

A PRELIMINARY STUDY ON THE POTENTIAL OF USING FRESHWATER FLORA AS AN INDICATOR IN AQUATIC ENVIRONMENTAL RISK ASSESSMENT

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This study explored the potential of using freshwater flora to assess heavy metal and pesticide pollution in water bodies. A survey on agrochemical usage was conducted in five Grama Niladhari divisions in Matara, Sri Lanka, through direct interviews with one hundred farmers. The study was carried out in the Thihagoda canal by collecting samples of *Salvinia natans*, *Hydrilla verticillata*, *Nelumbo nucifera*, and water from surface (10 cm), mid (65 cm), and bottom (100-120 cm) depths. Composite water and plant samples were analysed for pesticides using HPLC and for heavy metals using ICP-MS. The heavy metal pollution index for As, Cu, Zn, Cd, Ni, Pb, Cr, and Mn in water and the plants' Bio-Concentration Factor (BCF) were calculated using standard formulas. The most commonly used fertilisers at the site were mixed fertiliser (65%) and organic liquid fertiliser (55%), while the predominant herbicide and pesticide were Satunil (75%) and Gaucho-Imidacloprid (100%), respectively. Both pesticides were detected in all water and plant samples. Organic liquid fertiliser contained As (0.05 mg/L), Cr (13.13 mg/L), and Pb (0.56 mg/L), while mixed fertiliser also showed As (0.74 mg/kg), Cr (3.93 mg/kg), and Pb (6.75 mg/kg). *Salvinia* and *Hydrilla* exhibited a BCF > 5000 for As, Cr, and Pb, indicating strong bioconcentration potential. The heavy metal pollution index for As, Cu, Zn, Cd, Ni, Pb, Cr, and Mn in water and the plants' Bio-Concentration values below 100 at all three water depths suggested the absence of significant risk of heavy metal pollution in the canal. However, the high BCF values in plants highlighted the bioaccumulation of most metals. These results underscore that pollution assessments should not rely solely on water analysis and emphasize the importance of incorporating aquatic flora as key indicators in water quality assessments to better evaluate environmental risks in water bodies.

Keywords: Fertilizers, Freshwater flora, Heavy metals, Pesticides, Water quality