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Antibiotic resistance genes as emerging pollutants in wastewater

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Antibiotic resistance genes (ARGs) are primarily DNA sequences that are acquired by bacterial cells through different modes, such as conjugation, transduction and transformation. These genes are transferred from other bacterial cells directly or indirectly and make the recipient bacteria resistant to different concentrations of inhibitory or lethal chemicals called antibiotics. They are specific and hence confer resistance to one antibiotic only; however, more than one such gene can be found in a cell, which may confer multidrug resistance. In recent times, there has been a spike in the number of such bacteria found in association with different ecosystems, bodies of animals, humans and even plants that are treated with antibiotics. Recent studies have demonstrated that water from treatment plants that contains bacteria with ARGs seem to be one such source affecting river and lake water bacterial ecosystem. When such resistant bacteria are released into water bodies, they contaminate the flora present there as well. Hence, the requirement from industries and hospitals to decontaminate all waste before it is discharged into drains and sewage is high. Overuse and misuse of the oral forms of antibiotic drugs should also be avoided and their availability can be limited as prescription medicine. If such precautions are not followed, multidrug-resistant infections through bacterial pathogens may affect all realms of life.

Keywords: Antibiotic resistance genes, Multidrug resistance, Sewage, Decontamination, Water treatment plants

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