

Enhancement of tartaric acid modified washing solutions for lead decontamination of tropical soils

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Abstract. Tartaric acid is generally not an effective soil washing solution, hence this study focuses on enhancing its usage for soil-Pb decontamination. Three tropical soil types (sandy, clay and loamy) with different lead concentrations were subjected to single batch washing using 0.01, 0.1, 0.5 and 1 M tartaric acid with 5% and 10% KCl modification at 3% soil-pulp-density for 2, 6, 12 and 24 h washing time. The optimum washing conditions were 1 M tartaric acid at 24 h washing time, with Pb removal efficiency: sandy- 94.3%, clay-67.6% and loamy-36.8%. Modification of tartaric acid with 5% and 10% KCl brought about some degree of enhancement of Pb removal efficiency especially for clay and loamy soils. Removal efficiency for 5% KCl modification were: sandy-97.9%, clay-96.2% with 1 M tartaric acid at 24 h washing time, loamy-76.7% for 0.5 M tartaric acid. Similarly, 10% KCl modification were: sandy-96.7%, clay-97.2% for 1 M tartaric acid at 24 h, loamy-82.1% for 0.5 M tartaric acid. Removal efficiency was soil concentration dependent. Generally, removal efficiency increased with increasing tartaric acid concentrations and washing time. Tartaric acid washing is promising and recommended in events of moderate contamination and 10% KCl modification in event of high level contamination. Further study is needed on enhancing very low concentrations of tartaric acid for large scale applications.

Keywords: soil remediation; lead; tartaric acid; soil contamination.

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