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Moss (*Barbula* sp.) used as biomonitor of atmospheric heavy metal deposition: Estimation of uptake efficiencies

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Concentrations of Pb, Ni, Cu, Cr and Cd in two *Barbula* species in permeable bags (moss bag method) were compared with bulk deposition measurements of these elements at three monitoring stations; Dalugama, Biyagama and Sedawatte which can be identified as highly polluted areas in Sri Lanka. Amount of heavy metals in moss and bulk collector were determined by Atomic Absorption Spectrophotometry (AAS) during six months of period from October 2007 to March 2008.

Heavy metal concentrations measured in three monitoring stations during six months period is given in µg/g dry weight of moss sample. Concentration of heavy metals in bulk collector is expressed in µg/cm² area of the funnel. These elements showed generally significant correlations between moss and bulk deposition, and uptake efficiencies (E_x) relative to that of Pb were estimated using the formula $E_x (\%) = \frac{K_x}{K_{Pb}} \times 100$ where K_x is the slope of the

regression line of element x, and K_{Pb} is the slope of the regression line of Pb in mosses vs atmospheric deposition. The uptake efficiency of heavy metals were also established for each site using another formula $E_x^s (\%) = \frac{C}{D} \times A$ where E_x^s (%) is the uptake efficiency of an element

x at monitoring station s, C is the moss concentration, D is the bulk deposition and A is a “ratio constant” estimated for each monitoring station. The uptake efficiencies of heavy metals to be: Ni 50-65 %; Cu 55-70%; Cr 45-60 %; Cd 60-70% for *Barbula* sp.1 and Ni 65- 70%; Cu 80-90 %; Cr 30-50%; Cd 45-60% for *Barbula* sp.2. Therefore Ni and Cu have higher uptake efficiency towards *Barbula* sp.2 whereas Cr and Cd have higher uptake efficiency towards *Barbula* sp.1.

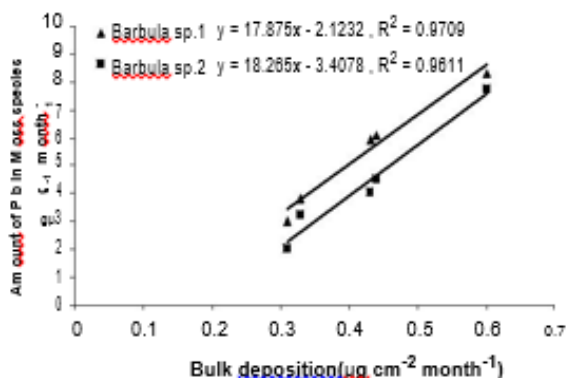


Figure 1
 Plot of amount of Pb in two moss species against the bulk deposition

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