Measuring of Nitrogen Dioxide Exposure Levels - A Quick Test for Air Pollution

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ABSTRACT

Any burning process involves emission of Nitric Oxide (NO) & Nitrogen Dioxide (NO_2) and the extent of emissions are dependent on the burning temperature and pressure which are very much specific to the burning process. It is identified that burning of fossil fuels, waste, forest fires, etc. are as major sources of air pollution. Nitric Oxide is very unstable in atmosphere which reacts spontaneously with ambient O_2 and O_3 to form NO_2. Therefore, monitoring of ambient NO_2 is a good indicator to understand the extent of air pollution due to burning process. Concentrations of other pollutants such as SO_2, CO, hydrocarbons, PM_{10}, etc. are also indicators of air pollution but dependent on the type of fuel that use and the atmospheric conditions. Continuous air quality monitoring at Colombo Fort Railway Station indicates that the ambient air pollution is in the increasing trend. A program carried out in parallel by the Environmental Division of NBRO for the monitoring of ambient NO_2 levels at 14 other locations using passive air samplers in an around Colombo also indicates a similar trend everywhere. This is a common phenomenon in most of the urban cities and areas where high polluting industries are located.

Passive Air Samplers are becoming more popular for the monitoring of ambient air quality because of their simplicity of operation and the low cost. However, the technology adopted varies from country to country and so far those methodologies are not being accepted as a Standard Methodologies and researches are on-going. The methodology developed by the Environmental Division of NBRO (Samarakkody et. Al, Under NRC

grant No.99/15) was tested against Automated Air Quality Monitoring Systems and has shown very high degree of accuracy even at very low levels of concentrations.

This methodology was used to monitor indoor and outdoor air quality levels in urban, semi urban & rural areas in Sri Lanka and was revealed that the average indoor pollution levels were about 20 - 80% higher than the levels compared to those of immediate outside. Monitoring results of ambient NO_2 levels at Fort and Maradana indicated annual average values of 55 and 57 $\mu g/m^3$, respectively in 2005, exceeded the WHO guideline value of 50 $\mu g/m^3$ and those values are almost 45% and 80% high compared to those of sub urban areas of Colombo District and rural areas outside Western Province, respectively.