

DOKTORSKÝ STUDIJNÍ PROGRAM / DOCTORAL STUDY PROGRAM

VYPSÁNÍ TÉMATU / LISTING OF TOPIC

Studijní program / Study Program: Agricultural Specialization

Studijní obor / Branch of Study: Exploitation and Protection of Natural Resources

Katedra / Department of: Soil Science and Soil Protection

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Forma studia / Form of Study: Full_time

Typ tématu / Type of Theme: Disposable

Téma / Topic: Contamination of soil and crops with micropollutants contained in treated wastewater and sludge from wastewater treatment plants

Hypotézy / Hypotheses: The composition and concentration of micropollutants in treated wastewater and in sewage sludge is different. Therefore, the possible contamination of plants grown in soils either irrigated with wastewater or enriched with treated sludge will be different. Contamination of plants with sludge micropollutants can be reduced by their composting.

Anotace / Summary: Under field conditions, the behavior of selected micropollutants in the soil and the uptake of these micropollutants by selected plants will be experimentally evaluated. The source of micropollutants will be: 1. Treated water from the WWTP (which will be used for irrigation), 2. Sludge from the WWTP (which will be incorporated into the soil before sowing the plants and the plants will be irrigated with clean water), 3. Composted sludge (which will be incorporated into the soil before sowing the plants and the plants will be irrigated with clean water). Climatic data, soil moisture, precipitation, irrigation and soil solution seepage will be monitored. Samples of irrigation and seepage water, soil after sowing and always during plant sampling will be taken. Both the concentrations of substances in individual matrices will be evaluated. The aim is to evaluate the transport and transformation of substances in soil and plants. Soil samples will be taken to determine the hydraulic properties and to evaluate the soil structure using X-ray computed tomography. The characteristics of plant growth will be evaluated: depth and density of roots, growth of aboveground parts, leaf area index, etc. In laboratory conditions, the behavior (i.e. sorption and degradation) of selected micropollutants in the soil will be evaluated. The results will be evaluated statistically and using the HYDRUS mathematical model.

Zdroje financování práce / Funding Sources: The fate of selected micropollutants, which occur in treated water and sewage sludge, in soil, NAZV, QK21020080

V / In Prague

dne / Date: 05.11.2021

Podpis / Signature: