

63.7  
Diss

**MONITORING AIR QUALITY AT GALAHA JUNCTION USING  
ACTIVE AND PASSIVE SAMPLING METHODS**

A PROJECT REPORT PRESENTED BY  
C. D. M. SANDAMALEE DISSANAYAKE

To the Board of Study in Environmental Sciences of the  
**POSTGRADUATE INSTITUTE OF SCIENCE**

*In partial fulfillment of the requirement  
for the award of the degree of*

**MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE**

of the

**UNIVERSITY OF PERADENIYA**

**SRI LANKA**

**2005**

**590985**

# MONITORING AIR QUALITY AT GALAHA JUNCTION USING ACTIVE AND PASSIVE SAMPLING METHODS

C. D. M. SANDAMLEE DISSANAYAKE

Department of Chemistry

University of Peradeniya.

Peradeniya

Sri Lanka

The area around Galaha Junction at Peradeniya is heavily polluted due to the large number of motor vehicles passing through the junction and several bus stops. Thus, it was considered important to study the level of pollutants at this site. The present study has been carried out to determine three pollutants  $\text{NO}_2$ ,  $\text{SO}_2$  and  $\text{O}_3$  using both Passive and active sampling methods. The sampling period was from 18<sup>th</sup> December 2004 to 20<sup>th</sup> May 2004.

Passive sampling is a simple, environmentally friendly and a low cost method. The samplers were made using Teflon. A paper filter impregnated with an absorbing solution was kept inside the sampler. This is capable of trapping gaseous pollutants from the atmosphere through molecular diffusion. Loaded samplers were exposed for 4 – 5 days at the site and after that trapped pollutants were extracted into deionized water. Dissolved ions were analyzed using colorimetric and turbidimetric methods in the laboratory.

Active sampling was carried out using air samples to determine the hourly variations of the pollutant levels. The air was pumped into a special absorbing solution using a calibrated GilAir3, model Gilian air pump. The solutions were analyzed using standard methods in the laboratory to obtain pollutant concentrations.

During this study 20 sets of data were obtained using the passive sampling method at Galaha Junction. The measured 24h average concentrations of the pollutants were in the range of 0.0294 - 0.0483 ppm with a median value of 0.046 ppm for  $\text{SO}_2$ , 0.0331 - 0.0632 ppm with a median value of 0.057 ppm for  $\text{NO}_2$ , and 0.0341 - 0.0824 ppm with a median value of 0.074 ppm for  $\text{O}_3$ . These values exceeded the recommended Sri Lankan standards on about 61% ( $\text{SO}_2$ ), 26.4% ( $\text{NO}_2$ ) and 37.3% ( $\text{O}_3$ ) occasions. Especially high values were observed during school days and under dry weather conditions. Results during the school vacation in April showed higher values than the vacation in December. This may be due to increased vehicular traffic during Sinhala New Year and the exposition of the Tooth Relic this year.

The hourly variations of  $\text{SO}_2$  and  $\text{NO}_2$  showed higher values during the morning rush hour (7.00 – 8.00 a.m.) and the concentrations of pollutants decreased during daytime. Again higher values were obtained between 1.00 pm-3.00 pm. This is the period during which there is heavy traffic after closure of schools. The ozone levels were found to be significantly high during 11.00 am – 4.00 pm. This higher level of ozone can be correlated to the light intensity and the temperature. The observed pattern of diurnal variation is similar to the trends observed for a study done in the city of Kandy.