

## Pollution of soils in urban areas in Serbia

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Soil pollution is a world-wide problems that affect rural and urban areas of all the continents (Hu et al., 2015; Mao et al., 2016; Trujillo-González et al., 2016; Elkhatib et al., 2016; Roy and McDonad, 2015; Mahmoud and Abd El-Kader, 2015; Adamcová et al., 2016). There is a need to develop a program to achieve the sustainability of the soil system as the soils offers goods, services and resources to the humankind (Keesstra et al., 2012; Brevik et al., 2015; Keesstra et al., 2016).

The program of systematic monitoring of soil pollution in Belgrade is aimed at testing the concentration of hazardous and harmful substances in soil at urban areas, interpretation of the results in accordance with current legislation, soil characteristics and geology and terrain, proposal of preventive and remedial measures in the wider territory of Belgrade. The paper gives an overview of the results of systematic monitoring of soil pollution in Belgrade in the period from 2009 to 2013.

In accordance with the objectives of the investigation during the period from 2009-2013, while having in mind the purpose and manner of land use, the program of monitoring of soil pollution in the territory of Belgrade is oriented to the following areas:

- 1 - Land in the zone of the sanitary protection of the Belgrade water supply system,
- 2- Land in zone nearby the main roads,
- 3 - Land within the communal areas (public areas and agricultural land in the wider vicinity of Belgrade).

On the basis of the conducted soil monitoring in the wider area of Belgrade, a large number of sites is contaminated with higher concentrations of hazardous and harmful substances that are exceeding the maximum allowed prescribed legal norms. The causes of soil contamination are both, anthropogenic and natural. Taking into account the all results, the most common deviation is referred to the increased nickel content in soil. A number of soil samples showed increase in concentrations of pollutants including Cu, Zn, Pb, Cd, As, Cr, Hg and organic pollutants. A special surveillance of soil pollution is related to the determination of the contents of hazardous and harmful substances in the soil surrounding public fountains with drinking water. The results indicated an increased content of Pb, Cd, Zn, Cu and pesticide residues that could lead to deterioration of the quality of drinking water of these springs and to endanger the health of the population that use this water. Investigation included determination of the level of radioactive elements in soil such are Cs, Sr and U.

The presence of the registered harmful and hazardous substances in the soil on the territory of Belgrade requires continued monitoring the content of these pollutants including an assessment of potential adverse effects on the human health and the environment, as well as undertaking the necessary prevention and protection measures.

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