Assessment of Soil Contamination by Heavy Metals: A Case of Vegetable Production Center in Banjarbaru Region, Indonesia

Sudarningsih Sudarningsih*, Fahruddin Fahruddin, Muhammad Lailiyanto, Alif Antasari Noer, Sadang Husain, Simon Sadok Siregar, Sri Cahyo Wahyono, Ichsan Ridwan

Faculty of Mathematics and Natural Sciences, Universitas Lambung Mangkurat, Jalan A. Yani Km. 36 Kota Banjarbaru, Kalimantan Selatan 7071

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Abstract

Landasan Ulin is a center for vegetable production, and it has an important role in producing vegetables for the city of Banjarbaru. Agricultural soil in this study was assessed for heavy metal contamination using the geoaccumulation index (I_{geo}), contamination factor (C_f^i), the degree of contamination (C_d), the degree of modified contamination (mC_d), and the Pollution Load Index (PLI) as well as magnetic susceptibility. Samples were collected from topsoil and analyzed using magnetic susceptibility and Atomic Absorption Spectrophotometer (AAS). The average concentration of heavy metals in the sampling area A is Fe>Zn>Mn>Cu>Hg, and the area B is Fe>Mn>Zn>Cu>Hg. Magnetic susceptibility values in area A is higher than in area B and the value of magnetic susceptibility can be used as a proxy for monitoring heavy metal concentrations, especially Zn in this area. Zn and Cu exceeded the threshold set by the Indonesian Standards Institute. Igeo results show that the research area is moderately contaminated with Cu, Zn, and Hg. According to C_f^i, the soil was classified as low contaminated with Fe, Zn, Cu, Mn, and Hg, as well as Cd and mCd. The PLI results show that in both area, drastic corrective action is not required.

Keywords: geoaccumulation index, contamination factor, contamination degree, pollution load index