

O 5. ANTIBIOTIC POLLUTION IN THE ENVIRONMENT – SOIL RESISTOME

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ABSTRACT: Environmental antibiotic pollution is a problem that is expected to gain more attention in the near future since antibiotic consumption is still increasing around the world. Antibiotic pollution is poorly regulated on a local and global scale, antibiotic molecules are increasingly found in terrestrial, freshwater, and marine environments. Fluoroquinolones are one of the most used classes of antibiotics. Enrofloxacin belongs to the class of fluoroquinolone antibiotics that have been intensively used for the treatment of bacterial infections in veterinary medicine. In the environment, enrofloxacin can undergo degradations by different processes including photolysis, biodegradation, and oxidation by mineral oxides but it is not sensitive to hydrolysis. Despite these degradation mechanisms, the environmental half-life time of enrofloxacin is very long. In this study, the effect of enrofloxacin on the function and structure of soil microbial communities was evaluated. In pots with different concentrations of enrofloxacin were planted: *Lactuca sativa* var. *crispa*, *Anethum graveolens*, *Thymus serpyllum*, *Mentha piperita*, *Calendula officinalis*. Soil respiratory responses were inhibited at the high enrofloxacin concentrations in the soils and were increased at the lowest concentration (10 mg·kg⁻¹). The maximum level of soil toxicity was 67.21% at the concentration of enrofloxacin 1000 mg·kg⁻¹, in the control this parameter was 8.56%. The soil with a high concentration of antibiotics was characterized by a low content of nitrogen-fixing microorganisms and a high number of oligotrophic and spore-forming microbiota. Thirty-seven antibiotic-resistant bacterial isolates were cultured from the soil. All isolates were multi-drug resistant, of which greater than 64% were resistant to 9–12 antibiotics, comprising almost all classes of antibiotics. The antibiotic contamination of the soil causes negative changes in the microbial community, reduces the respiratory activity of the soil, and is one of the important factors in the formation of soil resistome.

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