Abstract

The increasing pollution caused by compounds of anthropogenic origin can lead to harmful effects on human health and the environment. The majority of produced chemicals are continuously released into the environment, and restrictions are usually not employed until negative effects have already manifested. Recently, micropollutants have been given a lot of attention among researchers. These compounds are present in the environment at very low concentrations (ng–µg/l) and are transported over the globe through the hydrosphere. Micropollutants, including pesticides, pharmaceuticals, and personal care products, have a tendency to persist in the environment. Moreover, even trace concentrations of the compounds can have severe detrimental impacts. Many micropollutants can interfere with the natural functions of the endocrine system, which can result in the development of several types of cancer, decrease in fertility, or delayed puberty. The presence of endocrine disruptors in nature can eventually lead to the collapse of populations.

This thesis focuses on the study of the endocrine-disrupting effects and degradability of antimicrobial compounds, which are, besides other applications, widely used in oral care products. The emissions of these compounds are unregulated. The results demonstrated that none of nine tested compounds acted as an agonist of the estrogen and androgen receptors; nevertheless, five of the compounds exhibited antiandrogenic and/or antiestrogenic effects. The degradability of two selected antimicrobial compounds was studied using model ligninolytic fungi and their extracellular enzymatic apparatus. Only partial transformation of both compounds was detected. The limited degradation capability of this group of microorganisms, which were previously shown to transform a broad range of diverse chemicals, emphasizes the persistent nature of antimicrobial compounds.