaVerma, Kritika Sharmaand ShikhaYashveer, ¹Department of Molecular Biology, Biotechnology and Bioinformatics,. COBS&H, CCS HAU
108. Study of genetic variability for processing traits in Okra (Abelmoschusesculentus L.)genotypes, Sonika* and Hitesh Kumar, Department of Genetics & Plant Breeding, CCS, Haryana Agricultural University, Hisar
109. Environmental sustainability, ¹Shobha saini, ²Dr. (Mrs.) SaritaDahiya, ³Dr. (Mrs.) Promila,, Assistant Professor, Saini institute of girls' education, Rohtak.
110. E-Waste Management for Environment Sustainability, Kirti Sharma,RainuNandal, Assistant Professor, UIET,MDU,Rohtak
111. E-waste and its effects: A literature review, Meenakshi,RainuNandal, UIET, MDU, Rohtak.
112. E-Waste: A Technological Bane, RajatMalik ,RainuNandal, UIET, MDU, Rohtak
113. Zinc toxicity in Amaranthusviridis L.: Plant growth and biochemical parameters, RachnaBhateria* and Snehlata, Department of Environmental Sciences, Maharishi Dayanand University, Rohtak.
114. Salinity development under shallow water table condition, Mukesh Kumar Mehla, College of Agricultural engineering and technology, CCS Haryana Agricultural University, Hisar.

115. Optimization of in vitro plant regeneration and transformation system of chickpea (*Cicerarietinum*L.), DarshnaChaudhary* , Anil Kumar, Honey Yadav and Mohini Singh, Centre for Biotechnology, MaharshiDayanand University Rohtak-124001, Haryana
116. Mitigation of drought stress by improving water uptake efficiency with different concentration of am fungi in wheat (*triticumaestivum* l.) under varying soil moisture regimes, Pooja Rani* and K D Sharma, Department of Botany and Plant Physiology, CCS Haryana Agricultural University, Hisar.
117. Effect of pruning and foliar application of ethrel on fruit yield of cucumber under polyhouse, Mange Ram Suthar, Horticulture Training Institute, Uchani, Karnal, Haryana
118. Increasing Pollution and depleting Biodiversity, Vipul Chaudhary¹*,Manoj Kumar Singh *, Pamela Singh¹, *National Bureau of Animal and Genetic Resources(ICAR), Karnal, Haryana.
119. Global warming and its constitutional mandates, Lata(LL.B., LL.M.,NET)
120. Suitability assessment of groundwater with reference to fluoride in some villages of Bapoli block of Panipat district of Haryana., DrBhupindersingh, Assistant Professors, Department of Basic & Applied Sciences, BhagatPhool Singh MahilaVishwavidyalaya, KhanpurKalan, Sonapat, Haryana.
121. Effect of gibberellic acid and salicylic acid on morpho - physiological parameters of Chickpea (*Cicerarietinum* L.) under saline soil, Deep Dangi*, Asha Sharma*, Department of Botany M.D. University, Rohtak.
122. Detection of pyruvate in serum by an improved amperometric pyruvate biosensor, Mansi Malik¹, Reeti Chaudhary and C.S. Pundir² Department of Biotechnology, DeenbandhuChhotu Ram University of Science and Technology, Murthal, Sonipat, Haryana.
123. Environmentally sustainable spin polarized organic light emitting diode, SavitaKhatri, Rajesh Kumar,, UIET, MDU, Rohtak.
124. E-waste management in India: A study, RainuNandal, Assistant Professor, UIET, MDU, Rohtak
125. Oxygen evolved by a Manganese compound induces colon cancer cell death in hypoxia, Deepa and UttamPati, Jawaharlal Nehru University, New Delhi.
126. Effect of Cadmium on physiological aspects of *Chenopodium* genotypes, Pooja*, Sunder Singh Arya*, Deptt. Of Botany M.D. University, Rohtak.
127. Morphological analysis of isolated starch, Sapna and B. S.Yadav*, Department of Food Technology, MaharshiDayanand University,
128. Phytoremediation of contaminants of soil and ground water, NaveenaDinodia, Asst. Prof of Botany Govt. College Badli.
129. RNAi, an environment friendly approach for the control of agricultural pests, Archana Suhag and Ranjana Jaiwal¹*, Department of Zoology, M. D. University, Rohtak,
130. Evaluation of Onion genotypes for growth and bulb yield parameters in different regions, Hitesh Kumar* and S.K. Dhankhar, Department of vegetable Science, CCS, Haryana Agricultural University, Hisar.

131. Towards a Sustainable Future, Preeti Dabas, Department of Economics, Maharshi Dayanand University, Rohtak, Haryana.
132. Effect of Induced drought condition on chilli (*Capsicum annum*) variety, Chanchal Garg¹, Kirpa Ram¹ and Asha Sharma^{2, 1} Department of Botany, Baba Mastnath University, Rohtak.
133. Effects of heavy metal pollution on soil microbial population: A review, Ganpat Louhar^{1*} and Divya Gaur^{2, 1*} Division of Soil Science and Agricultural Chemistry, IARI, New Delhi.
134. Mitigating climate change: A step towards sustainable development, Dr. Monika Gupta, Assistant Professor in Chemistry, Vaish College, Rohtak.
135. The importance of medicinal plants, Mukhan Wati and M. Khabiruddin, Department of Chemistry, Chaudhary Charan Singh Haryana Agricultural University, Hisar.
136. Microbial degradation of Lindane (γ -HCH) from the soil samples from environmental sites, Dharmender Kumar*, *Department of Biotechnology, Deenbandhu Chhotu Ram University of Science and Technology, Murthal.
137. Effect of acceptance of food by freshwater fish in surfactant polluted water, Sudesh Rani, Preeti Madan, Priyanka and Anshu, Department of Zoology, M.D. University, Rohtak.
138. Climate remodeling through Carbon Sequestration Potential of Plants, Neetu, Abhishek, Amrender and Surender S. Yadav*, Department of Botany, Maharshi Dayanand University, Rohtak.
139. Characterization of phytoconstituents present in the selected weeds, Yogita Sharma and Dr. Rachna Bhateria*, Department of Environmental sciences, Maharshi Dayanand University, Rohtak.
140. Climate change and its impact on Biodiversity, Amrender Singh Rao, Abhishek, Neetu and S.S. Yadav* Department of Botany, Maharshi Dayanand University, Rohtak
141. Use of Plant Growth Promoting Rhizobacteria for Alleviation of Adverse Effects of Heavy Metal Ion Stress in Crop Plants, Sangeeta Kumari*, Pooja Rani¹ and Anita R. Sehrawat* Department of Botany, M.D. University Rohtak.
142. Assessment of heavy metal content in vegetation at various urban traffic sites of Rohtak city, Sunil Kumar, Department of Environmental Sciences, MDU, Rohtak.
143. Cancer a manifestation by pollution in India, Jagjeet Singh* Department of Zoology, MDU.
144. Genetic engineered *Camelina sativa* for improved heavy metal tolerance against environmental pollutants, Sapnabhorja, Dr. P.K. Jaiwal, Centre for biotechnology, M.D.U. Rohtak.
145. Transition towards environmental sustainability: coordinated approaches, Dr. (Mrs.) Sarita Dahiya, Shobha Saini, Dr. (Mrs.) Promila, Department of education, Rohtak,
146. S doped ZnO: An insight for visible light photocatalysis, Rakesh Kumar, Assistant Professor, JVMGRR College, Charkhi Dadri
147. Effect of climate change on fertility, Sonika and Dr. Pushpa Dahiya, Department of Botany, Maharshi Dayanand University, Rohtak.
148. Solar hydrogen revolution: A compelling fuel for future, Saloni Mangal, Dr. Rachna Bhateria, Department of Environmental Science, Maharshi Dayanand University, Rohtak

149. Synthesis and luminescent properties of europium (III) complex $\text{Eu}(\text{L})_3$ phen-N-oxide, Rajesh Kumar, Jyoti, V.B. Taxak*, Department of Chemistry, Maharshi Dayanand University, Rohtak.
150. Environment and Pollution Control, Dr. Meenakshi, CDLU, Sirsa.
151. E-waste: A challenge or opportunity, Harkesh Sehrawat, Vikas Siwach, Yudhvir Singh, UIET, MDU, Rohtak.
152. Recycling Metallic Waste: A Study, Pardeep Gahlot, Deptt. of ME, UIET, MDU, Rohtak
153. Impacts of E-waste on Human Life, Vikas Siwach, Yudhvir Singh, Harkesh Sehrawat, UIET, MDU, Rohtak.

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Climate change

Shobha saini

Assistant Professor

Saini institute of girls' education, Rohtak

sainishobha22081979@gmail.com

Climate change is no more an environmental concern. It has emerged as the biggest developmental challenge for the planet. Its economic impacts, particularly on the poor, make it a major governance issue as well. Climate change is one of the important issues of our time. Global warming is a result of various human activities, that why humans are expected to change Earth's climate. The atmosphere and oceans have warmed, accompanied by sea-level rise, a strong decline in Arctic sea ice, and other climate-related changes occurred. The current warming trend is of particular significance because most of it is extremely likely to be the result of human activity since the mid-20th century and proceeding at a rate that is unprecedented over decades to millennia.

GCCCS-2019: 2

Management of paddy waste by manure technology

Simran*, Vineeta Hooda*

*Deptt. Of Botany M.D.University,Rohtak

simr914@gmail.com

Abstract

Agro-waste management is the need of hour especially in the developing countries like India where farmers are not very strong financially. There is a lack of awareness regarding the proper management of waste among the farmers which can improve their economic conditions. Paddy is one of the most important crop which remains poorly managed. Unlike foreign countries in India, the main focus of farmers remains upon 3 – 5% of the harvest whereas straw 90 – 95% is often underestimated. Rice straw has lesser fodder value because of its high silica and oxalic acid content. Many farmers find burning quite easy to get rid of it which is proving very hazardous for the environment. Some also sell it but that too at a low return. Therefore, we need to go for a

management practice which can be afforded by the farmers and contribute to the economic status one of which is MANURE technology. It involves to use paddy straw for making organic manure that will result into nutritionally better crops and reduce the burden of buying expensive fertilizers on farmers in an eco-friendly way.

Key words: Agrowaste,management,manure technology,empowerment of farmers

GCCCS-2019: 3

A Greener approach towards the synthesis of Nanoparticles and their enhanced activity

Tanya Dhanda^A, Tamanna Malika and V.K.Madana
^A Department of Chemistry, CCSHAU, Hisar, 125004, Haryana, India
^A dhanda.tanya12@gmail.com

Nanotechnology is mainly concerned with synthesis of nanoparticles of variable sizes, shapes, chemical compositions and controlled dispersity and their potential use for human benefits. Although chemical and physical methods may successfully produce pure, well-defined nanoparticles, these methods are quite expensive and potentially dangerous to the environment. Use of biological organisms such as microorganisms, plant extract or plant biomass could be an alternative to chemical and physical methods for the production of nanoparticles in an eco-friendly manner. Employing plants towards synthesis of nanoparticles are emerging as advantageous compared to microbes with the presence of broad variability of bio-molecules in plants which can act as capping and reducing agents and thus increases the rate of reduction and stabilization of nanoparticles. Biological synthesized nanoparticles have upsurge applications in various sectors.

Plants are recognized in the pharmaceutical industry for their broad structural diversity as well as their wide range of pharmacological activities. The biologically active compounds present in plants are called phytochemicals. These phytochemicals are derived from various parts of plants such as leaves, flowers, seeds, barks, roots and pulps. The Researchers mainly deal with collection, extraction, qualitative and quantitative analysis of phytochemicals i.e. alkaloids, flavonoids, glycosides, terpenoids, phenolics, saponins and carbohydrates etc. The use of antioxidants in treatment of oxidative stress-related pathologies is a possible therapeutical strategy for the future. Natural product with antioxidant properties could trigger this goal. Nanotechnology has emerged as a promising multidisciplinary field. It has shown several applications including diagnostics, imaging and structural design. Nanoparticles can be

synthesized via chemical and physical approaches, carrying many threats to the ecosystem. To overcome these threats, sustainable routes for the synthesis of nanoparticles were implemented. Green synthesis is the most fascinating and attractive alternative to chemical synthesis as it offers more advantages. Nontoxic and eco-friendly secondary metabolites from plants are used as reducing and capping agents. This process is comparatively simple and cost-effective. A gold, silver or zinc salt is simply reduced by biomolecules (phenols, alkaloids, proteins, etc.) present in the extracts of these plants. In this review, we have emphasized the synthesis and antimicrobial potential of various nanoparticles using various plant extracts and their proposed mechanisms.

GCCCS-2019: 4

Hydrochemical characterisation of groundwater near Khanak stone mining area, Haryana

Anjali Yadav, Ritu Yadav, Sandeep Kumar, Sujata, Anita Singh¹, Somvir Bajar*

Department of Environmental Sciences, Central University of Haryana, Mahendergarh
(Haryana)

Department of Environmental Sciences, Central University of Jammu, Rahya Suchani,
Samba (J&K)

*Corresponding Author: Sksomvir@Gmail.Com

Abstract

Stone quarrying is one of the major opencast mining activity followed around the globe. After agriculture, mining is the most important industry, which significantly contributed in raising the economic growth and development of a country. The surrounding region is exposed with a variety of pollutants affecting significantly the micro-environment. Groundwater quality is affected in quarrying sites through accidental spillage and fine sediments. Moreover, the increasing demand of variety of minerals and resources has led to their over exploitation without paying any considering the impacts posed to the environment. Considering the issues of water pollution in the surrounding regions of mining area, the current study is focussed on assessment of groundwater hydrochemistry in Khanak region of Haryana, India. Over exploitation of groundwater in the surrounding area had made the study more crucial to appraise the quality of groundwater. The groundwater is observed as alkaline in nature with varying pH from 7.1 to 7.8. Moreover, the dominance of cations including Na⁺, K⁺, Ca²⁺, Mg²⁺ and Cl⁻ anion influence the hydrochemical characteristics in the vicinity of the

surrounding area. The trace elements including Zn, Pb, Fe, Ni and Mn were also analysed, though, Pb (0.022-0.028), Fe (0.51-0.59) and Mn (0.026-0.058) were found in higher concentration in comparison to the Indian Standards laid down for the drinking water quality. The physico-chemical (pH, EC, TDS, Alkalinity, Hardness, Ca, Mg, Cl) characterisation of samples, revealed a significant salt concentration in the groundwater. The level of different parameter especially cations and anions was found beyond even the acceptable limit. Moreover, heavy metal (Pb, Fe and Ni) in few sample indicated the unsuitability of groundwater for drinking purpose and probability of contamination with the mining activities.

Keywords: Stone quarrying, groundwater, hydrochemical, Heavy metals, Khanak

GCCCS-2019: 5

Statistical screening of nutrient and environmental factors to enhance methane oxidation using waste dumpsite soil as biocover

Somvir Bajar*^{1,2}, Anita Singh^{1,3}, C.P. Kaushik^{1,4}, Anubha Kaushik^{1,5}

*Corresponding Author: sksomvir@gmail.com

¹ Department of Environmental Science and Engineering, Guru Jambheshwar University of Science and Technology, Hisar-125001, Haryana (India)

² Department of Environmental Sciences, Central University of Haryana, Jant-Pali, Mahendergarh-123029, Haryana (India)

³ Department of Environmental Sciences, Central University of Jammu, Jammu & Kashmir-180011 (India)

⁴ Amity School of Earth and Environmental Sciences, Amity Education Valley, Panchgaon, Manesar, Gurgaon, Haryana-122413 (India)

⁵ University School of Environment Management, Guru Gobind Singh Indraprastha University, Dwarka, New Delhi-110075 (India)

Abstract

The waste treatment sector is one of the largest contributor towards elevated atmospheric methane (CH₄) concentration. Though, several tradition technologies are available to curb the CH₄ concentration, but biotic system containing active methanotrophs are getting wide recognition, due to their effectiveness and sustainability. The microbial mediated CH₄

oxidation (MOX) is governed by several factors which needs to be selected and optimised for enhancing the oxidation process. Therefore, the current study is focussed towards selective screening of nutrient and environmental factors to govern the suitability of waste dumpsite soil to diminish the CH₄ emission from solid waste dumpsites or landfills. The statistical-mathematical model, Plackett Burman Design (PBD), was exploited to screen out the significant factors, which have a considerable impact on oxidation process, out of seven variable. The normal plot and student t-test of PBD indicated that ammonical nitrogen (NH₄⁺-N), nitrate nitrogen (NO₃⁻-N), CH₄ dose and copper (Cu) had emerged as a significant out of all tested variables. Further, the results revealed that higher concentration of ammonical nitrogen (NH₄⁺-N) and nitrate nitrogen (NO₃⁻-N) have antagonistic effect on the microbial mediated oxidation process. While, CH₄ dose and copper (Cu) concentration in the microcosm indicated their supportive role and appeared favourable at higher level. Other variables including, incubation time, temperature and phosphate concentration were remained insignificance over a wide tested range. The pareto-chart also revealed that maximum inhibitory role of NH₄⁺-N, followed by NO₃⁻-N in the microcosm. The statistical data also indicated that the oxidation potential increased by 2.04 and 1.51 times, on increasing the tested level from lower to higher for CH₄ dose and Cu, respectively. The maximum oxidation potential of 9.04 μgCH₄ h⁻¹ was achieved in the microcosm, incubated with 30 % (v/v) CH₄ dose, 260 μg/g NH₄⁺-N, 150 μg/g NO₃⁻-N, 1325 μg/g PO₄²⁻ and 375 μg/g Cu at 45^oC temperature for a period of 4 hours. The elevated CH₄ dose, lower incubation time and higher nutrient concentration attributed to the suitability of the biocover towards stimulating the methanotrophic activities and diminishing the CH₄ emission from solid waste dumping sites.

Key words: Biocover, Methanotrophs, Methane oxidation, Solid waste, Plackett-Burman Design (PBD)

GCCCS-2019: 6

Management of environment pollution by producing microbial phytases using agriculture residues

Pragya and Bijender Singh*

Laboratory of Bioprocess Technology, Department of Microbiology. Maharshi Dayanand University, Rohtak-124001, Email: pragyabhardwaj72@gmail.com

*Corresponding author Email: ohlanbs@gmail.com

Burning of agricultural residues is a major problem all over the world and contributes direct role in environmental pollution and also reduced fertility of soil. Agricultural or agro industrial wastes like wheat bran, rice straw, wheat straw, corn cob, sugarcane bagasse and mustard oil cake, sesame oil cake are natural sources of carbon and nitrogen available at low cost. Phytase (*myo*-inositol hexaphosphate phosphohydrolase) belongs to the class of phosphatases and have ability to hydrolyze phytic acid to *myo*-inositol and inorganic phosphates and also reduced phosphorus pollution by eliminating its anti-nutritional properties. Plants generally contains organic phosphorus in the form of phytic acid, a derivative of *myo*- inositol. Territory of the production of livestock accumulated by phosphorus is a major concern of environment pollution. In present study, *Aspergillus oryzae* SBS50, a filamentous fungus was used for the production of phytase by using mixed substrate. Among the different substrates (rice straw, wheat straw, cotton oil cake, sesame oil cake and sugar cane bagasse) used in combination with wheat bran, and maximum phytase production was obtained with combination of wheat bran and rice straw in 1:1 (w/w) at 5th day (29.93U/g DMR) of incubation with addition of moistening medium (containing 0.5 g MgSO₄.7H₂O, 0.5g FeSO₄.7H₂O and 0.5g (NH₄)₂SO₄) in ratio of 1: 4 (v/w). Phytase production was further increased (31.35 U/g DMR) on supplementation of 1% ammonium sulphate as nitrogen source. Microbial phytases significantly contribute in preventing environmental pollution from phosphorus and are used in dephytinization of food and feed industries.

GCCCS-2019: 7

Environmental changes and their effects on agriculture in haryana

Annu*

Department of Zoology, MDU

* annuphogat297@gmail.com

Abstract

Environment is major and unavoidable factor for mankind. In agriculture, environment is major factor to decide production and quality of cereals. Abiotic components of environment

are beyond our control. But biotic factors i.e. pests of agriculture can be controlled and checked by some chemical or physical applications. Chemical controls include pesticides which are used all over the globe. Pesticides as agrochemicals constitute a variety of chemicals which are designed to act specifically to control pests and to increase production. Changes in global environment causes disturbance in crop cycle with enhanced pest attacks lead to increase in demand and application of pesticides. In Haryana irregular precipitation, increasing range in temperature and difference in mean minimum post monsoon temperature increases pest attack susceptibility. These environmental changes are posing a threat to agricultural production both in field and in storage. Humidity and moisture of cereals are chief physical conditions which ensure availability of pest, feeding and hatching of eggs. With disturbances in physical environment farmers apply different pesticides in order to control supposed pest attacks. These genotoxic compounds control pest to some extents but they cost much more than that in form of health degradation. Threats involving DNA damage has been associated to farmers who were subjected to high uses of pesticides. Lung cancer, breast cancer, skin cancer and blood cancer are serious health issues which are associated to use of these harmful agrochemicals. The evidence of risks associated to high pesticide consumption due to changing environment stresses the need for implementation of suitable safety measures to prevent and minimize the exposure to these agrochemicals and use of bio controls.

Keywords: Environment, Pesticides, Farmers.

GCCCS-2019: 8

Biosynthesis and characterization of silver nanoparticles by *Pseudomonas pseudoalcaligenes*

Hari Mohan¹, Enakshi¹, Samander Kaushik², Kamla Chaudahary³ and Minakshi⁴

1 – Centre for Medical Biotechnology, Maharshi Dayanand University, Rohtak, Haryana-124001

2 – Assistant Professor, Centre for Biotechnology, Maharshi Dayanand University, Rohtak, Haryana-124001

3- Professor Emeritus, Department of Microbiology, Maharshi Dayanand University, Rohtak, Haryana-124001

4- Professor, Department of Animal Biotechnology, LalaLagpatRai University of Veterinary and Animal Sciences, Hisar, Haryana-125001

Presenting author: Dr. Hari Mohan; Email ID: harimohan.cmbt@mdurohtak.ac.in

Abstract

Biosynthesis of silver nanoparticles from the microbes naturally dwelling in particular type of habitat has garnered much attention. These microbes are capable of synthesizing nanoparticles of various size and shape. An extensive number of methods are being employed for synthesis of nanoparticles e.g. physical, chemical, photochemical and cryochemical methods but most of them are environmentally hazardous, costly and inefficient. Biogenic synthesis of nanoparticles has emerged as a novel approach as the process is of low cost, clean, non-toxic and eco-friendly. In the present study, synthesis of silver nanoparticles from goldsmith silver cleaning effluent has been reported. Biochemical and molecular identification of the microbe showed it as *Pseudomonas pseudoalcaligenes*. These nanoparticles were characterized by FTIR. These silver nanoparticles also exhibited significant antimicrobial activity. The 16S rRNA sequence of the microbe was submitted to Genbank (NCBI).

Keywords: *Pseudomonas pseudoalcaligenes*, silver nanoparticles, FTIR, antimicrobial activity

GCCCS-2019: 9

Impact of synthesis parameters on *in vitro* anti-fungal activity of copper nanoparticles synthesized using *Azadirachta indica* aqueous leaf extract

Manjeet Kaur
Department of Biotechnology
University Institute of Engineering and Technology
Maharshi Dayanand University, Rohtak-124001, Haryana

Email: manjeet.kundu@gmail.com

Abstract

In present study green synthesis of copper nanoparticles (CuNPs) has been carried out under variable parameters of temperature, pH and molar concentration using *Azadirachta indica*. A change in colour from green to brown was noticed indicating the synthesis of CuNPs. The synthesized CuNPs were characterized by UV-Vis spectral analysis and peaks at different wavelength were noticed indicating the effect of synthesis parameters on size and shape of synthesized nanoparticles. The synthesized NPs were further characterized for chemical composition using FT-IR spectrometer in the range of 5800-1000cm⁻¹ and it was found that

CuONPs were formed. In vitro antifungal activity study of synthesized NPs showed a variation in activity with change of synthesis parameters.

Keywords: Copper, nanoparticles, CuNPs, UV-Vis spectrometer, FT-IR, antifungal activity

GCCCS-2019: 10

Optimization of laccase production from thermophilic fungus *Thermoascus aurantiacus* by statistical approach

Anita Singh¹, Somvir Bajar²

1 Department of Environmental Sciences, Central University of Jammu, Jammu and Kashmir

2 Department of Environmental Sciences, Central University of Haryana, Jant- Pali,
Mahendergarh, Haryana

Email- anitasaharan@gmail.com

Laccases are copper-centered, blue colored polyphenolic oxidases which are able to degrade aromatic compounds. Fungal laccase play an important role in lignin degradation, dye degradation, wastewater treatment, bioremediation of some toxic chemical waste, pulp & paper manufacturing etc. In the present study, laccase enzyme is produced by thermophilic fungus *Thermoascus aurantiacus*, a local isolate, under solid state fermentation using rice straw as substrate. Solid state fermentation technique mimics the natural habitat of microbial growth, so produce more enzymes. Rice straw was used as support for microbial growth as well as substrate for enzyme production in the present study. The nutritional and operational parameters affecting laccase production- pH, incubation temperature, particle size, inoculum dose, initial moisture content, rice straw, sodium nitrate, KH_2PO_4 , MnSO_4 , $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, CuSO_4 , incubation time were first screened by Plackett-Burman design. The most significant factors- inoculum dose, initial moisture content and CuSO_4 concentration were optimized by Box-Behnken design of Response Surface methodology. The statistical approach for optimization allows screening various experimental factors along with determination of impacts of each studied variables as well as the interactive effect of variables on target response.

Fabrication of SnO₂-CNT nanocomposite-based sensor for detecting pesticide

Vikas Dhull

Department of Biotechnology, University Institute of Engineering & Technology, Maharshi Dayanand University, Rohtak-124001, Haryana, India

Email: v.nano87@gmail.com

Abstract

The exponential growth of population requires enhancement in the agricultural productivity. Due to this, the pesticides are in great use. The extensive use of pesticides is causing serious health and environmental concern. So, it is necessary to detect presence of pesticides in different samples before use. The present work is focused on the fabrication of inhibition-based biosensor using *acetylcholinesterase*. The working electrode comprised of nanocomposite of tin oxide nanoparticles and the carbon nanotubes. The tin oxide nanoparticles were chemically synthesized. The successful synthesis of tin oxide nanoparticles was confirmed using characterization techniques such as UV- visible spectroscopy and other techniques. Further, the nanoparticles were used to prepare nanocomposite with the SWCNTs using a crosslinker, and a wire has been inserted to make the electrical contact in the nanocomposite. The covalent binding of enzyme on the nanocomposite surface was confirmed using FTIR. The electrochemical analysis was done using potentiostat mini. Then, the fabricated working electrode was used to detect the presence of pesticide in the sample. The developed sensor showed good linearity range and low detection limit. The working potential of the developed sensor was also very low which is due to the use of electroactive nanoparticles and the nanotubes. The membrane fouling was not observed. The reusability of the developed sensor was also investigated and the results were accurate. The sensor also possessed excellent storage stability which has enhanced the reusability.

GCCCS-2019: 11

***In vitro* antioxidant potential of methanolic fruit extract of *Momordica charantia*.**

Preety, Dheeraj and Pushpa Dahiya

*Department of Botany M.D. University, Rohtak

monurohilla39@gmail.com

Abstract

It is believed that two-third of the world's plant species have medicinal importance, and almost all of these have excellent antioxidant potential. Recently antioxidants have attracted considerable attention in relation to radicals and oxidative stress, cancer prophylaxis and therapy. Experimental evidence suggests that free radicals (FR) and reactive oxygen species (ROS) are responsible for various diseases. Plants produce a lot of antioxidants that control the oxidative stress caused by high sun light and oxygen, so they can represent a source of new compounds with antioxidant activity. Present study was carried out to evaluate the antioxidant potential of *Momordica charantia* (bitter gourd) fruits extract prepared in solvent methanol using Soxhlet apparatus. The radical scavenging activity of *Momordica charantia* fruits was determined by using DPPH assay. The IC₅₀ value of bitter gourd extract was found to be 45.16µg/ml. Total phenol content (TPC) & total flavonoid content (TFC) of the extract was calculated by using gallic acid and quercetin as standard respectively. The values of TPC and TFC found in fruit extract was 27.5 mg GAE/g and 82.5 mg QE/g respectively. A correlation was found between the antioxidant activity, TPC & TFC values which showed that bitter gourd fruit extract exhibited good antioxidant potential & can be used for the treatment of disease occurs due to free radicals.

Key Words: Antioxidant, methanol, DPPH, soxhlet apparatus TPC, TFC, IC₅₀

GCCCS-2019: 12

Global warming a big concern

Sonali Verma, Jyoti Yadav and Ranjana Jaiwal*

Department of Zoology, M. D. University, Rohtak

*Corresponding author: ranjana.jaiwal@gmail.com

All over the globe the scientists and environmentalist show their immense interest related to climate change and motivate the others for finding the ways to solve the problems related to global warming and other concerns. The main causes of global warming are continuous use of fossil fuels which produce harmful gases like carbon dioxide, methane and nitrous oxides. Deforestation is also responsible for increasing the temperature of earth. Earth environment is mainly damaged by global warming. Most of the people are even not aware of it and also about its withering effects. It severely affects and damages the ecosystem. Due to these serious effects of global warming, many scientists discovered some solutions like alternative energy sources (solar, wind, hydro, geothermal, bio mass etc). Uses of renewable sources of energy are the best methods to oppose the ever increasing effects of global warming. Here, we elaborate on the causes, hazards and present solutions to solve the issue of climate change.

Keywords: Global Warming, Fossil Fuels, Renewable Energy, Climate Change

GCCCS-2019: 13

Production and application of xylanase from thermophilic mould

***Myceliophthora thermophila* in saccharification of agricultural residues**

Seema Dahiya and Bijender Singh*

Laboratory of Bioprocess Technology, Department of Microbiology, Maharshi Dayanand

University Rohtak- 124001, E-mail: seemadahiya20@gmail.com

*Corresponding author E-mail: ohlanbs@gmail.com

Agro-industrial residues such as rice straw, wheat straw, corn cob, and sugarcane bagasse are the cheapest and abundantly available natural sources of carbon for significant production of industrially required enzymes. Numerous enzymes which have a number of applications in industrial and biotechnological processes have been produced by utilizing various types of microorganisms from agricultural residues and also utilization of agricultural residues offers great potential for reducing the cost of enzyme production while increasing the utilization of these enzymes for industrial and biotechnological purposes. Present study reports the high extracellular xylanase production (2191.28 U/g DMR) after optimization from thermophilic fungus *Myceliophthora thermophila* BJTLRMDU3 in solid state fermentation (SSF) using rice straw. The application of enzymatic hydrolysis for obtaining sugars from agricultural waste is of significant interest in present biotechnology, mainly for bioethanol and

xylooligosaccharides. The saccharification of agricultural substrates was carried out by *Myceliophthora thermophila* BJTLRMDU3 xylanase that yielded maximum reducing sugars, 410.55, 135.61, and 132.61 mg/g of substrate from wheat bran, rice straw, and corn, respectively, after 12, 48, and 36 h.

Keyword: Xylanase, *Myceliophthora thermophila*, Saccharification, Rice straw, Wheat bran, Corn cob.

GCCCS-2019: 14

Climate change and the laws in India: a critical appraisal

Dr. Jitender Singh Dhull
Dept. of Law,
M.D. University, Rohtak

Abstract

India is world's fastest-growing emergent economies with pressing development and infrastructure requirements. The government has sought to achieve this balance by creating a legal and policy landscape that facilitates ease of doing responsible business. In the past few years, the government has introduced a slew of environmental regulations in consultation with diverse stakeholders, ensured mandatory implementation of 24/7 real-time emission and effluent monitoring in industries, upgraded emission standards for polluting industrial sectors, and taken stringent action, including closure against polluting industries. The judiciary, be it the various benches of the National Green Tribunal (NGT) or even the Supreme Court of India, have been playing a more proactive role in the recent years. Recent judgments relating to fuel emission standards for automobiles and other industries, imposition of green cess on diesel vehicles, waste management, biological diversity, wetland and forest conservation, cleaning of rivers and compliance with environmental consents and clearances have ensured that environmental issues are paid much more attention compared to a few years earlier. The government, to support its initiatives such as 'Make in India' and 'Invest India', has introduced a series of strategic measures to streamline the environmental clearance process to tackle delays in crucial development and infrastructure projects. It has also revised some of the laws, including those relating to electronic, plastic, construction, biomedical and other kinds of waste management. In the past year or so, the collective consciousness regarding environmental issues has increased drastically owing to various instances of air and water pollution in cities and questions being raised about resource conservation and management. All of these have given environmental law and policy a prominent position in the India growth story. Indian Constitution is among the few in the world that contain specific provisions on environmental protection. The Constitution embodies environmental protection and promotion as a fundamental right guaranteed to Indian citizens.

Despite all these laws and enforcement agencies some more efforts to be done in order to achieve the goal i.e. environmental protection. For that focus on self-regulation and implementing the laws in their true spirits.

Climate Change: Role of Indian Judiciary

¹Kritika Nagpal, Research Scholar,
Faculty of Law, MDU Rohtak.

Abstract

The main objective behind this research is to identify the present scenario and study the nature and extent of till date developments in various environmental statutes through various statutes, law and convention and various issues regarding the court decisions and judicial process. India has a rich and well developed environmental law. The stellar role being played by the Indian judiciary has strengthened the environmental jurisprudence in India. Although numerous legislative steps have been taken to give effect to the significant right of man to live in a sound environment and the corresponding duty on state and individuals to ensure environment preservation and conservation, my endeavour, in this study, is to analyze the steps taken by judiciary to forward this goal. Public Interest Litigations (PILS) became effective tools in the hands of creative judges to impart justice in the field of environment. Many doctrines were advanced by the judiciary to protect the environment. New principles and concepts like the Polluter Pays Principle, Precautionary Principle, Principle of Absolute Liability, concept of sustainable development, and the notion of inter generational equity were used by the courts to wake up a lethargic executive to deal with many an environmental crisis. The principle of Equity and Common but Differential Responsibilities enshrined in the United Nations Framework Convention on Climate Change and embedded in international environmental law recognize the need for a developing country like India to ensure right to development to its billions of impoverished citizens. The proposed study will lead to a more descriptive and comprehensive understanding of the environment law and the policy along with the role of Supreme in today's context to the new emerging threat which need to be combat effectively.

Xylanase production by *Trichoderma atroviride* AD-130 using *Saccharum munja* as substrate

Anil Kumar^a, Joginder Singh^b, Rajesh Dhankhar^c

^a Pt. N. R. S. Govt. College, Department of Botany, Rohtak – 124001
(E-mail: anildhaka2k9@gmail.com)

^b Department of Botany, A.I.J.H.M. College, Rohtak

^c Department of Environmental Sciences, M. D. University, Rohtak - 124001

Abstract

Xylanase is the industrially important class of the hydrolysing enzymes which hydrolyse xylan. Xylan is the most abundant hemicellulose which is linear polymer of beta-1, 4 linked D-xylopyranose. Xylanase production can be performed on a variety of lignocellulosic materials, such as wheat bran, wheat straw, rice husk, rice bran, rice straw, corncob, corn stalk, sorghum straw, apple pomace and sugarcane bagasse. Microbial xylanase which is produced from fungus is most stable. Fungal species of *Aspergillus*, *Trichoderma* and *Penicillium* are mainly used for the production of xylanase at industrial scale. Xylanase have wide application in industry like food, feed, and pulp or paper industry. In the present study, *Trichoderma atroviride* AD-130 was used for the production of xylanase which was isolated from soil sample by serial dilution method. Whole fermentation process was carried out in 250 mL Erlenmeyer flask. *Saccharum munja* was used as substrate for xylanase production by *Trichoderma atroviride* AD-130 under submerged fermentation. Xylanase production is influenced by substrate as well as physiochemical conditions of the medium like pH, temperature, incubation period and rpm. The maximum xylanase production of 120.80 U/mL by *Trichoderma atroviride* AD-130 was obtained at initial medium pH of 6.0, 30°C and 180 rpm on 4th day.

Key words: *Trichoderma atroviride* AD-130, lignocellulosic material, xylanase, xylan, *Saccharum munja*

GCCCS-2019: 17

Removal of phenolic pollutants from water using immobilized enzymes

Jagdeep Singh¹, Seema², Rajeev Kumar Kapoor³

¹ Research Scholar, Department of Microbiology, M.D.U, Rohtak

² Asst. Professor, Jat College, Hisar

³ Asst. Professor, M.D.U, Rohtak

Phenol and its derivatives are present in many of industrial effluents and possess a high toxicity even at trace concentrations. Discharge of untreated or partially treated phenol can cause serious ecological problems in water bodies or land sites. This study was aimed to develop a laboratory scale enzymatic process to treat the phenolic pollutants using laccase grafted polypropylene water filters and cotton threads in water filtration cartridge. A fixed bed transparent cartridge reactor with 20 cm length and 1.2 cm diameter was packed with 1g of immobilized polypropylene (5 micron) sections and cotton threads. The system containing 1µL/ml guaiacol in 100 mM citrate phosphate buffer of pH 5 was passed through the column using peristaltic pump. The fate of the guaiacol, a phenolic substrate was studied in batch configuration with the enzymatic grafted matrix being operated in tangential filtration mode with a flow rate of 5ml /minute. At the end of each cycle a sample was withdrawn with the help of fraction collector for the analysis of biotransformation of phenol with spectrophotometric system. Spectrophotometric absorbance pattern of treated water samples through batch mode confirmed biotransformation of phenolic contaminants

Key words: Phenol, Laccase, Biotransformation, Polypropylene, Cotton threads

GCCCS-2019: 18

Association between occupational lead exposure and metabolic characteristics

Dr. Promilla Ahlawat, Dr. Vineeta Shukla and Dr. Rajeev Sen*

Promilla.ahlawat@gmail.com

Department of Zoology, M D University, Rohtak

*Department of Pathology, Pt. BDS PGIMS University of Health Sciences, Rohtak

Abstract: All the working environment have a certain degree of work related hazard. Cardiovascular disease is a major cause of disability and premature death. In the present study, to determine the effect of lead(Pb) exposure on occupational workers, blood samples were collected from the subjects working in auto workshops. Office workers were taken as control subjects. The concentration of blood lead was determined in the samples using atomic absorption spectrophotometer (AAS). The blood lead levels were found significantly higher than that of the control subjects. Metabolic characteristics like serum glucose, cholesterol and total serum protein was also determined in the blood samples. Investigations revealed that level of serum glucose was found higher than the normal range in 20% of the subjects. Increase in serum cholesterol above normal value was found in 13.75% of the workers, whereas total serum protein though statistically significant was found within the normal range.

Keywords: Blood Lead, auto-workers

GCCCS-2019: 19

Bioremediation of pulp and paper industry effluents

Savita Sihag, Sheetal

dahiyasheetal610@gmail.com; Guru Jambheshwar University of Science & Technology,
Hisar (Postal address: 11B/58, Old Campus, CCS HAU, Hisar)

Abstract

Pulp and paper mill are characterized as highly polluting industries and are classified under “RED” category by Ministry of Environment and Forest, as largest contributor to industrial water pollution. It generates variety of pollutants depending upon the scale of operation, raw materials used and the process employed. Untreated effluents from pulp and paper mill industry have high biochemical oxygen demand (BOD), chemical oxygen demand (COD), adsorbable organic halides (AOX), Volatile organic carbon (VOCs), Organic and inorganic chlorine compounds, resins, fatty acids, dark brown colour, etc. This untreated effluents when discharged into water bodies, damages the water quality. The undiluted effluents are toxic to aquatic organisms and exhibit a strong mutagenic effects. Several physical, chemical and

biological method are used for the removal of color from the pulp and paper industry .Physical and chemical processes remove high molecular weight chlorinated lignin, color, toxicants, suspended solids and chemical oxygen demand but are quite expensive but BOD and low molecular weight compounds are not removed efficiently. Biological treatment is known to be effective in reducing the organic load and toxicants. Biological treatment methods involve the utilization of microorganisms including fungi, bacteria, algae and enzymes, as a single step treatment or in combination with other physical and/or chemical methods. The biological treatment has been identified as cost effective and eco-friendly methods for the degradation of xenobiotic compounds and polymeric lignin derived chromophoric materials from the paper mill wastewater with the help of microorganisms. Various studies have been performed so far to investigate the complex nature of wastewater by the application of bacteria, fungi and their enzymes at industrial scale.

Keywords: Paper mill effluent, treatment, bacteria, fungi, enzymes.

GCCCS-2019: 20

Utilization of aquatic plants for heavy metal removal by adsorption process

Asha and Sunil Kumar

Department of Environmental Sciences, M.D.University, Rohtak-124001, Haryana, India

E-mail: khushi.ashu007@gmail.com

Abstract

The industrial activities such as metal plating, mining, battery manufacture, petroleum refining and paint manufacturing are the source of generation of metal containing waste effluents which are discharged directly or indirectly into the water bodies. Heavy metals are toxic and affect aquatic ecosystem and human health beyond permissible limit. Heavy metal removal from waste water is a matter of concern for environment. Various conventional methods such as precipitation, evaporation, ion exchange, chemical oxidation, reverse osmosis etc. have been used for removal of heavy metals since previous years. But these methods are not applicable due to high cost, generation of toxic sludge, non eco-friendly. Exploration of cheap method for removal of heavy metal is found to be adsorption. The adsorption using aquatic plants as adsorbent found to be a cost effective and environment friendly method for removal of heavy metals from wastewater as aquatic plants grow rapidly

and found abundantly. In this review, adsorption capacity of different aquatic plants for heavy metals has been discussed.

Keyword: Adsorption, Heavy Metal, Aquatic Plant, Adsorbent.

GCCCS-2019: 21

Chemical pretreatment and saccharification of rice straw for bioethanol production

Anu and Bijender Singh

Laboratory of Bioprocess Technology, Department of Microbiology, Maharshi Dayanand University Rohtak- 124001, Email: anu30ani@gmail.com

Corresponding author Email: ohlanbs@gmail.com

Abstract

Rice straw is one of the cost-effective and easily accessible lignocellulosic residue in nature. Burning of rice straw in open fields is a common practice all around the world, that results in huge air pollution. So industrial utilization of these raw materials as an efficient source for the production of biofuels can solve the problem of its proper disposal. But the recalcitrant properties of lignocellulosic constituents hinders the enzymatic accessibility of cellulose and hemicellulose to various value-added products. So there is a need of an ideal pretreatment that makes the lignocellulosic biomass more flexible to convert them into different fermentable products such as bioethanol etc. Chemical pretreatment usually modifies or convert the crystalline structure of biomass into amorphous form without any consequential energy requirement. Present study utilized various chemical methods i.e. acidic (sulfuric acid, lactic acid, citric acid) and alkaline (sodium bicarbonate, calcium carbonate and ammonia) for pretreatment of rice straw. Then the saccharification of pretreated biomass was carried out by partially purified enzyme (20U) of thermophilic mould *Myceliophthora thermophila* at 60 °C and 150 rpm for 6h. Among these, ammonia pretreated rice straw resulted in releasing of maximum reducing sugars i.e, 233.76 mg/g substrate after saccharification. Bio-ethanol production in ammonia pretreated enzymatic hydrolysate (100g/L) was carried out by *Saccharomyces cerevisiae* at 30 °C and 150 rpm that produced 18.07 g/L ethanol after 72 h.

GCCCS-2019: 22

Nanotechnology for water treatment

Asha

Department of Basic and Applied Sciences, Bhagat Phool Singh Mahilla Vishawavidyalaya,
Khanpur Kalan, Sonipat, Haryana.

Email: arana5752@gmail.com

Abstract: The major problem our society is facing these days is “Environmental Pollution”. The environmental pollution is introduction of contaminants in the environment which can produce harmful effects and are known as pollutants. These pollutants produce adverse effect both on human health and biodiversity. Though the problem of environmental pollution faced by the world is vast but its solution lies in very small elements of nano size known as nano particles. Nanotechnology provides effective technologies to reduce environmental pollutants as compared to current technologies in bulk size. Treatments done by nanotechnology are also cost effective. The size of nanomaterial is very small and its surface area to volume ratio is high and hence it is helpful in detecting contaminants which are very sensitive. By applying material technology, industrial processes and other methods, nanotechnology is also used to prevent the formation of pollutants or contaminants. Thus, three major applications of nanotechnology in the fields of environment can be classified, namely (1) restoration (remediation) and purification of contaminated material, (2) pollution detection (sensing and detection) and (3) pollution prevention. Environmental pollution occurs in various forms i.e. air, water, soil and noise pollution etc. but our emphasis is in treatment of water pollution using nanotechnology. Iron nanomaterial, ferritin (iron containing protein), polymer nanoparticles and bioactive nanoparticles are used for water disinfection.

Keywords: nanomaterials, Iron nanomaterial, water pollution, polymer nanoparticles and ferritin.

GCCCS-2019: 23

Applications of nanotechnology in environment sustainability

Neelam Yadav¹, Surender Singh Yadav^{2*}, Anil Kumar Chhillar^{1*}

¹Centre for Biotechnology, Maharshi Dayanand University, Rohtak-124001, Haryana, India

²Department of Botany, Maharshi Dayanand University, Rohtak-124001, Haryana, India

*Corresponding Author: Dr. Anil Kumar Chhillar; E-mail: anil.chhillar@gmail.com

Abstract

Rapid rate of environmental degradation, increasing prices for raw materials and energy, coupled with the increasing environmental awareness of consumers compels all of us to search some novel eco-friendly products and processes for maintaining the sustainability of the environment. Therefore, it becomes imperative to explore the usefulness of all traditional and modern approaches currently employed for environment conservation. Scientists are looking towards nanotechnology as an alternative option to increase the sustainability of the environment. Various nanotechnological based products and processes have significantly enhanced environmental sustainability by reducing the non-requisite use of raw materials, power and over-irrigation as well as minimizing the use of greenhouse gases and toxic wastes. Nanomaterials and nano based products have increased the durability of various products. For waste water treatment and purification nanoporous membranes and filters with nanomaterials have been used. Nano-technologically optimized lithium-ion batteries have exhibited better storage capacity and prolonged the lifespan. These lithium ion batteries have been used in electrical vehicles and minimize the emission of carbon and poisonous gases in motor vehicles. Nanomaterials have replaced several environmentally problematic chemicals. Thus, nanomaterials based devices and products can provide the effective solutions to various environment issues.

GCCCS-2019: 24

Climate change

Dr. Sushila Dabas, Associate Professor & HOD of Botany
A.I.J.H.M.College, Rohatk-124001

Abstract

Today the environment is at its top disturbing face, if it will remain disturbing at this speed after 10 to 20 years the life not only in the metropolitan area but also in small towns as well as in villages will be totally spoiled.

The disease like Asthma, Allergy, Skin disease, Tuberculosis, Arthritis, Intestine Problem, Cancer, Jaundice/Hepatitis B, Infertility, Heart Problem, ENT Problem etc. not only it will

spoil the life of human being but also there is a major change in the temp, rainfall, fresh air, water and soil quality even seasons.

Since 15 to 20 years, one can see that the season changes like winter, rainy and summer have totally disturbed. It will not occurs at usual time/month. The statistical data on rainfall and micro environmental changes in the Rajasthan particularly in the area of Jodhpur and Bikaner that the rainfall since 2007 has been increased and rains are at frequent interval.

The temp in winter also goes down and temp in summer also increased as compare with period beyond 2007. In newly paddy growing area like Basin of Indira Canal i.e. Punjab (newly irrigated area, Rajasthan and Haryana) Disease like Cancer, Hepatitis B/Jaundice, T.B, Asthma, Infertility, Allergy, Skin Disease have increased (A train is known as Cancer train which is from Punjab to Bikaner Hospital). Govt and human beings have to think and long term policies have to be implemented to protect the environment.

GCCCS-2019: 25

Statistical modelling of lead biosorption process in aqueous medium by *Aspergillus Niger* using Response Surface Methodology

Renu Dhaka and Rachna Bhateria*

*Department of Environmental Sciences, Maharshi Dayanand University, Rohtak-124001,

*Email- bioremediationlab.mdu@gmail.com

Abstract

Biosorption is an efficient technology for the decontamination of metals from industrial wastewater. In present study, cadmium resistant fungal strain *Aspergillus niger* was isolated from the effluent of electroplating industry. The effect of five independent variables i.e. pH (3-7), initial Pb(II) ion concentration (90 – 210 mg/L), biomass dosage (0.5 – 1.5 g/mL), temperature (10 - 50 °C) and contact time (30 – 90 min) was studied on Pb(II) biosorption by employing *Aspergillus niger* using batch mode. Optimum conditions were selected for maximum biosorption. The experimental design i.e. Box- Behnken design (BBD) was aimed at distinguishing the optimum levels of the above selected process variables. Maximum biosorption was achieved at pH 5.0, initial Pb(II) concentration (150 mg/L), biomass dosage

(1.0 g/mL), temperature (30 °C) and contact time (60 min). At optimum conditions, 97% removal of lead ions was achieved.

Keywords: Biosorption, Optimization, *Aspergillus niger*, Response surface methodology, Box - Behnken design.

GCCCS-2019: 26

Vermicomposting as a process for management of sewage sludge and organic waste as an application for soil.

Savita and Rajesh Dhankhar*

Department of Environmental Science, Maharshi Dayanand University, Rohtak -124001

*dhankhar.r@rediffmail.com

Abstract

This paper review the issue of sewage sludge and organic waste generation is a constant problem nowadays; recycling and reduction are expensive physical and chemical processes, so the use of vermicomposting techniques reduces production coast and contaminants from the environment. Vermicomposting is an effective method of management of sewage sludge and organic waste. Earthworm decomposed organic waste and residual sewage sludge and results into useful products is called vermicompost. The present bibliographic review underscores its importance via the use of diverse sorts of organic waste to reincorporate them into the environment. The parameters considered to produce vermicompost are: pH, temperature, moisture, total solid contents, nitrogen, carbon, C/N ratio and humic acids. The farmer used vermicompost as a soil conditioner because it reduce level of contaminates, enriches soil, increasing harvest yield and suppressing plant diseases. It also reviews advantage and application of vermicomposting technology.

Key words: vermicompost; earthworm; sewage sludge; organic waste.

Recent advancement in genomic characterization using Y STRs

Shivkant Sharma¹, Lokesh Kumari², Dr. Ritu Yadav

Department of Genetics, M.D.University

Shivkant7788@gmail.com

India is well known for its human and geographical diversities consisting of more than four and a half thousand anthropologically well defined populations. Each population differs in terms of language, culture, physical features and, most importantly genetic architecture. The size of populations varies from a few hundred to millions. Linguistically, Indians are classified into four major language families; Indo-European, Dravidian, Austro-Asiatic and Tibeto-Burman. These social classifications are very rigid and have remained undisturbed by emerging urbanisation and cultural changes. There has been many exciting observations have been made regarding Indian people by several investigators; However, these findings have remained scattered. Since India is an diverse country consisting of a remarkable population divided according to their caste, language, culture and according to their time to come in India. Division of population according to caste system is highly dramatic and cause many problems for people in ancient time. To overcome this problem there is a need for identification of genomic character. Y-Short tandem repeats (Y-STR) and associated Single Nucleotide Polymorphism are the most widely used markers that are incorporated in determination of genomic character. Since they are designed in such a way that advancement of this method is helpful in determination of genomic character but also in **Burned human remains, Sexual assault, Gender confirmation and Forensic paternity**. Several kits are available associate with Y-STR **Powerplex Y 23 System , AmpFISTR@Yfiler@plus kit etc.**

Impact of ozone depletion on environment & human beings

Sudesh Kumari and Pushpa Dahiya

Department of Botany M.D.University,Rohtak

sudeshkumaribhera@gmail.com

Abstract

Ozone depletion simply means reduction in protective ozone layer. Due to increase in solar UV radiations coming through ozone hole higher chances of skin cancer and other problems like cataract and mutation have been reported. Until now, measurement of effective UV dosage could not be based on spectral data on cancer causing agent. Instead the spectral vulnerability of sunburn or mutation was used. These data contained little detail on longwave Ultraviolet radiation (UVA-315 to 400, UVB-290 to 315, UVC-100 to 290). Recently, experiment performed on Hairless Mice, gave an insight into the carcinogenic effect of UV-A. By this experimental data, we can estimate the effect of ozone depletion on the Annual carcinogenic UV dose. We find that a 2% decrease in ozone yield cause 2.12% increase in annual carcinogenic UV; but this value is independent of geographical latitude. Similar effects observed on human beings by exposure to UV radiation. One study showed that incidents of melanoma increased by 19% in men and 16% in women when UVB radiation increases by 10%. According to NASA, the ozone hole continuously grew in size from 7.6 million square Kms (250-350 Db) in 1970 to 22.9 million square Kms (104 Db) in 2018. High energy UVB is more dangerous for us because it is most likely to be absorbed by DNA and cause mutation. Ozone depletion results in decrease in biodiversity, fertility, photosynthetic rate and also causes health related issues.

Keyword: ozone hole, ultraviolet radiation, carcinogenic, Dobson unit (Db)

Advancements in wastewater management from industrial effluents

Jalaj Kumar Gour¹, Manoj Kumar Singh², Vipul Chaudhary³
Department of Biochemistry, Faculty of Science, University of Allahabad, Uttar Pradesh,
India¹

ICAR-National Bureau of Animal Genetic Resources, Karnal, Haryana²
Department of Biotechnology, Deen Bandhu Chhotu Ram University of Science and
Technology, Murthal (Sonapat), Haryana³

Abstract

Almost every region of the world is facing the problems emerged due to the various types of environmental pollutions that mainly include water, soil, noise, air. Out of all, the water pollution is one of the most serious problem among various parts of the several countries. As we know that, pure water is an essential criteria for the survival of life and several daily human activities. But the regular growth in the human population and different industries disbalances the purity of water day by day. Now a days, the most challenging task for the industries mainly the chemical industries is the management of wastewater effluents to check the water pollution by minimizing the intolerable limits of several heavy metals, toxins, contaminants, chemicals etc. from industries to limit the contamination load of water bodies. Therefore, it is necessary for every industry to follow the specific guideline to minimize the wastewater effluents by applying several wastewater treatment or management processes. There are several physicochemical and biological methods are present as options for the successful treatment of wastewater from industries. The most reliable and feasible methods includes-API-oil separator which is an excellent way for the treatment of wastewater from most of the industries. Another method the combination of two processes such as aerobic and anaerobic which is better option to prohibit the toxic materials. Several types of membranes can also be useful for the separation of pollutants from the wastewater. This process is very much reliable for the stabilization of pond effluent and is most common process in developing countries. The highly developed oxidation processes have several limitations, such as economical and technical also for its application in treatment of wastewater. Further, the use of cost effective, activated carbons for the management of wastewater effluents such as several metals, fluoride, chloride and also COD from various industries. Therefore, it is the demand of current era to search new economical, reliable, and eco-friendly options for the

successful management of wastewater from industries to save our environment and life on earth.

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ABSTRACT

*Dr. Parveen Rani

Associate Professor, Govt PG College for Women, Rohtak

By ‘environmental management’ we mean keeping control of our activities so that we do what we can to conserve these physical resources and to avoid polluting them. We can apply these controls in our life domestically, in what we buy and what we throw away, but it is usually in our work where the environmental impact of what we do is greatest. Such has been the impact of industrial activity that resources are becoming depleted and environmental damage is increasing. Environmental management helps to investigate and manage the environment within the context of human influences, incorporating an examination of economics, culture, political structure, and social equity, as well as natural processes and systems. This paper discusses in detail the various issues relating to environmental management, including the fundamentals; the concept of environmental impact assessment. Environmental management helps to investigate and manage the environment within the context of human influences, incorporating an examination of economics, culture, political structure, and social equity, as well as natural processes and systems.

Key words: Environment, Management, Environmental Management, Assessment

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Climate change in India: Causes and solution

Kiran
Law department
Mdu Rohtak
(Student)

Climate change has emerged as the greatest danger of the 21st century. This danger is believed to be greater than the third world war or the collision of any asteroids with the earth. Climate change has been manifesting itself in the form of irregularities and disturbance in the climate cycle as fallout of increase in the temperature of the earth due to the phenomena of global warming. In the last 150-200 years, climate change has happened so rapidly that the flora and fauna of the world are finding it difficult to reconcile with this change.

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Screening of phosphate solubilizing endophytic bacteria from nodules and roots of *Cicer arietinum* and *Pisum sativum*

Rajat Maheshwari, Namita Bhutani, Anu, Pooja Suneja*

Department of Microbiology, Maharshi Dayanand University, Rohtak

Email- poojapavit@gmail.com

Abstract

Phosphorus is essential nutrient for plant after nitrogen which exists in soil as mineral salt. It is abundant in agricultural soil but majority is in insoluble form. Endophytic bacteria which reside inside plant tissues are known to solubilize phosphate, making it available to plants thereby fulfilling the requirements of plant. In this study a total of 31 endophytic bacteria from roots and nodules of pea and chickpea were screened on PVK and NBRIP agar plates for phosphate solubilization. 28 isolates were solubilizing phosphate showing halozone on PVK agar media with PSE of 250-350%. Among them 8 isolates (CPHN2, PRER2, CPJN13, CPHN4, PJR11, PHR8, PBR9 and CPMN2) were showing highest PSE, CPHN2 being the best solubilizer with PSE of 350%. Dendrogram of similarity coefficients were constructed

between these best 8 isolates. All the isolates formed 7 clusters at 45% similarity, isolate PBR9 and PHR8 showed 100% similarity in cluster 1.

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E-waste management: problems and solutions

Ritu Jakhar, Alka Khichi, Mehak Dangi

Centre for Bioinformatics, Maharshi Dayanand University, Rohtak-124001

Electronic waste or E- waste is the electronic products that have become unwanted, non-working and have reached the end of their useful life. This waste has become major problem worldwide. They are also ecologically toxic. E-waste contains many hazardous metallic contaminations such as cadmium, lead, gold, copper, silver and mercury. When improperly disposed, they leach into ground water, contaminating it. The very same ground water is then used for human consumption, leading to fatal illness like skin and respiratory disorders. The lead batteries contaminate air, water and soil. Indirect effects include bio-magnification. E-waste rules implemented by the government in May of 2012 state that all e-waste is now classified as hazardous waste. The methods for proper treatment of e-waste are- **buy less, recycle and donate** so someone else can use it or some stores also have buyback program, sell them as soon as you don't need them. In a notification released by Government of India, ministry of environment, forest and climate change on 23rd March, 2016, several responsibilities were released for manufacturers, producers, collection centres, bulk consumers and for many others. These included that the manufacturer should collect e-waste generated during the manufacture of any electrical and electronic equipment for recycling or disposal. The producer should pre-treat e-waste to immobilise mercury and reduce the volume of waste to dispose off. So, that no harm is caused to environment during storage and transportation of e-waste. Every dealer shall ensure that the e-waste thus generated is safely transported to authorized dismantlers or recyclers. At university level there are usually two e-waste disposal methods namely- 1) store at warehouse and 2) hand over to e-waste collectors. The future of e-waste recycling is bright in India as there is a gap of proper solution provider that can handle the growing demand of electronic appliance consumption. With growing amount of consumers this sector will keep on giving positive returns in the years to come.

Cost effective xylanase production using Sugarcane bagasse and its application in saccharification

Alokika and Bijender Singh

Laboratory of Bioprocess Technology, Department of Microbiology, Maharshi Dayanand University Rohtak- 124001, Email: alokikasuhag28@gmail.com, ohlanbs@gmail.com

Agro-industrial residues generated from sugarcane bagasse, rice straw, wheat straw, paddy, waste of vegetables etc. is the major concern of environmental pollution. Solid state fermentation using these residues is one of the eco-friendly alternative to produce different fermented value added products like enzymes, bio-pesticides, organic acids etc. which finally results in greener and cleaner environment. Sugarcane bagasse is an agro-residue generated in large amount (186 million tons / year) by alcohol and sugar industry. It is a porous residue of cane stalks left over after the crushing and extraction of the juice from sugarcane. Using optimized basal medium by 'one variable at a time' approach *Bacillus subtilis* subsp. *subtilis* JJBS 250 produced xylanase (20.35 U/g substrate) at 40 °C, 7.0 pH after 48 h. On the basis of results of 'one variable at a time' approach, three variables tryptone, tween 20 and PEG 20000 were selected for statistical optimization. Due to the combined effect of these three variables, the xylanase production was enhanced after RSM. There was 4.82-fold increase in xylanase production in RSM than the 'one variable at a time' approach. Xylanase produced was followed by partially purification using lyophilization, dialysis and gel filtration chromatography. Utilization of partially purified xylanase (10 u/g) resulted in effective saccharification of sugarcane bagasse at 60 °C and pH 7.0 for 6 h.

Air pollution tolerance index (apti) of plant species growing roadside of sector -9 gurugram (haryana)

*Nancy, Nitin Chauhan, Archana Sharma, Abhishek Swami

Department of Environmental Science, SGT University, Gurugram - 122505

E-mail i.d.: khatana883@gmail.com

Abstract

Green vegetation on road side can provide a cost effective and eco-friendly way to mitigate air pollution. Therefore screening of plants for their sensitivity and tolerance level to air pollutants is important because the sensitive plants can serve as bio-indicator and the tolerant plants as sink for controlling air pollution in urban and industrial areas. In order to evaluate the susceptibility level of plants to air pollutants, air pollution tolerance index (APTI) of plants is calculated by analysing the four parameters namely ascorbic acid, chlorophyll, relative water content and pH of leaf extract. APTI of following species *Polyalthia acerifolium*, *Polyalthia longifolia*, *Bauhinia variegata*, *Hibiscus rosasinensis*, *Ficus religiosa*, *Ricinus communis*, *Lantana camara* growing at road side of sector-9, Gurugram has been carried out, which are heavily disturbed by the vehicular pollution. The highest value of APTI was found in following species: *Ficus religiosa* (16.96) and *Polyalthia longifolia* (13.26) whereas the lowest APTI was found in following species *Lantana camara* (6.03%) and *Hibiscus rosa-sinensis* (04%). Present study reveals that plant species with high APTI value can be used to develop green belt on road side and the species with lower APTI can grown as bio-indicators of stress.

Keywords: Air pollution, APTI, Plant species, Gurugram

Biofortification of vitamin E by engineering genes involved in tocopherol biosynthesis for enhanced production under global climate change

*Manish Sainger¹, Sonia Kapoor¹ and P.K. Jaiwal²

¹Deptt. of Biotechnology, UIET, M.D.University, Rohtak

²Centre for Biotechnology, M.D.University, Rohtak

Corresponding author: msainger@gmail.com

Enhanced production can be a solution to increasing global food demand but it has certain limitations and hence it will be important to augment crop nutritional qualities. Vitamin E (VTE) is a component of a balanced diet and vital for humans. It is an effective antioxidant with free radical scavenging action and prevents certain types of diseases. It protects plants against lipid oxidation, stress tolerance and is crucial for cell membrane stability. VTE is a group of lipid-soluble antioxidants called as tocopherols or tocotrienols and there are four tocopherols (T) and four tocotrienols (T₃) having different types of isoprenoid side chain. Plants are the primary source of dietary vitamin E. Humans are unable to synthesize VTE naturally and obtain it in sufficient quantity from their diet. VTE deficiency is more critical in people of developing countries. The oxidative stress due to VTE deficiency makes it necessary to fine tune its quantity and quality in the human diet and similarly for plants subject to oxidative stress. Biofortification is an approach to enrich nutrient content potential or increasing micronutrient deficiency, especially vitamins, minerals, etc. in staple crops to sustain nutritional and health goals. Identification of VTE biosynthetic genes has helped to improve the VTE content of crops either by metabolic engineering or classical breeding. Recently, most of the genes for VTE pathway enzymes have been identified and cloned using genetic and genomics-based methods but studies are still limited to the model organisms like *Arabidopsis thaliana* and *Synechocystis* and still limited number of genes has been explored for biofortification. However, the genetic and genomics-based findings from *Arabidopsis* can be efficiently applied to other plants. VTE has been increased in some cases by regulating the activity of enzymes involved in tocopherol biosynthesis. A combined approach to exploit natural genetic variability of a given trait using molecular markers and engineering vitamin pathways or vitamin-related metabolism should be used as a complementary to each other for improving the nutritional wellbeing of impoverished people.

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Climate change and its impact on environment and human health

Pradeep and Pardeep Kumar
Department of Geography, M.D.University, Rohtak, Haryana
Email id:dahiyaa0007@gmail.com

Abstract

Climate change is long term weather change in a region throughout the world. These changes are caused due to anthropogenic activities and release green house gases increasing global average temperature of Earth. Climate change involve rising in temperature, weather events like drought, cyclones, hurricanes and vector borne infectious diseases. The effects of rising temperature include soil degradation, loss of productivity of agricultural land, desertification, loss of biodiversity, degradation of ecosystems, reduced fresh-water resources, acidification of the oceans, and the disruption and depletion of stratospheric ozone. All these have an impact on human health and cause several diseases like typhoid, cholera, malaria, dengue, hypertension, diabetes, ischemic heart diseases, heart failure and stroke and various types of allergies. So there is a need to minimize the anthropogenic activities which cause these problems.

Keywords: climate change, global warming, disease, green house gases.

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Climate change cause high but predictable extinction risk

Partibha and Pushpa Dahiya
Department of Botany
Maharshi Dayanand University, Rohtak
email:partibhasingroha@gmail.com

Abstract

In the recent decades, climate change is one of the most important topic for concern. Over the past approximate 30 years, there is lot of change in climate pattern. The climate of any region is affected by latitude, elevation, nearby water, ocean currents, topography, vegetation and wind. Now, earth climate has changed due to volcanic eruption, shifts in tectonic plates, sunrays output and human activity. There are 8.7 million species on earth. Every species has its own climate requirement at which it survives and flourish well. Due to climate change, the fauna and flora of that region is adversely affected. Some species can not bear this change so they will extinct with in a short time. The rise of carbon dioxidelevel due to burning of fossil

fuel, solid waste, wood product, vehicular emission and chemical reaction in industries leads to the risk of extinction of 43% of the world's endemic species. Due to climate change about 11,046 species of plants and animals are facing high risk of extinction. The extinction risk of approximate 20-30% of species are due to increase in global average warming upto 1.5-2.5°C. Anthropogenic climate change is predictable to be a major cause of species extinction. Due to habitat destruction and climate change approximate 100-10,000 species are lost per million per year. Now a days, judging the effect of climate change on extinction may be easier than previously thought. There is need to rapid implementation of technologies to decrease greenhouse gas emission and strategies for carbon sequestration.

Keywords: anthropogenic , Climate, extinction, topography, greenhouse.

GCCCS-2019: 39

Impact of climate change on indian agricultural sector

Dr. Anju Sigroha
Assistant Professor

Department of Management Studies
Deenbandhu Chotu Ram University
of Science and Technology, Sonipat

Email: anjusigroha2007@gmail.com

Address: C-26, campus DCRUST,
Murthal, Pin-131039

Ms. Surbhi Dahiya

Research Scholar

Department of Management Studies
Deenbandhu Chotu Ram University
of Science and Technology, Sonipat

Email: surbhidahiya19@gmail.com

Address: H.no. 44, Sector- 13, Sonipat
Pin-131001

Abstract

Climate change is the term used for the shift in weather phenomenon associated with an increase in global average temperatures. It is resulted from both natural changes and various human activities. Human activity is currently generating huge amount of lasting greenhouse gasses like carbon dioxide, methane and nitrous oxide, resulting in a continuing build up of heat. These greenhouse gases are adversely impacting agriculture productivity. Agricultural sector plays a strategic role in the process of economic development of India. The sector is the backbone of Indian economy which provides the basic ingredients to mankind and raw material for industrialisation. But climate changes has severely impacted agricultural sector. While the magnitude of impact varies greatly by region, climate change is expected to impact agricultural productivity and shifting crop patterns. The policy implications are wide-reaching, as changes in agriculture could affect food security, trade policy, livelihood

activities and water conservation issues, impacting large portions of the population. This paper presents an overview of the state of the knowledge of possible effect of the climate change on food grain production in India. It also studies in turn effect of agricultural activities on the climate changes.

Keywords: Agriculture, environment, climate change.

GCCCS-2019: 40

Environmental damage: a negative externality key to present and future of Environmental Crisis

Nidhi katyal

Research scholar, Department of Chemistry, BMU, Rohtak

Abstract

In order to address these different manifestations of the environment as a public problem, ecological crisis due to rapid, unlikely, non reversible changes in environment leading to study the neoclassical economics resorts to just one group of analysis the negative externalities. It deals with various extinction, loss of species, biodiversity, increased levels of toxic pollutants, damage to natural ecosystem structure and function, climate change, damage to natural resources, failures in government policies of forest and common resource management, an ecological system exhibiting a tipping point, increased technological risk and an economy and environment interaction with positive feedbacks. We have studied the common denominator to lower the risk to the lowest common in terms of negative externality, for higher generaliability with assumptions economic market tools. After taking any present environmental problem finding the possible ecological, social causes in terms of exclusiveness, lack of common, to address environmental degradation with economic tools, with a facts and model the paper describes an analysis of both epistemic uncertainty and moral complexity and thereby to emphasize the place of incommensurability in public decisions concerned with the environment. The concept of negative externalities can be a useful heuristic in discussing environmental damage as negative externalities if the social cost of an activity is higher than its private cost. The theoretical confront to environmental damage represents for neoclassical economics has been openly assumed and investigated.

Keywords: Environmental crisis, negative externality, neo-classical, economics

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Biosorption of heavy metals from microbial biomass: A Review

Deepak Kumar and Sunita Arya*

*sunitaarya95@gmail.com

c. r. college of education, rohtak

Abstract

The tremendous increase in the use of heavy metals over the past few decades has certainly resulted in an increased flux of metallic substances in aquatic environment. Metals are of special concern because they are non-degradable and therefore persistent. A number of methods have been developed for removal of toxic metal ions from wastewaters such as precipitation, evaporation, electroplating, ion exchange, membrane processes, etc. However, these conventional technologies are providing expensive due to non-regenerable materials used, high cost and generation of toxic sludge. Biosorption is a process which represents a biotechnological innovation as well as a cost effective excellent tool for removing heavy metals from aqueous solutions. It represents a typical technique for using economical alternate biological materials for the purpose. Today, biosorption is one of the main components of environmental and bioresource technology.

GCCCS-2019: 42

Enviornmental Pollution

Dr. (Mrs.) Promila

Assistant professor,

V.B. College of Education, Rohtak

pardeephoodahyr152@gmail.com

Abstract

Today, pollution is taking place on a vast and unparalleled scale around the world. Developmental activities like production, transportation and manufacturing not only run

down the natural resources but also turn out large amount of wastes that leads to pollution of air, water, soil, and oceans bring about global warming and acid rains. Unprocessed or improperly treated waste is a major cause of pollution of water bodies and environmental degradation causing ill health and loss of crop production. The major causes of pollution must be found out and their effects on our environment must be studied so that the various measures could be taken to control such pollutions. Today's pollution is integrally related to economic production, modern technology, life-styles, the sizes of human and animal populations, and a congregation of various other factors. This is unlikely to yield excepting broad macro transitions that have multiple social benefits. These transitions include shifting of fossil fuels and waste intensive technologies, bringing our most complicated science to bear, altering prices and other economic incentives, perceiving pollution as transboundary and global, and continuing to a stable world population. People from everywhere are offended by pollution. But there is a need to clean up the world, make it a better place and be good trustees of the Earth for future generations. This paper brings light on the major issues of environment pollution and preventive measures to control the pollution. Every people of the world of the world must have to understand “heaven is under our feet as well as over our heads”.

Keywords: Environmental Pollution, Environment degradation

GCCCS-2019: 43

Transition towards environmental sustainability: coordinated approaches

Dr. (Mrs.) Sarita Dahiya
Assistant professor-III, MDU,
Department of education, Rohtak
sarita.dahiya.in@gmail.com

Abstract

Environmental sustainability is an ability to maintain the qualities which are valuable in the physical environment. Sustaining the recycling of certain materials may only need to continue for as long as those types of material are needed technologically, and depending on the pace of technical change, this could be for centuries or for decades. Coordinated approaches are necessary for solving the major environmental and sustainability problems facing the developing as well as developed countries. Government policies as well as

economic outlook, natural resource accounting, estimation of the environmental impact and evaluation of the environment are the approaches that help in sustain environment. Therefore, there is a need to have a better understanding of the multidisciplinary inter-relationships between sustainable development, human health and the environment. Major prominence is laid on globalization and sustainable growth, bioethics and poverty, organizational performance and sustainability, environmental management and individual progress, human and ecosystem health, and water resources and recycling. The resources are only needed for a short time however as society might find new uses for materials as technology, lifestyles and environmental awareness build up. Environmental sustainability can only be obtained through a combination of both preventive and restorative actions. So restoration is a key part of what needs to be done to achieve sustainability. Transition toward sustainable society requires behaviour change. This behaviour change will definitely develop the environmental sustainability. This paper provides us path of coordinated approaches for transition towards environmental sustainability.

Keywords: Environment Sustainability, Coordinated approaches, Transition, Restoration etc.

GCCCS-2019: 44

E- Waste management

Priyanka Verma¹, Kritika Sharma and Shikha Yashveer
Department of Molecular Biology, Biotechnology and Bioinformatics
CCS HAU, Hisar (125004)

¹Corresponding author: pv955929@gmail.com

Abstract: Electronic waste or e-waste term is used for the old, end-of-life electronic appliances such as computers, laptops, TVs, DVD players, mobile phones, mp3 players, etc., which have been disposed by their original users. It is categorized into three types: Large household appliances; Refrigerator and washing machine, Information and communications technology equipment; PC, monitor and laptop and Consumer electronics; TV and mobiles. E-waste consists of Ferrous (Iron & Steel - 50%) & Non-ferrous Metals Plastics- 21, Glass, Wood etc (Iron & Steel - 50% Plastics - 21% Non-ferrous metal - 13%. Disposal of e-waste is an emerging global environmental and public health issue, as this waste has become the most rapidly growing segment of the formal municipal waste stream in the world. In last two decades, the global growth in electrical and electronic equipment production and consumption has been exponential. Today,

electrical and electronic waste is the fastest growing waste stream (about 4 per cent growth a year). About 40 million tonnes of e-waste is created each year (Schluep, M. et al. 2009). Improper disposal of e-waste releases highly toxic chemicals like lead, cadmium, mercury, beryllium, BFR, polyvinyl chloride and phosphorus compounds. About 80 per cent of all e-waste sent for recycling in developed countries ends up in informal e-waste recycling sites in developing countries, primarily in Africa and Asia. To mitigate the heavy metal pollution, many processes like adsorption, precipitation, coagulation, ion exchange, cementation, electro-dialysis, electro-winning, electro-coagulation and reverse osmosis are being used. Microbe–metal interactions reveal the heavy metal accumulating or removal properties of different microbes eg. *Aspergillus niger*, *Penicillium chrysogenum*, *Rhizopus nigricans*, *Ascophyllum nodosum*, *Sargassum natans*, *Chlorella fusca*, *Oscillatoria angustissima*, *Bacillus firmus* and *Streptomyces sp.* In future, emerging microbial technology will provide a better platform for the bioremediation of e-waste.

Key words: e-waste, phytoremediation, cementation, electro-coagulation and reverse osmosis.

GCCCS-2019: 45

Abstract

Prince and Shishram

M.Com, Department Of Commerce, Kuk

Email: Virkprince350@Gmail.Com

Email: Ramrathore1710@Gmail.Com

Abstract

In the race of fastest development, humanity is devouring our planet's resources in increasingly destructive volumes, according to a new study that reveals we have consumed a year's worth of carbon, food, water, fiber, land and timber in a record 212 days. As a result, the earth overshoot day which marks the point at which consumption exceeds the capacity of nature to regenerate has moved forward two days to 1 August, the earliest date ever recorded. While ever greater food production, mineral extraction, forest clearance and fossil fuel burning bring short term lifestyle gains, the long term consequences are increasingly apparent

in terms of soil erosion, water shortage and eliminate disruption. In 2018, August 1st marked earth overshoot day. It means that between January `1st and august 1st 2018, human beings had consumed a year's worth of natural resources. Earth's population of 7.6 billion consumed 1.7 times more from nature than our planet can regenerate. Earth overshoot day like a report card. It reflects how human are not using natural resources wisely. In 2018, it would take 1.7 earths to the natural resources we will collectively use a planet. In fact, last year overshoot day came the earliest since 1970s. Thirty year ago, the overshoot was on 15 October. Twenty years ago, was on 30 September. Ten year ago, was on 15 August. On current trends next year could mark the first time, the planet's budget is busted in July.

Keywords: Earth overshoot, humanity, devouring, destructive, sustainable

GCCCS-2019: 46

Effects of Salicylic Acid alleviating salt stress in mungbean [*Vigna radiata* (L) Wilzek]

Preeti*, Asha Sharma*

Department of Botany, Maharshi Dayanand University, Rohtak

Email: preitysingh.100@gmail.com

Abstract

Mungbean is one of the most important crop among pulses. It has a high nutritional value and a great ability to improve soil fertility by fixing atmospheric nitrogen. Salinity is a major abiotic stress which causes adverse effects on various physiological and biochemical parameters of mungbean (*Vigna radiata*) reducing overall crop yield and growth.

Salicylic acid is an endogenic phytohormone which functions in regulating plant growth. Exogenous foliar application of salicylic acid (SA) greatly enhances plant growth under salinity. Work has been carried out taking different mungbean varieties growing in various salinity concentrations. The treatments comprised of foliar spray of SA at different concentration in ppm (eg. 50-200ppm) along with untreated control treatment. The observation was taken at various parameters like total chlorophyll content, proline and protein content and various physiological parameters like plant shoot length, root length etc. SA induced a highly positive effect on above mentioned parameters in

comparison to untreated ones. So, on the basis of above investigation it may be concluded that foliar spray of salicylic acid is a potential tool in inducing tolerance for salinity in mungbean.

Key Words : Mungbean, salicylic acid, biochemical, physiological, shoot length, root length

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Environment pollution due to solid waste

Pooja and Rajvir Singh

Department of Chemistry

CCS Haryana Agricultural University, Hisar-125004

Email: poojabhardwaj24@gmail.com

Wastes are the material that are not needed and are not usable economically with further processing. It may be in the form of solid, liquid, and gas. They originate from the human activities such as agriculture, industry, domestic activities etc. According to origin, waste is classified as domestic, industrial, commercial, clinical, construction, nuclear, and agricultural. According to properties waste is classified as inert, toxic, and inflammable. If these wastes remain untreated, it leads to air, water, soil or solid waste pollution. Hence, solid waste management is very essential. Solid wastes are categorized as municipal waste, industrial waste, and hazardous wastes. Municipal waste arises from domestic activities of human beings. Industrial waste arises from industrial activities and hazardous wastes are the substances which causes hazard to plants, animals and human beings. Few of the common hazardous waste is radioactive substances, chemicals, biological wastes, flammable wastes and explosives. Solid waste can pollute air, water and soil, and leave various environmental impacts, and cause health hazard, due to improper handling and transportation. It is done most commonly through a sanitary landfill or through incineration. A modern sanitary landfill is a depression in an impermeable soil layer that is lined with an impermeable membrane. In it solid waste is placed in a suitably selected and prepared landfill site in a prescribed manner. The waste material is spread out and compacted with appropriate heavy machinery. The waste is covered each day with a layer of compacted soil. From the above study it is concluded that it is the immense need of present times to get rid from solid waste pollution. It can be controlled effectively through solid waste management. As it is a difficult task, its main objectives are to reduce the harmful effects and find ways for their utilization.

Environmental sustainability in India

Dr. Anju Sigroha and Ms Pooja

Department of Management Studies Deenbandhu Chotu Ram University of Science and Technology, Sonipat Email: anjusigroha2007@gmail.com Email: pooja1994antil@gmail.com

Abstract

Sustainability is the study of how natural system functions, remains diverse, and produce everything it needs for the ecology to remain in balance. In short, sustainability measures how we might live with the natural world around us, protecting it from damage and destruction. The concept of sustainability development based on three pillars: social development, economic development, and environmental protection. Environmental sustainability is talked about in relation to all aspects of our lives – from creating eco homes and environmentally conscious communities to sourcing sustainable food, renewable energy, low impact furniture and clothing. It is defined as responsible interaction with the environment to avoid depletion or degradation of natural resources and allow for long term environmental quality. Environmental sustainability not only focuses on climate changes but also on other environmental problems like chemical pollution or depletion of natural resources. The focus of this paper is to discuss need of environmental sustainability, factors that leads to the need of environmental sustainability, and policies introduced in India for achieving environmental sustainability. This paper also emphasis on the various issues related to environmental sustainability in India.

Keywords: environment, sustainability, resources, policies

Rural waste water treatment through constructed wetlands: A Review

Vishal and Sunil kumar

Department of Environmental Sciences, MDU Rohtak

Email: vishalpanghal2012@gmail.com

With the rapid development of urbanization and economy, India has been facing many serious environmental issues. One of the typical problems is the water pollution triggered due to decentralized domestic wastewaters in vast rural areas is discharged directly into water bodies. Constructed wetlands (CWs) are recognized as a promising technique for wastewater treatment with low energy consumption and easy management. There are two basic types of constructed wetlands, surface flow and subsurface flow. Constructed wetlands are engineered and managed wetland systems that are increasingly receiving worldwide attention for wastewater treatment and reclamation. Compared to conventional treatment plants, constructed wetlands are cost-effective and easily operated and maintained, and they have a strong potential for application in a small Community. Constructed wetlands are one of the most promising treatment options for municipal wastewater with respect to the decentralized settlements, especially in rural and suburban areas, because they are low in cost and maintenance requirements with a good performance. They need more land compared to technical intensive treatment but less space than pond systems. Constructed wetlands treat the sewage water using highly effective and ecologically sound, design principles that use plants, microbes, sunlight and gravity to transform wastewater into gardens and reusable water. The water treatment mechanisms are biological, chemical and physical, these include physical filtration and sedimentation, biological uptake, transformation of nutrients by bacteria that are anaerobic (bacteria that flourish in the absence of oxygen) and aerobic (oxygen-needing bacteria), plant roots and metabolism, as well as chemical processes (precipitation, absorption and decomposition) that purify and treat the wastewater.

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**Studies of Cobalt(II) and Copper(II) complexed with tellurium containing
12-membered tetraazamacrocyclic ligands**

Nitu Sehwat

Bharati Vidyapeeth's College of Engineering

Paschim Vihar, New Delhi

Abstract

A Variety of 12-membered tellurium containing tetraazamacrocyclic complexes, $[ML^1Cl_2]$, $[ML^2Cl_2]$ and $[ML^3Cl_2]$, where $[M = Mn(II), Co(II), Cu(II); L^1, L^2$ and $L^3 = 10$ -membered tellurium containing tetraazamacrocyclic ligands] have been designed via the template condensation of 1,3-diaminopropane and diaryltellurium dichlorides, R_2TeCl_2 , ($R = p$ -hydroxyphenyl, 3-methyl-4-hydroxyphenyl, p -methoxyphenyl) in the presence of metal chlorides. These complexes have been studied by elemental analysis, conductivity, magnetic susceptibility measurements, infrared, electronic absorption and proton magnetic resonance spectra. An octahedral geometry has been assigned to all the metal complexes.

Key words : Te containing tetraazamacrocycles, Diaryltellurium dichlorides, 1,3- diaminopropane, Template condensation, Transition Metal complexes.

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**International environmental law: an effective tool to proscribe global
climate change**

Himanshu Jangra

Faculty of Law, M.D. University, Rohtak

“The environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn”, This statement, made by the International Court of Justice (ICJ) in the Nuclear Weapons Advisory Opinions and With the

emergence of the concept of world community, environmental issues are now regarded as a matter of concern not for a particular nation but for the whole planet. This led to ascertainment of global standards that governments establish to manage natural resources and environmental quality through international treaties, conventions and all such standards are broadly recognized as international environmental law and developed as a separate area of public international law in the 1970s with the Stockholm Conference on the Environment in 1972. Since then interest has steadily increased and it has emerged as an effective method to deal with environment issues on global scale. Nairobi Declaration 1982, Vienna Convention for the Protection of the Ozone Layer 1985, UNFCCC 1992, and Paris Agreement are major accords in this behalf. Even our constitution has witnessed the insertion of article 48A and 52A clause (g) as result. The average reduction in consumption of ozone depleting substances in period of 2002- 2013 witnessed a considerable change i.e., 24.44 % globally. Forest cover around the globe has also exhibited an increase by 2.82 %. This is the proof of feasibility of all above mentioned global accords created by the nations in order to protect, conserve, and develop an environment in which all living creatures can sustain. There is a common law principle i.e., “ignorantia facit excusat and ignorantia juris non excusat” which means ignorance of fact is excusable but ignorance of law is not. Hence the development of International Environmental Law in regard of sanctions will surely serve the purpose.

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Development and evaluation of loop-mediated isothermal amplification (LAMP) assay targeting the *pstS1* and *mpt-64* gene for rapid diagnosis of osteoarticular tuberculosis

Anish Khan¹, Raj Singh² and Promod Mehta^{1*}

¹Centre for Biotechnology, Maharshi Dayanand University, Rohtak-124001(Haryana), India

²Department of Orthopedics, Post-Graduate Institute of Medical Sciences, Rohtak-124001

*Corresponding Author, [email- pkmehta3@hotmail.com](mailto:email-pkmehta3@hotmail.com)

Abstract

Loop-mediated isothermal amplification (LAMP) is an ultra-sensitive molecular method which detects the nucleic acid molecules such as DNA and RNA in the infectious disease, like tuberculosis (TB). Recently, we developed LAMP assay based on multiple gene targets *i.e.* *PstS1* and *Mpt-64* of *Mycobacterium tuberculosis* in clinical samples of osteoarticular TB

patients. The detection of limit (LOD) of LAMP assay was 1ng/mL from purified DNA of *Mycobacterium tuberculosis* strain (H37Rv) and compared with polymerase chain reaction (PCR) or multiplex-PCR of *PstS1* and *Mpt-64* gene targets. We will also check the sensitivity in clinical fluids such as synovial fluids and biopsies in the samples of osteoarticular TB patients with these gene targets. Currently, we are focusing our research to detect these gene targets in clinical samples of osteoarticular TB patients by LAMP assay for an early diagnosis of TB disease.

Keywords: LAMP, *Mycobacterium tuberculosis*, Osteoarticular Tuberculosis.

GCCCS-2019: 53

Genetic engineered *Camelina sativa* for improved heavy metal tolerance against environmental pollutants

Sapna bhoria , Dr.P.K.Jaiwal

Centre for biotechnology, M.D.U.Rohtak

Email. bhoriasapna@gmail.com

Abstract

Increasing industrialization, human activities and improper ways of waste disposal are becoming the main reasons of soil and water bodies' contamination. Soil contamination with heavy metals like cadmium (Cd), mercury (Hg), copper (Cu) now has become a matter of concern. In few cases, heavy metals leach into the water bodies and then their spread is not limited to a confined area. To eradicate the contamination and remediate the soil and water bodies from toxic contaminants researchers have targeted plants for this work. Plants are safe, inexpensive and have easy monitoring system. Many plants have the ability to grow in highly contaminated sites and absorb, accumulate and transform the contaminant into less toxic forms. *Camelina sativa* (false flax ,gold-of-pleasure,German sesame) widely popular oil crop, is a small duration crop(85 to100 days) with low agronomic inputs like nitrogen ,herbicides and pesticides, high yielding, fast growing and has the ability to phytoremediate. Camelina has a family of eight genes in their genome collectively called *CsHMAs* work for storage and transfer of heavy metals .Out of these eight genes *Cs HMAs* 1to 4 genes act as effective candidate work for transfer and storage of Cd, Pb, Zn and Co specifically. The ability of this plant to accumulate contaminants present in the surrounding can be improved

with cloning and expression of foreign genes. . Nowadays camelina with HM accumulator genes is very much in demand.

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Development of edible vaccine against rotavirus infection in plants

Pooja Malik,* Dr. Darshna Chaudhary

*Centre for biotechnology, Maharshi Dayanand University, Rohtak- 124001, Haryana, India.

E –mail ID: poojamalikbt12@gmail.com

Acute gastroenteritis and dehydrating diarrhea is caused by group A rotavirus in animals and children. It leads to large economic loss due to decreased growth rates and increased mortality and costs of treatment. Children get encountered with rotavirus during first three years of their life. And around 60,000 lose their lives due to this infection around the globe. Among all structural proteins VP6 is most important as it constitutes around 51 % of virus mass. Calves get infection in first few days of life and it is difficult to actively immunize the animals during initial days of life. Hence to develop vaccines against rotavirus, various strategies have been utilised involving different plant species and different methods (nuclear and plastid transformation). Codon optimised VP6 gene was inserted into alfalfa genome using agrobacterium mediated transformation(expression levels were 0.06% - 0.28% of the TSP). Beet black scorch virus was engineered by replacing coat protein by VP6 gene and used to transform *Chenopodium amaranticolor*. Rotavirus VP8 protein has been expressed in tobacco chloroplasts. Rotavirus capsid protein VP2 and VP6 has been expressed in transgenic tomato plants with viral protein content ~1 %. Anti VP6 antibodies cross reacts maximally among all group A rotaviruses. Edible vaccines based on VP6 can provide heterotypic protection against rotaviruses. Berseem is important nitrogen fixing leguminous crop. It produces nutritious and palatable green fodder for bovines and its high protein content makes it a good bioreactor for the production of recombinant proteins. The present study is aimed to express rotavirus antigen in berseem (*Trifolium alexandrinum*) for successful plant based vaccine development for protection against the rotavirus infection in calves.

GCCCS-2019: 55

Statistics in nutritional sciences

Baishali Mishra* and Alisha

Department of Mathematics and Statistics, CCS Haryana Agricultural University, Hisar,

Email- Vaishalimishra545@gmail.com

Over the past 3 decades, there have been revolutionary developments in life science technologies characterized by better output, high efficiency and rapid computation. Nutritionists now have the advanced methodologies for the analysis of DNA, RNA, protein and low-molecular-weight metabolites, as well as access to bioinformatics databases. Statistics, which can be defined as the process of making scientific inferences from data that contain variability has historically played an important role in advancing nutritional sciences. Presently, in the era of system biology, statistics has become an increasingly important tool for quantitatively analyzing the information about biological macromolecules. We describe here the general terms used in statistical analysis of large and complex experimental data. These terms include experimental design, power analysis, sample size calculation and experimental errors (Type I and II errors) for nutritional studies at cellular, tissue, population and molecular levels. In addition, we highlighted various sources of experimental variations in studies. Moreover, we provided guidelines for nutritionists and other biomedical scientists to plan and conduct studies and to analyze the complex data. This work implies an important contribution of statistical techniques in solving major nutrition-related problems in humans and animals.

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Photocatalytic dye degradation under visible light irradiation

Tamanna Malik^{A,B}, Sandeep Kumar^A and Ashok K. Ganguli^A

^ADepartment of Chemistry, Indian Institute of Technology, Hauz Khas, New Delhi, 110016

^BDepartment of Chemistry, CCSHAU, Hisar, 125004

^{A,B}maliktamanna1996@gmail.com

The wastewater from textiles, paint, printing, cosmetics and other industries has become one of the most vital environmental problems recently because wastewater containing various

kinds of organic dyes exerts adverse effects on people's lives and upon the ecosystem. In the textiles dyeing processes a wide variety of synthetic dyes such as azo, polymeric, anthraquinone, triphenyl-methane, and heterocyclic dyes are used. In most of the textile dyeing process, almost 15% of synthetic dyes are unutilized, which are released into the waste water stream. Owing to the stability of synthetic dyes and the high salinity of wastewater containing dyes, this type of wastewater is more difficult to treat. Conventional methods used in wastewater treatment, such as adsorption, combined coagulation and flocculation, biodegradation and activated sludge, cannot fully meet the requirements of this type wastewater. As a consequence, to prevent environmental contamination, it is imperative to develop environmental friendly technologies for the degradation of synthetic organic dyes which are resistant to conventional methods and not easily removed in water treatment plants. Recently, semiconductor photo catalysis has proved to be efficient in the advanced oxide process, which refers to chemical treatment to remove pollutants from wastewater through oxidation, and photocatalysis has emerged as one of the most promising technologies. Moreover, a wide range of organic dyes can be oxidized quickly and non-selectively.

Following the studies described here, we aimed at synthesizing $\text{NaNbO}_3/\text{MoS}_2$ and $\text{NaNbO}_3/\text{BiVO}_4$ core/shell heterostructures via two steps hydrothermal synthesis (firstly synthesis of NaNbO_3 using different surfactants and then integrating MoS_2 and BiVO_4 onto NaNbO_3 nanoparticles). Nanotechnology requires the synthesis of desired shape and size of the nanomaterials for their appropriate applications. Under visible light irradiation, the photodegradation was evaluated by the degradation of Rhodamine B (RhB), and the photocatalytic hydrogen evolution over the $\text{NaNbO}_3/\text{MoS}_2$ and $\text{NaNbO}_3/\text{BiVO}_4$ core/shell heterostructures was investigated in methanol aqueous solution. Reckoned by the degradation of Rhodamine B these core/shell heterostructures offer enhanced photocatalytic activity compared to the corresponding bare components under visible light irradiation.

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Phytoremediation of heavy metal in soil and water

Anil kumar, Hanuman, Shruti, Jyoti, Anita, Gayatri & S.S. Yadav*

Department of Botany, Maharshi Dayanand University, Rohtak (Haryana)

*Corresponding author:- ssyadavindia@gmail.com

Abstract

Phytoremediation is the technology that uses plants to clean contaminated sites from soil and water. It is achieved through degrading or immobilizing contaminants from soil and water. This is the alternative strategy against conventional method of remediation of contaminated waste sites. Phytoremediation is used for scavenging heavy metal that is lead (Pb), mercury (Hg), cadmium (Cd), Zinc (Zn), Cobalt (Co), Arsenic (Ar) from water and soil. Heavy metal are most important pollutant in developing countries like India and China due to anthropogenic activities which include, large scale mining industries and small scale industries like battery industry, electrical and cable industry. Heavy metal cause serious problem to human and other animal as well as plant. Some plants are known as accumulators which are useful in remediation of heavy metals through accumulating 100 times more metal than any other normal plant such plant species are known as Hyperaccumulators. Various environmental Protection Agencies are encouraging the development of this technology to improve the human health and also for clearing the contaminated sites and their by cleaning environment. An attempt is being made through this overview to present effects of heavy metals on plants, various methods of remediation, types and their advantages over conventional methods of remediation.

Keywords:- Phytoremediation, Heavy metals, pollution, Hyperaccumulator.

GCCCS-2019: 58

Probiotic bacteriocin as alternative to clinical antibiotics

Manoj Kumar Yadav and Santosh Kumar Tiwari*

Department of Genetics, Maharshi Dayanand University, Rohtak Haryana-124001

*Corresponding author e-mail: santoshgenetics@gmail.com

The overuse of antibiotics has prompted pathogens to develop resistance with several side effects on human health (Allen et al. 2014). Therefore, development of new safe antimicrobials is essential for food safety and therapeutic applications. Bacteriocins are ribosomally-synthesized antimicrobial peptides which kill/inhibit the growth of other bacteria

(Cotter et al., 2012). In the present study, plantaricin LD1 was purified from a food isolate, *Lactobacillus plantarum* LD1 using tangential flow filtration (TFF). The MIC of plantaricin LD1 was found 34.57 µg/ml against *Micrococcus luteus* and 69.15 µg/ml against *Escherichia coli*. Plantaricin LD1 was able to interact with phospholipid vesicles suggesting membrane-acting nature of the bacteriocin. The untreated cells of *M. luteus* and *E. coli* showed cocci and rod shape respectively with clear cell boundary whereas cells treated with plantaricin LD1 showed ruptured cell boundary and leakage of cellular contents under scanning electron microscopy. The antimicrobial activity against different pathogenic strains such as *Salmonella typhi*, *Staphylococcus aureus*, *Shigella flexi*, *Pseudomonas aeruginosa*, *Vibrio sp.* and *Escherichia coli* was found in the range of 9-20 mm. The above properties suggest bacteriocin, plantaricin LD1 may be used as an alternative to clinical antibiotics.

Keywords: Lactic acid bacteria, plantaricin LD1, agar well diffusion assay, minimum inhibitory concentration.

GCCCS-2019: 59

Ramping up of green and renewable solar energy systems: a review

Rashmi Agrawal, Dr. Sunil Kumar*

Department of Environmental Sciences

Maharshi Dayanand University, Rohtak, Haryana-124001

Email: sunilevs@yahoo.com

Abstract

According to an ongoing temperature analysis conducted by scientists of NASA's Godard Institute of Space Studies (GISS), the temperature of Earth has been raised by 1.4 Fahrenheit or 0.8°C since 1880 due to excessive release of Green House Gases (GHGs) in the atmosphere and it will rise by 2 Fahrenheit up to next century as per the report of Intergovernmental Panel for climate change (IPCC).

Carbon Di Oxide Gas (CO₂) among other GHGs has highest heat trapping capacity and is the major cause of rising temperature of the planet. Nearly 28.5% of CO₂ is released by Electricity production mainly due to burning of coal in coal based thermal power plants.

To cut the excessive CO₂ emission in atmosphere; the alternative, Green and renewable source of energy which is ramping up and getting most popularity is Solar Energy. Solar Electrical and Solar thermal Energy Systems are two forms of Systems based on Solar energy. These systems work by trapping Solar energy and converting it to electrical and thermal energy respectively.

The review is compiling the data showing increasing installation of solar energy systems, reduced CO₂ emissions, self sufficiency of solar energy based systems and efforts to chase the 7th Sustainable Development Goal which is “affordable and clean Energy” by solar energy applications.

Key terms:

Solar Energy, Green and renewable sources of energy, Green House Gases (GHGs), Solar Electrical Energy Systems, Solar thermal Energy Systems Sustainable Development Goals.

GCCCS-2019: 60

Renewable energy: a panacea to mitigate pollution

Abhishek, Amrender Rao, Neetu and Surender S. Yadav*

Department of Botany, Maharshi Dayanand University, Rohtak (Haryana) India

*Corresponding author: ssyadavindia@gmail.com

Abstract

In today's era the energy requirement of the globe including India is increasing at a frightening rate and the demand of power is ahead of the supply. The generation of power through conventional sources affects our environment and also creates problems like global warming, pollution, desertification, ecological imbalance, climate change etc., for all of us which are likely to be more acute in the upcoming future. All these problems have forced us to find out and develop new and alternative techniques for power generation. Our conventional sources are depleting at an alarming rate and emission of pollutants from the use of conventional sources indicate that we have to find out new non-conventional sources for fulfillment of demand and start to use the conventional sources in a sustainable manner. The other non-conventional sources of power generation may be such as solar cells, thermo-

electric generator, thermionic converter, solar power generation, wind power generation, geothermal energy generation, tidal power generation etc. all of these are renewable sources (RE) which are not green by color but are clean. It is therefore, the need of the hour is to adopt Green Energy Clean Energy.

Keywords:Green, Clean Energy, Conventional sources and Renewable sources.

GCCCS-2019: 61

Effect of acid rain on soil biological and chemical environment: A review

Divya Gaur^{1*} and Ganpat Louhar²

^{1*}Department of Soil Science, CCSHAU, Hisar, 125004, Haryana

²Division of Soil Science and Agricultural Chemistry, IARI, New Delhi, 110012

Corresponding author - divyagaur777@gmail.com

Abstract

Acid rain is also known as acid deposition is a broad term used for all form of acid precipitation (rain, snow, hail, fog, etc.). Acid rain results when dioxides of sulphur (SO₂) and nitrogen (NO_x) are emitted into the atmosphere and transported by wind and air currents.

The SO₂ and NO_x react with water, oxygen and other chemicals to form sulfuric and nitric acids. It mixes with water and other materials before falling to the ground and cause acid precipitation. Acidification of soil causes loss of basic cations as calcium, magnesium, sodium and potassium. Lowering in pH lowers down the cation exchange capacity of the soil because the charge on weak acid exchange sites are pH dependent and acid dissociates at low pH. Degradation of primary and secondary minerals may result following large input of acid through the rain. One of the severe effect of acid rain is in podsolization process that is dominant in cold and humid regions resulting in extreme leaching conditions and loss of available nutrients. Increasing acidity can cause reduction in atmospheric nitrogen fixation by soil flora by affecting the pH for nodulation. Microorganisms present in soil are extremely sensitive to pH for their functioning in soil. They also affect the conversion of organic nitrogen to inorganic nitrogen affects rate of decomposition and availability of nutrients. Denitrification also an important process in waterlogged soils is also affected by low pH as addition of acid from atmosphere.

Keywords: Available nutrient, buffering capacity, cation exchange capacity, nitrogen fixation

GCCCS-2019: 62

Removal of brilliant green dye from waste water using gram shell as an adsorbent

Sonia Rani and Sudesh Choudhar

Email- soniaantil10@gmail.com

Centre of Excellence of Energy Studies and Environment Management, DCRUST, Murthal

In the present work, the adsorptive potential of gram shell for the removal of brilliant green dye was investigated. The adsorption was studied as a function of contact time, initial dye concentration and pH using batch study. The adsorption capacity of gram shell was found to be 90% for brilliant green dye. The data was well described by Langmuir and Freundlich models. This result reveals that gram shell can be an effective adsorbent for the removal of dyes from waste water.

Keywords: Adsorption, Brilliant green, Gram shell, Langmuir model, Freundlich model

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Stubble burning- a pernicious practice

Nitin Chauhan

Department of Environmental Science, SGT University, Gurugram.

Corresponding Author: nitinkashipur@gmail.com

Abstract

Stubble burning is simply the act of burning crop residue left behind on field after the harvesting of existing crop to prepare the field for the next crop. The available combine harvesters leave approximately a foot long stubbles in the field that are turned to fumes by the farmers. This practice has become widespread tragedy to the air of northern India especially in winter months. The available resources and policies do not compensate farmers for the management of this problem, then too, they are the one to be blamed for deteriorating air

quality and worsening of respiratory diseases and reduction in visibility. According to the farmers, for whom, deteriorating environment is not above their economic loss, find it easy to use a single matchstick rather than employing costly management strategies. To add to miseries is the Punjab Preservation of Subsoil Water Act, 2009, which prohibits paddy transplantation before a notified date in June. This reduces the gap interval between paddy and wheat to 15-20 days which makes it impossible to manage the residue. There is strong need to work on the solutions of this practice. “The first step to curb crop burning is to find uses for the stubble,” said Anumita Roy Chawdhary of Centre for Science and Environment to Down to Earth. But only 20% of straw is managed through biomass power plants, paper and cardboard mills, rest over 15 million tonnes is burnt in open fields. Other possible solutions can be:

1. Use of technological innovations like Happy Seeder.
2. Making compost, biochar, balers for heat production out of stubbles.
3. Use of stubbles in various industries and to build energy.
4. Crop diversification.
5. Role of co-operative societies and NGOs.
6. Government intervention.

Keywords: Crop residue, Stubble burning, Environment, Paddy Straw

GCCCS-2019: 64

Vegetation based climate change mitigation and adaptation strategies

Shruti, Jyoti, Gayatri, Anita, Anil, Hanuman and S.S.Yadav*

Department of Botany, Maharshi Dayanand University, Rohtak (124001)

*Corresponding author: ssyadavindia@gmail.com

Climate change a, global phenomenon has attracted scientists to contribute in anticipatory research to mitigate adverse impacts which are more important for horticulture, considering that the scenario is in the midst of revolution reaching the production level of 250 M tonnes in India. In India increase in mean annual maximum temperature was 0.76⁰C and mean minimum temperature was 0.22⁰C increase in annual mean temperature was 0.49⁰C during this period .The years 2009 and 2010 were recorded as the warmest in the country since 1901. Increase in weather extremes and climatic risks due to global climate change have been

posing immense challenge to agricultural and horticultural crops. Impact of climate change, the number of disease epidemics has dramatically increased in recent years and also the threat of emerging new diseases has increased. For adaptation strategies the emphasis should be on development of production systems especially vegetation plantation and conservation, improved water use efficiency to adapt to the hot and dry conditions. Changing sowing or planting period, modifying fertilizers, climate proofing through genomics and biotechnology for development of climate resilient horticulture offers vital adaptation strategy for nutritional security and sustainable farm income. Reforestation, afforestation along with promotion of sustainable development could play a key role in climate change stabilization.

Keywords: Climate change, Horticulture and vegetation.

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Wasteland reclamation

Gayatri, Jyoti, Shruti, Anita, Anil, Hanuman & S.S.Yadav*

Department of botany, Maharshi Dayanand University, Rohtak(124001)

Corresponding author: ssyadavindia@gmail.com

Abstract

According to National Wasteland Development Board (NWDB) “Wasteland is degraded land which can be brought under vegetation cover with reasonable effort and which is currently underutilised and land which is deteriorating for lack of appropriate water and soil management or on account of natural causes”. Reclamation of wasteland means reclaiming it or to use it for productive purpose. It is process of turning barren, sterile wasteland into something that is fertile and suitable for habitation and cultivation. India’s total land area is around 329 million hectares. Of this, the government classifies 90 million hectares are ‘wasteland’. The largest area under wasteland in india is Rajasthan with 84,929sq km. Main cause of land degradation are overcultivation, overgrazing, overexploitation and desertification. Need for Wasteland Reclamation is ,it ensure a constant supply of fuel, fodder and timber for local use.It makes the soil fertile by preventing soil erosion and conserving moisture.It helps in maintaining ecological balance and local climatic condition. There are various method of wasteland reclamation like Afforestation, Reforestation, Mulching and Changing ground topography on downhills such as strip farming, terracing. Jatropha is a example and has great ability to withstand

hot weather with water scarcity. It has scope for cultivation on wasteland even in hot desert and in high soil salinity. Thus rehabilitation of wasteland through the sustainable serves a management better cover to soil and aids regeneration of forests.

Keywords: Wasteland reclamation, Rehabilitation.

GCCCS-2019: 66

Water pollution: Sources, effects, control and management

Dr. Sunita Arya*, Associate Professor, C.R. College of Education, Rohtak

*sunitaarya95@gmail.com

Abstract

Industrialization, discharge of domestic waste, radioactive waste, population growth, excessive use of pesticides, fertilizers and leakage from water tanks are major sources of water pollution. These wastes have negative effects on human health. Different chemicals have different affects depending on their locations and kinds. Bacterial, viral and parasitic diseases like typhoid, cholera, encephalitis, poliomyelitis, hepatitis, skin infection and gastrointestinal are spreading through polluted water. It is recommended to examine the water quality on regular basis to avoid its destructive effects on human health. Domestic and agriculture waste should not be disposed of without treating. This paper tries to discuss basically what water pollution is and equally to address the source, effect control and water pollution management as a whole. Some recommendations such as introduction of environmental education were mentioned.

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Effect of salinity stress on physiological and biochemical aspects of Wheat genotypes

Bhavini Chopra* Dr. Asha Sharma*

*Deptt. Of Botany, M.D. University, Rohtak.

Abstract

Wheat (*Triticumaestivum*) is widely grown in world as a staple food. In India, it is grown as food grain next to rice. India is the fourth largest producer of wheat in the world. Wheat contributes 34.2% of total production of food grains.

Soil salinity is major environmental stress affecting both agriculture and water resources restricting food production. In India soil salinity problem mainly occurs in arid, semiarid and canal command regions. The deleterious effects of salt stress on agricultural yield are significant, mainly because crops exhibit slower growth rates (less shoot and root length), reduced tillering and, over months, reproductive development is affected. Salinity imposes ion toxicity and nutrient imbalance deficiency, osmotic stress and thus limits water uptake from soil. Salt stress also causes inhibition of development and growth, reduction in photosynthesis, chlorophyll content and carotenoid amount. The toxic effects of salinity are observed in all wheat genotypes.

KEY WORDS: Salinity stress, shoot and root length, chlorophyll content.

GCCCS-2019: 68

E-waste: an emerging challenge in India

Vinay Malik*

Department of Zoology, MDU

*vinaymalik71@gmail.com

Abstract

Electronic waste popularly known as "e-waste" is a growing problem of developing countries. E-waste consists of useless, unwanted and outdated electronic appliances or their remains. Some parts of this electronic waste can be recycled to get maximum possible benefits thereby reduction in wastes and utilizing that recyclable waste for further manufacturing. Fast growing electrical sector, advancement in technology and modernization demands manufacturing of constant new advanced electrical products. Discarded electronic equipments or their parts is one of the major growing concern in the developing countries, increased sales and short life of these modern gadgets make situation more critical. E-waste consists of broad and range of electronic devices like TV, PCs, mobiles, AC and many more life style products, which contains toxic materials and metals that poses both occupational and environmental health risks along with pollution threat to the environment. Developed countries as a common practice dumps their out dated computers as e-waste in the developing

countries like India at a large level; where this practice poses a major problem. This paper highlights computer e-waste management offering some plausible solutions.

Key words: E-waste, problem, solution, India.

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Production of laccase isoenzymes from *Ganoderma lucidum* using agricultural waste and their application in Dye decolorization

AkshayShankar, Amit Kumar, Khuswant and Krishna Kant Sharma*

Laboratory of Enzymology and Recombinant DNA Technology, Department of Microbiology, Maharshi Dayanand University, Rohtak, Haryana -124001, *Email:

kekulsharma@gmail.com

Laccases (benzenediol:oxygen oxidoreductase, EC 1.10.3.2) are a group of blue multi-copper oxidases which is capable for degradation of phenolic compounds, including lignin units, with concomitant reduction of oxygen to water. *Ganoderma lucidum* MDU-7, a polypore group of macro fungi belongs to white rot fungi which produce different laccase isozymes in the presence of various agricultural wastes. The laccase activity and total protein were found to be optimum when sorghum (3581 U/ml, 0.086 mg/ml) and rice husks (3095 U/ml, 0.065 mg/ml) were used as solid substrate. The zymogram study revealed four extracellular isozymes secreted from *G. lucidum* MDU-7 in the presence of saw dust and rice bran as a substrate. Laccase isozymes (500 U) degrade malachite green (43 %) after 20 h. The spectroscopic measurement showed breakdown of chemical structure of malachite green at 618 nm.

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Water fluoridation: a review on the health effects

Bhajan Lal Mehra* and Sunil Kumar

Department of Environmental Sciences, M. D. University, Rohtak-124001(Haryana)

*bhajan.mehra82@gmail.com

Drinking water is the largest contributor of fluoride in daily intake. Fluoride is a chemical element that is found most frequently in groundwater and has become one of the most important toxicological environmental hazards globally. Fluoride when ingested in small quantities ($<0.5\text{mg/L}$) is beneficial in promoting dental health by reducing dental caries, whereas higher concentrations ($>1.5\text{ mg/L}$) may cause fluorosis. Fluoride toxicity can also cause non-skeletal diseases like aches and pain in the joints, non-ulcer dyspepsia, Polyurea (tendency to urinate more frequently) and polydipsia (excessive thirst), muscle weakness, fatigue, anaemia with very low haemoglobin levels, etc besides other reasons. This paper presents a review, which focuses on the sources of fluoride in drinking water, its impacts on health and different control measures.

Keywords: Fluorosis, groundwater, Fluoride

GCCCS-2019: 71

Role of greenhouse gases on climate change

Manju Bala*

University Institute of Engineering and Technology, M.D. University, Rohtak , Haryana

E-mail address: manjuhooda@gmail.com

Abstract

Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time (i.e., decades to millions of years). The Earth's climate has changed throughout history. The planet's temperature has risen about $0.9\text{ }^{\circ}\text{C}$ since the last 19th century, a change largely driven by increased carbon dioxide and other human-made emissions into the atmosphere. The oceans have absorbed much of this increased heat, with the top 700 meters of ocean showing warming of more than $0.4\text{ }^{\circ}\text{C}$. Satellite observations reveals that the snow cover in the Northern hemisphere has decreased over the past five decades and that the snow is melting earlier. Global sea level rose about 8 inches in the last century. The number of record high temperature events and intense rainfall are increasing while the number of record low temperature events has been decreasing. Since the beginning of industrial revolution the acidity of surface ocean waters has increased about 30 percent.

The main cause of current global warming is human expansion of the greenhouse effect. Gases like carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), water vapors and chlorofluorocarbons (CFC's) contribute the greenhouse effect. Observations throughout the world make it clear that climate change is occurring and rigorous. Scientific research demonstrates that greenhouse gases emitted by human activities are the primary driver.

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Bioremediation of pulp and paper industry effluents

Savita Sihag, Sheetal

dahiyasheetal610@gmail.com; Guru Jambheshwar University of Science & Technology,
Hisar (Postal address: 11B/58, Old Campus, CCS HAU, Hisar)

Abstract

Pulp and paper mill are characterized as highly polluting industries and are classified under “RED” category by Ministry of Environment and Forest, as largest contributor to industrial water pollution. It generates variety of pollutants depending upon the scale of operation, raw materials used and the process employed. Untreated effluents from pulp and paper mill industry have high biochemical oxygen demand (BOD), chemical oxygen demand (COD), adsorbable organic halides (AOX), Volatile organic carbon (VOCs), Organic and inorganic chlorine compounds, resins, fatty acids, dark brown colour, etc. This untreated effluents when discharged into water bodies, damages the water quality. The undiluted effluents are toxic to aquatic organisms and exhibit a strong mutagenic effects. Several physical, chemical and biological method are used for the removal of color from the pulp and paper industry .Physical and chemical processes remove high molecular weight chlorinated lignin, color, toxicants, suspended solids and chemical oxygen demand but are quite expensive but BOD and low molecular weight compounds are not removed efficiently. Biological treatment is known to be effective in reducing the organic load and toxicants. Biological treatment methods involve the utilization of microorganisms including fungi, bacteria, algae and enzymes, as a single step treatment or in combination with other physical and/or chemical methods. The biological treatment has been identified as cost effective and eco-friendly methods for the degradation of xenobiotic compounds and polymeric lignin derived chromophoric materials from the paper mill wastewater with the help of microorganisms.

Various studies have been performed so far to investigate the complex nature of wastewater by the application of bacteria, fungi and their enzymes at industrial scale.

Keywords: Paper mill effluent, treatment, bacteria, fungi, enzymes.

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A review on polymer nanocomposites as technological tool in material science

Rimmy and Dr. Rachna Bhatelia*
Department of Environmental Sciences, MDU, Rohtak-124001
bioremediationlab.mdu@gmail.com*

Abstract

The term “nanotechnology” can be defined as the controlled manipulation of materials with at least one dimension less than 100 nm. This technology attempts to integrate chemistry, physics, materials science, and biology to create new material properties that can be exploited to develop facile processes for the production of electronic devices, biomedical products, high performance materials and consumer articles. The commercialization of nanotechnology is expected to boost wide technological development, improve quality of life and societal benefits around the world. A key idea of synthesizing nanocomposites comprising of biopolymers that in specific contexts can replace conventional materials such as synthetic polymers. It is well known that the properties of nanocomposite materials depend not only on the properties of their individual components but also on morphological and interfacial characteristics arising from the combination of distinct materials. Therefore, the use of polymers such as cellulose, starch, alginate, dextran, carrageenan, and chitosan among others, gain great relevance not only due to their renewable nature and biodegradability, but also because a variety of formulations can be exploited depending on the envisaged functionality. This abstract highlights the applications of nanocomposites with polymer technology to improve the material properties.

Keywords: Nanotechnology, nanocomposites, technology, materials, polymers

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Economic prediction and consequence of climate change

Mousumi Priyadarshini¹, Sourav Ranjan Pradhan²

¹Department of Agricultural Economics, CCS, Haryana Agriculture University (CCSHAU), Hissar

²Department of Agricultural Economics, Banaras Hindu University (BHU), Varanasi

¹Corresponding author – msousumipriyadarshini96@gmail.com

Abstract

The earth's response to increased carbon dioxide and other green house gases is called climate change, which has raised the earth's average temperature to at least 1.2 degree Celsius since 19th century. 95 per cent of green house gases are emitted by the developed countries. Due to global warming the oceans are absorbing carbon dioxide from the atmosphere and they have become 30 per cent more acidic since the beginning of industrial revolution. In may 2018 the Stanford university scientists have calculated that if temperature rose to 2.5 per cent then global gross domestic product would fall to 15 per cent and if the temperature increases to 3 degree Celsius the global gross domestic product will fall by 25 per cent. If nothing is done by 2100 the temperature would increase by 4 degree Celsius and the global gross domestic product would fall by 30 percent which is worse than great depression where the global gross domestic product fell by 25 per cent. According to world economic and social outlook 2018 climate change has threaten 1.2 billion jobs. The natural disasters have already cost 23 million working life since 2000, whereas effort an effort to stop global warming can create 24 million jobs by 2030. The industries most at risk are agriculture, fisheries, forestry. As these industries are a major source of food for human society there is a probability of decrease in production and increase in price of these sectors.

Key words- green house gases, climate change, industrial revolution, gross domestic product, great depression

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A study of wastewater treatment units operating at different pressures

Rajeev Kumar Kapoor* and Sanjay Kumar

Department of Microbiology, Maharshi Dayanand University, Rohtak

E-mail ID: patent.agent.biotech@gmail.com

Abstract

This paper demonstrated that a laboratory scale reactor is capable of removing 92.5% of the applied BOD loading, and can operate efficiently at a loading excess of 20 g BOD /m²d. The ability to remove BOD increases appreciably with pressure between 5 psi and 10 psi and to a lesser extent between 10 psi and 10 psi. The optimum concentration of sludge into the liquid in the reaction vessel is 26%. At 26% sludge, and air flow of 10vvm and a liquid retention period of 80 min, units operating in ambient temperatures of 10°C, 20°C and 30°C all produce effluents well within permissible standard. More than 60% of the BOD was removed in the first 40 min. Recirculation of the effluent (1:1) failed to produce any appreciable improvement in the condition of the effluent. The MLSS concentration in the reactor vessel was found to be about 23,000 mg/l and it has been suggested that under ideal conditions this particular reactor is as efficient as the activated sludge process.

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Organic micro pollutants removal in Drinking Water by Ion exchange

Seema Bhayana

University Institute of Engineering & Technology

Maharshi Dayanand University, Rohtak.

E mail : seemabhayana15@gmail.com

Abstract

Human evolution has led to scientific and technological progress in life. Various Developmental activities like industrialization, mining, disposal of waste, use of chemical fertilizers etc. release pollutants in the environment. The presence of organic micro pollutants (OMPs), in drinking water is of great environmental and public health concern. To achieve unpolluted drinking water several technologies and processes for organics removal are used. Ion exchange is a water treatment technology that can be used to remove various contaminants in drinking water and has shown increased adoption in recent years due to its operational advantages. This overview provides an outlook of the major available technologies for organics removal in water with emphasis on utilization of safe and economical integrated approach. The application of this may offer enormous environmental and cost benefits for public health.

Key Words:Organic micro pollutants, Ion Exchange

Decolourization of commercial dyes using purified low redox bacterial laccases

Shruti Ahlawat¹, Deepti Singh¹, Jugsharan Singh Virdi² and Krishna Kant Sharma^{1*}

¹Laboratory of Enzymology and Recombinant DNA Technology, Department of Microbiology, Maharshi Dayanand University, Rohtak-124001, Haryana, Email: shrutiahlawat5@gmail.com, *kekulsharma@gmail.com

²Microbial pathogenicity laboratory, Department of Microbiology, University of Delhi, South Campus, Benito Juarez Road, New Delhi-110021.

Laccases, the member of multicopper oxidases family, catalyzes the reduction of molecular oxygen to water with the oxidation of various aromatic compounds. The present work was performed to decolourize various commercial dyes using purified bacterial laccases. Laccases from *Bacillus pumilus* DSKK1, *Yersinia enterocolitica* strain 7 and *Y. enterocolitica* strain 8081 were docked with commercial dyes using CCDC GOLD software. The stability of docked complexes was investigated via molecular dynamics (MD) simulations performed using Gromacs version 4.5.5. Maximum Goldscore was obtained for docking of laccase from *B. pumilus* DSKK1, *Y. enterocolitica* strain 7 and *Y. enterocolitica* strain 8081 with rose bengal, rose bengal and xylidine ponceau, respectively. The high electrostatic energy and lower binding free energy of laccase-rose bengal complex suggested their higher stability. The MD simulation results support docking results. Thus, 25 U/ml laccase from *Y. enterocolitica* strain 7 and *B. pumilus* DSKK1 were further used to decolourize 10 µg of commercial dyes. The alteration in dyes structure was studied via Fourier-transform infrared (FTIR)-spectroscopy. Both bacterial laccases decolourize rose bengal, congo red and malachite green efficiently. The laccase treated rose bengal gave peak at 2925 cm⁻¹ indicating C-H stretching and a shift in peak from 982 cm⁻¹ to 989 cm⁻¹ due to N-N stretching. Similarly, laccase treated congo red suggested C-C, C-H and N-N stretching. The analysis of laccase

treated malachite green showed loss of 1384 cm^{-1} peak with a shift in peak from 528 cm^{-1} to 534 cm^{-1} suggesting alkyl group change with C-I stretching.

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Consolidated bioprocessing of microbes for bioethanol production

Meenakshi Suhag^a, Anil Kumar^b and Joginder Singh^c

^aInstitute of Environmental Studies, Kurukshetra University, Kurukshetra-136119, Haryana, India

^bDepartment of Botany, PNRS Govt. College, Rohtak- 124001 (HRY) India

^cLab. of Env. Biotechnology, Department of Botany, A. I. Jat H. M. College, Rohtak-124001, Haryana, India

Email Addresses: meenakshisuhag@gmail.com; anildhaka2k9@gmail.com;
jssdahiya@gmail.com

Abstract

The success of bioethanol production from lignocellulosic biomass is mainly dependent upon the microbes employed in enzymatic saccharification and fermentation. For better efficiency, either the native cellulolytic microorganisms/ strains could be improved by genetic engineering or by exploring new strain suitable for the advanced application. This review addresses various bioprocessing microbes available for efficient lignocellulosic bioethanol production on the basis of relevant research and development technologies. *Saccharomyces cerevisiae* has been widely used in the industrial ethanol production while this species could not withstand the elevated temperatures. Therefore, recent research focuses on the utilization of thermo-tolerant yeast *Kluyveromyces marxianus* and ethanol producing bacteria (EPB) *Zymomonas mobilis* for commercial production of bioethanol. Several engineering efforts have been made not only to express recombinant cellulases genes in the *Saccharomyces pastorianus* but also to induce significantly higher enzyme activity of the species. Consolidated bioprocessing (CBP) is a process in which biomass pretreatment, hydrolysis and fermentation processes are performed in one step with the help of a single microorganism or microbial consortium (native and recombinant strategies). The recombinant technology focuses on directed mutagenesis, genetic and metabolic engineering of cellulolytic microbes. Co-cultures or microbial consortia may also be utilized in which saccharolytic and ethanologenic microorganisms are co-cultured to enhance efficient saccharification and fermentation in one pot.

keywords: bioethanol, saccharification, fermentation, consolidated bioprocessing, microbial consortia

Distribution of algal species in sewage irrigated soil

Lalita Rana*, Rajesh Dhankhar

Deptt. Of Environmental Science, Maharshi Dayanand University, Rohtak 124001, Haryana.

*email:lalita.777@gmail.com

Abstract

Use of low quality water in agriculture may be regarded as an economic augmentation to the existing water supply. Despite health and safety concerns, planned use of low quality water for non-potable purposes can reduce the gap between supply and demand in water stressed regions with minimum of risk. Sewage water is justified by its fertilizer value in terms of nitrogen and phosphorus and as a source of organic matter and micronutrients. Sewage biosolids application produced an immediate increase of the inorganic nitrogen, mainly in ammonium form. Main problems of an excessive application of sewage sludge, are plant toxicity, due to accumulation of heavy metals in soils. In addition, sewage sludge heavy metal content, toxic pollutants and parasitical organisms are the negative characteristics. Algae are highly sensitive to heavy metals and pesticides residues in the soil and their use can provide information on the accumulation of such chemicals and their possible detrimental effects on crop plants. In the present investigation, algal communities of sewage irrigated soils and tubewell irrigated soils was investigated. The sewage irrigated fields and tubewell irrigated fields were sampled located along the sewage drain of Rohtak city, Haryana, India. Soil samples were analyzed using enrichment culture techniques in presence and absence of nitrate of BG-11 medium. A total of 47 algal isolates were recorded from sewage irrigated soils and 83 algal isolates were recorded from tubewell irrigated soils. The analysis revealed a substantial low species diversity in sewage irrigated soil as compared to tubewell irrigated soil due to heavy metal residues and other toxic chemicals in the soil. It is important that sewage irrigated soils are maintained and restored.

Key words: Algae, Sewage irrigated soil, Tube well irrigated soil, Abundance.

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Groundwater analysis of urban and suburban regions in the vicinity of gurugram city

*Ritu Vashishtha, Tarun Gaur, Annu Yadav, Kajal Goyal, Vikram Mor, Manbir Singh

Department of Environmental Science, SGT University, Gurugram – 122505

Corresponding author: rituvashishtha19@gmail.com

Abstract

Water is an essential requisite for sustenance of life. Due to proliferating urbanization in India, the availability and quality of groundwater have been severely affected. Groundwater plays quite a vital role as important source of drinking water and irrigation; making alteration in its quality a major cause of concern. Hence, periodical monitoring of groundwater quality of an area is essential for public health and assessment of geological changes. The objectives of study were to assess the underground water quality of Gurugram region. Water can be contaminated or laden with nitrates, lead, heavy metals and pesticides. In the reported study, ground water quality parameters from urban and sub urban Gurugram city were studied. A total of 50 samples were collected from different locations. The samples were analyzed using standard methodology prescribed by APHA (American Public Health Association), USA. The range values of pH, Electrical conductivity, TDS and total hardness in ground water samples were 6.7-8.1, 270.7-1218.2 $\mu\text{S}/\text{cm}$, 175.8-930.4 mg/l and 146-480 mg/l. The concentration ranges of Cl^- , total alkalinity, HCO_3^- , PO_4^{3-} and NO_3^- in ground water samples were 18.1-88.4 mg/l, 56-268, 12.7-77.8 mg/l, 0.89-1.2 mg/l and 1.39-20.8 mg/l. The range values of F^- , Magnesium, Calcium, Sodium and Potassium were 0.242-0.92 mg/l, 24.1-63.2 mg/l, 18.2-82.6 mg/l, 2.4-42.0 mg/l and 3.5-50.4 mg/l. All the quality parameters were found to under prescribed limits provided by WHO and Indian Standards (IS-10500).

Keywords: Water Quality, Gurugram, APHA, Ground Water Monitoring

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Effect of salinity stress on chickpea (*Cicer arietinum* L.) genotypes

*¹Rita and ¹Sunder Singh Arya
Department of Botany Maharshi Dayanand University, Rohtak

Presenting author- ramdatirita@gmail.com

Abstract

The experiment was carried out on three chickpea genotypes viz. HK1, HK2 and HK4 to study the salinity induced changes in plant growth and development. The salinity were created using different concentration of salts of levels 0, 4.0, 8.0, 12.0 and 16.0 dS/m. The percent seeds germination decrease with gradual increase in salinity in all the genotypes. With the induction of salinity length of plumule and radicle, fresh and dry weight decreased with increase in salinity in all the genotypes. The percentage germination was 81.81%, 66.66% and 81.81% in HK1, HK2 and HK4, respectively at highest level of salinity.. Chickpea variety HK4 was salt tolerant during germination stage. On the performance of above parameters studied, it is concluded that the genotype HK4 performing better than the HK2 and HK1.

Keywords: Chickpea, salinity, plumule, radical

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Enzymatic delignification of rice straw using laccase isozymes overcomes the excessive use of chemicals: Green approaches towards environmental sustainability

Sonu and Krishna Kant Sharma*

Laboratory of Enzymology and Recombinant DNA Technology, Department of Microbiology, Maharshi Dayanand University, Rohtak, Haryana 124001, India. Email:

kekulsharma@gmail.com

Lignocellulosic agricultural biomass is the most abundant biopolymer present on the earth and could serve as a promising raw material for the production of bioenergy and industrially important chemicals. The major challenges in the production of marketable and energy products from agro-residue include pretreatment process, energy investment and capital cost. In this context our studies using laccase isozymes (300 U/g) at 36 °C followed by mild sodium chlorite concentration (0.75 % w/v) showed a prominent removal of phenolics (52 %), which leads to a significant lignin degradation (60 %). This approach gave better lignin degradation profile in comparison to alkali pretreatment alone (4 % w/v) and chemical usage was reduced to about 80-fold. Compositional studies of laccase pretreated biomass showed a significant increase in the available polysaccharides content, which makes them suitable for the production of biofuels and other industrially important products.

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Solid waste management

Vandana Singhal

Postal Address: House No. 309, Sector-19, Faridabad-121002

E-mail ID: vandanasinghal.ca@gmail.com

Abstract For Oral Presentation

Solid waste management is one of challenging issue in all over the world, specially in Low-Middle Income country like India. With rapid urbanization, the situation has become more critical. Municipal corporations are responsible for building and maintaining waste disposal networks. There are many types of Municipal solid waste such as biodegradable organic waste like food waste, vegetable and fruit peels, recyclables waste like paper, cardboard, plastic, metals, glass etc., Composite waste like waste clothing, tetra packs, waste plastic such as toys, toxic waste like paints, pesticides, used batteries etc., medical waste like blood stained cotton, disposable needles and syringes, expired pharmaceutical drugs, etc. and Electrical and electronic waste like lights, bulbs, washing machines, TVs, computers,

screens, mobile phones, alarm clocks, watches, etc. Improper disposal of Municipal solid waste may cause a serious environmental problem. Garbage thrown in the streets or in open spaces creates a public health hazard, while waste dumped near the rivers, lakes etc. contaminates the water. Management of municipal solid waste in India is a difficult task due to inappropriate planning and poor financial condition. Management of solid waste includes collection, segregation, storage, transportation, treatment and disposal of waste as per prescribed regulations. Many initiatives have been taken by the Indian Government for management of solid waste by enactment of various laws, framing of various rules related to it, providing loans to MSW composting plants & Swachh Bharat Abhiyan etc. There are many options available for processing/treatment and disposal of MSW are composting, incineration/combustion, recovery & recycling, plasma gasification, waste to energy, waste minimization, and landfills. Not all technologies are equally good. Each one of them has its advantages and limitations.

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Pioneer ideas for reducing carbon emission other than renewable

Mr. Rajesh Kumar¹, Dr. Aman Ganesh², [Dr. Vipin Kumar](#)^{1*}

¹ University Institute of Engg. & Technology, M D U Rohtak

² LPU, Phagwara, Jalandhar

* Corresponding Author: vipinsaini4434@gmail.com (8222880106)

Abstract : The world has been groomed with technological advancement over centuries. The technology has become an inevitable part of our lives. It is so deeply enrooted in our lives that's its almost not possible for life without them. As human nature commands, most of us think about measures only when extremes are reached. The following has resulted because of the competence of leading industries towards energy, power and technological advancement without any thought for its consequences. Since it's evident now that we have reached the limits scientists and industrialists are raising concerns over pollution. Current scenario has caused a paradigm shift of market and competition towards renewable energy sources. So,

researchers now are primarily focusing on the development of new prototypes, increasing efficiency, in the field of renewable. But considering the exponential growth in productions, we need to implement some step right away by proper designing. This could include different methods for energy conservation because as rightly quoted energy conserved is energy generated. After a thorough audit of the side, consideration of steps for energy conservation must be implemented. These could include energy-efficient buildings, automated tariffs, and management, diminishing the embodied energy by efficient system design, waste management system etc. this could lead to significant reduction of CO₂ and GHG in the environment within the optimized economical way.

GCCCS-2019: 85

Abstract

*Dr. Parveen Rani

Associate Professor, Govt PG College for Women, Rohtak

Abstract

By 'environmental management' we mean keeping control of our activities so that we do what we can to conserve these physical resources and to avoid polluting them. We can apply these controls in our life domestically, in what we buy and what we throw away, but it is usually in our work where the environmental impact of what we do is greatest. Such has been the impact of industrial activity that resources are becoming depleted and environmental damage is increasing. Environmental management helps to investigate and manage the environment within the context of human influences, incorporating an examination of economics, culture, political structure, and social equity, as well as natural processes and systems. This paper discusses in detail the various issues relating to environmental management, including the fundamentals; the concept of environmental impact assessment. Environmental management helps to investigate and manage the environment within the context of human influences, incorporating an examination of economics, culture, political structure, and social equity, as well as natural processes and systems.

Key words: Environment, Management, Environmental Management, Assessment

GCCCS-2019: 86

Role of nature in environmental protection

Suman Kumari

Department of Food Technology
Maharshi Dayanand University, Rohtak, Haryana (India)
(Corresponding author: skumari0211@gmail.com)

Abstract

Petroleum-based packaging materials have become a serious problem for environmental pollution. Thus there is a requirement of degradable packaging materials. Renewable and abundantly available biopolymers are the most viable alternative for producing green materials in the near future. In the family of renewable polymeric materials, polysaccharides has been proved as one of the most promising and useful materials for the future because it is a natural, renewable, nontoxic and fully biodegradable polymer so that its potential use is attractive for a wide variety of industrial sectors in which biodegradation is a key factor such as packaging industry, disposable products for hygienic use. Films based on biodegradable materials have poor mechanical strength and high permeability to water vapours. There is emerging interest and quest for the development of biomaterials based nanoparticles. Particle size has a significant impact on stability, chemical reactivity, flowability, and opacity and material strength of numerous materials. Various researches have shown that packaging materials could be prepared from biodegradable materials with unique functional properties. Present study was carried out by preparation of biodegradable nanoparticles and their role in improving mechanical and structural characteristics of films. Current environmental concerns have turned natural materials into candidates of growing interest as bio-nanofillers for nanocomposites applications. Biopolymers have advantages over the synthetic polymers.

Keywords: Nanoparticles, packaging materials

GCCCS-2019: 87

Agricultural biomass burning: emissions and impacts on air quality, health and climate in india

Preeti Vijarniya, Poonam Yadav, Rajesh Dhankhar

Department of Environmental Science, M.D.U, Rohtak (Haryana)

Abstract

Burning agricultural biomass before and after harvest is a common farming practice. Regional and extensive agricultural open field burning can cause serious air pollution events. It also contribute towards the greenhouse gas (CH₄, NO₂, CO₂), air pollutants (NO_x, NMHC, NH₃, SO₂, VOC), particulates matter and smoke there by posing threat to human health. Emissions from current biomass combustion products negatively affect respiratory and, possibly, cardiovascular health issues. Biomass combustion emissions, in contrast to emissions from most other sources of air pollution, are increasing. In addition, this paper provides insights into the role of anthropogenic biomass burning on air quality and health globally. The understanding of the impact of intentional biomass burning emissions on the present and future climate is reviewed. Presently, fires and their emissions are controlled under fire management and emission reduction schemes. Under future climate conditions, significantly more effective controls on these fires seem necessary. Finally, some suggestions/ recommendations are proposed for the recycling of agricultural biomass to reduce the impact of biomass burning on air quality. We hope that this Paper about biomass burning will bring the issue to the attention of governments and other researcher.

Key words: Biomass burning, Air pollution, Greenhouse gases, agricultural biomass.

GCCCS-2019: 88

Air pollution tolerance index (apti) of plant species growing roadside of sector -9 gurugram (haryana)

*Nancy Khatana, Archana Sharma, Nitin Chauhan, Abhishek Swami

Department of Environmental Science, SGT University, Gurugram – 122505

Corresponding author: khatana883@gmail.com

Abstract

Green vegetation on road side can provide a cost effective and eco-friendly way to mitigate air pollution. Therefore screening of plants for their sensitivity and tolerance level to air pollutants is important because the sensitive plants can serve as bio-indicator and the tolerant plants as sink for controlling air pollution in urban and industrial areas. In order to evaluate the susceptibility level of plants to air pollutants, air pollution tolerance index (APTI) of plants is calculated by analysing the four parameters namely ascorbic acid, chlorophyll, relative water content and pH of leaf extract. APTI of following species *Polyalthia acerifolium*, *Polyalthia longifolia*, *Bauhinia variegata*, *Hibiscus rosasinensis*, *Ficus religiosa*, *Ricinus communis*, *Lantana camara* growing at road side of sector-9, Gurugram has been carried out, which are heavily disturbed by the vehicular pollution. The highest value of APTI was found in following species: *Ficus religiosa* (16.96) and *Polyalthia longifolia* (13.26) whereas the lowest APTI was found in following species *Lantana camara* (6.03%) and *Hibiscus rosa-sinensis* (04%). Present study reveals that plant species with high APTI value can be used to develop green belt on road side and the species with lower APTI can grown as bio-indicators of stress.

Keywords: Air pollution, APTI, Plant species, Gurugram

GCCCS-2019: 89

Environmental sustainability: a juducual approach

Manu Ahlawat

Research Scholar, Department Of Law, M.D.U Rohtak

#108/22 Laxmi Nagar, Rohtak-124001, Haryana

Email: Manuahlawat92@Gmail.Com

Abstract

Environmental sustainability is the rates of renewable resource harvest, pollution creation, and non-renewable resource depletion that can be continued indefinitely. If they cannot be continued indefinitely then they are not sustainable. Basically the world's standard definition of environmental sustainability is sustainable development, which means sustainable economic growth, which is an oxymoron. No form of economic growth can be continued indefinitely. Furthermore, all economic growth today is terribly degrading the environment.

Thus it's impossible to be sustainable and achieve economic growth at the same time. Today, we are heading towards rapid industrial and economic growth at the cost of the environment. The concept of 'Sustainable Development' is not a new concept. The doctrine had come to be known as early as in 1972 in the Stockholm declaration. It had been stated in the declaration that: " Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well being and he bears a solemn responsibility to protect and improve the environment for present and future generation "

The research paper seeks to highlight the meaning of environment sustainability and the approach of Indian Judiciary towards sustainable environment through the study of various landmark cases related to Environment Law. It is hoped that the study will enable the readers to understand the role of Indian Judiciary in achieving environmental sustainability.

GCCCS-2019: 90

Hydrazide derivatives: An overview of their inhibition activity against acid corrosion of mild steel in acidic medium

Suresh Kumar*, Hari Om¹

*Research Scholar, Department Of Chemistry, M.D.U Rohtak

¹Assistant Professor, Department Of Chemistry, M.D.U Rohtak

*Email: Suresh.Grover296@Gmail.Com

Abstract

The present work deals with the synthesis and study of the inhibition effect of 3-nitrobohydrazid on mild steel corrosion in 1 M hydrochloric acid solution using weight loss measurement, potentiodynamic polarization, electrochemical impedance spectroscopy (EIS) techniques. The surface morphology was analyzed through scanning electron microscopy (SEM). Weight loss results showed that the inhibition performance of the studied compound increases with the concentration and the maximum inhibition efficiency was obtained at just 300 ppm concentration. The best result having an inhibition efficiency of 85.90% on the 300ppm concentration. The potentiodynamic polarization study indicates that 3-nitrobohydrazid is a mixed type inhibitor. Adsorption of 3-nitrobohydrazid on the metallic surface obeyed the langumeri adsorption isotherm. The adsorption of 3-nitrobohydrazid the compounds on the metallic surface was also supported by the scanning electron microscopy (SEM. experimental studies suggested that the inhibition efficiency of the tested compound followed the order well corroborated .

Keywords: 3-nitrobohydrazid, corrosion; inhibition efficiency; mild steel.

GCCCS-2019: 91

Role of aquatic plants in waste water purification

Ranjeet Tanwar* and Manvender Singh*

*Department of Biotechnology, UIET, MD University, Rohtak (Haryana)

E-Mail – msgalaut@yahoo.com

Abstract

This paper examines potential uses of naturally growing aquatic plants for wastewater purification. The treatment of effluents using biological methods such as plants is a complex waste management option comprising water, substrate, plant roots, and a large number of microorganisms which interrelate. A major advantage of this system is that it can be implemented in situ where the effluent is produced, with low cost of operation, low energy consumption and operational simplicity. These plants enhance the removal of pollutants by consuming part of them in the form of plant nutrients. The treatment is basically using plants to utilize nutrients contained in the effluent and convert to green mass, in other words the plants acting as extractors of macro-and micro-nutrients in the effluent material. In addition, such plants may also extract or permit the possibility of transforming materials containing heavy metals and toxic organic compounds that may appear difficult to treat. This applies to urban and agricultural wastewater, in particular, where treatment units of different sizes can be applied at the pollution source.

Keywords: Aquatic plants, waste water, effluent etc

GCCCS-2019: 92

Impact of stubble burning on human health and its management

Amrita kumari

Assistant Professor

Hindu Girls College, Sonapat

Email: k.amrita9@gmail.com

Abstract

Stubble burning has been intensified over the last two preceding winters in Punjab and Haryana. The phenomenon of stubble burning is linked to 3 factors: (1) large size of landholdings of farmers, (2)

high level of mechanization, (3) a water conservation law (Punjab). In the year 2017, there were 44,000 paddy straw burning incidents in Punjab while 25,000 such cases were reported from Haryana. But, a drastic decrease of about 40% has been reported in Haryana alone about the paddy straw burning last year i.e. 2018. Every year thousands of people suffered from various health problems concerned with the burning of paddy stubbles like bronchial problems, irritation in eyes, coughing, asthma, nose/throat infection, respiratory allergies etc. To manage these crop residues Centre Govt. allocated 1,151 Crore in Punjab, Haryana, U.P. and Delhi. Farmers can manage their crop residues by having its alternate uses like: used as fodder, in bio thermal power plants, mushroom cultivation, paper production, as bedding material, making biogas or bio-fertilizers, incorporation in soil etc. However, farmers can also use different types of machinery like happy seeder, rotavator, mulcher, straw chopper, reversible plough and zero till seed-cum-fertilizer drill to manage the crop stubbles. For the effective management of crop stubbles Govt. also provides 50% subsidy of machinery cost to the farmers and 80% subsidy to the cooperative societies and self-help groups.

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Impact of global climate change on genetic diversity

Jyoti, Shruti, Anita, Gayatri, Anil, Hanuman & S.S.Yadav*

Department of Botany, Maharshi Dayanand University, Rohtak (124001)

*Corresponding author-: ssyadavindia@gmail.com

Abstract

In 21st Century, climate change is predicted to become a major threat to biodiversity but accurate predictions and effective solutions have proved to be difficult to formulate. Climate and biodiversity have deep rooted connections. The change in climate generates detrimental effects on biodiversity and is proving to be biggest threat to it. Genetic diversity provides the basic substrate for evolution and many studies assess the impacts of global climate change on intraspecific genetic variations. This arises various questions like, how does global climate change effect genetic diversity. How is the effect of climate change on genetic diversity currently studied? Rapid anthropogenic activity influenced environmental changes are altering the selection pressure on genetic diversity. Due to high anthropogenic pressure many genetic resources have been reduced to a great extent. Genetic diversity is facing detrimental stress due to habitat change and population fragmentation is likely to occur where large areas of land are disrupted. Awareness of biological harmony and proper planning reduce unnecessary natural habitat destruction. There is no doubt, species are being affected from global climate change but to what extent and which

will be most vulnerable remain uncertain. Consequently loss of genetic diversity will hinder their ability to adapt to changing environment and is, therefore of serious concern.

Keywords-: Global climate change, Genetic diversity, Biodiversity.

GCCCS-2019: 94

Air quality status in indoors at residential sites of urban area in India

Rajbala¹ Soni*

Rajesh Dhankhar

Asstt. Prof.

Professor

Deptt. of Environmental Science,
Vaish College of Engg., Rohtak

Deptt. of Environmental Science,
Maharishi Dayanand University, Rohtak

Id -rajenv2009@gmail.com

Abstract

Present study was carried to determine the air quality status at residential sites of urban area of Rohtak city. Urbanization reflects increase in number of Industries, population and vehicles with poor air quality. This paper emphasizes the effect of urbanization on environmental components especially on air quality and effect on health at residential area of Rohtak city. Quality of air in houses depends upon combined effect of indoor & outdoor sources which emitted inorganic gases, Ozone and ultra fine particles. Inorganic gases and suspended particulate matter liberates mainly during the process of cooking and combustion activities. Poor air quality affects lungs and cause asthmatic problems in urban people.

Keywords- Inorganic gases, Urbanization, Asthmatic problem.

GCCCS-2019: 95

Use of biowaste material for oligosaccharide production

Punit Kumar

Biotechnology Branch

University Institute of Engineering and Technology

MDU Rohtak, Haryana, India
Email: punitdariyapur@gmail.com

Abstract

Food exhibits direct impact on physical performance, health, or state of mind. With the development of research and development activities, People have become aware about the nutritional values of food products and role of diet in health and disease prevention. Thus selection of healthy foods products or functional food has become a new trend globally. Prebiotics are food components which are not digested in intestinal tract and promote the growth and activity of gut microflora which further influence the health of individuals. Oligosaccharides are termed as smallest polysaccharides and these are sugar molecules containing small number (3 to 10) of monosaccharides units. Oligosaccharides are involved in many activities such as cell recognition and cell binding. At present oligosaccharides are being involved in preparation of many food products, such as milk, dairy products, cookies, and candies, etc. Oligosaccharides are classified into different categories on the basis of monosaccharide units like galactooligosaccharide, xylooligosaccharide, and fructooligosaccharide etc. Production of agricultural waste is big problem in Indian and large amount of agricultural wastes is burned by farmers after harvesting which causes serious health concerns. This agricultural has been used in production of oligosaccharides using microorganisms. The agricultural waste such as waste from potato filed are rich in carbon sources and may be used in production of oligosaccharides. For this purpose, microorganisms such as *Bacillus circulans*, *Aspergillus oryzae* are grown in appropriate culture medium and analyzed for production of oligosaccharides

GCCCS-2019: 96

Waste management: It's disposal, recycling and composting

Dr. Seema Singh
Asstt. Prof, IMSAR
M.D.University, Rohtak

Abstract

This paper will analyze waste disposal, recycling and composting in a municipalities of Haryana State. In this study the actual data on waste disposal at the household level from a

residential areas will be considered, in addition to already survey data for the same households. Hopefully, this process will make it possible to carry out a more reliable and more detailed analysis than has been previously possible, particularly with respect to attitudinal variables towards waste. The most important determinants which will be considered for the study are individual household's waste of kitchen, living area, age and attitudes concerning the difficulty of disposal, recycling and composting of various materials. This paper will also study on the behaviour and willingness to pay for sound waste management and for the sake of comparison among different districts of Haryana state will be taken. To know the importance of economic incentives, which can be a driving force behind the reduction in municipal waste. And also, to know the role of proper infrastructure that will facilitates recycling of waste and people willingness to invest more time purely on savings for their waste management bill or penalty.

Key words: waste management, recycling, incentives

GCCCS-2019: 97

Effects of heavy metal pollution on soil microbial population: a review

Ganpat Louhar^{1*} and Divya Gaur²

^{1*}Division of Soil Science and Agricultural Chemistry, IARI, New Delhi-110012

²Department of Soil Science, CCSHAU, Hisar, Haryana-125004

*Corresponding author - loharganpat95@gmail.com

Abstract

Soil is a most important natural resource. Due to long term persistent, toxic and non biodegradable nature of heavy metals, the problem of heavy metals in the soil increasing day by day. Soil heavy metals are categorized into two groups by biochemical characteristics: (i) (Pb, Cd and Hg) harmful to crops, humans and animals (ii) when excessive (Cu, Zn and Mn) it will damage to biologically. Soil pollution by heavy metals contamination is a severe global environmental problem due to its adverse affects on plant growth, genetic variation and also on microbial composition and their activity. Soil microbes are used as an important indicator of soil environmental quality because of their sensitivity to soil environmental stress and adverse conditions. Soil microbes are important component of soil quality and play fundamental roles in soil fertility through organic matter decomposition and nutrient cycling of C, N, P, S and other elements. Activities of bacteria and actinomycetes are significantly decreased with increasing heavy metal content but actinomycetes affected more strongly by heavy metals. The degree of tolerance is as follows: fungi>bacteria>actinomycetes. When microorganisms disturbed by heavy metal contamination, they indirectly affects the soil

ecosystems through affecting soil structure, mineral metabolism and crop growth *etc.* So, we need to develop detection methods to detect the heavy metal content in the soil and get more accurate relationship with microbial communities and their activities.

Keywords: Heavy metals, microbial communities, natural resource, soil pollution, soil quality.

GCCCS-2019: 98

Climate change: A major concern in potato cultivation

BichhinnaMaitri Rout, MousumiPriyadarshini

Department of Vegetable Science, CCS, Haryana Agriculture University (CCSHAU), Hissar-125004, Corresponding author – bichhinnamaitri95@gmail.com

Abstract

Potato production is becoming more sensitive due to increase in climate variability which is manifested by large seasonal fluctuations in the amount and quality of yield. Due to erratic rainfall pattern it results in shorter potato growing season along with deterioration in its quality. At low temperatures potatoes are at risk of frost damage, which can reduce growth and badly damage tubers. Temperatures above 30°C can cause negative effects like slower tuber growth and initiation, less partitioning of starch to the tubers, physiological damage to tubers (e.g. brown spots) and shortened/non-existent tuber dormancy, making tubers sprout too early. The changing weather patterns results in the appearance of new diseases like phytoplasma *Stolbur*. The aphid population is also increasing over the years which lead to a great damage potato production. The reproduction rate of several pathogens becomes faster at higher temperatures. Many new innovation techniques have been developed to mitigate the problems in potato production caused due to climate change. One such example is the Subsurface Drip Irrigation technique which aimed at reducing water use by trailing on potatoes. Thus, adaptation of potato farming practices and potato varieties to changing conditions caused by climate change could help to maintain crop yields and quality.

Keywords: potato, aphids, temperature, yield

GCCCS-2019: 99

Remediation of methyl red by immobilized yeast biosorbent

Sunil Chhikara

Assistant Professor, University Institute of Engineering & Technology, MaharshiDayanand
University, Rohtak-124001(Haryana) India.Tel.No.+919255115900

Email:chhikaras14@rediffmail.com

Abstract

Yeast biomass was developed into immobilized biosorbent by chemical treatment with 0.1M H₂SO₄ and 0.1N NaOH. The biosorbent was immobilized in Ca-alginate matrix and its capacity to adsorb methyl red ions was investigated. The effect of several parameters, such as biosorbent dosage, contact time, initial metal ion concentration, pH and temperature on biosorption process was evaluated. The value of a, b (Langmuir constants), R_L (separation factor) and 1/n (adsorption intensity) revealed the favorable nature of biosorption process. Thermodynamic parameters including change of free energy (ΔG) was determined. The results show that the biosorption of methyl red ions by immobilized biosorbent was feasible, spontaneous and exothermic under studied conditions. Equilibrium was well described by Langmuir isotherm and rate kinetics was found to follow pseudo-second order type biosorption kinetics. The biosorbed dye was completely desorbed from the biosorbent by elution and biosorbent can be reused for five consecutive biosorption/desorption cycles without apparent loss of efficiency. The changes in the functional groups and the surface properties of pretreated fungal biosorbent were confirmed by FTIR spectra.

Key Words: Yeast, biosorption, kinetics, adsorption isotherm

GCCCS-2019: 100

The undesirable impacts of pesticides on human health and the environment

Rajnigodara^{*}, Preeti dhanker¹ and Sushil²

^{*}Department of chemistry, CCS HAU, Hisar, 125004, Haryana

¹Department of chemistry, CCS HAU, Hisar, 125004, Haryana

²Assistant Scientist, department of chemistry, CCS HAU, Hisar, 125004, Haryana

Corresponding author*: rajni2929g@gmail.com

Abstract

Pesticides have an immense potential to put our ecosystem at risk. Pesticides are highly toxic chemicals which not only harm our environment but also all living organisms inhabiting it, directly or indirectly. Although pesticides have played a particularly significant part in current agriculture by minimising the pest risks and increasing the production of agri-food products yet their extensive use has caused serious health risks on surrounding flora and fauna and humans living near pesticide contaminated fields. These pesticides enter water bodies through surface run off or leaching and affect the people consuming this polluted water. These pesticides are also present in our food and beverages that we engulf. Hence we are at major health risk directly or indirectly. Some effects are severe, like asthma, hypersensitivities and allergies, while other effects can be chronic and fatal. Elementary chronic effects comprise neural disorders like loss of coordination, memory loss, visual damage, reduced response to incentives, mood thumps and decreased motor skills. Pesticides also cause melanoma cancer, kidney damage, birth defects, fatal developmental issues and hormonal imbalance. Also children are more vulnerable to the effects of pesticides than adults. The detrimental bearings of pesticides are not only limited to humans; their impacts are fundamentally seen on wildlife and vegetation. A number of pesticides are so destructive that they kill even non-target plants while others get accumulated in the fruits and leaves of plants which then bio-accumulate in the food chain and have a tendency to affect organisms of diverse tropic levels. Environmental matrices laden with pesticides have attracted great attention because they have serious negative impacts on human health and natural ecosystems. The exposer of pesticides to the environment should be managed in such a way that their probable harmful effects on the environment can be controlled, thus imposing scarcer risks to biota, plants and humans.

Keywords: Pesticide, leaching, bio-accumulate, biota and hypersensitivity.

GCCCS-2019: 101

Environmental governance in India: Role of supreme court

Dr. SONU

Asst. Prof., Faculty of Law,

MDU, Rohtak

Abstract

The verdicts of Apex Court make it aptly clear that the right to healthy and clean environment is a fundamental right acknowledged under the Indian Constitution. The innovation by judiciary in the form of Public Interest Litigation shows the procedural flexibility adopted by court in environment related matters as liberal thought to achieve good governance. Holding industries liable to pay compensation under polluter pays principle in context of absolute liability is another remarkable step taken by the Indian judiciary. In so many environmental problems court itself visited the spot to assess the environmental damage at ground level. These innovations adopted for environmental jurisprudence has long lasting impact on the subsequent environment related issues taken up by the courts. The present research paper is an examination of role of Apex Court of India in environmental governance and the impact of the initiatives of Supreme Court in subsequent policy decisions in India.

GCCCS-2019: 102

ICT increase job for youth by incorporating indigenous knowledge in agriculture for benefit of farmer and environment

Poonam Sharma

Assistant Professor (Botany)

Govt. College, Badli (Jhajjar)

Email: saraswatpoonam30@gmail.com

Abstract

As we know India is a country where most of the population lives in village and their main occupation is farming. But in the past years, level of farming goes down. Most of the Youth engaged in agriculture are not interested and wants to go for another profession of high salary in private and govt. jobs. In agriculture farmer didn't earn high and most of time farmer go in loss due many reason. Because new farming use costly high yielding variety which require extra chemical fertilizer, chemical pesticide. This extra contaminate water that cause diseases due to excess use of pesticide, loss of useful nutrient from soil. This all happen because farmer didn't have knowledge to use these chemical. Indigenous biodiversity and number of small land holding farmer decrease, increase suicides of farmer. To cope up with situation, few farmer shift towards traditional farming , few mix traditional farming with modern agriculture, because one type of agriculture is not enough for changing environment. This paper discuss how ICT helpful for improving agriculture situation in many country by attracting youth. Youth in these country are getting new apportunities in E-agriculture market, information source of climate, broadcast knowledge of farmer to other farmer and link farmer with the organization. E- agriculture not only increase job appotunity for youth, but also save environment, indigenous knowledge and poor small holding farmer

GCCCS-2019: 103

Prioritizing Climate Change Adaptation Needs for Food Security

Vidya.R and Bichhinamaitrirout

Department of vegetable science

CCS Haryana Agricultural university, Hisar-125004, Haryana

E-mail: vidyar.vcc@gmail.com

Abstract

Investments aimed at improving agricultural adaptation to climate change inevitably favor some crops and regions over others. An analysis of climate risks for crops in 12 food-insecure regions was conducted to identify adaptation priorities, based on statistical crop models and climate projections. Adaptation is a key factor that will shape the future severity of climate change impacts on food production (1). Although relatively inexpensive changes, such as shifting planting dates or switching to an existing crop variety, may moderate negative impacts, the biggest benefits will likely result from more costly measures including the development of new crop varieties and expansion of irrigation (2). These adaptations will

require substantial investments by farmers, governments, scientists, and development organizations, all of whom face many other demands on their resources. Prioritization of investment needs, such as through the identification of “climate risk hot spots” (3), is therefore a critical issue but has received limited attention to date. We consider three components essential to any prioritization approach: (i) selection of a time scale over which impacts are most relevant to investment decisions, (ii) a clear definition of criteria used for prioritization, and (iii) an ability to evaluate these criteria across a suite of crops and regions. Here, we focus on food security impacts on most relevant to large agricultural investments, which typically take 15 to 30 years to realize full returns. We consider several different criteria for this time scale. First is the importance of the crop to a region’s food-insecure human population [hunger importance (HI)]. Second is the median projected impact of climate change on a crop’s production, assuming no adaptation. For this analysis, we generate multiple projections of impacts based on different models of climate change and crop response, in order to capture relevant uncertainties.

GCCCS-2019: 104

Identification of Homogeneous Rainfall Regions in Haryana

* Mohit Nain & B.K. Hooda

Department of Mathematics and Statistics, CCS HAU, Hisar-125004,
(Haryana), India*Corresponding Author E-mail:

nainbir93@gmail.com

Abstract

Cropping pattern of a region is decided by a large number of soil and climatic parameters which determine the overall agro-ecological conditions for cultivation of crops. Rainfall is the most important climatic parameter influencing the cropping pattern, soil erosion and sedimentation. In particular, nature and status of agriculture in a region is mainly dependent on the total annual rainfall its intensity and distribution. Distribution of rainfall varies greatly over time and space. In the present study, monthly rainfall data of 42 years (1970-2011), covering 27 rain gauge stations of Haryana were used for the classification and identification of homogeneous rainfall regions in Haryana. Clustering of rainfall stations for monsoon period was done by Ward's method applied on

the common principal components. The results indicated 4 clusters (homogeneous regions) of rain gauge stations having similar monsoon rainfall spread over Haryana. Cluster-I consisted of 6 stations (Ballabgarh, Gurgaon, Ambala, Karnal, FirozpurJhirka and Sonipat); Cluster-II consisted of 8 stations(Hassanpur, Fatehabad, Tohana, Sirsa, Hisar, Jind, Narwana and Narnaul); Cluster-III consisted of 10 stations (Sohana, Thanesar, Panipat, Rohtak, Bawal, Dujana, Jhajjar, Nuh, Kaithal and Dadri) while Cluster-IV consisted of 3 stations that were Kalka, Dadupur and Jagadhari. Cluster analysis of mean monthly rainfall using Ward's method was also performed. It also resulted in 4 clusters of the 27 rain gauge stations in Haryana. The homogeneous regions indentified using the two procedures are found in close agreement.

Key words:Rain gauge stations,Cluster analysis, Ward's method, Common principal components

GCCCS-2019: 105

Common principal components and cluster analysis approach for identification of homogeneous rainfall stations in Haryana

*Mohit Nain, B.K. Hooda

Department of Mathematics and Statistics, College of Basic sciences and Humanities, CCS
Haryana Agriculture University, Hisar-125004 (Haryana), India

*Corresponding Author E-mail: nainbir93@gmail.com

Abstract

Rainfall analysis is vital for farming creation as well as for regulatory purposes and plays an important role in designing water harvesting structures as well as crop planning. In the present study, monthly rainfall data of 42 years (1970-2011), covering 27 rain gauge stations of Haryana was used for the classification and identification of homogeneous rainfall stations in Haryana. Clustering of rainfall stations for monsoon period was done by utilizing Ward's method applied on the common principal components (CPCs). The results showed that there are 4 clusters of rain gauge stations having similar monsoon rainfall spread over Haryana. Cluster I consisted of six stations i.e. Ballabgarh, Gurgaon, Ambala, Karnal, FirozpurJhirka and Sonipat; Cluster II consisted of eight stations i.e. Hassanpur, Fatehabad, Tohana, Sirsa, Hisar, Jind, Narwana and Narnaul; Cluster III consisted of 10 stations i.e. Sohana, Thanesar, Panipat, Rohtak, Bawal, Dujana, Jhajjar, Nuh, Kaithal and Dadri while Cluster IV consisted

of three stations that were Kalka, Dadupur and Jagadhari. Cluster analysis of mean monthly rainfall was also performed using Ward's method. On the basis of mean monthly rainfall we observed that there are again 4 clusters of rain gauge stations. Cluster I consisted of five stations i.e. Ballabgarh, Gurgaon, Karnal, FirozpurJhirka and Sonipat; Cluster II consisted of eight stations i.e. Hassanpur, Fatehabad, Tohana, Sirsa, Hisar, Jind, Narwana and Narnaul; Cluster III consisted of 10 stations i.e. Sohana, Thanesar, Panipat, Rohtak, Bawal, Dujana, Jhajjar, Nuh, Kaithal and Dadri while Cluster IV consisted of four stations i.e. Ambala, Kalka, Dadupur and Jagadhari. The two analyses gave the patterns in close agreement.

Key words: Rain gauge stations, Cluster analysis, Ward's method, Common principal components.

GCCCS-2019: 106

Green Synthesis of platinum nanoparticles using fungus *Fusariumoxysporum* and its antimicrobial activity

Khushbu Gupta¹, Tejpal Singh Chudawat²

^{1,2}Department of Applied Sciences, The North Cap University, Sector 23-A Gurugram-122017, Haryana, India.

Email id: Khushbu17asd002@ncuindia.edu

The formation of nanoparticles from natural microbes has received special attention to wide range of applications as biological activities, less toxic for environment and many more. In this paper, we report on the use the fungus *Fusariumoxysporum* for the extracellular synthesis of platinum nanoparticles from platinum hexachloride solution. The confirmation of formation of nanoparticles was done by change in color of solution and by UV-Vis spectroscopy. The characterization of platinum nanoparticles was carried out by using Fourier transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD) and scanning electron spectroscopy (SEM). FT-IR measurements showed all functional groups having control on reduction and stabilization of the nanoparticles. X-ray diffraction pattern cleared that the particles have face-centered cubic (FCC) geometry with crystalline nature. SEM micrographs have shown the morphology and size of biogenically synthesized metal nanoparticles. Antimicrobial activity against both Gram negative bacterial strains {*Pseudomonas aeruginosa* (MTCC 441), *Escherichia coli* (MTCC 442)} and Gram positive bacterial strains

{*Klebsiellapneumoniae* (MTCC 109), *Staphylococcus aureus* (MTCC 96)} were studied by measuring the zone of inhibition.

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E- waste management

PriyankaVerma, Kritika Sharmaand ShikhaYashveer

¹Department of Molecular Biology, Biotechnology and Bioinformatics,

COBS&H, CCS HAU, Hisar

E.mail- pv955929@gmail.com

Electronic waste or e-waste term is used for the old, end-of-life electronic appliances such as computers, laptops, TVs, DVD players, mobile phones, mp3 players, etc., which have been disposed by their original users. It is categorized into three types: Large household appliances; Refrigerator and washing machine, Information and communications technology equipment; PC, monitor and laptop and Consumer electronics; TV and mobiles. E-waste consists of Ferrous (Iron & Steel - 50%) & Non-ferrous Metals Plastics- 21, Glass, Wood etc (Iron & Steel - 50% Plastics - 21% Non-ferrous metal - 13%. Disposal of e-waste is an emerging global environmental and public health issue, as this waste has become the most rapidly growing segment of the formal municipal waste stream in the world. In last two decades, the global growth in electrical and electronic equipment production and consumption has been exponential. Today, electrical and electronic waste is the fastest growing waste stream (about 4 per cent growth a year). About 40 million tonnes of e-waste is created each year (Schluep, M. et al. 2009). Improper disposal of e-waste releases highly toxic chemicals like lead, cadmium, mercury, beryllium, BFR, polyvinyl chloride and phosphorus compounds. About 80 per cent of all e-waste sent for recycling in developed countries ends up in informal e-waste recycling sites in developing countries, primarily in Africa and Asia. To mitigate the heavy metal pollution, many processes like adsorption, precipitation, coagulation, ion exchange, cementation, electro-dialysis, electro-winning, electro-coagulation and reverse osmosis are being used. Microbe-metal interactions reveal the heavy metal accumulating or removal properties of different microbes eg. *Aspergillusniger*, *Penicilliumchrysogenum*, *Rhizopusnigricans*, *Ascophyllumnodosum*, *Sargassumnatans*, *Chlorella fusca*, *Oscillatoriaanguistissima*, *Bacillus firmus* and *Streptomyces sp*. In

future, emerging microbial technology will provide a better platform for the bioremediation of e-waste.

GCCCS-2019: 108

Study of genetic variability for processing traits in Okra (*Abelmoschus esculentus* L.) genotypes

Sonika* and Hitesh Kumar

*Department of Genetics & Plant Breeding, CCS, Haryana Agricultural University, Hisar
Department of Vegetable Science, CCS, Haryana Agricultural University, Hisar (125004),
India

E-mail: sonikabhankhar@gmail.com

Abstract

Okra (*Abelmoschus esculentus* L.) (2n=130) is commonly known as bhindi or lady's finger belongs to the family Malvaceae. It is originated from Ethiopia and is widely spread all over tropical, subtropical and warm temperate regions of the world. It is very important in the human diet due to its high antioxidant activity (high total phenolic compounds and total flavonoids contents) which is needed against various diseases and nutritional value (high protein, carbohydrates, vitamins, calcium, potassium and total minerals) required for proper growth and development of the body. Unfortunately these antioxidants and nutrients are often lacking in the diet of developing countries. By looking at the medicinal usefulness of okra pod and seed it becomes very desirable to develop and evaluate different okra genotypes in terms of high antioxidant activity and high nutritional quality. Breeding high quality genotypes depends on the availability and the use of genetic variability for quality and yield attributing characters. Collection of plant material and estimation of genetic variability parameters are important for strategic planning and allocation of limited resources and also to know the amount of genetic variability present in the given population as well as the influence of environment over expression of the characters. For that the study should be conducted in order to study the genetic variability present among 30 okra genotypes for various processing traits. Antioxidant activity and nutritional parameters should also be studied at different conditions such as fresh conditions and storage conditions.

Environmental sustainability

¹Shobha saini, ²Dr. (Mrs.) SaritaDahiya, ³Dr. (Mrs.) Promila

1. Assistant Professor, Saini institute of girls' education, Rohtak,

E-mail: sainishobha22081979@gmail.com

2. Assistant professor-III, MDU, Department of education, Rohtak

3. Assistant professor, V. B.College of Education, Rohtak

Abstract

Environmental sustainability is the ability to maintain the qualities which are valued in the physical environment. Sustaining the recycling of certain materials may only need to continue for as long as those types of material are needed technologically, and depending on the pace of technical change this could be for centuries or for decades. Coordinated approaches are necessary for solving the major environmental and sustainability problems facing the developing as well as developed countries. Therefore, there is a need to have a better understanding of the multidisciplinary inter-relationships between sustainable development, human health and the environment. Specific emphasis is laid on globalization and sustainable growth, bioethics and poverty, organizational performance and sustainability, environmental management and individual progress, human and ecosystem health, and water resources and recycling. The resources are only needed for a short time however as society might find new uses for materials as technology, lifestyles and environmental awareness develop. Environmental sustainability can only be obtained through a combination of both preventive and restorative actions. So restoration is a key part of what needs to be done to achieve sustainability. Transition toward sustainable society requires behaviour change. This behaviour change will definitely develop the environmental sustainability.

GCCCS-2019: 110

E-Waste Management for Environment Sustainability

Kirti Sharma, RainuNandal

Assistant Professor, UIET, MDU, Rohtak

E.mail: krtbhardwaj1@gmail.com and rainu_nandal@yahoo.com

In the present era, advancement in technology leads to an exponential hike in sales of electronic devices, gadgets or electronic equipments that resulted as rapid growth in electronic manufacturing industries worldwide. Along with the generation, the change in trends, style and status of individual's (urbanization) resulted in rapid obsolescence of these electronic products, i.e. e-waste. E-waste is a term for the obsolete electronic products that are reverting in *trash* after a few years of usage. In the last few years, the exponentially increase in the amount of e-waste indicating its adverse affect on human health and disrupting the environment. *E-Waste is the toxic legacy of our digital age*. The improper and unorganized way of e-wastage management becomes the matter of sight which leads to human health at the high rate of risk and deterioration in the nature. So, in order to establish a well-maintained surrounding its necessary to take some steps ahead to provide solutions to that problem with the help of recycling and making awareness in the present generation. This paper is designed to review and capture the attention of individuals regarding the E-wastage and to illuminate the focused moves to save the future living beings and to maintain the balanced healthy environment.

GCCCS-2019: 111

E-waste and its effects: A literature review

Meenakshi, RainuNandal

UIET, MDU, Rohtak,

E.mail: meenakshimalik16@gmail.com and rainu_nandal@yahoo.com

One of the essential and critical issues of advanced world is electronic-waste (e-waste) and the same is rising as a toughest environmental challenge for twenty first century. E-waste is very fashionable yet casual name allotted to electronic and electrical equipments, gazettes and appliances; either useless or of futuristic use. In the management of Electrical and Electronic Equipment waste (e-waste or WEEE); Informal recycling is a fresh and expanding low cost recycling practice. It happens in plenty of developing countries, in which existing gaps in environmental management, hefty requirement for second-hand electrical/electronic appliances and the norm of selling e-waste to individual collectors support the expansion and development of a sturdy and firm informal recycling sector. In modern decades the issues in waste management have acquired great complexities and challenges. The consciousness in social environment and rising volumes of waste produced, push chief ecological drivers and environmental managers in the direction of achievement of a prolonged maintainable waste management schemes. This paper focus on the sources, components and consequences of e-waste and effects of e-waste on environment and living beings.

Keywords: E-waste, environmental challenge, environmental management, ecological drivers

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E-Waste: A Technological Bane

RajatMalik ,RainuNandal

UIET, MDU, Rohtak

E.mail: rjtmalik5@gmail.com and rainu_nandal@yahoo.com

As it is said that technology is boon as well as bane. Its emergence has sorted our lives to large extent but in return provided us with the e-waste. *E-waste is the term used for discarded or inoperative electronic and electrical devices.* It includes our household appliances to commercial equipment like cables, circuit boards etc. The disposal of these requires extra efforts as these products contain various harmful/hazardous components like mercury, lead, cadmium, Arsenic etc. which leads to environmental degradation. Also soil degradation and various diseases are the result of the improper disposal of this E-Waste. Developed countries are disposing their e-waste to developing countries like India and Africa, where this is recycled in improper manner, hence creating alarming situations of pollution level. The lack

of proper regulations has made the situation worse. As “95% of E-waste is recyclable” Recycling these products with approved mechanisms can help in tackling the situation in better way. This paper discusses the various sources and components of e-waste and the different mechanisms to ameliorate the effects of these on the mankind.

GCCCS-2019: 113

Zinc toxicity in *Amaranthusviridis L.*: Plant growth and biochemical parameters

RachnaBhateria* and Snehlata

Department of Environmental Sciences

Maharishi Dayanand University, Rohtak.124001

E.mail: rachnabhateria@gmail.com, snehevs4@gmail.com

Abstract

Zinc (Zn) plays a vital role in numerous biochemical functions of plants. The excess quantity of zinc is one of the most important growth limiting factors in soils. Average concentrations of zinc required for optimal plant growth varies between 25 and 150 mg kg⁻¹, whereas symptoms of zinc toxicity like growth inhibition occurs when the threshold of toxicity is surpassed. Zinc is an essential nutrient for plant growth, but its high concentration results in growth inhibition and toxicity symptoms. A universal characteristic to overcome stress factors is coordinated function of antioxidant enzymes which helps alleviating cellular damage by limiting reactive oxygen species (ROS). ROS are inevitable by products of essential aerobic metabolisms; these are required under sub-lethal levels for normal growth of plant. In the present study, effect of different concentration (0 to 380 mg/kg) of zinc on the growth of *Amaranthusviridis L.* was studied. Stress tolerance index (%), translocation factor (TF), bioconcentration factor (BCF) and yield (%) were calculated to evaluate the effect of various concentration of zinc on the growth of *AmaranthusviridisL.*. Antioxidant potential was observed by calculating the peroxidase (POD) and superoxide dismutase (SOD) activity in all the parts of the plant. Results revealed that as the concentration of Zn got increased, peroxidase (POD) and superoxide dismutase (SOD) activity also got increased in all the parts of the *AmaranthusviridisL.*. Results highlight the relationship between oxidative stress in

plants and role of antioxidant enzymes that can defeat oxidative stress with the help of antioxidant enzymes.

Keywords: Heavy metal, antioxidant enzymes, zinc, biochemical functions

GCCCS-2019: 114

Salinity development under shallow water table condition

Mukesh Kumar Mehla

mukeshmehla310@gmail.com

College of Agricultural engineering and technology, CCS Haryana Agricultural University
Hisar - 125004, Haryana (India)

Salinization of soil under shallow water table condition is a serious problem in arid and semi-arid which is influenced by the climate, soil type, crop, irrigation water quality and management practice, depth to water table and salinity of the water table in the area. India have around 9.38 million ha area affected by salt problem. Salinity in the soil varies noticeably in soil due to heterogeneity of soil physical-chemical properties and with Change in Water table, Influx of water (Rainfall, Irrigation), Evapotranspiration (ET) and Drainage. According to a study FAO, nearly 62 million hectares (20% of the world's irrigated land) is affected by salinity, losses in crop yield due to salinity problem in wheat, rice, sugarcane and cotton is 40%, 45%, 48%, and 63%, respectively. Use of poor quality water for irrigation which is 32 to 84% of the total groundwater development is main culprit behind increasing salinity problems. Most of the salt affected areas have low fresh water availability with low rainfall and high Evapotranspiration which cause greater use of poor quality water and that cause problem of water logging, rise of salt due to capillarity. Parts of Rajasthan, Gujarat, Western Haryana and Uttar Pradesh are seriously affected by these problems were main source of irrigation is highly saline groundwater. Variation of natural condition with time and space, non-uniform distribution of the irrigation water, fertilisers, pesticide etc., variation in agricultural practices, topography of the area, Climate change, seepage from nearby area or groundwater are some of the main causes of the variability.

Key Words: Salinity, Saline Soil, Soil loss, Salinization, Climate change.

GCCCS-2019: 115

**Optimization of *in vitro* plant regeneration and transformation system of chickpea
(*CicerArietinum*L.)**

DarshnaChaudhary^{*}, Anil Kumar, Honey Yadav and Mohini Singh

¹Centre for Biotechnology, MaharshiDayanand University Rohtak-124001, Haryana, India

*Corresponding Address: Dr. DarshnaChaudhary, Assistant Professor, Lab no.224, Centre for Biotechnology, MaharshiDayanand University, Rohtak-124001, Haryana, India

E-mail ID: darshnarajan@gmail.com

Abstract

Chickpea is a very important and is the third most important pulse crop in the world. Chickpea is a highly nutritious crop and is a rich source of protein (25%). It can easily survive under different types of soils like sandy, split and loam but it is very sensitive towards wet soil. The low production of chickpea is due to some abiotic and biotic stresses. The major biotic constraints in chickpea production are Pod Borer which feed on leaves and seeds. This pest adversely affects the chickpea production up to 70%. Production of chickpea by breeding could not be enhanced because the genes against pod borer are not available in chickpea germplasm. Hence only option left to improve the chickpea production by genetic engineering. The present study was carried out to optimize the *in vitro* plant regeneration and transformation system of chickpea (*CicerArietinum*L.). Cotyledonary node explants were excised from 4-d-old *in vitro* raised seedling and were cultured on MSB5 medium containing 3% sucrose and supplemented with BAP, zeatin and kinetin. Maximum number of shoots (10.6) was induced on MSB5 medium supplemented with kinetin (2 μ M/l). Regenerated shoots (2-3 cm in length) were separated individually from the explant and transferred to rooting medium (MS basal medium supplemented with 1.0 μ M/l IBA) for rooting. Shoots with well developed roots were transferred to pots containing soil. The transformation factors of chickpea were also optimized. The present investigation describes an efficient *in vitro* plant regeneration system of chickpea which will be compatible for development of transgenic against, the biotic as well as abiotic stresses.

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Mitigation of drought stress by improving water uptake efficiency with different concentration of am fungi in wheat (*triticumaestivum* l.) under varying soil moisture regimes

Pooja Rani* and K D Sharma

Department of Botany and Plant Physiology

CCS Haryana Agricultural University, Hisar -125004

E-mail: poojahooda07@gmail.com

Abstract

Arbuscularmycorrhizal fungi provide a variety of benefits to their hosts including increased nutrient uptake under low-input Conditions and improvement of plant water status by increasing hydraulic conductivity through an increase of water absorption by the external hyphae and drought tolerance increased growth and yield. Plants are exposed to a variety of abiotic stresses, such as drought, salt loading and freezing that influence their development, growth and productivity. One of the major abiotic stresses that affect plant productivity is water stress resulting drought. It is one of the major causes of crop loss worldwide, reducing average yields for most major crop plants by more than 50%. To mitigate this problem bioinoculants have been used to improve water uptake efficiency and plant nutrients in sustainable agriculture. Bioinoculants are products containing living cells of different types of microorganisms that have an ability to convert nutritionally important elements from unavailable to available form through biological processes and are known to help with expansion of the root system and better seed germination. *ArbuscularMycorrhizae* (AM) increase seed germination and have positive effects on plant growth promotion by improving water uptake efficiency under moisture stress condition. An experiment was conducted on wheat (*Triticumaestivum* L.) during rabi seasons to find suitable growth responses at the time of harvest in wheat genotypes WH 1142 under restricted irrigation. The experiment was designed as split plot consisting of three irrigation schedules viz., one irrigation at crown root initiation (CRI), two irrigation at CRI and heading stage and three irrigation at CRI, tillering, heading stage in main plot and five bio-inoculants treatments viz., recommended dose of fertilizers (RDF), *ArbuscularMycorrhizae* (AM) with Azotobacter and PSB (75% of RDF), AM fungi with RDF, Azotobacter with PSB and RDF, AM fungi with 75% of RDF in the sub-plots with three replication. The plant water relation parameters such as water potential, relative water content of leaves and canopy temperature depression decreased significantly

under drought stress. Application of bio-inoculants improved relative water content, water potential and canopy temperature depression under drought stress. Absolute value of water potential and osmotic potential were comparatively high (less negative) with AM fungi + *Azotobacter* with PSB under all the irrigation environments.

Keyword: bioinoculants, drought, wheat, AM

GCCCS-2019: 117

Effect of pruning and foliar application of ethrel on fruit yield of cucumber under polyhouse

Mange Ram Suthar

Horticulture Training Institute, Uchani, Karnal, Haryana

mangeram10@gmail.com

Abstract

A field experiment was conducted at Research Farm, Department of Vegetable Science, CCS Haryana Agricultural University, Hisar to study the effect of pruning and foliar application of ethrel on cucumber production under polyhouse. The experiment laid out in split plot design with three replications accommodated five cucumber genotypes planted as main plot treatments (hybrids namely PusaSanyog, Stimora and Rani and cultivars were Poinsett and Jyoti Green Long), while the six treatment combinations of two pruning treatments (no pruning and pruning of side shoots up to 5th node) with three ethrel treatments (untreated control, 10 ppm and 25 ppm) as the sub-plot treatments. Seventeen day old seedlings were transplanted on flat seed beds at a spacing of 60x60 cm. Foliar spray of 10 or 25 ppm ethrel at 4th true-leaf stage, and pruning of side shoots up to the 5th node was done in all the cucumber genotypes. Hybrid Stimora produced maximum number of fruits per vine 15.7 with pruning of side shoots up to 5th node. Foliar application of 25 ppm ethrel on the plants of hybrid Rani exhibited maximum number of fruits per vine (12.5). Also, the foliar application of 25 ppm ethrel and pruning of side shoots up to 5th node in hybrid Rani produced maximum fruit yield of 625.0 q/ha. Therefore, pruning of side shoot up to 5th node and foliar application of ethrel 25 ppm are useful for getting maximum fruit yield of cucumber genotype Rani under polyhouse condition.

Key words: Cucumber, pruning, ethrel, polyhouse, fruit yield

GCCCS-2019: 118

Increasing Pollution and depleting Biodiversity

Vipul Chaudhary¹*, Manoj Kumar Singh *, Pamela Singh¹

*National Bureau of Animal and Genetic Resources(ICAR), Karnal, HARYANA

¹ Department Of Biotechnology, DCRUST, Murthal, Sonapat, HARYANA

Email: vipulchaudhary29@gmail.com

Abstract

The term biodiversity refers to the wide range of organisms plants and animals that exist within any given geographical region. That region may consist of a plot of land no more than a few square meters or yards, a whole continent, or the entire planet. Biodiversity consider all the organisms that interact with each other in an extended geographical region, such as a tropical rain forest or a subtropical desert. Total 1.4 million species (70% of which are invertebrates) presented and estimated 3 to 50 million species alive. Indian biodiversity consists of 7.6% of all mammalian, 12.6% of all avian, 6.2% of all reptilian, 4.4% of all amphibian, 11.7% of all fish, and 6.0% of all flowering plant species. Biodiversity provides us with an array of foods and materials and it contributes to the economy. Without a diversity of pollinators, plants, animals and soils, our supermarkets would not be able to sustain. Ecosystem conversion and ecosystem degradation contributes to habitat fragmentation. Habitat loss from exploitation of resources, agricultural conversion, and urbanization is the largest factor contributing to the loss of biodiversity. Polluted streams result in the abandonment of traditional spawning areas and ultimately in the loss of salmon populations. Species' sensitivity to pollution is variable. However, many species are vulnerable to the indirect effects of pollution through the concentration of toxic chemicals in top predators of food chains and disruption of predator-prey interactions.

GCCCS-2019: 119

Global warming and its constitutional mandates

Lata(LL.B., LL.M.,NET)

E.mail: advlataverma@gmail.com

Abstract

Global warming bring about climate changes causes, climatic changes causes changes in the livelihood of plants and animals, disturbance in agriculture and food production, melting of

snow caps and increase in sea levels. Due to the greenhouse effect every year the temperature is rising. The factor responsible for this warming may be natural and man-made. Pollution causes the levels of greenhouse gases to go up. This phenomenon is known as global warming. The increased volumes of carbon dioxide and other greenhouse gases released by the burning of fossil fuels, land clearing, agriculture and other human activities are believed to be the primary sources of global warming that has occurred over the past 50 years. The earth has warmed by about one degree Fahrenheit in the last century and the warming has accelerated in the last two decades. Global Warming leads to extreme Weather changes and has reportedly contributed to more frequent incidences of weather changes such as hurricanes, droughts, tropical storms and floods .To reduce the effect of global warming, we can help to reduce the demand for fossil fuels, which in turn reduces global warming by using energy more wisely and we need to take other effective steps of international level to reduce the effect of global warming.The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. In order to tackle this problem removal of carbon – dioxide from power plant smokestacks, switching from fossil fuel combustion to biomass combustion, reforestation etc. Government of India as well as our Parliament is increasingly supportive of stringent environmental legislations and Regulations. Article 48-A of the Constitution comes under Directive Principles of State Policy and Article 51 A (g) of the Constitution comes under Fundamental Duties.

GCCCS-2019: 120

Suitability assessment of groundwater with reference to fluoride in some villages of Bapoli block of Panipat district of Haryana.

DrBhupindersingh

Assistant Professors, Department of Basic & Applied Sciences

BhagatPhool Singh MahilaVishwavidyalaya, KhanpurKalan, Sonapat, Haryana, India

Email: bhupindersinghmehta@gmail.com

Abstract

In India more than 70% population rely on ground water for their daily needs. Ground water may be contaminated from natural contaminants e.g. fluoride, iron, arsenic and salinity etc. It has been proved that more than 20 states of Indian Republic are suffering from fluoride problem in their ground water. Consumption of fluoride (0.5–1.0 mg/l) through drinking water is beneficial in terms of dental health preventing dental caries. But, higher levels of

fluoride (> 1.5 mg/l) may result in dental or skeletal fluorosis depending on the intensity and duration of exposure. Considering the health effects of fluoride, the present study was undertaken to assess the concentration of fluoride in groundwater of Bapoli block of Panipat district of Haryana. In Bapoli block fluoride content ranged from 0.24 to 1.76 mg/l with a mean of 0.99 mg/l. Out of 40 samples analyzed from Bapoli block, 34 samples had fluoride content within permissible limit and 06 samples had fluoride content above the permissible limit. In general, it has been observed that ground water contains higher amount of fluoride, may be dissolved from geologic conditions while surface water usually contains lesser fluoride content except when contaminated by industrial water. Thus the fluoride accumulation in ground water in different areas varies accordingly to source of water (surface of subterranean), the geological formation of the area, amount of rainfall and quantity of water lost by evaporation. The various factors that govern the release of fluoride in natural water by fluoride bearing minerals and rocks are the basic chemical composition of water, presence and accessibility of fluoride and the time of contact between the source of mineral and water.

GCCCS-2019: 121

Effect of gibberellic acid and salicylic acid on morpho - physiological parameters of Chickpea (*Cicerarietinum L.*) under saline soil

Deep Dangi*, Asha Sharma*

* Department of Botany M.D. University, Rohtak

deepdangi333@gmail.com

Cicerarietinum(Chickpea) is a legume crop belonging to family Fabaceae. It is grown in North India as rabi crop. Chickpea is a salt sensitive crop. High concentrations of salts have detrimental effects on plant growth and eventually result in death growing plants. Plant species differ in their sensitivity or tolerance to salts. Salicylic acid and gibberellic acid play an important role in the regulation of plant growth and development. A direct physiological impact of SA is the alteration of antioxidant enzyme activities in vivo. Gibberellic acid alleviates the negative effects on pigment contents and water use efficiency. Three chickpea varieties (BG - 1103, BGD - 72, BG - 1053) were grown under 5dS/m salinity concentration in pots. Five sets for each variety with triplicates were taken as control 1 with soil salinity 1dS/m (normal condition), control 2 with soil salinity 5dS/m and three sets of soil salinity

5dS/m with plants foliar sprayed by salicylic acid (200 ppm), gibberellic acid (20 ppm) and salicylic acid (200 ppm) + gibberellic acid (20 ppm) in water (with four drops of tween 20) from 19th to 21st day, 29th and 30th day. Shoot length, root length and 3rd internode length from above were observed on 50th day. All three parameters were found to be reduced in control 2 that is under 5dS/m salinity in all three varieties. Shoot length of BGD 72 was restored by S.A. + G.A. application together and shoot length of BG 1103 and BG 1053 were restored by S.A. application. Root lengths of all three varieties were restored by G.A. application. Internode lengths of all three varieties were not just restored but almost doubled by all three applications that is S.A., G.A. and S.A. + G.A.

GCCCS-2019: 122

Detection of pyruvate in serum by an improved amperometric pyruvate biosensor

Mansi Malik¹, Reeti Chaudhary¹ and C.S. Pundir²

¹ Department of Biotechnology, Deenbandhu Chhotu Ram University of Science and Technology, Murthal, Sonapat, Haryana 131039

² Department of Biochemistry, Maharshi Dayanand University, Rohtak- 124001

The nanoparticles of commercially available pyruvate oxidase (POx) were prepared by desolvation method, characterized and immobilized covalently onto gold electrode (AuE) to fabricate an improved laboratory model of pyruvate biosensor. The characterization of pyruvate oxidase nanoparticles (POxNPs) was done by UV- visible spectroscopy, transmission electron microscopy (TEM), Fourier- transform infrared spectroscopy (FTIR) and X- Ray diffraction (XRD) pattern, while that of the modified working electrode (POxNPs/AuE) was carried out by scanning electron microscopy (SEM), cyclic voltammetry studies (CV) and electrochemical impedance spectroscopy (EIS). The biosensor was scrutinized for optimum working conditions at 0.28 V in terms of effects of pH, incubation temperature, response time and substrate (pyruvate) concentration on biosensor response and it was found to be 5.5, 35°C, 7.5s and 0.01µM- 5000 µM respectively. The improved model was applied to measure total pyruvate level in sera of apparently healthy individuals and patients suffering from heart failure in between age group 30- 90 years. The pyruvate levels were analyzed to be in between a range of 47.4±1.85 to 119.0±2.10 in healthy candidates whilst, displayed elevated levels of 154.6±2.10 to 347.±2.71 in the diseased patients. The

biosensor lost 25% of its initial activity after its regular use for a period of 240 days, while being stored dry at 4°C when not in use.

Keywords:Pyruvate, Pyruvate oxidase, Amperometric, Gold electrode, Enzyme Nanoparticles, Serum

GCCCS-2019: 123

Environmentally sustainable spin polarized organic light emitting diode

Savita Khatri, Rajesh Kumar,

UIET, MDU, Rohtak E.mail: savitakhatri.rtk@gmail.com and lather_rajesh@yahoo.com

Abstract

A number of next-generation display technologies emerge in recent years, now there's another one to add to the mix i.e. Spin electronics or spintronics. The increasing interest in spin electronics is due to several distinctions over their inorganic counterparts including its rich physics, flexible chemistry, cost efficiency, and potential applications in new generations of electronic devices. While displays based on the new "spintronic" OLED technology are still some years off, the researchers say they will be brighter, cheaper and more environmentally friendly than the LEDs or OLEDs found in the current crop of TVs, computer displays, traffic lights and other electronic devices. These are based on a new kind of technology known as a spin-polarized organic Light Emitting Diode or spin OLED. Like normal OLEDs, the new spin OLED uses an organic semiconductor to generate light. But instead of simply being an electronic device that stores information based on the electrical charges of electrons, the organic semiconductor is a "spintronic" device that stores information using the "spins" of electrons. At present, the spin OLEDs only operate at temperatures below around minus 28° F (-33° C), so the technology needs to be improved so that they can run at room temperature.

Keywords: OLED: Organic light emitting diode, LED: Light-emitting diode

GCCCS-2019: 124

E-waste management in India: A study

RainuNandal

Assistant Professor

UIET, MDU, Rohtak

rainu_nandal@yahoo.com

Waste management, especially when it comes to plastic, has been given much attention over the years in the country. Plastics took centre stage in the country's discourse on environmental conservation this World Environment Day. Still, somehow, the issue of e-waste, which is among the most dangerous kinds of waste — for it contains heavy metals and other toxic chemicals — remains insidious. Even today, when India is among the world's largest consumer of mobile phones with 1.5 million tonnes of e-waste generated in 2015, most consumers are still unaware of how to dispose of their e-waste. Most Indians end up selling their e-waste to the informal sector, which poses severe threats to human (including children's) lives, with its improper and highly hazardous methods of extracting the trace amounts of precious metal from it and handling e-waste for profit. E-waste is growing at a compound annual growth rate (CAGR) of about 30% in the country. ASSOCHAM estimated that e-waste generation was 1.8 million metric tonnes (MT) per annum in 2016 and would reach 5.2 million metric tonnes per annum by 2020. This paper discusses about new laws on e-waste management in India and a step-by-step guide for a citizen who wants to dispose of his electronic gadget (phone/TV/laptop/anything else) in the right way.

GCCCS-2019: 125

Oxygen evolved by a Manganese compound induces colon cancer cell death in hypoxia

Deepa and UttamPati

Jawaharlal Nehru University, New Delhi-110067, India

E-mail [address- deepac638@gmail.com](mailto:deepac638@gmail.com)

Abstract

The characteristics of tumor microenvironment (TME) includes- low extracellular pH, high interstitial fluid pressure, nutrient deprivation and low oxygen level. Low oxygen level or hypoxia of TME plays a pivotal role in cancer development and progression. This oxygen

deficient micro-environment facilitates therapeutic resistance in cancer. Alleviation of hypoxic environment by enhanced oxygen level is an apparently encouraging approach in cancer therapeutics. A manganese (Mn) based compound has been reported, previously, which is a bio-mimic of oxygen evolving complex of photosystem II. This compound has been identified for oxygen evolution in aqueous solution. In this study we have investigated that oxygen evolved by Mn-compound induces colon cancer cell death selectively in hypoxia. Oxygen generation property of Mn-compound was confirmed by electron paramagnetic resonance oximetry in cell culture conditions. Additionally, Mn-compound induced cell death was confirmed by morphological studies, where this compound is affecting the morphology of hypoxic colon cancer cells. In future this compound could be used as a solution for the problem of oxygen delivery in hypoxic tumor microenvironment.

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Effect of Cadmium on physiological aspects of *Chenopodium* genotypes

Pooja*, Sunder Singh Arya*

*Deptt. Of Botany M.D. University, Rohtak

poojachoonbuk0512@gmail.com

Abstract

Cadmium (Cd) is a heavy metal with a high toxicity that have no role in living organisms. It is toxic at very low exposure levels and has acute and chronic effects on health and environment. Present investigation carried out in order to evaluate the Cd effect (0-100 mM) on growth and development of *Chenopodium album* and *Chenopodium murale*. Both the *Chenopodium* species showed wide difference for Cd tolerance. The shoot length decreased with increased in cadmium stress in comparison of control plants. The variety of *C. album* showed the lowest value of shoot length at 100mM cadmium stress. While the variety of *C. murale* showed drastically decrease in shoot length at all Cd level. The root length decreased with increased in cadmium stress in comparison of control plants. The decreased in root length was maximum in *C. album* (70.9%) while minimum in *C. murale* (64.8%). The total chlorophyll increased with increased in cadmium level from 0 to 50mM concentration in comparison of control plants. The variety of *C. murale* showed the lowest value of total chlorophyll at 25mM cadmium stress and the highest value shown by *C. album* at 25mM concentration of stress while both varieties showed increased in total chlorophyll up to 50mM Cd level but at highest concentration plants could not survive.

Key Words: Cadmium, heavy metal, total chlorophyll, shoots length, root length, concentration

GCCCS-2019: 127

Morphological analysis of isolated starch

Sapna and B. S.Yadav*

Department of Food Technology, MaharshiDayanand University, Rohtak- India

*baljeetsingh.y@gmail.com

Abstract

Starch is a carbohydrate that is present in various crops like cereals, tubers and pulses as semi crystalline granules. This further is made up of two polyglucans-amylose and amylopectin. Amylose is a straight chain having α -(1,4) linkage and comprising 15-35% of starch weight. Amylopectin is smaller but extensively branched chain having α -(1,4) and α -(1,6) glycosidic linkage and its concentration varies from 65-85% of starch weight. The size and morphology of starch granules varies from source to source. As starch molecules are semi-crystalline in nature, both crystalline and amorphous regions are present in starch. The morphology of cereal, tubers and legume starches is different. Under the polarized light microscope a pronounced birefringence cross were exhibited at the centre of native legume starch which is a symbol of average radial orientation of helical structure. Scanning electron microscopy is used to observe outer structure of starch. The starch granules were rounded and oval shaped. Furthermore, the surface of starch granules was smooth with no fissures under the scanning electron microscopy.

Keywords: Morphology, starch, SEM etc.

GCCCS-2019: 128

Phytoremediation of contaminants of soil and ground water

NaveenaDinodia, Asst. Prof of Botany Govt. College Badli (Jhajjar)

E.mail.: - Kumarj881@gmail.com

Abstract

Phytoremediation is a complementary technology that is cost effective and has tremendous use of plant potential to degrade hazardous abnoxious contaminants from the environments. It aims at remediating sites with shallow low to moderate toxic metals at a fraction of the cost conventional technologies such as soil replacement, solidification and washing strategies. Phytoremediation has been progressing attempting to catch up with field application. It is an alternative technology that can be applied for metal pollutant that are amenable to phytostabilization, phytoextraction, phytotransformation or Rhizosphere bioremediation. The accumulation of heavy metals in the crop strongly correlates with the total concentration of metals in soil but is significantly influenced by soil properties, such as content of mass and micronutrients and soil acidity. The plant root system increases the microbial activity giving a biologically active environment in soil for degrading organic compound.

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RNAi, an environment friendly approach for the control of agricultural pests

Archana Suhag and Ranjana Jaiwal^{1*}

¹Department of Zoology, M. D. University, Rohtak

*Corresponding author: ranjana.jaiwal@gmail.com

Food is the basic necessity of any country but due to various abiotic and biotic factors the yield and quality of food crops has been affected drastically. Among the biotic factors insect pests cause a great loss to the crop productions. Various control measures like cultural, chemical, biological and mechanical methods have been applied to control various pests either singly or in combinatorial fashion as integrated pest management. But all these strategies have their own inherent limitations like laborious, harmful to the environment, economic constrains, chances of insects acquiring resistance for the insecticide etc. Here comes a new technique i.e. RNAi which involves the sequence-specific degradation of target mRNA without altering the genome of target insect pest and also it works extremely well with any kind of insect pests like aphids, moths etc. In this approach, any vital gene in the insect body is targeted and silenced by introducing dsRNA showing homology with the target gene. Exogenous dsRNA triggers the RNAi mechanism in the insect body resulting in silencing of the target gene and ultimately the death of the insect. RNAi is a powerful gene regulatory mechanism present in eukaryotes, which was first observed in higher plants and later discovered in *Caenorhabditiselegans*, *Drosophila melanogaster*, insects, fungi, and

vertebrates. This phenomenon of gene silencing has now been considered as a potential strategy for the control of insect pests.

Keywords: Integrated Pest Management, RNAi, dsRNA

GCCCS-2019: 130

Evaluation of Onion genotypes for growth and bulb yield parameters in different regions

Hitesh Kumar* and S.K. Dhankhar

Department of vegetable Science, CCS, Haryana Agricultural University, Hisar-125004

E-mail: hitesh.3971@gmail.com

Abstract

Onion (*Allium cepa*L.) belonging to the family *Alliaceae* is a widely grown vegetable crop. It is popularly called as *Queen of kitchen*, as both of the green leaves and mature bulbs stages are used as a salad, vegetable and spices for daily human consumption across the world. Onion has a great demand due to its flour, pungent test and medicinal value. In India, it is mainly grown in states of Maharashtra, Orissa, Karnataka, Uttar Pradesh, Gujarat, Tamil-Nadu and Madhya Pradesh. An experiment was conducted to study the growth, yield and quality parameters with genotypes of onion *viz.*, Hisar onion-2, Hisar onion-3 and local variety at the study farm of vegetable, CCS HAU, Hisar during November, 2016-17 with a view to select the suitable genotypes based on higher yielding abilities at research farm of vegetables. Results revealed that the genotype Hisar onion-4 produced the highest bulb yield followed by Hisar onion-2 while the lowest yield was found in local variety. These high yields were obtained due to the favourable environment or climate conditions and nutritional management system. Considering yield and yield contributing characters, the genotype Hisar onion-2 can be selected as the best genotype for growing in loamy soil at vegetable experiment farm. Therefore, the findings of the present study will help the breeders for further yield improvement of onion at research farm of vegetable.

Key words: Growth, Onion, Quality, Yield

Towards a Sustainable Future

PreetiDabas

Department of Economics, Maharshi Dayanand University, Rohtak, Haryana

Email address: preetidabas871@gmail.com

Abstract

This paper attempts to project progress towards a sustainable future by examining the global region-wise performance in implementing all 17 indicators of the United Nations Sustainable Development Goals (SDGs). SDGs are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. SDGs have set the 2030 agenda to transform the world by tackling multiple challenges which the humankind is facing to ensure well-being, economic prosperity, and environmental protection. For the purpose of study, the world is divided into eight regions; namely, Europe and Northern America, Latin America and the Caribbean, Sub-Saharan Africa, North Africa and Western Asia, Central and Southern Asia, East and South-Eastern Asia, Australia and New Zealand, and Oceania. The study is based on secondary data which has been retrieved from Statistics Division of Department of Economic and Social Affairs, United Nations.

The paper at the end tracks India's position as well in all the indicators and concludes whether the performance is decreasing, stagnating, moderately increasing, on track or maintaining SDG achievement in all the indicators separately.

Key Words: climate, environment, goals, inequality, sustainable development, inequality.

GCCCS-2019: 132

Effect of Induced drought condition on chilli (*Capsicum annum*) variety

Chanchal Garg¹, Kirpa Ram¹ and Asha Sharma²

¹Department of Botany, Baba Mastnath University, Rohtak

²Department of Botany, MaharshiDayanand University, Rohtak

Email: chanchu518@gmail.com

Abstract

Drought is one of the major abiotic concern for increasing agricultural demand. It affects the morphological behaviour & as well as internal system of plant to adapt in stress condition for survival or completion of life cycle. During stress condition plant RWC (Relative water content) and Total chlorophyll content get reduced to some extent that shows plant tries to overcome stress condition. The present analysis was carried out under different mannitol concentration (100, 150, 200 and 250 mM) on chilli genotypes. Two chilli genotypes (PSB and PJ) were grown under natural condition (all recommended irrigations are given) and drought conditions (created by the different concentration of mannitol; 100mM, 150mM, 200mM and 250mM) in screen house at the experimental area of MD University, Rohtak. A notable decrease in total chlorophyll content and relative water content was observed at each concentration of mannitol and growth stages whereas at 250mM concentration of mannitol it was found maximum against the stress condition. Genotypes

Keywords: Morphological, drought and relative water content etc.

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Effects of heavy metal pollution on soil microbial population: A review

Ganpat Louhar^{1*} and Divya Gaur²

^{1*}Division of Soil Science and Agricultural Chemistry, IARI, New Delhi-110012

²Department of Soil Science, CCSHAU, Hisar, Haryana-125004

*Corresponding author - loharganpat95@gmail.com

Abstract

Soil is a most important natural resource. Due to long term persistent, toxic and non-biodegradable nature of heavy metals, the problem of heavy metals in the soil increasing day by day. Soil heavy metals are categorized into two groups by biochemical characteristics: (i) (Pb, Cd and Hg) harmful to crops, humans and animals (ii) when excessive (Cu, Zn and Mn) it will damage to biologically. Soil pollution by heavy metals contamination is a severe global environmental problem due to its adverse affects on plant growth, genetic variation and also on microbial composition and their activity. Soil microbes are used as an important indicator of soil environmental quality because of their sensitivity to soil environmental stress and adverse conditions. Soil microbes are important component of soil quality and play fundamental roles in soil fertility through organic matter decomposition and nutrient cycling of C, N, P, S and other elements. Activities of bacteria and actinomycetes are significantly decreased with increasing heavy metal content but actinomycetes affected more strongly by heavy metals. The degree of tolerance is as follows: fungi>bacteria>actinomycetes. When microorganisms disturbed by heavy metal contamination, they indirectly affects the soil ecosystems through affecting soil structure, mineral metabolism and crop growth *etc.* So, we need to develop detection methods to detect the heavy metal content in the soil and get more accurate relationship with microbial communities and their activities.

Keywords: Heavy metals, microbial communities, natural resource, soil pollution, soil quality.

GCCCS-2019: 134

Mitigating climate change: A step towards sustainable development

Dr. Monika Gupta

Assistant Professor in Chemistry, Vaish College, Rohtak

Email: guptamonika77@yahoo.com

Abstract

Climate change refers to the variation in the earth's global climate or in regional climates over time. It describes changes in the state of the atmosphere over time ranging from decades to millions of years. Unsustainable consumption patterns of the rich industrialized nations are the main cause for the risk of climate change. Only 25% of the global population lives in these countries, but they emit more than 70% of the total global CO₂ emissions and consume 75 to 80% of many of the other resources of the world. Indians should be concerned about

climate change since it may have substantial adverse impacts on the population. Not all possible consequences of climate change are yet fully known, but the three main categories of impacts are those on agriculture, sea level rise leading to submergence of coastal areas, as well as increased frequency of extreme events. Each of these pose serious threats to India. This Paper deals with direct or indirect efforts made by the Government to reduce energy consumption, promotion of renewable energy sources, abatement of air pollution and the various fuel substitution policies that ultimately is a step towards sustainable development.

GCCCS-2019: 135

The importance of medicinal plants

MukhanWati and M. Khabiruddin

Department of Chemistry

Chaudhary Charan Singh Haryana Agricultural University

Hisar – 125004, Haryana

Email id: mukhandagar88@gmail.com

Abstract

Plants are good source of antioxidants. Thus, in recent years, researchers have been searching for pharmacologically potent and non-toxic antioxidants from natural resources, especially edible or medicinal plants. Many indigenous medicinal plants have been used popularly as folk medicine in India and other Asian countries. The bioactive principles have been reported in some of these Indian medicinal plants. Secondary metabolites such as polyphenols have drawn increasing attention due to their potent bioactivities and their credible effects in the prevention of various oxidative stress associated diseases. One of the more prominent properties of the phenolics is their excellent radical scavenging ability.

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Microbial degradation of Lindane (γ -HCH) from the soil samples from environmental sites

Dharmender Kumar*

*Department of Biotechnology

Deenbandhu Chhotu Ram University of Science and Technology,

Murthal-131039 Haryana India

*Email: dkbiology@gmail.com

Abstract

Lindane (γ -HCH) is an organochlorine insecticide and their residues continue to persist in the environment having serious health concerns. Its use in agriculture has been prohibited in most countries, but the pharmaceutical use is allowed up to 2015. Consequently, new sites are being contaminated. Its residues persist in the environment and have been found in water, sediments, soil, plants and animals. One of the strategies adopted to remove lindane from the environment is bioremediation using microorganisms. In the present study we are looking for potent degraders which could utilize lindane as a sole carbon source. The various approaches of decontamination of HCH like chemical treatment, incineration, and land filling available, but they lack widespread application due to their cost factor and toxicity concerns to the living system. The bioremediation technology has been proposed as promising tool for *in-situ* detoxification of pesticide-contaminated sites. The residues of lindane persist in the environment and have been detected in water, sediments, soil, plants and animals. One of the strategies adopted to remove lindane from the environment is bioremediation using microorganisms. Strains which are Gram-negative related to *Sphingomonas* sp. which is potent degraders of lindane. Mixed culture was also observed which is showing more ability to remove lindane more than pure isolated cultures which degrade up to 400 ppm concentration. This mix culture was analyzed microscopically and found that along with bacteria, fungi and actinobacteria (like *Streptomyces* sp.) were observed among mix culture. The actinomycete isolates were cultivated, as pure and mixed cultures, in minimal salt medium with lindane. The cell free extracts for dechlorinase activity assays and the supernatants from these cultures were used to determine. The characterizations of microorganisms from different sites have been deployed for the capability of microorganism for the degradation of different pesticides.

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Effect of acceptance of food by freshwater fish in surfactant polluted water

Sudesh Rani, PreetyMadan, Priyanka and Anshu

Department of Zoology, M.D.University, Rohtak

E-mail: sudesh_zoology@rediffmail.com

Abstract

Surfactants are considered as major component of detergent used in household as cleaning products. In present effect of food acceptance by fresh water fish, *Labeorohita* was studied in response to water polluted due to surfactant. For this different concentrations of surfactant, Surf excel were taken and accordingly three groups were formed. Group-1 act as control group-2 and 3rd were received surfactant of different concentrations. The concentration chosen were 6.63 mg surfactant /lit water and 13.03 mg surfactant / lit water respectively. Estimation of Feeding rate was calculated at 1st, 2nd 3rd and 4th days of the experiments. The feeding rate was reduced with increasing concentrations of surfactant in water. The study revealed that there were more physiological stresses to the fish exposed in higher concentrations of surfactant than the lower concentrations.

key words: Fish, surfactant, feeding rate

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Climate remodeling through Carbon Sequestration Potential of Plants

Neetu, Abhishek, Amrender and Surender S. Yadav*

Department of Botany, MaharshiDayanand University, Rohtak, (Haryana) India

*Corresponding author: ssyadavindia@gmail.com

Abstract

The modern world is totally dependent on carbon based energy and world environment is heavily linked with carbon trading. The release of carbon due to various anthropogenic activities is leading to climate change and environmental degradation. Forests on terrestrial ecosystem contribute maximum to capture the carbon dioxide but existing global policy alone will not be enough in carbon management. Plant stem, living biomass, roots, foliage, and litter prominently store carbon captured from atmosphere through the process of photosynthesis. Moreover, soils of forest ecosystems are major sink of carbon and represent more than half of the stock of carbon in forests. Forests through carbon capture helps to reduce the level of green house gases, air pollution that are major threat for environment causing global warming. Total carbon stock of forests in world is 652 gigatonnes. Worldwide, boreal and tropical forests have major carbon stock contributing nearly 46% to total carbon stock in forests. The carbon stock of Indian forests is 7,082 million tonnes. Burning of biomass, fossil fuels and deforestation act as a source of carbon emission. Realizing the importance of carbon management in forests, recent international and national

treaties and protocols have paid more attention towards forests. Hence, conservation, protection and rejuvenation of forests alongwith carbon trading may be promoted for harnessing full potential of forests for carbon sequestration as a viable strategy for sustainable development.

Keywords: Carbon management, Forest, Carbon sequestration, Carbon trading.

GCCCS-2019: 139

Characterization of phytoconstituents present in the selected weeds

Yogita Sharma and Dr. RachnaBhateria*

Department of Environmental sciences, MaharshiDayanand University, Rohtak

*Email: bioremediationlab.mdu@gmail.com

Abstract

In recent years, gas chromatography and mass spectrography (GC–MS) has been applied unambiguously to identify the structures of different phytoconstituents from plant extracts and biological samples with great success. Many plants are rich source of secondary metabolites such as alkaloids, phenol, glycosides, flavonoids, tannins and terpenoids determined by gas chromatography and mass spectrum. GC-MS analysis revealed the presence of biomolecules present in the methanolic extract of leaves of *Daturainoxia* and *Partheniumhysterophorous*. The chemical compositions of methanol extracted leaves powder of *Daturainoxia* and *Partheniumhysterophorous* were investigated using Thermo Fisher Gas Chromatography- Mass Spectrometry. The mass spectra of the compounds found in the extract was matched by the National Institute of Standards and Technology (NIST) library. The analysis revealed the existence of important compounds like 9, 12, 15 Octadecatrienoic acid (17%) and phytol (10%) in *Daturainoxia*, with total of 20 compounds were identified while phenol (14%) and ascorbic acid (17%) in *Partheniumhysterophorous* with total of 19 compounds identified representing of total methanolic extract composition. These studies will be helpful for analyzing the reducing ability of the weeds for green synthesis of metal nanoparticles. The present study designed to determine the bioactive compounds in the methanol extract of leaves of the weeds namely *Daturainoxia* and *Partheniumhysterophorus*.

Keywords: *Daturainoxia*; *Partheniumhysterophorous*; Phytochemical studies; GC-MS analysis; methanolic extract.

Climate change and its impact on Biodiversity

Amrender Singh Rao, Abhishek, Neetu and S.S. Yadav*

Corresponding author* : ssyadavindia@gmail.com

Department of Botany, MaharshiDayanand University, Rohtak

Abstract

Climate change is assessed as the sum of all the weather conditions over a long period of time. Various factors like biotic processes, variation in solar radiation, plate tectonics and volcanic eruptions and last but not the least anthropogenic activities contribute towards climate change. Biodiversity and climate change are two sides of a coin, where one influences the other. Generally change in climate leads to loss of biodiversity at various ecosystem levels, influencing and altering various ecosystems like terrestrial, marine and freshwater. Environmental conditions play a key role in defining the function and distribution of plants in combination with other factors. Changes in long term environmental conditions which are collectively termed as climate change are known to have had enormous impact on current plant diversity patterns. Factors influencing climate change include rising levels of CO₂, rising temperature, water levels. These factors have a defining role over biodiversity and its components altering their genetics, physiology, phenology, dynamics, distribution, interspecific relationships, community productivity, ecosystem services, biome integrity. There is a need for science based assessment tools that also provide solution oriented approaches which work in practice. Awareness and strict implementation of acts like United Nations Convention on Biological Diversity act 1992, Threatened Species Conservation act and environmental planning and assessment act. There is extant need of prioritizing the allocation of limited resources to maximize conservation outcomes, relative to conservation goals, under a constrained budget so as to combat impacts of climate change.

Keywords: Climate change, Biodiversity, Ecosystem, Plant diversity.

Use of Plant Growth Promoting Rhizobacteria for Alleviation of Adverse Effects of Heavy Metal Ion Stress in Crop Plants

Sangeeta Kumari^{*}, Pooja Rani¹ and Anita R. Sehrawat^{*}

^{*}Department of Botany, M.D. University Rohtak.

¹Department of Plant Physiology CCSHAU Hisar

Email: sangeetaghawat@gmail.com

In the present time, pollution of water, soil and air with heavy metals is increasing rapidly. In agriculture soil heavy metal ion accumulation increase due to human resources such as use of fertilizers, sewage sludge, and pesticides in agricultural soils. Excess additions of heavy metals in soil have changed ecology and diversity of microbial community, deteriorate soil, decreased the growth and yield of plant, and entered into the food chain. Metal ion accumulation exerts a negative impact on the growth, biomass, and photosynthesis of plant and compromise sustainable food production. Plants tolerance against to heavy metal ion stress needs to be increased in order to allow growth and production of crops with minimum or without accumulation of heavy metals in edible parts of plant that satisfy safe food demands for the world's rapidly increasing population. It is well known that plant growth promoting rhizobacteria enhance crop productivity and plant resistance to heavy metal stress. This review article describes the application of heavy metal resistant plant growth promoting rhizobacteria to enhance agricultural yields without accumulation of metal in different plant tissues and their effects on crop plants.

Keywords: metal stress, plant growth promoting rhizobacteria

GCCCS-2019: 142

Assessment of heavy metal content in vegetation at various urban traffic sites of Rohtak city

Sunil Kumar

E-mail: sunilevs@yahoo.com

Department of Environmental Sciences, MDU, Rohtak

Abstract

Environmental pollution with heavy metals is a global problem. Living organisms are not able to prepare and adapt rapidly to a sudden and huge environmental load with different toxic compounds, thus the accumulation of such toxic compounds, especially of heavy metals having highly hazardous effect. This study examined the heavy metals content at various urban traffic sites of Rohtak city. Vegetation from 10 sites was collected from various locations. Fine powder of the plant stem, leaves and roots were digested with di-acid mixture and analysed by Atomic Absorption Spectrophotometer. Average concentration of heavy metals in vegetation like Cd, Zn, Pb and Cr 5.10, 15, 15, 28 mg/kg, respectively, which are above the permissible limits given by IS/WHO/FAO (1996), where as Ni metal is found below the permissible limits i.e., 2.57 mg/kg. On the basis of our finding it is concluded that these traffic sites were polluted by vehicle exhaust.

Keywords: Heavy metals, toxicity

GCCCS-2019: 143

Cancer a manifestation by pollution in India

Jagjeet Singh*

Department of Zoology, MDU

E-mail: jakharjagjeet@gmail.com

Abstract

Cancer is major problem of global world population. It is a non-communicable disease which is a result of the activation of the proto-oncogenes inside the body. In present scenario

cancer's threat is increasing day by day due to modernisation of life style and the present socioeconomic conditions. Increased cancer cases are associated with heavy metal pollution, exposure to harmful chemicals of various industries. Increasing industrialisation, growing economy, population explosion, contamination of abiotic environment and contaminated food intake are major reasons for cancer in India. India accounts for nearly twice the number of cancer cases than USA and UK. Farm pesticides, tobacco consumption, polluted water, polluted air and unhealthy working conditions along with poor medical facilities and high population density made the conditions inductive for cancer proliferation. Nearly 6% of death among adults are due to cancer and are likely to increase, but healthy life style and reduction in pollution may help to combat cancer.

Keywords: Cancer, India, Pollution, Life style.

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Genetic engineered *Camelina sativa* for improved heavy metal tolerance against environmental pollutants

Sapnabhorla ,Dr.P.K.Jaiwal

Centre for biotechnology, M.D.U.Rohtak

E-mail: bhoriasapna@gmail.com

Abstract

Increasing industrialization, human activities and improper ways of waste disposal are becoming the main reasons of soil and water bodies' contamination. Soil contamination with heavy metals like cadmium (Cd), mercury (Hg), copper (Cu) now has become a matter of concern. In few cases, heavy metals leach into the water bodies and then their spread is not limited to a confined area. To eradicate the contamination and remediate the soil and water bodies from toxic contaminants researchers have targeted plants for this work. Plants are safe, inexpensive and have easy monitoring system. Many plants have the ability to grow in highly contaminated sites and absorb, accumulate and transform the contaminant into less toxic forms. *Camelina sativa* (false flax ,gold-of-pleasure,German sesame) widely popular oil crop, is a small duration crop(85 to100 days) with low agronomic inputs like nitrogen ,herbicides and pesticides, high yielding, fast growing and has the ability to phytoremediate. Camelina has a family of eight genes in their genome collectively called *CsHMA*s work for storage and transfer of heavy metals .Out of these eight genes *Cs HMA*s 1to 4 genes act as

effective candidate work for transfer and storage of Cd, Pb, Zn and Co specifically. The ability of this plant to accumulate contaminants present in the surrounding can be improved with cloning and expression of foreign genes. . Nowadays camelina with HM accumulator genes is very much in demand.

GCCCS-2019: 145

Transition towards environmental sustainability: coordinated approaches

¹Dr. (Mrs.) SaritaDahiya,²Shobha saini,Dr. (Mrs.) ³Promila

1. Department of education, Rohtak sarita.dahiya.in@gmail.com

2. Saini institute of girls' education, Rohtak sainishobha22081979@gmail.com

3. V.B. College of Education, Rohtak pardeephooahyr152@gmail.com

Abstract

Environmental sustainability is the ability to maintain the qualities which are valued in the physical environment. Sustaining the recycling of certain materials may only need to continue for as long as those types of material are needed technologically, and depending on the pace of technical change this could be for centuries or for decades. Coordinated approaches are necessary for solving the major environmental and sustainability problems facing the developing as well as developed countries. Government Policies and Economic Outlook, Natural Resource Accounting, Estimation of the Environmental Impact, Appraisal of the Environment are the approaches with the help of which we can sustain environment. Therefore, there is a need to have a better understanding of the multidisciplinary inter-relationships between sustainable development, human health and the environment. Specific emphasis is laid on globalization and sustainable growth, bioethics and poverty, organizational performance and sustainability, environmental management and individual progress, human and ecosystem health, and water resources and recycling. The resources are only needed for a short time however as society might find new uses for materials as technology, lifestyles and environmental awareness develop. Environmental sustainability can only be obtained through a combination of both preventive and restorative actions. So restoration is a key part of what needs to be done to achieve sustainability. Transition toward sustainable society requires behaviour change. This behaviour change will definitely develop the environmental sustainability.

GCCCS-2019: 146

S doped ZnO: An insight for visible light photocatalysis

Rakesh Kumar

Assistant Professor, JVMGRR College, CharkhiDadri

Email: rakeshjangramba@gmail.com

Abstract

ZnO material has gained attention as the most studied semiconductor material for photocatalytic purposes, including their use in devices for clean energy production, such as solar cells and water splitting systems which is need of time to fight against global climate change. However, the wide band gap of this material limits applications to UV light, which also confines the use of solar irradiation as the energy source. Most research in the last years is showing the ability of S doping in ZnO to promote light absorption in the visible range but, till date, effect of S doping on properties of ZnO is still controversial. This paper summarizes the recent advancement in the structural design perspective of S doped ZnO photocatalyst, in a critical analysis of its application for environmental purposes. We reported the effect of S doping on the structural, morphological and optical properties of ZnO. Furthermore, selected recent and significant advances in the area of renewable energy applications for modified S doped ZnO were assessed with the particular importance given towards the photocatalytic degradation of pollutants.

Keywords: global, climate, morphological, pollutants.

GCCCS-2019: 147

Effect of climate change on fertility

Sonika and Dr.PushpaDahiya

Department of Botany, MaharshiDayanand University, Rohtak,

E-mail: Soninehra08@gmail.com

Global warming is a major issue of century. Increasing temperature is a threat to biodiversity. Climate change effect species survival as well as fertility. Rising temperature can reduce fertility or make some species sterile. Extreme temperatures can severely impact fertility in animals, plants and fungi. Climate change increases populations' extinction due to fertility losses. A m measure of how organisms function at extreme temperatures that focuses on fertility is known as the Thermal Fertility Limit (T. F. L.). Standard measures of T. F. L. may help to predict species at risk under climate change. Global warming might directly affect fertility in two ways:-First, hot weather could affect

sexual behavior as all energy requiring processes are difficult to carry at high temperature. Second, temperature could negatively influence reproductive health factors such as sperm motility and menstruation. Sperm motility is important factor for fertilization. Reduced sperm motility reduces fertility. New findings published in the journal *Nature Communication* reveal that heat waves damage sperm in insects with negative impact for fertility across generations. Heat waves halved the amount of offspring males could produce. Research finds that hot weather causes a fall in birth rate nine months later in human. Hot weather harms reproductive health at the time of conception. Many developing countries experience hotter climate than the United States. As a result, these are more likely to feel the effects of climate change, which could include worse fertility outcomes.

Keywords: Reproduction, Thermal fertility limit, Sexual behavior, Sperm motility, Menstruation, Heat waves.

GCCCS-2019: 148

Solar hydrogen revolution: A compelling fuel for future

SaloniMangal, Dr. RachnaBhateria*

Department of Environmental Science

MaharshiDayanand University, Rohtak

E-mail: bioremediationlab.mdu@gmail.com

Amidst the enormous demand for a clean and safer alternative propellant, solar hydrogen fuel cell proves to be a prominent fuel. By combining the properties of both insolation or sun's energy and hydrogen fuel cell we can cut out on the limitations which they generate if used individually for electricity production. In this technology sun's energy is used to create and provide electricity to the electrolyzer for chemical decomposition of water and become source of hydrogen, instead of getting hydrogen from fossil fuel burning in conventional fuel cell which is unhealthy for environment. Hydrogen produced and oxygen are then fused in the fuel cell to induce electric power. It is green in terms of its byproducts also as it releases only heat, water and oxygen which brings out no destruction to the nature. Further the problem of continuous furnishing of the hydrogen in the fuel cell is also resolved in solar hydrogen fuel cell as the extra energy released from solar panels can be used to reserve hydrogen during electrolysis process. Taking into consideration the fact that growing utilization of solar panels and its depreciating cost, thereby cheaper hydrogen fuel can lead this technology to be used in power plant instead of hazardous propellants for power production. This review delivers insights on details of this compelling technology as to how it

works, what are its components, how it overcomes various limitations and its potential as future legitimate fuel.

Keywords: Renewable Propellant, Hydrogen Fuel Cell, Solar Energy, Chemical Decomposition, Electricity Generation

GCCCS-2019: 149

Synthesis and luminescent properties of europium(III) complex $\text{Eu(L)}_3\text{-phen-N-oxide}$

Rajesh Kumar, Jyoti, V.B. Taxak*

Department of Chemistry, Maharshi Dayanand University, Rohtak – 124001, India

**Corresponding Author: Tel:9466722544, E-mail-v_taxak@yahoo.com*

The europium complex $\text{Eu(L)}_3\text{-phen-N-oxide}$ was synthesized by using aromatic carboxylic acid ligand, 1-(4-methoxyphenyl)-5-(trifluoromethyl)-1H-pyrazole-4-carboxylic acid and ancillary ligand 1,10-phenanthroline-N-oxide via solution precipitation method. The complex was characterized by means of elemental analysis, $^1\text{H-NMR}$, $^{13}\text{C-NMR}$, IR, UV-visible, photoluminescence (PL) spectroscopy and thermogravimetric analysis. The photoluminescent studies confirm the bonding of ligand with europium ion through carboxylate group. In emission spectra of europium(III) complex, the intense and hypersensitive $^5\text{D}_0 \rightarrow ^7\text{F}_2$ transition observed at 614 nm (1). The time decay curve of complex clearly reveals the presence of single luminescent centre. The CIE color coordinates of complex are close to National Television committee system (NTCS 1987) primary color (0.63, 0.35). The TG-DTG curve of complex exhibits high thermal stability. The excellent luminescence performance of the europium(III) complexes makes it promising candidate for fabrication of OLEDs.

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Environment And Pollution Control

Dr. Meenakshi
Asst. Prof. (Dept. of Geography)
CDLU, Sirsa

Environment is a most important part of human life. The word environment derived from the French word 'Environed' that means 'to surrounds.' It includes both biotic and a biotic substances. Environment is the totality of all physical, social and biological factors, individually as well as collectively, that comprise the nature and manmade surroundings. A great geographer Allen Sample wrote in her book "Influence of Geographic Environment" that man is a child of nature and nature rears up the men, the total of all conditions, agencies and influences, which effect the development, growth, life and death of an organism, species and races. In this case we study all the relevant issues related to environment.

Pollution is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of energy and chemical substances. Pollutants are the components of pollution, can be either foreign substances, energies or naturally occurring contaminants. Pollution is very danger for human life. If we can study on pollution then we find that in 2015, pollution killed 9 million people in the world. At present we can control the pollution and then we escape human life.

Pollution control is a term used in environment management. It means the control of pollutants into air, water or soil. Without pollution control heating, agriculture, mining, manufacturing, transportation and other human activities, whether they accumulate or disperse, will destroy the environment. In the hierarchy of controls, pollution prevention and waste minimization are more desirable than pollution control. We control pollution with recycling of water, reusing of other materials, waste minimization, preventing, mitigating and compost the materials. We can use other pollution control devices like air pollution control thermal oxidizer, dust collection systems for example bag house, cyclones, electrostatic precipitation, scrubbers, sewage treatment, industrial waste water treatment, vapor recovery systems etc.

Our government also works to save environment and make many policies and acts because man become selfish for his own development and he destroy environment. The government make many policies to save the environment. Some policies are described here which Indian government makes:-

1. Environmental Protection Act, 1986
2. National Environment Policy, 2006
3. Water Act, 1974

4. Air Act, 1981
5. Noise Pollution Rules, 2003
6. Hazardous Waste Rules, 2016
7. Bio Medical Waste Rules, 2016
8. Municipal Solid Waste Rules, 2016
9. Plastic Waste Management Rules, 2016

Environmental elements conservation does not mean the denial of use, but rather the proper use without causing any adverse effect on economy. The future welfare and prosperity of India would very much depend upon over ability, effort and success in conserving, developing and proper utilization of our environment. It is therefore high time that the nation as a whole awakens to this burning problem for the sake of a better future. The new reports of the National Remote Sensing Agency indicate that the country is losing about 1.3 million hectares of forest cover in every year. When we save earth's elements like soil, water, animals, plants then we save our life because man is the main part of environment, which depends on every part of earth. Man developed his own life and destroyed environment. Natural Resource Management is very similar to environment conservation, but focuses primarily on our actions and effect of quality of life in that habitat.

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E-waste: A challenge or opportunity

Harkesh Sehrawat, VikasSiwach , Yudhvir Singh
UIET,MDU, Rohtak
sehrawat_harkesh@yahoo.com

Abstract

The usage of various types of electronic equipment is increasing day by day, and the result is the amount of electronic waste produced each day is equally growing enormously around the globe. Due to hazardous contents, disposal of e-waste is an emerging global environmental and public health issue but recycling of valuable elements contained in e-waste such as copper and gold has become a source of income mostly in the informal sector of developing or emerging industrialized countries. E-waste contains discarded products like computers, televisions, stereos, copiers, fax machines, VCRs, electric lamps, cell phones, audio equipment and batteries. Although there are many issues with e-waste but it is creating lot of opportunity in the form of recycling the waste. These discarded products can be reused, refurbished, or recycled so that they would be less harmful to the ecosystem. This paper provides a study of various methods which can result in converting this major problem to new opportunities in this global era.

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Recycling Metallic Waste: A Study

Pardeep Gahlot

Deptt. of ME, UIET, MDU, Rohtak

Pardeepgahlot84@gmail.com

Abstract

Waste management is a major problem in India. Faced with rapid population growth, disorganization of city governments, a lack of public awareness and limited funding for programs, cities have struggled for years to find a way to responsibly manage the country's ever-increasing amount of trash. As a developing country, India is producing lot of metallic waste. Although almost every kind of metal can be recycled repeatedly without degradation of properties, currently, only 30 percent of metal is recycled. Throwing away a single aluminum can waste energy equivalent to the same can filled with gasoline. This paper highlights the importance of metal recycling and its current scenario in Indian Market.

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Impacts of E-waste on Human Life

VikasSiwach ,Yudhvir Singh, Harkesh Sehrawat

UIET,MDU, Rohtak

singhvikashuiet@gmail.com

Abstract

E-waste has become a major problem. E-wastes are dangerous as they contain components of some electronic products, which are hazardous to health, depending on their condition and density. Due to the crude recycling process, many pollutants, such as persistent organic pollutants and heavy metals, are released from e-waste, which can easily accumulate in the human body through the inhalation of contaminated air. E-waste is highly complex to handle because of its composition. It consists of multiple components some of which contain toxic substances that have an adverse impact on human health and environment if not handled properly that is if improper recycling and disposal methods are deployed.