ANTIBIOTICS AND ANTIBIOTIC RESISTANT GENES IN WATER - ENVIRONMENTAL AND HUMAN HEALTH RISKS

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Introduction. Antimicrobial resistance is a worldwide problem that is both pressing and challenging due to the rate at which it is spreading, and the lack of understanding of the mechanisms that link humans, animals and environmental sources contributing to its proliferation. Antibiotic pollution is becoming an increasingly serious threat across different countries. Potential risks associated with release of human antibiotics into the environment have become an increasingly important issue of the environmental health. This concern has been driven by the widespread detection of antibiotics in all aquatic compartments. Antibiotics are ubiquitous in the environment and significant concentrations have been detected in water sources. The prevalence of antibiotics and antibiotic resistant genes in water has drawn attention in recent years, due to their potential public health risks.

Material and methods. The purpose of the study was to carry out an analysis of the literature related to antibiotics and antibiotic resistant genes in groundwater, based on 61 bibliographic scientific research across the country and abroad using Academic Google and PubMed databases for articles published between 2016-2021.

Results. Antibiotics play a significant role in the induction and dissemination of antibiotic resistance genes in water that has recently become the primary environmental concern. Over the recent decades, antibiotics and antibiotic resistance genes have been regarded as emerging pollutants. The abuse of antibiotics can increase their residual amount in the water environment, which causes the enhancement of antibiotic resistance, being recognized as a new type of pollutant. Various types of normal bacterial genes that become activated under severe antibiotic stress, produces resistant enzymes even under normal conditions. Therefore, the resistance genes are being transferred horizontally from one bacterial cell to another, thus, increasing resistance to antibiotics. The distribution of antibiotics in water sources varies significantly in time and space, corresponding to the amount of antibiotics used locally. The main source of this contamination in the aquatic environment is the wastewater from antibiotic manufacturers, large scale animal farming, and hospitals. Environmental antibiotics pose a range of risks and have significant effects on human health.

Conclusion. Antibiotics have greatly polluted the environment globally. The anti-infectives in environmental waters is of interest because of their potential role in the dissemination of anti-infective resistance in bacteria. Finally, scientific guidance on drug use is still required to discourage and prevent antibiotic abuse. A careful literature review was conducted in order to understand the sources, fate and occurrence of antimicrobials in the aquatic environment. In this context, a broad and specialized background was obtained, enabling a complete overview of the state-of-the-art in these subjects.

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