Česká zemědělská univerzita v Praze
Fakulta agrobiologie, potravinových a přírodních zdrojů

DOKTORSKÝ STUDIJNÍ 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. Ing. Jiřina Száková, CSc, szakova@af.czu.cz**

Konzultant (včetně titulů)/*Co-supervisor*: **prof. Ing. Pavel Tlustoš, CSc., Dr.h.c.**

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

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

Téma/*Theme:*
Mobility, transformation, and degradation/immobilization of hazardous substances in soil, plants, and food chain

Hypotéza/*Hypothesis*:

Reasonable modification of physicochemical and biological soil properties will lead to increasing degradation and/or immobilization of the hazardous substances in soil (according to the composition and properties of these substances), and, therefore, will reduce the potential uptake of these substances by plants and other organisms.

Anotace/Annotation:
The input of risk elements and organic pollutants to soil can result in a serious level of contamination of this medium including possible dissemination of these contaminants to other components of the environment, such as ground-and surface water, plants, and animal organisms. At the present time, the investigations concern of wide spectrum of organic pollutants such as polychlorinated biphenyls (PCB), polycyclic aromatic hydrocarbons (PAH), pharmaceuticals (antibiotics, antidepresives, hormonal disruptors), and residues of personal care products. Risk elements such as As, Cd, and Pb represent the important group of contaminants, as well. The targeted compounds should be investigated both separately, and in their interactions. Moreover, the effect of the potential ability of organic matter-rich waste materials (biosolids, vermicomposts, sewage sludge) for sorption of these pollutants, and/or to improve the degradation potential of soil for these pollutants will be considered. These materials, however, could be potential sources of various organic and inorganic contaminants. For instance, the levels of per- and polyfluoroalkylated substances, brominated flame retardants, and synthetic musk compounds tended to increase in the long-term sewage sludge treated plots. These compounds are hardly biodegradable in the soil, and the potential enhancement of the biodegradability of these compounds in rhizosphere, where the activity of soil microorganisms is supported by the activity of plant roots, is very limited.

The main objective of the work will be the investigation of the mobility and potential transformation of hazardous substances in soil. Based on this knowledge, suitable remediation methods will be developed and tested to either temporarily reduce the bioavailability of the contaminants, or permanently remove the contaminant from the soil matrix.

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Podpis/*Signature:*