

HUMAN HEALTH RISK ASSESSMENT OF POPs IN BACKGROUND SOILS IN THE CZECH REPUBLIC

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Background and Aims: Persistent organic pollutants (POPs) cause serious problems, due to their persistence, lipophilicity and toxicity in the environment, for the whole ecosystem. Because of these properties they are still detectable in abiotic and biotic environmental compartments. Spatial concentrations of selected pollutants (PCBs, DDT, HCB and PAHs) in the soil and resulting human risks were modeled in high resolution network (1x1 km) for the area of the Czech Republic.

Methods: Datasets of 534 soil samples on arable land, grassland and forest land were used for analysis. Urban and industrial areas were not included in this study. We used nonparametric methods (random forests) for modeling spatial concentration in the soil. The exposure model approach was used for the risk evaluation. This method is usually used to identify areas, chemicals and exposure pathways that represent the potential risks to human health.

Results: The result of the model shows the highest concentrations for pesticides in lowlands and sites close to former application of these compounds. Human risks concerning these pesticides were determined as negligible. On the other hand the highest concentrations for PCBs were predicted in forest soils (mountain areas). Health risks resulting from exposure to PCBs do not show any important level. Concerning PAHs concentrations, the highest levels were modeled at sites close to industrial areas and at places with highest annual mean precipitation. Exposure to PAHs (especially to benzo(a)pyrene) was evaluated as the most important in health risk assessment.

Conclusions: The study shows that connection of the model techniques with monitoring give useful information about the behavior of the pollutants and their influence on human health.

The research was supported by the Czech Ministry of education project INCHEMBIOL (MSM0021622412) and by the CETOCOEN project from the European Regional Development Fund (No. CZ.1.05/2.1.00/01.0001).