Partitioning of heavy metals in soil columns using selective sequential extractions

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Abstrak (Abstract)

Heavy metals that entered the soil columns after the leaching experiment were bound to different phases by various retention mechanisms. The quantity of heavy metals bound in these phases can be extracted selectively using selective sequential extraction technique (SSE). The technique involves different types of chemical reagents utilised to destroy the bonding between the heavy metals and various active soil components. There are five different groups of binding phases between the soil components and heavy metals, i.e. in association with an exchangeable phase; carbonate phase; amorphous oxides/hydroxides phase; organic phase and residual fractions.

The results from the SSE technique should be considered as operationally defined by the method of extraction. The results from the study show that the retention of heavy metals Pb, Cu and Zn was mainly associated with various processes, where the main process of retention in the leaching columns was precipitation with the carbonates. The second most important process was also a precipitation process involving the association of the heavy metals with amorphous materials (oxides/hydroxides). The third process was complexation (chelation) with organic matter. The fourth process was via adsorption into soil primary and secondary mineral lattice (residual fractions). And finally the fifth process was via exchangeable cations of heavy metals on negatively charged clay mineral surface.

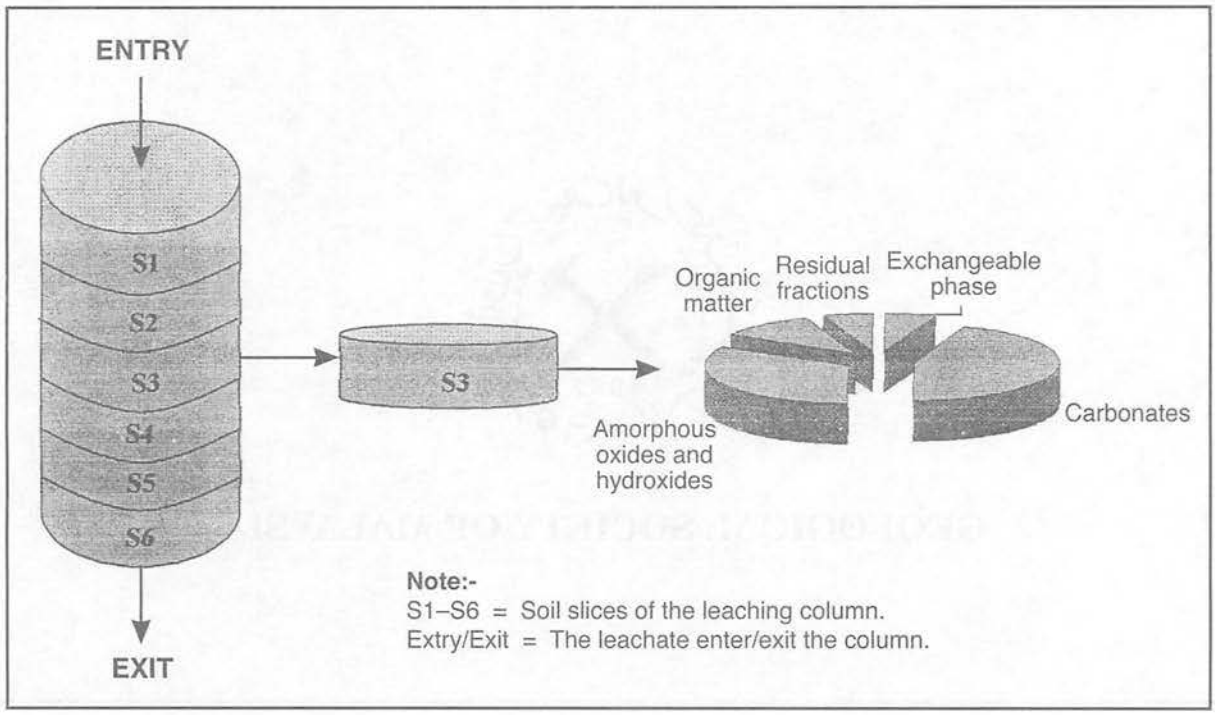

Figure 1. The sketch of partitioning of heavy metals on each slice of soil column.