

DOKTORSKÝ STUDIJNÍ PROGRAM/ DOCTORAL STUDY PROGRAM
PROPOSAL OF THEME

Study Program: **Crop Science**

Branch of Study: **General Crop Science**

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

Supervisor, email: **doc. Ing. Aleš Hanč, Ph.D.; hanc@af.czu.cz**

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Form of Study: **Full_time**

Theme: Elimination of Micropollutants from Sewage Sludge Using Vermicomposting

Hypothesis:

1. It is assumed that the vermicomposting process will reduce the concentration of micro-pollutants in the vermicompost compared to sewage sludge.
2. Significant accumulation of risk elements in the earthworm bodies will occur.
3. Micropollutants such as endocrine disruptors, pharmaceutical residues, polyaromatic hydrocarbons and polychlorinated biphenyls will be degraded to less harmful substances by vermicomposting.
4. For elimination of micropollutants, interaction of earthworms, their enzymes and microorganisms activity are predicted.
5. Vermicompost from sewage sludge allows application of sludge to soil and grown crops.

Annotation:

In the case of application to agricultural land, the sludge must meet certain requirements such as risk elements, PCBs, PAHs and pathogenic microorganisms. Until now, however, proper attention has been paid to pharmaceuticals and personal care products. At present, however, access to sludge applicability to soil is changing significantly. It is known that some species of earthworms are able to degrade or accumulate a number of micropollutants. It is therefore possible to use earthworms to remove these substances from sludge. The aim of the dissertation is to determine the effect of the vermicomposting process on the elimination of a wide range of micropollutants from sewage sludge. By comparing the concentration of micropollutants in the resulting vermicompost and the sludge entering the process, the efficiency of the system for the particular micropollutants will be determined. Under analogous conditions, control variants without earthworms will be implemented, which will make it possible to define the proportion of earthworms to remove micropollutants. Attention will also be paid to the study of the proportion of microorganisms to eliminate the monitored substances. Due to the complexity of the dissertation, vermicompost will be tested as a fertilizer in precise pot experiments and field vegetation experiments. Collected samples will be evaluated for agrochemical properties of the soil and for the quantitative and qualitative parameters of the plants.

Source of: NAZV QK1910095 Use of Vermicomposting to Eliminate Micropollutants for Safe Application of Sewage Sludge on Agricultural Land

The student could be financially supported from this project even simultaneously with the receiving of the scholarship.

Date: 30.1.2019

Signature: