

Determination of rainwater quality at selected locations in Kandy district

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Chemical characteristics of atmospheric deposition, the major pathway for washing out pollutants from the atmosphere to the earth's surface, can be determined using bulk deposition, whose composition would be used to identify the atmospheric quality of selected locations. Although the determination of the quality of surface water is a common exercise, analysis of rainwater has not been given due attention despite the necessity of having a nationwide rainwater quality database. In this respect, this study was focused on the determination of rainwater quality through the analysis of bulk deposition weekly collected from April to November 2024, at three sampling sites: the University of Peradeniya (UOP), the Kandy Zonal Educational Department (KED), and the Polgolla Mahaweli Authority (PMA) Premises. The water quality parameters, namely, rainfall, pH, conductivity, total dissolved solids (TDS), total hardness, anionic species: Cl^- , NO_3^- , SO_4^{2-} , and trace elements: Fe, Zn, Cu, Cr and Pb, determined with the aid of standard analytical procedures throughout the period indicate

that the Kandy sampling site, having the lowest average pH (min: 5.21; max 8.34) and the highest average values for many quality parameters, was the most polluted region, due to the urbanization and low vegetation cover. Moreover, a smaller number of dry deposition events occurred at each sampling site, with an overall value of 12.6 %. Anions of bulk deposition followed the trend, $\text{Cl}^- > \text{SO}_4^{2-} > \text{NO}_3^-$ at the UOP and PMA sampling sites, while the KED site followed $\text{Cl}^- > \text{NO}_3^- > \text{SO}_4^{2-}$. Nevertheless, the trace metal concentration of all sampling sites showed the trend, $\text{Fe} > \text{Cu} > \text{Zn} > \text{Cr} > \text{Pb}$. The Pearson correlation coefficient of conductivity, TDS, and total hardness shows a positive correlation each other, while rainfall and pH inversely correlate with each other. Sulphate and chloride anions at three sampling sites are positively correlated, and Zn, Cu, and Cr show a positive correlation with each other.

Keywords:

Bulk deposition; Kandy; pearson correlation; rainwater; urbanization