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Chapter 8

Biomonitoring of Trace Elements Using Epiphytic Lichens Collected in a Suburban Area of Selangor, Malaysia

Boon Siong Wee, Shakirah Abd Shukor, Ahmad Firdaus Khaidir, Mohd Suhaimi Hamzah, Shamsiah Abdul Rahman, Md Suhaimi Elias, Nazaratul Ashifa Abdullah Salim and Azian Hashim

Abstract Lichen samples (*Dirinaria sp.* and *Parmotrema sp.*) were collected in a suburban area of Selangor. Their chemical compositions were determined using the instrumental neutron activation analysis (INAA) and 21 elements (Al, As, Ce, Co, Cr, Cs, Eu, Fe, Hf, Hg, K, La, Mn, Na, Rb, Sc, Se, Sm, Th, V and Zn) were reported. Most of the concentrations found in the lichens were similar to those of baseline data from unpolluted areas. Regression analysis found that the elements Al, As, Ce, Cr, Eu, Fe, Hf, La, Mn, Na, Sm, and Th showed statistically significant correlations ($p < 0.05$) with Sc, which suggests that they were associated with crustal materials. Other elements Co, Cs, Hg, K, Rb, Se, V and Zn showed weak correlations with Sc implied that they were possibly contributed by anthropogenic sources. The enrichment factors of the elements Hg and Se were found to be high signifying that they may be originated from long-range transport from sources. The elements V and Zn were slightly enriched in the lichen samples, which could be due to some anthropogenic inputs. From correlation with Sc and enrichment factors, some constrain on potential elemental pollutants namely Hg, Se, V and Zn that could be due to anthropogenic pollutants could be identified. The use of lichens as biomonitor for trace elements has been able to indicate possible natural and anthropogenic inputs, which could provide information on air pollution in the study area.

Keywords Biomonitoring · Trace elements · Epiphytic lichens · Selangor · Instrumental neutron activation analysis

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