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Arsenic distribution in anthropogenically impacted soils of northern Chile

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Arsenic (As) is a highly toxic metalloid that is usually present in the upper continental crust (UCC) with concentrations of nearly 5.7 mg/kg [1]. Some areas in the world that have been impacted by historic and present anthropogenic activities, namely mining, might present elevated concentrations of this element.

Northern Chile has been characterized by intense anthropogenic activities, especially mining, which is important for the economy of the Antofagasta Region. Due to the mining activities present in this zone, the concentration and potential of mobilization of As in soils of Tocopilla and Antofagasta were assessed. These sites were sampled concentrically to the main anthropogenic emissions, which correspond to the AES Gener Thermoelectric and City Port, respectively. A total of 43 soil samples were collected and submitted to total (12 mL HNO_3 + 4 mL HCl + 300 mg sample) and selective digestions [2].

The main preliminary results indicate that the average concentrations of As in soils are higher in the vicinity the Port of Antofagasta (43.2 mg/kg) when compared to Tocopilla (12.7 mg/kg). Regarding the potential mobilization of As in the soils, Antofagasta presents the higher potential (59%) in relation to Tocopilla (39%). In Tocopilla, As is related to pH sensitive and reducible fractions, while in Antofagasta, As is present in the oxidizable, reducible, pH sensitive, and exchangeable fractions.

Although both sites are related to As-enriched soils when compared to the UCC, the higher concentrations and potential of mobilization are observed in the soils of Antofagasta. This could be related to the geology of the area in addition to the presence of a warehouse in the port where As-rich copper concentrate is stored [3]. On the contrary, mining activities in Tocopilla were mainly historic and the ores currently treated in this city are not highly enriched in As.

References

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