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Biomonitoring of atmospheric heavy metal deposition using moss (*Hyophila involuta*): Efficiency of different moss bag techniques

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Biomonitoring is important as large scale, direct air monitoring is costly and time consuming. Moss *Hyophila involuta* was selected as the bioindicator for the current study. When native mosses are not available, transplanted mosses commonly named as moss bag technique is widely used. The efficiency of different moss bag techniques, including design of moss bags, irrigation system and environmental conditions were investigated by comparing the atmospheric heavy metal deposition in local areas and around point sources. Sedawatte area which is under the influence of Kelanitissa power plant and Dalugama University premises which is close to the A1 road were selected as the sampling sites.

Two systems of moss bags were designed with different orientations, i.e., two vertical and two horizontal. One vertical system was sprayed with deionized water and a horizontal system was kept on a sponge within deionized water. Other systems were not irrigated. The obtained moss samples were dried, ashed and acid digested. Heavy metal concentrations (Pb, Ni, Cu, Cd and Cr) were determined in each moss bag system using Atomic Absorption Spectrometry during a ten week period from July 2012 to October 2012. Heavy metal concentrations measured are given in $\mu\text{g/g}$ dry weight of moss in different moss bag systems (two vertical and two horizontal) together with a background study in Norton Bridge. The heavy metal concentration of the selected metals in mosses were measured with the orientation of the moss bag system and the rain fall during the sampling weeks. When weekly rain fall is above 4 mm, a high metal accumulation was seen in the horizontal moss bag systems, whereas, when rain fall is below 4 mm the vertical moss bag systems had the higher levels.

When comparing the data with the orientation of the moss bag system and the rain fall during the sampling weeks, it was found that the vertical moss bag system is significantly important for active biomonitoring during the dry period. Vertical positioning enables the capture of contaminants present in the air. Horizontal positioning can capture contaminants by gravitational sedimentation and wet deposition.