

Assessment of Spatial and Temporal Variations in Ambient Concentration of Hydrocarbon in Hambanthota District-Sri Lanka

Bandara¹, R.M.M.H., Jayarathna², R.N.R., *Perera¹, T.A.N.T. and Jayasinghe¹, G.Y.

¹Department of Agricultural Engineering, Faculty of Agriculture, University of Ruhuna

²Air Quality Monitoring Unit, Industriail Technology Institute, Colombo 07

*Corresponding E-mail: nilutp@gmail.com

Urban air pollution is comprised of a highly complex mixture of gaseous and particulate components. Hydrocarbons (HC) are the major air pollutants, which cause health and environmental concerns. This study was carried out to investigate the variations of total HC, methane (CH₄) and non-methane hydrocarbon (NMHCs) concentration in ambient air in Hambantota district, Sri Lanka. The study was conducted for three months in rural, suburban and urban locations in Hambantota district under proportionate sampling method. Two hundred and fifty samples were collected by using an air sampler into standard bags within three time intervals (7.00-9.00 am, 11.00 am-1.00 pm and 3.00-5.00 pm) in each locations. Samples were analyzed by using Flame Ionization Detector and standard T-test. According to the study temporal variation and spatial variation of above parameters were undertaken. There was a significant difference ($P < 0.05$) in NMHCs between 7.00-9.00 am and 11.00 am-1.00 pm (0.01) in suburban as well as 7.00-9.00am and 3.00-5.00pm (0.03) in urban areas. Further, considering the spatial variation there was a significant difference ($P < 0.05$) in urban than rural (0.00) at 7.00-9.00 am. And, there was a significant increment in NMHCs concentration in suburban (0.004, 0.002) and urban (0.03, 0.00) areas than rural area at 11.00 am-1.00 pm and 3.00-5.00 pm. When considering the spatial variation in ambient CH₄ concentration at each time interval, there was a significant reduction ($P < 0.05$) in urban (0.003) and suburban (0.00) areas when compared with the rural area at 7.00 am-9.00 am. Similarly, it showed a significant reduction in suburban (0.013) and rural (0.01) at 3.00-5.00 pm. According to the temporal variation in CH₄ concentrations among rural, suburban and urban areas, it was observed that there was a significant difference in rural (0.032) at 11.00 am-1.00 pm and 3.00-5.00 pm. Furthermore, in suburban at 7.00-9.00 am (0.005) and 11.00 am-1.00 pm (0.016) at than 3.00-5.00pm. Correspondingly, there was a significant difference at 7.00-9.00 am (0.002) and 3.00-5.00 pm (0.001) than 11.00 am-1.00 pm in urban area. Ambient HC concentration in Hambanthota district were in the desirable level when compared with the global standards.

Key words: Air pollutants, Air quality standards, Hydrocarbons, Urbanization