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Acid iron sulfate treated contaminated soils and post-treatment liming effect on stability and bioaccessibility of Lead (Pb) and Arsenic (As)

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Soil remediation with *in situ* chemical amendments offers a cost-effective alternative to costly and environmentally-damaging excavation practices. Chemical amendment techniques transform soil metal contaminants to phases that are not easily mobilized upon ingestion; but effective options for treating both lead (Pb) and arsenic (As) are limited. A novel treatment utilizing ‘acid iron sulfate’ (AIS) has shown to be very effective at converting both Pb and As into alunite group minerals that have remarkably low bioavailability. However, post AIS treatment soils are highly acidic (~pH 3) with properties much like acid sulfate soils and issues such as poor plant survival. To remedy this, pH neutralization is needed but too much liming could destabilize the mineral-bound Pb and As and increase bioaccessibility. For these reasons, we studied lime response rates for multiple AIS treated soils in shaken batch reactions at multiple pH endpoints (pH 3.07 - 7.0). Liming effect on Pb and As bioaccessibility was assessed with in-vitro bioaccessibility extractions (EPA 1340). Additionally, we measured plant root toxicity potential by 1M KCl extractable aluminum. Bulk X-ray absorption spectroscopy was also utilized to identify Pb and As speciation changes with liming. Results and their implications for post-AIS treatment land use will be discussed.