ELIGIBILITY OF PASSIVE SAMPLING TECHNIQUES FOR RURAL AIR QUALITY MONITORING

H.D.S. Premasiri, M.D.C. Perera, C.J. Annakkege, A.T.R. Fernando,
Environmental Division, National Building Research Organisation

Abstract

Development of passive sampling techniques originated in the field of occupational exposure monitoring. It is possible to develop them further to monitor low levels of certain pollutants in ambient air. In rural areas where pollutant concentrations are relatively low, this inexpensive technique could be successfully deployed. Added advantages are that it does not require highly skilled personnel on site, and an electricity supply since air pollutants are collected on an absorbing material without using an air pump. These advantages render the passive technique to be more suitable for rural area monitoring than other conventional sampling techniques.

In this study, ambient air quality monitored at 20 locations in rural areas of Kitulagala, Puttalam and Thihagoda (Matara) using passive sampling technique, is discussed. Results show that, in case of SO_2 and NO_2, the two-week maximum exposure levels are less than 15 $\mu g/m^3$ and 10 $\mu g/m^3$ and minimum levels are 0.33 $\mu g/m^3$ and 0.92 $\mu g/m^3$ respectively. Average levels of SO_2 recorded at three locations are 5.45 $\mu g/m^3$, 6.82 $\mu g/m^3$ and 8.00 $\mu g/m^3$ respectively.

The maximum, minimum and average weekly exposure levels of SO_2 in Colombo in $\mu g/m^3$ were 77.88, 33.15, and 57.8, respectively. The maximum, minimum and average weekly exposure levels of NO_2 were 72.64, 36.43 and 53.2 respectively. In some rural locations, levels of said pollutants are found to be lower than the minimum detection limit (0.001 ppm) of conventional automated air quality monitoring equipment. Therefore, passive technique is very useful in air quality monitoring in rural areas for screening and baseline studies, site selection and determining site representatives etc.