

DOKTORSKÝ STUDIJNÍ PROGRAM/ DOCTORAL STUDY PROGRAM

NÁVRH TÉMATU/PROPOSAL OF THEME

Studijní program/*Study Program*: **Special Agricultural Science**

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

Katedra/*Department of*: **Agroenvironmental Chemistry and Plant Nutrition**

Školitel (včetně titulů), email/*Supervisor, email*: **Prof. Dr. Pavel Tlustoš, tlustos@af.czu.cz**

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Forma studia/*Form of Study*: **Full_time**

Typ tématu/*Type of Theme*: **Framework**

Téma/Theme: Bioremediation of Pharmaceuticals and Personal Care Products Accumulated in Wastewater Sewage Sludge

Hypotéza/ Hypothesis: We assume that during the wastewater treatment process in a wastewater plant solid part of waste, sewage sludge accumulates easily reused nutrients, and also large scale of pollutants including a wide range of pharmaceuticals and personal care products (PPCPs). A high content these compounds in wastewater sewage sludge can substantially limit their possible reuse e.g. in agriculture. It is assumed, that PPCPs and their transformation products can be significantly decreased or remove from a sewage sludge or soil amended with a sewage sludge-organic substrate mixture using the environment friendly bioremediation and phytoremediation approaches and safely used in agriculture.

Anotace/Annotation: Sewage sludge disposal costs are continuously rising with increasing sewage sludge production from a wastewater plants. A sewage sludge contains a large amount of organic matter and nutrients. Due to this, could be suitable for the replacement of mineral fertilizers. Wastewater sludge can also accumulate wide spectra of inorganic and organic pollutants especially persistent organic pollutants, pharmaceuticals and personal care products (PPCPs) and their residues. PPCPs compounds persist in the environment, may enter to plants, animals and further can get into the food chain of biota. Thus, many side effects may occur in biota. Therefore, the application of sewage sludge into agriculture soil can lead to a serious environment threat. It is necessary to find suitable bioremediation approaches for the decrease amount of PPCPs derived from raw sewage sludge before their reuse as a mineral fertilizer.

Main aim of PhD study is to find suitable bioremediation and phytoremediation methods for the removal of selected PPCPs compounds present in sewage sludge. The goal of plant experiments will be to establish plants and autochthonous microorganisms ability to decrease the content of sewage sludge PPCPs amended soils in relation with selected microbial enzyme activities. Influence of PPCPs on biomass dry weight and their plant uptake will be evaluated as well their removal from sewage sludge amended soil, and compared to the removal of PPCPs spiked soil.

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Podpis/*Signature*: