

Microbial Biotransformation and Degradation of Antibiotics using Antimicrobial Resistant Microbiome

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ABSTRACT

Antibiotics are used to treat microbial infections in human and veterinary medicines and also in poultry feeds. Antibiotic medicines which are partially metabolized by patients and pharmaceutical ingredients from industries were discharged into sewage systems and municipal waste water which may end up in contaminating the environment. Drastic increase in usage of antibiotics will increase concentration of antibiotics in the respective places. This leads to increase in the antibiotic resistance in environmental microbiome. Misuse and overuse of antimicrobials are one of the major sources in the development of drug-resistant pathogens. World Health Organization (WHO) has listed antimicrobial resistance among one of the top 10 global public health threats. Also, WHO reported that by 2050 the death due to drug-resistant pathogens may go up to 10 million per year in India, this is predicted as highest in the world. Bacteria can develop drug resistance through various mechanisms by altering its metabolic activities in response to the presence of antibiotics. The antibiotics or their action genetically regulate the resistance gene expression so that bacterial cells expend significant amount of energy that supplies genetic space to resist the antibiotics. The most prominent examples of bacteria comprising resistant genes are *vancomycin resistant Enterococci*, methicillin resistant *Staphylococcus aureus* and multi resistant *Pseudomonas*. In recent years, the emergence and spread of B-lactamases called carbapenemases has become a major health crisis. The present study aims to screen microbes which has developed a resistant gene that degrades the antibiotics. Kinetic characterization of degradation of antibiotics by isolated microbes will be done to understand metabolism of antibiotic degradation. Then the isolated microbes will be used for degradation of antibiotics under controlled bioprocess conditions.

Keywords: Antibiotic resistance; Biotransformation; Microbiome; Wastewater.

