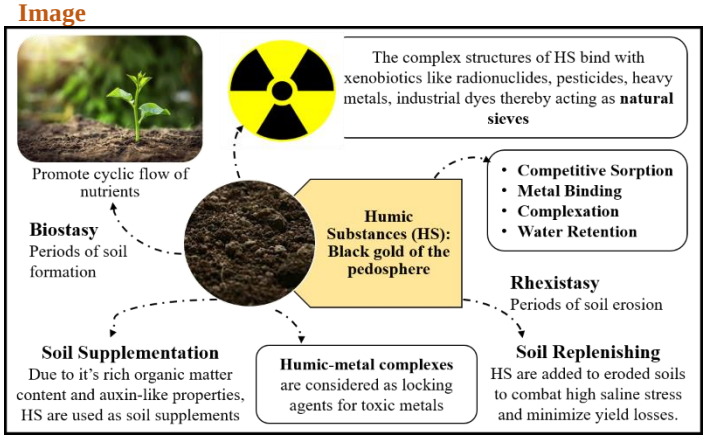
Humic Substances: The black gold of the pedosphere

Hemlata K. Bagla, PhD, RSO Level-I, Department of Nuclear and Radiochemistry, K.C. College, India

Abstract (300 word limit)

Statement of the Problem: The current state of global soil and water pollution has led to deteriorated ecosystems with a severe paucity of nutrients, flora, and fauna. Industrial effluents containing heavy metals, pesticides, and organic pollutants like dyes, are often left untreated into the nearest water body. Most places fail to comply with regulatory norms, due to high treatment costs and multi-step procedures. Moreover, regions employing inadequately treated wastewater for irrigation may face the problem of heavy metal deposition. Other xenobiotics like radionuclides enter the ecosystem due to nuclear accidents and reactor operations. In order to combat the rising pollution crises and lower its immediate effects on the environment, we have explored a simple yet efficient system of biosorption using naturally occurring, ubiquitous humic substances (HS). Methodology & Theoretical Orientation: HS are rich in functional groups that interact with xenobiotics and form long-lived complexes, acting as buffers of the ecosystem. They positively influence the physical, chemical, and biological properties of soil and give rise to auxin-like molecules, therefore rightly termed as 'black gold' of agriculture. Batch biosorption method was carried out with all essential parameters for the removal of heavy metals like Zn, Ag, Co, and radionuclides like ^{137}Cs and ^{85}Sr with humic acid (HA) as the biosorbent. Findings: High adsorption percentages were calculated. The reactions were governed by rapid kinetics and were spontaneous, feasible, and exothermic; thus, conducive at R.T. Conclusion & Significance: In the field of wastewater treatment, HA acts as an eco-friendly, inexpensive biosorbent for the removal of toxic heavy metals and radionuclides, which is difficult to achieve via conventional techniques. A simple HA filter can prevent the pollution of agricultural soils, when treated water is used for irrigation. Since HA is a component of SOM, it does not pose any ill-effects on the environment.

Image



Recent Publications (minimum 5)

1. Bagla, H. and Khan, A.: Soil Augmentation by Humus: Replenishing lost soils and supplementing new ones, EGU General Assembly 2021, online, EGU21-11478, Apr 19–30, **(2021)** https://doi.org/10.5194/egusphere-egu21-11478.
2. N. Dubey and H. Bagla, "Air Quality Analytics and Monitoring: A study employing Transplanted Porina Lichen in Mumbai City", Res. J. Chem. Environ., vol. 25, no. 2, pp. 45-53, **(2021).**
3. S. Sayed and H. Bagla, "Sorption Studies of Radionuclides from Simulated Low Level Waste using Green Biosorbent", Res. J. Chem. Environ., vol. 25, no. 1, pp. 1-6, **(2021).**
4. Sushma S. Chavan & Hemlata K. Bagla* "Measurements of Alpha Radioactivity in Thermal Power Plant Effluents Employing CR-39 Detector Based Improved Alpha Track Detection Method" Journal of Environmental Radioactivity, Vol. 233, https://doi.org/10.1016/j.jenvrad.2021.106574 **(2021).**
5. V. Sharma, R. Acharya, Hemlata K. Bagla and P. K. Pujari, "Standardization of an external (in air) PIGE methodology using tantalum as a current normalizer in conjunction with INAA for rapid and non-destructive chemical characterization of "as received" glass fragments towards forensic applications", J. Anal. At. Spectrom.,The Royal Society of Chemistry **(2021)**. DOI: 10.1039/d0ja00482k E-ISSN:1364-5544



Biography (150 word limit)

Dr. Hemlata K. Bagla is the Senior Dean, Faculty of Science and Technology, HSNC University, and Principal of K. C. College, one of the premier institutions of Mumbai, India. She has been an administrator for 13 years and the Head of Chemistry and Nuclear & Radiochemistry Department. In her thirty years of academic experience, she has been a research guide for Masters and PhD students for the last 23 years. Besides Nuclear and Radiochemistry, her research interests include Soil Sciences, Solid State Nuclear Track Detectors, Nano Technology, Industrial and Environmental Chemistry, Green Chemistry, Biomonitoring, Solvent Extraction, Ion-Exchange, and Neutron Activation Analysis. She has published more than 170 research papers in national and international journals of repute including nine publications in NASA's Astrophysical database and has presented papers and delivered number invited talks in various academic forums in colleges, universities, and national and international conferences.

Contact Details:

Email: hemlata.bagla@kccollege.edu.in, hemabagla@gmail.com

Contact Number: +919821420698

Linked In: https://www.linkedin.com/in/hemabagla

Session: Pollution and Climate Change

Presentation Category: Oral