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POTENTIAL OF BRYOPHYTES FOR BIOMONITORING OF HEAVY METAL POLLUTION: A CASE STUDY

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Abstract

Bryophytes are a heterogeneous group of terrestrial plants that occupy a pivotal position in land plant phylogeny. They are the closest living relatives to the ancestors of the land plants. Bryophytes possess unique features that enable their survival and persistence on land. This study aims to investigate the potential of native bryophytes to monitor environmental contamination by heavy metals. Three complex thalloid liverwort species; *Marchantia papillata*, *Dumortiera hirsuta*, *Riccia billardierei*, one simple thalloid liverwort species; *Pallavicinia lyellii*, three leafy liverwort species; *Frullania ternatensis*, *Frullania apiculata*, *Bazzania tridens*, and six moss species; *Philonotis thwaitesii*, *Sphagnum ceylanicum*, *Meteorium buchananii*, *Pogonatum aloides*, *Pogonatum marginatum*, *Isopterygium pohliaecarpum*, were sampled from four different land-use types in Sri Lanka. The concentrations of Ag, Cu, Ni, Pb, Mn, Cr, and Cd in these samples were analyzed by Atomic Absorption Spectrometry (AAS). The heavy metal concentrations in study sites were compared. Heavy metal concentrations in samples revealed that different species have different capacities for accumulating heavy metals. Accumulation of heavy metals depend on the metal species and land use type. The study revealed that native bryophytes indicate the heavy metal deposition pattern of the environment. All the species investigated were found to be hyperaccumulators e.g. *M. papillata* (Mn 557333μg/g), and have a high potential to be used as bioindicators of heavy metal pollution in the environment. We emphasize the need for further research exploring a wider range of the countries' geographic and topographic areas enabling the development of a model to predict heavy metal accumulation in the environment.

Key words: bioaccumulation, bio-magnification, hyper-accumulators, liverworts, mosses

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