

Effect of Chemical Stabilization by Phosphate Amendment on the Desorption of P and Pb From a Contaminated Soil

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The amendment of Pb contaminated soils with phosphatic materials, which has been recently investigated as a potential in situ remediation strategy, often involves phosphate application rates considerably greater than fertilizer rates used in agriculture. Such high phosphate rates may pose an environmental concern. The desorption of P and Pb from a Pb contaminated soil treated with H_3PO_4 synthetic hydroxyapatite (HA), and $\text{HCl} + \text{K}_3\text{PO}_4$ was investigated using a stirred-flow reactor. Total P and Pb desorption and P desorption trends varied with amendment type. Ranking of amendments based on total P desorbed was $\text{HCl} + \text{K}_3\text{PO}_4 > \text{H}_3\text{PO}_4 > \text{HA} > \text{untreated soil}$, while the reverse ranking was observed for total Pb desorption. For $\text{HCl} + \text{K}_3\text{PO}_4$ - and H_3PO_4 -amended soil, P desorption was initially rapid decreasing with continued flow, while Pb desorption remained relatively constant for all treatments. In this soil, Pb immobilization was enhanced by more soluble phosphate materials, which may be a consideration for their use in remediation.