

Comparative Analysis of Secondary Metabolites from Terrestrial vs Aquatic Plants for Heavy Metal Remediation

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Abstract: *The persistence, toxicity, and bioaccumulation of heavy metal in the ecosystems have made it a critical issue of environmental and human health. Phytoremediation would provide a cost effective and sustainable method of mitigating such pollutants mainly via the action of plant derived secondary metabolites. This paper is a comparative analysis of land and water plants, which will be done based on the effect of habitat on phytochemical composition and metal binding capacity. Stimulated metabolites, such as phenolics, flavonoids, alkaloids and tannin were tested together with their ability to decontaminate lead (Pb), cadmium (Cd) and arsenic (As). The results are based on illustrative experimental observations that indicate that aquatic flora have strongly enhanced efficiency with regard to metal accumulation since they are constantly exposed to polluted water bodies. On the contrary, plants on earth exhibit comparatively lower accumulation but enhanced antioxidant-mediated detoxifications mechanisms. The experiment also reveals the existence of a positive relation between the level of metabolite and the ability to absorb metal. In general, the study identifies habitat-specific biochemical adaptations in increasing the capacity of phytoremediation and indicates that combining both forms of plants may maximize remediation plans under varied environmental conditions.*

Keywords: Phytoremediation, Secondary Metabolites, Heavy Metals, Aquatic Plants, Terrestrial Plants, Phytochemistry

