

Environmental Pollution Caused by Antibiotics

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The annual global consumption of antibiotics by humans and other organisms is estimated about 106 tons per year, which is an issue of the increasing importance of environmental contamination by antibiotics. Consumed antibiotics by humans and other organisms do not completely degrade in their bodies, and are transmitted through the sewages or hospital wastes back to environment. Recently, the amount of antibiotics in the soil and water has been measured by liquid chromatography and mass spectrometry techniques, which indicates the concentration of these compounds in the environment varies from a few nanograms to the hundreds of nanograms per kilogram, which the level of contamination increases due to the increasing usages of antibiotics in the winter. According to studies, the antibiotic concentration in American aquatic resources is up to 15 micrograms per liter, European and African countries are more than 10 micrograms per liter and 50 micrograms per liter, and in the Asian countries, this is over than 450 micrograms per liter. The presence of these antibiotics in the water and the soil may directly affect the bacteria involved in ecosystem cycles such as nitrogen fixation cycles, methanogenesis, sulfate reduction, nitric cycle, or indirectly by the horizontal gene transfer phenomenon, low antibiotic concentrations in the range of micrograms per liter lead to resistance, genetic and phenotypic changes, or various physiological activities in bacteria. Studies that have conducted to remove released antibiotics into the environment indicate that methods such as coagulation, freezing, sedimentation, and filtration have failed. New inquiries have carried out in order to the removal of contamination by using advanced oxidation methods, which seem to be effective methods; however, more advanced studies are needed.

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