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Poster abstract submission

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Presenting author Anu Priya B

Presenting author's email se23plsc002@mahindrauniversity.edu.in

Further authors (if any)
Dr. Mrittika Sengupta

Affiliation(s)
Mahindra University

Country India

Type of organization Academic / research institution

Poster title
Bacteriophage-Functionalized Biocarbon Nanodots: A Novel Antimicrobial Conjugate

Poster abstract

Pseudomonas aeruginosa is an opportunistic pathogen often causing threat to immunocompromised individuals or hospitalized patients. They are capable of forming strong biofilms, which allows them to adhere to any living or non-living surface, especially on implanted hospital care devices, which is extremely difficult to eradicate. They are one of the ESKAPE pathogens and are usually resistant to antibiotics, which makes it difficult to treat their infection.
To address this, we aimed to develop a targeted antimicrobial agent using bacteriophages specific to P. aeruginosa. Bacteriophages were isolated from agricultural irrigation water in Bengaluru, India, with the isolate designated as BSW (Bengaluru Stagnant Water) Phages. Comprehensive characterization revealed that BSW Phages exhibit high thermal and pH stability, moderate stability in organic solvents (DMSO, chloroform, ethanol), but poor stability under UV irradiation.
To enhance their stability and expand their applicability, carbon nanodots were synthesized via high-temperature carbonization of aloe vera under a nitrogenous atmosphere and subsequently conjugated with the isolated bacteriophages. The resulting bacteriophage–carbon nanodot complexes demonstrated improved colloidal stability compared to bacteriophages alone. MIC assays confirmed that these conjugates retained potent antimicrobial activity against P. aeruginosa. These bacteriophage and bacteriophage– carbon nanodot conjugate have shown ability to disrupt P. aeruginosa biofilm.
This study underscores the promise of carbon nanodot–bacteriophage conjugates as versatile and highly effective antimicrobial agents with broad potential for real-world applications.

Keywords- P. aeruginosa, bacteriophages, antimicrobial, carbon nanodots, biofilm

Research topic Phage or phage products

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