Leaching Behaviour of Arsenic from Soil Stabilised by Blast Furnace Slag

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Stabilisation has been and will continue to be one of the most widely used remediation techniques applied to reduce mobile fractions of hazardous elements in Brownfields. This is done by the use of appropriate amendments treated with the soil via physicochemical processes like sorption, precipitation and co-precipitation. This work aimed at investigating leaching behaviour and dynamics of As from contaminated soil samples using BFS as the amendment. This was realised through batch leaching tests and chemical extraction methods while varying the geochemical parameters. The intrinsic physicochemical properties of the two different slags did not have a considerable bearing on the leaching of As. More As was leached as co-precipitates when soil was added to amendments possibly favoured by the presence of other elements with which As forms complexes and precipitates. Adding BFS as amendment did not quantitatively reduce the amount of As leaching due to overall increase in alkalinity, but rather caused the release of much harmless co-precipitated form of As. More over it seems the low CEC of BFS also contributed to the formation of complexes with As since they easily exchange or release out the necessary free cations that readily co-precipitate with it. Acidification released the most amount of As while oxidation the least and fairly more As was also leached from L/S ratio 10, than from L/S 2. Yet the pH proved to be the most significant factor in this case and caused the mobilisation and stabilisation of As strictly via sorption processes. The experiments proved that both BSFs are good amendments that could be utilised to relieve contaminated lands from As especially via sorption and co-precipitation chemical processes. More so it is a readily available and environmentally friendly filter material since it is relatively cheap, non toxic and recyclable. These investigations were conducted in the lab thus it should be recommended to carry out further works on the field under real natural situations in situ.

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