

## **Background Levels of Heavy Metals in Moss *Hyophila involuta* as A Bioindicator Using Four Strict Nature Reserves in Sri Lanka: Sinharaja Rainforest, Knuckles Mountain Range, Horton Plains National Park and Hakgala Mountain Forest**

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Atmospheric deposition of six heavy metals (Zn, Cu, Pb, Ni, Cr and Cd) using the moss *Hyophila involuta* as a bioindicator was investigated to establish the background levels of heavy metals for different geographical and climatic zones of Sri Lanka.

Moss sampling was carried out in four strict nature reserves in different geographical and climatic zones of Sri Lanka, namely Sinharaja rainforest (6°24'–6°27' N, 80°24'–80°26' E, 450–500 m) from wet zone, Knuckles mountain range (7°31' N, 80°43' E, 1,000–1,300 m) from intermediate zone, Horton Plains National Park (6°46'–6°48' N, 80°47'–80°49' E, 2,000–2,200 m) and Hakgala mountain forest (6°55' N, 80°48' E, 1,700–1,800 m) from wet zone and Central highlands using about 10 sampling sites from each location within a month from October to November 2015. Concentrations of heavy metals in moss were analysed by using atomic absorption spectrometer.

The atmospheric deposition of heavy metal concentrations in all sampling stations is given for dry weight of moss and the ranges of six elements around four strict nature reserves were 9.58–65.68, 1.87–9.97, 1.20–10.56, 1.12–7.81, 1.20–10.60 and 0.05–0.36 µg/g for Zn, Cu, Pb, Ni Cr and Cd separately.

According to the statistical analysis (one-way ANOVA,  $p < 0.05$ ), accumulation of Cu, Cr and Cd in moss was not significantly change among four strict nature reserves and accumulation of Ni and Pb in moss was significantly higher around Hakgala mountain forest. Atmospheric deposition of Zn in moss was significantly higher around Knuckles mountain range area than other sampling locations.

Therefore background levels of heavy metals in moss can be expressed as 5.53 ( $\pm 1.75$ ), 7.23 ( $\pm 2.11$ ), 4.03 ( $\pm 1.41$ ), 6.61 ( $\pm 2.58$ ) and 0.17 ( $\pm 0.06$ ) µg/g for Cu, Pb, Ni, Cr and Cd respectively for the most of the geographical and climatic zones of Sri Lanka and background levels of Zn can be established as 30.62 ( $\pm 8.11$ ) and 47.42 ( $\pm 12.31$ ) µg/g for wet zone including Central highlands and intermediate zone of Sri Lanka respectively.

**Keywords:** atmospheric deposition, bioindicator, moss, heavy metals, Sri Lanka

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