

Abstract

Phytoextraction is an example of a method of removal of chemical pollutants from the environment. The objective of this thesis was the possibility of the removal of selected pharmaceuticals and one pharmaceutical metabolite through maize (*Zea mays*) growth. The main point of interest was the group of pharmaceuticals called NSAIDs. One of the chosen pharmaceuticals being ibuprofen, whose initial concentration in the growing medium of 5 mg/l was lowered in 9 days by 99 % and from the initial concentration of 10 mg/l of the same pharmaceutical by 77 %. The possibility of phytoextraction of the metabolite 2-hydroxyibuprofen was also examined. From its initial concentration of 5 mg/l the concentration was lowered by 47 % in 9 days. The last examined xenobiotic was ketoprofen whose initial concentration of 5 mg/l was lowered by 89 % in 9 days.

The concentration of pharmaceuticals accumulated in the plant body during the cultivation was assessed. The values of concentration were higher in the shoot system and were dispersed in the magnitude of hundredths of mg of the pharmaceutical per g of fresh plant weight. In the root system the values fell into the magnitude of thousandths of mg per g of fresh plant weight. The concentration of accumulated 2-hydroxyibuprofen fell under the limit of detection. The concentration of 2-hydroxyibuprofen released into the surroundings of the plant during the phytoextraction of ibuprofen was also assessed. During the experiment with the lower initial concentration 15 % of the dose intaken by the plant was released into its surroundings and during the experiment with the higher initial concentration it was 18 %. The biochemical response of the plant was examined as well. It was observed that all of the examined xenobiotics caused higher oxidative stress to the plants.

The chosen method has been proven to be more effective for the pharmaceuticals than for the more polar metabolite of ibuprofen probably because of its higher solubility in water. The release of the metabolite during the phytoextraction of ibuprofen may impose a limitation for future use of the method.

Key words: Phytoextraction, ibuprofen, ketoprofen, hydroxyibuprofen, enzymatic response

[IN CZECH]