Assessment of heavy metal contamination of serpentinite soils, Harsin-Sahneh region, Kermanshah

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Abstract

The pollution of heavy metals not only affects directly the physical and chemical features of soil and reduces biological activities and access to nutrition materials in soil, but also is considered a danger for human health. The finding from geo-accumulation index of serpentine soil samples shows that the intensity of serpentine soil is classified in the range of no pollution to average regarding chromium and nickel. In addition, the pollution bar index of chromium and nickel is more than 1 proving the inappropriate soil quality and soil pollution of the region. However, nickel has the most considerable value. The average value of EF proving the region shows enrichment for the chromium and nickel elements. According to the Pearson correlation coefficient, there is a high correlation between cobalt, chromium, and nickel that indicating the equal source or similar geochemical behavior of the elements toward each other. According to the geostatistics values such as geo accumulation, enrichment factor, and pollution bar in the studying area, is pollution in nickel and chromium elements. Pearson correlation coefficient reveals that there is a high correlation among cobalt, chromium, and nickel proving the same origin. Making a zoning map of heavy metal density in the region soil demonstrates that the high density of the elements in some stations is related to geological factors. Cluster analysis shows the division of the elements into 7 clusters. Besides, the elements with the structural relationship are related in the next subcategories. Clusters 6 and 7 together indicate the same origin for these elements.

Keywords*: Pollution, Soil enrichment, Serpentine soil, Geo-accumulation index*