



Apportionment and Seasonal Variations of Trace Metals Levels in Kuwait Governorates Aerosol (PM₁₀, PM_{2.5}, PM₁)

A.H. Bu-Olayan*, B.V. Thomas

POB 5969, Department of Chemistry, Faculty of Science, Kuwait University, Safat-13060, Kuwait

Received November 04, 2009; Accepted December 14, 2009

Abstract: Our study reports the presence of changed air quality standards in Kuwait as a result of particles sized 1.0, 2.5 and 10 μm \varnothing (PM_{1.0}, PM_{2.5}, PM₁₀). Irrespective of the six Kuwait Governorate areas (GI-GVI) and seasons, high trace metal concentrations were observed in the sequence of PM₁₀ > PM_{2.5} > PM_{1.0} respectively. The annual mean concentrations for PM_{1.0}- PM₁₀ (15 $\mu\text{g m}^{-3}$ - 93 $\mu\text{g m}^{-3}$) exceeded the World Health Organization (WHO) standards. Trace metals in these aerosols in Kuwait were never evidenced before and hence this study. Samples in G-VI showed high trace metals levels (4.93 μgg^{-1} -39.56 μgg^{-1} : PM_{1.0} - PM₁₀) among the six Governorates indicating the significance of trace metals from the re-suspension of dust and soil from the desert crust, dispersal from the oil industries, rise in population and urbanization. Metal-wise analysis revealed high metals levels in the sequence of Al > Cu > Fe > Ni > Zn > Pb > V. Season-wise analysis revealed high trace metals concentrations in aerosol during summer than in winter attributing to frequent dust storms and anthropogenic sources. Findings also revealed that these aerosols are detrimental to generate substantial health impacts. Hence, these aerosols can be characterized as indicators to trace metals pollution in the ambient air for a given area and also present opportunities to reduce airborne aerosols to improve public health.

Keywords: *Trace metals, outdoor air pollution, Kuwait*

*Corresponding: E-Mails: bivint@yahoo.com, buolayan@yahoo.com ; Tel: +965-24987075 Fax: +965-24816482