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Heavy metals and human health risk in a peri-urban park

L. Poggio (1), B. Vrščaj (1,2) , F. Ajmone-Marsan (1)

(1) Di.Va.P.R.A – Chimica Agraria, Università di Torino, Italy, (2) Soil Science, Soil Information and Environment, Agricultural Institute of Slovenia, Slovenia

Heavy metals in urban soils are affecting human health especially for young children.

The assessment of the risk derived from human exposure to heavy metals in soil can be estimated with a case-specific health risk assessment. The process involves 1) the analysis of heavy metals concentrations, 2) the identification of exposed populations and 3) the description of heavy metals exposure pathways to estimate the heavy metals intakes for each pathway for different land uses. The most important heavy metal intake pathways are the food chain and the direct ingestion of soil. Toddlers are the most exposed. Generic land use scenarios for assessment of human health risk are envisioned. The differences are expressed according to the human receptor chosen and to the exposure period, i.e. frequency, duration and intensity.

The paper presents the research study on the link between urban land use, soil pollution and human health. A simplified procedure for heavy metals soil pollution risk assessment toward human health, adapted to urban planning and soil management practices, is presented. The procedure is focused on i) use of different heavy metals fractions, especially human bioaccessibility, ii) link with land uses, and iii) easy applicability.

The procedure is being tested in the industrial city of Grugliasco (Italy), where a park is planned in order to extend green areas. The human health risk for heavy metals soil pollution in the area is described with the devised procedure. The heavy metals content in the soils of the area is normally above the legislation limit. The human health risk is generally high or very high.

In order to reduce the risk, possible options aimed at breaking the significant relation-

ship source-pathway-target are examined.