

Abstract

Pharmaceuticals are a group of organic substances with significant worldwide consumption in human and veterinary medicine. These compounds may be metabolized in the organism, but in some cases they remain unchanged and both are usually excreted via renal excretion in the native form or as metabolites. Large quantities of pharmaceuticals and their metabolites contaminate municipal wastewater. The wastewater treatment plants are unable to remove these substances completely, so they contaminate surface water, groundwater and soil as well. Due to the biological activity of pharmaceuticals, long-term effects may cause bacterial resistance, endocrine influence, DNA and renal damages in non-target organisms. The phytoextraction and the translocation of radiolabeled diclofenac with ^{125}I were experimentally studied by using of *in vitro* cultivated plants *Helianthus annuus* and *Zea mays*. Efficiency of phytoextraction was monitored as decrease of radioactivity of tested substance [^{125}I]diclofenac in Murashige-Skoog cultivation medium. Both species are able to extract tested substance during 8 to 10 days of cultivation, with efficiency approximately 85 % using *Zea mays* and 79 % using *Helianthus annuus*. Better extraction ability of diclofenac was observed at *Helianthus annuus* – 80 mg/kg of dry weight compared to 30 mg/kg of dry weight in *Zea mays*. The translocation of [^{125}I]diclofenac studied by electronic autoradiography showed the maximal occurrence in the plant roots, where the primary adsorption probably occurs. The presence of the labeled diclofenac was observed also in stems and leaves, which shows the penetration of tested substance into the roots and translocation to the shoot parts of plants.

Keywords

Pharmaceuticals, ibuprofen, naproxen, diclofenac, iodination, phytoextraction, translocation, wastewater