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POLLUTION WITH METALS (As, Sb, Hg, Zn) IN AGRICULTURAL SOIL LOCATED CLOSE TO ZARSHURAN GOLD MINE, IRAN

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Abstract

Zarshuran As-Au deposit is the major ore deposit in northwest of Iran. Having been exposed to weathering, the accumulated mining waste is consumed to deteriorate regional soil and water quality. Accordingly, 11 composite surface soil samples were collected to evaluate the metallic pollution. Mean concentration of elements As, Sb, Hg and Zn were measured to be 234.9, 19.6, 24.2 and 476.7 ppm, respectively. In comparison with mean earth crust and local guidelines for agricultural soil, the samples are strongly polluted by toxic elements As, Sb, Hg and Zn. The major reason of such high pollution may be contributed to the lasting gold mining activities that ease the exposure of Au-As- Sb rich minerals to the air and moisture. Detailed statistical analysis categorizes the 11 stations into two distinct groups. Stations S1 to S5 (showing lower metallic pollution) belong to the first group and are located in higher elevations than the mining site. Being located in downstream of the mining site, stations S6 to S11 (second group) manifest more severe soil quality degradation. The seasonal inundation of regional river waters plays the key role in polluting the downstream soil. Regarding extremely high concentrations of toxic elements (As, Sb, Hg and Zn) in the soil of the study area, severe threats may be posed to human health through consumption of the harvested crop.

Key words: gold mine, Iran, soil pollution, toxic element

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