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Phytoextraction of lead in roadside sediments using selected legumes and composites – A model study

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Our study was focused on using phytoextraction of Pb by *Pueraria phaseoloides* and *Tridax procumbens* as a potential method to treat contaminated roadsides. In modeled experimental conditions, the extraction of Pb by *Pueraria phaseoloides* and *Tridax procumbens* with the increase in soil Pb concentration was studied. The Pb accumulation of *Pueraria phaseoloides* and *Tridax procumbens* increased with the increase in soil Pb concentration. According to the study *Pueraria phaseoloides* and *Tridax procumbens* can tolerate up to 2000mg/kg and 1500 mg/kg soil Pb concentrations added as $Pb(NO_3)_2$ respectively.

Tridax procumbens had shown higher Pb accumulation compare to *Pueraria phaseoloides* in same soil Pb concentrations. The Pb concentration of *Pueraria phaseoloides* and *Tridax procumbens* were 107.7 ppm (mg/kg of dry weight) and 158.5 ppm respectively, when the soil Pb concentration was 1500mg/kg. This observation shows that *Tridax procumbens* can accumulate about 50% more Pb compare to *Pueraria phaseoloides*.

Pueraria phaseoloides has relatively higher biomass. Germination of *Pueraria phaseoloides* seeds takes a longer time and they have a relatively longer lifetime however *Tridax procumbens* is an annual plant. Because of these reasons, use of *Pueraria phaseoloides* for the phytoextraction is more practical and hence economical.

Application of EDTA (1g/kg of soil) as an external chelating agent increased the amount of extracted Pb by *Pueraria phaseoloides* significantly. With EDTA (1g/kg of soil) added, the extracted Pb concentration in *Pueraria phaseoloides* was 313.0 ppm and in the absence of EDTA the extracted Pb concentration was 129.8 ppm, when the soil Pb concentration was 2000 mg/kg.
In our study it was also shown that electrodeposition techniques could be successfully used to recover the extracted Pb from the harvested *Pueraria phaseoloides* plants.

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