

SURVEILLANCE OF ANTIMICROBIAL RESISTANCE GENES FROM WASTEWATER-A LITERATURE REVIEW

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Aim: The environment acts as a reservoir for antibiotic resistance bacteria (ARB) and plays a role in the spread of antimicrobial resistance genes (ARGs). The aim of the study is to present the problem of ARB in the environment through a literature review.

Background: The overuse of antibiotics in the agricultural, veterinary and medical sectors is contributing to the global epidemic increase in antimicrobial resistance. Wastewater treatment is a double-edged sword that can act as either a pathway for ARB spread or as a barrier to reduce the environmental release of anthropogenic ARB.

Methods: Systematically searches of the literature in the electronic databases PubMed to identify studies that have compared findings from Waste Water Surveillance (WWS) and ARGs and their analysis is performed. The search was limited to peer-reviewed published articles on English language without restriction on the publication year combining the keywords „Wastewater surveillance“ and „Antimicrobial resistance genes“ using “AND”.

Results: Literature searches initially identified 34 entries which 21 abstracts met the inclusion criteria. After review of the articles, 3 scientific papers were dedicated to the detection of multidrug-resistant bacteria and antimicrobial resistance genes analysis with conventional microbiological tests or tests such as Polymerase Chain Reaction (PCR) and sequencing with metagenomic analysis published between 2023-2024 year.

Conclusions: Evidence shows that wastewater are significant reservoirs and dissemination pathways. The active surveillance of ARB using an integrated one-health approach can help to reduce the emergence and spread of ARB, reduce the associated economic impact, and guide antimicrobial stewardship programs.

Keywords: antimicrobial resistance genes (ARG); antibiotic resistance; wastewater; sewage; environment; one health