MONITORING AIR POLLUTION IN ANURADHAPURA USING PASSIVE GAS SAMPLING TECHNIQUES: POSSIBLE TRANSBOUNDARY EFFECTS

V.D.K. Abeyratne and O.A. Ileperuma
Department of Chemistry, University of Peradeniya

Abstract

The city of Anuradhapura is not expected to have a high degree of pollution from local sources except during festive periods. However, there is a possibility of transboundary pollution affecting Anuradhapura specially during the north-east monsoon owing to emissions carried from the Indian sub continent. In order to determine the contribution made by possible transboundary pollution, attempts were made to measure pollution in Anuradhapura city using three criteria pollutants, NO_2, SO_2, and O_3 using the passive sampler method.In this method, passive samplers were used to trap pollutants where, gases are passively transported to the filter by molecular diffusion. Exposure period of samplers was limited to 4-6 days at each station and weekly samples were collected from two stations during the sampling period from February 2002 to September 2004. Pollutants were analyzed using standard colorimetric and turbidimetric methods.

During this sampling period, high NO_2 and SO_2 concentrations were recorded during both monsoonal periods compared to inter-monsoonal periods. A significant effect of rainfall on pollutant concentrations was identified. Relatively high values of O_3 were recorded during months with high temperature and no rainfall. Calculation of the air quality index (AQI) shows that air quality is not "good" for human health on 47% of the occasions in Anuradhapura. The data reveal that SO_2 and O_3 determined during the sampling period in Anuradhapura exceeded the recommended Sri Lankan standard on 19 % and 38 % occasions respectively, while NO_2 showed no exceedences throughout the sampling period. The increased SO_2 levels during October to February

may be due to Transboundary effects. When these results are compared with those obtained for the city of Kandy during the same period, the exceedances were 45% (SO_2) , 30% (O_3) and 3% (NO_2) respectively during the same sampling period.