Abstract Title: Chemical Composition and Sources Apportionment of Rain Water in an Urban and a Rural Area of Bangladesh

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Abstract

Thirty four samples of rain water were collected from Dhaka city and Bhola island of Bangladesh during monsoon season (June to September) of 2015. Different physical properties of rain water, e.g. pH, electrical conductivity etc. were measured. Concentrations of different cations and trace metals (Na^+, K^+, Ca^{2+} and Mg^{2+}, Zn, Fe and Mn) and anions (Cl^-, SO_4^{2-}, NO_3^-, HCO_3^-) in rain water were determined by using atomic absorption spectroscopy (AAS) and ion chromatography (IC), respectively. Source characterization of the chemical species in rain water was conducted with a combination of correlation analysis, enrichment factor analysis, % source contribution calculation and air mass trajectory analysis. The average concentrations of SO_4^{2-} in rain water from Dhaka and Bhola were 12.53 μeqL^{-1} and 8.48 μeqL^{-1} and the concentrations of NO_3^- were found to be 40.64 μeqL^{-1} and 33.93 μeqL^{-1}, respectively. The average concentrations of Na^+ and Cl^- were 20.43 μeqL^{-1} and 18.31 μeqL^{-1} for Dhaka and 25.17 μeqL^{-1} and 18.90 μeqL^{-1} for Bhola, respectively. The Total Dissolved Solids in rainwater of Dhaka and Bhola were 8.85 mgL^{-1} and 6.78 mgL^{-1}, respectively. The concentration of Zn was higher in Dhaka whereas the concentration of Fe was higher in Bhola. Neutralization factor analysis showed that Ca and Mg were the major neutralization constituents of the rain water in both areas. High enrichment factors of SO_4^{2-} and NO_3^- were a good indication of anthropogenic sources. Correlation factor analysis showed that the compounds that bore the components were mainly $ZnSO_4$, NaCl and KCl.

Keywords: rainwater analysis, neutralization factor, enrichment factor, source characterization

Professional Biography (100-150 words)

Mohammad Ullah has completed his B.S. in *Chemistry* and M.S. in *Inorganic and Analytical Chemistry* at the age of 24 years from University of Dhaka. He is the lecturer of Chemistry at *Cardiff International School, Dhaka,* a college affiliated by *University of Cambridge.* He has been associating research works in University of Dhaka for three years. He completed his Undergraduate research on *rainwater analysis* and his thesis on *Dust and soil analysis* and expecting to publish articles for both works in renowned journals.



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Photograph of Mohammad Ullah