

Compositional variation of Sewage Sludge's from India: Implications for agriculture.

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As part of an international project to look at soil re-mediation in India, several hundred samples of sewage sludge were collected from various treatment facilities and analyzed for element content. The concentration of 8 potentially toxic trace elements in sludge samples collected from various facilities is extremely variable: (range in ppm) As: 2-140, Cd: 0-335, Cr: 63-25,000, Cu: 35-1350, Mo 1.5-27; Ni: 28-177, Pb: 10-329 and Zn: 49-5000. For the same elements average element concentrations are, As: 48, Cd:49, Cr:1811, Cu:311, Mo:10, Ni:67, Pb:136 and Zn:1064.

The extreme range of concentrations is primarily facility/urban center related. For example the average Cr content in sludge samples from Kanpur is 6200ppm, where as it is only 190 ppm from Bhilai. The high Cr content in the Kanpur sludge is related to tannery effluent and soils amended with this sludge would quickly exceed phyto-toxicity ranges for Cr (100-300 ppm in the soil). A similar situation was identified in Varanasi. Sludge samples have an average Cd concentration of 194 ppm. In Varanasi the sludge is sold to local farmers who apply it annually to agricultural plots at a rate far above the suggested 0.2 kg/ha/year for Cd.

The variability in element content indicates that risk assessment be made for each treatment facility and that broad guidelines for the application of sludge's to edible croplands should be made available.