

BOOK OF ABSTRACTS

International Conference on Chemistry for Human Development (ICCHD-2025)

Jointly Organized by

**Professor Asima Chatterjee Foundation Kolkata (PACFK),
University of Calcutta,
Biswa Bangla Biswabidyalay
and
Luminescent Organic Consortium of India**

At Kolkata during January 4-6th, 2025

Venue:

**University College of Science and Technology,
Kolkata-700009**



Asima Chatterjee

ICCHD-2025

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IL-32

Enhanced antibacterial activity of azithromycin conjugated magnetic nanocarrier**Moupiya Ghosh**

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Abstract

Antibiotics, including metronidazole, sulfamethoxazole, erythromycin, trimethoprim, penicillin, and, azithromycin (AZM) have become the most widely used medications in recent years to treat a variety of illnesses in aquaculture, contemporary husbandry, and people^{1a,b}. However, the use of these antibiotics may show several side effects. Serious adverse effects from azithromycin include liver damage, hearing loss, serious or life-threatening allergic reactions, abnormal heartbeats, and diarrhea linked to clostridium deficiency^{1c}. Recent developments point to the potential application of nanotechnology to alleviate some of AZM's drawbacks, including its high dosage requirements and poor absorption. Because of their small size (1–100 nm) and high surface-to-volume ratio, nanoparticles (NPs) are a useful method of delivering AZM^{1d,e}. These carriers have the power to lessen the negative effects on the entire body, ensure accurate transport of the medication to the designated site, and enhance the pharmacokinetics of the medicine. Additionally useful for the development of contemporary sensors and biosensors that can be used in both industrial and biomedical fields are spinel ferrites^{1f,g}. Furthermore, these nanoparticles (NPs) have demonstrated potent antibacterial properties in specific formulations. Among the several ferrites, MgFe₂O₄ is widely used in medicine due to its unique magnetic and physical characteristics. In the present work, MgFe₂O₄ nanoparticles have been synthesized by sol-gel method and applied to target the antibiotic Azithromycin (10 mol% drug has been conjugated). The samples have been well characterized by the analysis of the XRD, EDS pattern, FESEM and TEM images analysis. The enhanced activity of the drug-conjugated sample against Gram- positive bacteria has been confirmed by Agar – cup assay and MIC study. It has been revealed that the drug-conjugated nanoparticles (with 10 mol% azithromycin) and the pure 100% azithromycin have almost similar efficacy against bacteria. This confirms the enhanced activity of azithromycin after its conjugation with the nanoparticles.

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Personal Profile

Dr. Moupiya Ghosh obtained her Ph.D. in 2022 from The University of Burdwan under the guidance of Prof. Swapan Kumar Pradhan. She worked as a postdoctoral fellow under the mentorship of Professor Jaydeep Basu at IISC Bangalore. She also worked as an Assistant Professor at the Department of Physics, Amity University, Kolkata, and at Brainware University, Kolkata. Her research expertise includes nanomedicine, nanotechnology, drug delivery, structural and microstructural characterizations, synthesis of different nanoconjugates, development of different antibacterial, antifungal and antidiabetic agents, cancer therapeutics and wastewater treatment. Her research is focused on the development of different drug conjugated nanomaterials for the treatment of common and epidemic diseases with minimum side effects and higher efficacy. She has published more than 20 SCI, SCOPUS Indexed articles in several reputed international journals. She has received several International, National and State Awards in the field of research. Presently, she is working as an Associate Professor in the Department of Basic Science and Humanities, IEM, UEM, Kolkata.

Awards

University Gold Medalist (1st class first in M.Sc); 2019;
Outstanding Paper Award in 27th West Bengal State Science and Technology Congress, 2020;
International Best Research Award (SF), 2020;
ISSN International Best Researcher Award, 2022;
Record Owner Young Scientist Award, 2023;
Membership by World Research Council.
INTERNATIONAL Best Researcher Award (International Science, Technology & Research Awards Congress 2024. ISTR);
Member of the American Chamber of Research;
Research Excellence Award (INSC), 2024;
Empowering Woman Award (ICST 2024)

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