

PLANT-MICROBE-URANIUM INTERACTIONS IN PHYTOACCUMULATION OF URANIUM FROM SOIL USING SUNFLOWER AND INDIAN MUSTARD

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Abstract: Decades of nuclear activities including the development of nuclear weapon and nuclear power station resulted in uranium contamination in soil worldwide. Phytoaccumulation that utilizes plants to cleanse the nature by means of accumulation of contaminants was explored as an economical and *in situ* approach to remove uranium from contaminated soil. Sunflower (*Helianthus annuus*) and Indian mustard (*Brassica juncea*) have been widely recognized as efficient uranium accumulators for remediation of uranium contaminated soil. Root-associated microbes are deemed to play a significant role in phytoaccumulation. However, the structure of root microbiome and the interactions between plant, microbe and uranium is still little known. In this research, High-throughput sequencing of the 16S ribosomal RNA gene and ITS amplicons was carried out to determine the root rhizosphere and entophytic bacterial and fungal communities of 12-week-old sunflowers and Indian mustard separately grown in control soil and soils artificially contaminated with UO₂, UO₃ and UO₂(NO₃)₂·6H₂O, separately, at a rate of 100 mg U kg⁻¹. Soil properties, plant oxidative stress and growth parameters were also determined. Effect of different uranium compounds and plants on rhizosphere and entophytic microbiota along with the potential contribution of microbiota in phytoaccumulation were expected to be further understood that will help to develop a more advanced phytoaccumulation strategy.

Keywords: Uranium; Phytoaccumulation; Sunflower; Indian mustard; Microbiota; High-throughput sequencing.