ASSESSMENT OF METAL CONTAMINATION AND ECOLOGICAL RISK IN URBAN SOILS SITUATED NEAR A METALLURGICAL COMPLEX

Maria-Alexandra Hoaghia1*, Erika-Andrea Levei1, Oana Cadar1, Marin Senila1, Gheorghe-Gavrila Hognogi2

1INCDO-INOE 2000, Research Institute for Analytical Instrumentation, 67 Donath Street, 400293 Cluj-Napoca, Romania
2Babeș-Bolyai University, Faculty of Geography, 5-7 Clinicilor Street, 400006, Cluj-Napoca, Romania

Abstract

Anthropogenic activities negatively affect the ecosystems by introducing high amounts of metals in the environment. The study assessed the contamination and ecological risk caused by As, Cd, Cr, Cu, Pb and Zn in urban soils situated near a metallurgical complex, based on geochemical load (Igeo), contamination factor (Cfi), degree of contamination (Cd), potential ecological risk factor (Eri) and potential ecological risk index (Ri). The results showed concentrations above the geochemical background in more than 80% of samples for As, Cd, Cu, Pb, Zn and 25% for Cr, respectively. The alert level for sensitive soil use was exceeded in 80% and 5% of samples for Pb and Cd, respectively, while in 15% of samples the Pb concentrations exceeded the intervention level. The Cfi indicated considerable contamination with Pb, moderate contamination with Cd, Cu, Zn, As and low contamination with Cr. The Igeo indicated moderate to strong pollution with Pb, moderate pollution with Cd, Cu, Zn, As and no pollution with Cr in the majority of the soils. The Cd showed low and moderate degree of contamination of soils with the studied metals. The Eri revealed moderate potential ecological risk for Cd and low potential risk for Pb, Cr, Cu, Zn and As, while the Ri indicated a low risk for all studied soil samples.

Key words: contamination indices, ecological risk, geochemical load, metals

Received: November, 2016; Revised final: June, 2017; Accepted: July, 2017

* Author to whom all correspondence should be addressed: e-mail: alexandra.hoaghia@icia.ro; Phone: +40 264 420 590