Studies for the sorption of metals from lake water using limestone and rice bran

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Environmental research studies were carried on Noor Mohamed Lake in Katedan Industrial Development Area Hyderabad, India. The study reveals that the lake was highly contaminated with industrial effluents. Contamination of lake was due to release of industrial effluent containing organic and inorganic chemicals. A sorption experiment using laboratory columns was carried on lake water to reduce the concentration of heavy metals to limited extent, in this study an agricultural by product rice bran (30%) and a geological media limestone (70%) has been successfully used for reducing the concentration of metals in lake water. The Medias are efficient in reducing metal concentration by Sorption, adsorption, precipitation, oxidization and reduction reactions involved in process which depends on the factors like pH, surface areas of reactive media and porosity.

Vertical columns open at both the ends made of polyvinyl chloride of length 50 cm / 10 cm diameter was packed with two different medias in 3:7 ratio covered with a filter paper and closed with Teflon lids fitted with Silicon tubes of 3 mm size and effluent was passed using a peristaltic pump with speed of 55 rpm / 10 ml per minute. The experiment was carried for one week and the sample was collected from outlet, analysed for pH, E.C, TDS and metals like Zn, Cu, Cr, Pb, Ni by inductively coupled plasma optical emission spectrometry (ICP-OES).

The results shows that there was no change in pH but a slight increase in total dissolvable solids from 1026 ppm to 1857 ppm, this was due to the release of dissolvable solids from the medias, concentration of metals for Cr-43.52ppb (Cr-68% removal), Zn - 98.25ppb (Zn-88% removal), Cu–30.43ppb (Cu-41% removal), Ni–27.44ppb (Ni51% removal), Pb–15.62 ppb (Pb-84% removal) with limestone and rice bran.

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Contribution of two main smelters on urban soils pollution in northern France investigated by lead isotopes

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Introduction and objectives

The studied urban zones are located in northern France at the vicinity of two base metal smelters which are 3.5 km distant from each other. Historical Pb, Cd and Zn contamination through atmospheric emissions from both plants has been demonstrated by different authors (Frangi *et al*., (1997) or Sterckeman *et al*., (2002) on cultivated soils).

Urban (kitchen garden and lawn) soils in the studied zones present varying and sometimes higher Pb contents than the neighbouring cultivated soils (Pruvot *et al*., 2006). Pb isotopes have then been used to better constrain the contribution of each emitter to the observed pollution. A second aim was to look for other possible sources of contamination (manures with ashes or slag, other atmospheric inputs…) to explain the anomalous contents.

Analyses have been performed on homogenised samples from the upper 25 cm of the garden soils. Pb isotopic compositions were analysed by TIMS on a MAT-261. Pb, Cd and Zn concentrations were obtained by GFAAS.

Isotopic results and discussion

Garden soils with different lead contents and supposedly various cultural practices show a distribution into two distinct and homogeneous lead isotopic signatures. Each signature corresponds to soils located in the vicinity of one of the two plants. This supports the hypothesis of a quite exclusively airborne pollution related to one refinery activity. Furthermore, mixing of the two lead types can be observed on one soil located in between the two refineries, which displays an intermediate isotopic composition. Additionally, whatever its chemical speciation, lead obtained by single chemical extractions performed on some garden soils shows isotopic homogeneity within a specific soil, suggesting that pollution has affected all soil compartments.

References

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