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Spatial distribution of selected heavy metals and soil fertility status in south-eastern Serbia

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Environmental pollution by heavy metals is one of the most powerful factors destroying biosphere components that directly affecting agricultural production quality and therefore health of human and animals. Regional soil contamination by heavy metals occurs mainly in industrial areas and in big cities. However, pollutants can be air-and/or water-transferred to big distances and may accumulated far from industrial zone what makes difficult to distinguish original background concentrations of heavy metals in soil.
Our study covers south-eastern part of Serbia and is a part of a big project studying soil fertility and heavy metal contamination all around Serbia. Diverse natural characteristics and heterogeneity of soil cover, as well as, human activity greatly influenced soil fertility parameters, while, diverse geological substrate and human activity determined the level of potential geochemical pollution. There are number of industrial factories functioning from the last century on the studied area. Also, close to studied area, there was a mining in the middle of the last century. About 600 soil samples from surface 0-30 cm were investigated for main soil fertility characteristics (pH, humus, available K and P) and concentrations of selected heavy metals (As, Cd, Cr, Ni and Pb).
Soils graded as very acidic cover 46% of the area, which are mainly mountains with acidic parent materials. Content of humus in 41% of soil samples were below 3%. The most of the soils (71%) are weakly supplied available phosphorus. While available potassium in more than 70% is presented in the concentrations enough for good soil quality. So, about 75% of studied area is characterized with unfavorable soil fertility properties (extremly low soil pH, very low content of available P, about half of the area maintained low soil humus) that is located under forests, meadows and pastures.
Content of heavy metals on studied area in 80% of sampled soils was below maximum allowed concentrations (Sluzbeni glasnik RS, 1994). However, 19 % of samples showed contamination or potential contamination with one or other toxic elements, where As was the most often pollutant. Contaminated sites is the results of both, geochemical composition of the area and anthropogenic pollution.
Our study gives a clear picture of the status of soil fertility and the level of soil pollution with selected heavy metals. The rezults of this study build the foundation for further detailed investigations of effects of higher concentrations of pollutants on plants and other components of biosphere, which in turn would help in finding measures for amelioratin and/or prevention of eventual negative consequences.