

Abstrakt

Pharmaceutically Active Compounds include metformin, the most often prescribed drug for a treatment of the diabetes mellitus type 2. Metformin is used in high daily doses (up to 3000 mg per day) and it is eliminated by kidneys in its original non – metabolized form. Metformin is degraded in the wastewater treatment plants to guanylurea. The wastewater treatment plants aren't able to clean the waste water, so metformin and guanylurea enter the environment, especially surface water.

This diploma thesis deals with the ability to remove metformin and its environmental metabolite guanylurea via phytoextraction technologies. First experiment was focused on phytoextraction of metformin using 5 plant species - *Zea mays L.*, *Pisum sativum L.*, *Avena sativa L.*, *Alternanthera reineckii Mini L.* and *Staurogyne repens L.* Second experiment studied phytoextraction of guanylurea using *Zea mays L.* and *Pisum sativum L.* The third experiment deals with the phytoextraction of metformin and guanylurea together using *Zea mays L.* The media of all plants were contaminated by metformin or guanylurea at different concentration levels. The samples of media were taken in 24 hours intervals during the plant cultivation and the decrease of its concentration were studied by HPLC with UV detection at 233 nm for metformin and 210 nm for guanylurea.

The best phytoextraction ability of metformin had the aquatic plant *Staurogyne repens L.* One gram of this plant was able to extract 1,87 mg of metformin during 5 days. The best phytoextraction ability of guanylurea had *Pisum sativum L.* One gram of this plant was able to extract 0,13 mg of guanylurea during 5 days. The phytoextraction of metformin and guanylurea in combination was up to twice lower than in monocomponent samples.

Keywords: metformin, guanylurea, phytoextraction, HPLC