

A Comparison on Composition of Rain in Selected Locations in Colombo and Gampaha Districts

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Expansion of industrial processes significantly contribute to the extent of atmospheric deposition, and hence, quantitative determination of the atmospheric quality through monitoring rainwater quality parameters is important for understanding the transport and fate of chemical species in the atmosphere. In this respect, the study presented is on the chemical composition of rainwater in two sampling stations: Rajagiriya in Colombo District representing a metropolitan area and Weliveriya in Gampaha District representing a semiurban area. Analysis of bulk atmospheric samples, performed using standard analytical procedures, collected on weekly basis in each sampling location from December 2021 to March 2022 indicated that the volume weighted average (VWA) value of conductivity was $77.1 \mu\text{S cm}^{-1}$ (Range: $30.8 - 178.8 \mu\text{S cm}^{-1}$) for Colombo, while the corresponding value for Gampaha was $30.9 \mu\text{S cm}^{-1}$ (Range: $22.0 - 64.8 \mu\text{S cm}^{-1}$), and further, only a single acid precipitation event was recorded during the entire sampling period at

the Colombo sampling location. Among the four anions investigated, Cl^- , SO_4^{2-} , NO_3^- and F^- , the chloride content was the highest in both locations having the VWA values of $161.6 \mu\text{eq l}^{-1}$ (Ragagiriya) and $95.4 \mu\text{eq l}^{-1}$ (Weliveriya). On the other hand, the fluoride content was the lowest having VWA values of $0.52 \mu\text{eq l}^{-1}$ (Ragagiriya) and $0.84 \mu\text{eq l}^{-1}$ (Weliveriya). The VWA values of the ionic species present in precipitation samples were in the order of $\text{Cl}^- > \text{SO}_4^{2-} > \text{NO}_3^- > \text{F}^-$ in both sampling locations. The fact that chloride is the most abundant anion can be attributed to effect of sea breeze. Sulphate, the second most abundant ion in both locations followed by nitrate. The majority of the precipitation events reported with high pH is probably due to possible acid neutralization of basic cations, such as calcium and ammonium, present in the atmosphere.

Key words: Acid precipitation, Anions, Chemical composition, Rainwater