

056**Investigation of trace metals in air particulate matter collected from Colombo**A D T Liyanage<sup>1</sup>, K G S Jayawardana<sup>2</sup>, R N R Jayaratne<sup>2</sup>, C K Amaratunga<sup>2</sup> and K R R Mahanama<sup>1</sup><sup>1</sup>Department of Chemistry, University of Colombo, Sri Lanka.<sup>2</sup>Central Environmental Authority, Battaramulla, Sri Lanka.

The suspended particulate matter (SPM) in air is a complex multi-phase mixture of all airborne chemicals. Among the airborne inorganic chemicals, compounds associated with heavy metals have subjected to numerous chemical investigations due their known health effects. Uniqueness of the heavy metals has attributed its use in identifying or tracing the pollutant sources through source apportionment studies and in understanding the distribution of pollutants through computer modeling.

In general, airborne metals exist in trace quantities. The suspended particulate matter may contain the metallic species as fine particles or they may have adsorbed onto other particulate matter originated from natural or human activities. Agglomerated heavier particle settles due to gravitation and pose a lesser risk to human health. Finer particles with aerodynamic diameter less than 2.5  $\mu\text{m}$  ( $\text{PM}_{2.5}$ ) are believed to posses the biggest health threat through respiration.

Central Environmental Authority (CEA) has been involved in air quality monitoring at the Colombo Fort Railway Station. Using their high volume air sampler, particles having aerodynamic diameter less than 10  $\mu\text{m}$  ( $\text{PM}_{10}$ ) were collected onto glass fiber filters daily during the period of November 2003 to November 2005. They were gravimetrically analyzed by CEA. This study was focused to further investigate randomly selected filters (two filters per month) to differentiate the levels of selected metals during the period. The filters were acid digested to recover the airborne metallic species. Levels of copper (Cu), nickel (Ni), cadmium (Cd), lead (Pb) and manganese (Mn) were analyzed by using atomic absorption spectrophotometer at the Department of Chemistry, University of Colombo.

The average concentrations found during the study were  $\text{Cu} = 0.29 \pm 0.25 \text{ ng/m}^3$ ,  $\text{Ni} = 0.21 \pm 0.10 \text{ ng/m}^3$ ,  $\text{Pb} = 0.59 \pm 0.48 \text{ ng/m}^3$ ,  $\text{Cd} = 0.03 \pm 0.03 \text{ ng/m}^3$ ,  $\text{Mn} = 0.43 \pm 0.22 \text{ ng/m}^3$ . During the study period Pb levels were found to be the highest and Cd levels were found to be the lowest. The maximum airborne levels were 1.24  $\text{ng/m}^3$  for Cu in April 2005, 0.56  $\text{ng/m}^3$  for Ni in January 2005, 2.37  $\text{ng/m}^3$  for Pb in February 2004, 0.09  $\text{ng/m}^3$  for Cd in February 2004 and 0.78  $\text{ng/m}^3$  for Ni in May 2005.

On average the minimum airborne levels were found in the period of May to August. This is attributed to the settling of particles with rainfall as well as the wind patterns which drifts the pollutants away from the sampler during the season. From November to April all the five metals have showed relatively higher concentrations compared to any other months in each year. This may be due to poor dispersion patterns in the Colombo air which results in stagnating pollutants. In general, wind speed is relatively higher for the period of May to August compared to the period of November to April.

The most prevailing metal in the Colombo air is Pb while the least prevailing metal is Cd. The levels of Pb have demonstrated a pronounced decline in concentration starting from April 2005 which coincides with the introduction of un-leaded petrol to Sri Lankan market in January 2004.

057**Factors governing an integrated solid waste management program: A case study at Nuwara-Eliya district secretariat division**

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Solid Waste Management is one of the main national problems in Sri Lanka and integrated solid waste management (ISWM) has been recommended as the only solution. However, ISWM is hardly successfully practiced anywhere in the country due to many inherent reasons. This study examines the governing factors for the success/ failure of an ISWM program within 3 LAs including Municipal Council (MC), Urban Council (UC), and Pradeshiya sabha (PS) in Nuwara Eliya Divisional secretary