SciTechnol
International Publisher of Science, Technology and Medicine

Medical Microbiology Reports

# Bacteriophages: A novel approach of treating multi-drug resistant bacteria present in hospital wastewater

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## Abstract

The wide application of antimicrobial agents in clinical settings to treat infectious disease and improper sewage treatment is of great concern to public health as this can lead to the development and evolution of antibiotic resistant bacteria. This occurs as a result of the high selective pressure that antibiotics place on bacteria, resulting in the proliferation and subsequent dissemination of resistant bacteria in the community. We investigated the presence and survival of antibiotic resistant bacteria in untreated hospital wastewaters and their survival after post sewage treatment at three busy hospitals at Davangere, Karnataka. Physiochemical parameters showed high COD levels (552.8 to 714 mg/L), and BOD level observed ranged from 108.6 to 148.4 mg/L. The total heterotrophic bacterial counts, ranged from 2.8 × 105 to 7.3 × 106 CFU/mL, total coliform counts ranged from 0.9 × 103 to 2.4 × 103 MPN/100mL and faecal coliforms count ranged from 110 to 310. In Untreated hospital wastewater high frequency of multidrug resistant bacteria like E.coli, Klebsiella pneumoniae, Enterobacter cloacae, Pseudomonas aeruginosa, Acinetobacter baumannii, Citrobacter freundii, Proteus vulgaris, Staphylococcus aureus and Enterococcus faecium, Salmonella enteritidis and Enterococcus faecalis were isolated. In treated hospital wastewater majority of the bacteria were re-isolated in lesser frequency indicating chlorine is less effective in removal of drug resistant bacteria. Bacteriophages were isolated against all the pathogens from the environment. When untreated hospital wastewater was challenged with the cocktail of bacteriophages, it resulted in 100 % removal of all the multidrug resistant bacteria from the hospital wastewater within 16 hours suggesting bacteriophages could be an alternative to chlorine in wastewater treatment plant. Hence bacteriophage could be an alternative method in treating hospital waste water when no other substitutes are available and phage could easily be integrated in sequential batch reactors in wastewater treatment system. Biography VinodKumar C.S has completed his Phd in Microbiology from Gulbarga University, Gulbarga in 2006 and Phd in Medical Microbiology (Virology) in the year 2013 from St. Johns Medical College, Rajiv Gandhi University of Health Sciences, Bangalore. He is the professor of Microbiology, S.S.Institute of Medical Sciences and Research Centre, Karnataka, India. He has over 120 publications that have been cited over 568 times as per google scholar citation, and his publication H-index is 15 and i-10 index is 17 and has been serving as an editor of two journals and board member of reputed Journals.

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International Conference on Virology and Microbiology | July 30, 2020

**Citation:** VinodKumar C.S, Bacteriophages: A novel approach of treating multidrug resistant bacteria present in hospital wastewater, Virology Congress 2020, International Conference on Virology and Microbiology, July 30, 2020, page 7