

Antibiotics and antibiotic resistant genes contamination in the subsurface environment: Sources, fate/transport and remediation

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The discovery and use of antibiotics has brought benefits to human health, but their overuse since the invention released into the environment caused problem. It has become a big threat to human health and eco-environment. The threat of the induced antibiotic resistance genes (ARGs) and antibiotic resistant bacteria (ARB) is at even higher risk [1].

This article summarizes the research results related to the pollution of antibiotics and ARGs in the environment in recent years via critical review of the latest literature. The sources and pollution pathways of antibiotics and ARGs in the subsurface environment, including soil and groundwater, were initially investigated. The impact of antibiotics and ARGs to the ecological environment, especially human health was assessed. By comparison with the relevant literature, the current status of contamination caused by antibiotics and ARGs was highlighted, and finally potential remedial technologies were studied, to reduce or eliminate the possible risk to the subsurface environment.

Under impact of human activities, various wastes containing antibiotics and ARGs continuously discharge into soil and aqueous environment. Surface water, soil, and groundwater have all been contaminated at certain degrees [2]. The governing factors, such as geology, hydrology, colloids and geochemistry of soil and groundwater were investigated to provide a better understanding of the fate & transport of the ARGs and ARB. The in-situ techniques of various removal methods for antibiotics and ARGs in the environment is timely needed. However the initial survey of soil and groundwater in the NE China indicated importance of natural attenuation for antibiotics.

[1] O'Flaherty et al. (2018) *Sci Total Environ*, 616-617, 1356-1364. [2] Grenni et al. (2018) *Microchemical Journal*, 136, 25-39.