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Comparison of Lead analysis using nuclear related techniques and aomic absorption spectroscopy

Recently there has been a widespread interest in monitoring Pb levels in air. Although several methods are available to measure Pb in airborne dust they are expensive and time consuming. This study was initiated to examine the feasibility of using a nuclear related method based on X-ray absorptiometry to measure Pb levels in aerosols and to compare the validity of this method with XRF and Atomic Absorption Spectrometry.

Ten air samples were collected for 2-60 h through 47 mm diameter Millipore filters using a high volume air sampler at each of the locations: University of Colombo, Jawatta and Fort centres of National Building research Organization (NBRO) and Meteorological Department. The dust samples were analysed using X ray absorptiometry, XRF and AAS. Data obtained from the two nuclear related methods: XRF and Absorptiometry is within 10% deviation excepted in two samples. The greater deviation (16%) of these two filters are to be expected as the values obtained by Absorptiometry are very close to the minimum detection limit of 1.9266 $\mu g/ cm^2$.

Results obtained with AAS and absorptiometry are within 12% error for filters with a concentration greater than 2.0 $\mu g/ cm^2$. The Absorptiometry method used in this study can be used to detect the recommended 24 H average value in Sri Lanka – 2 $\mu g/ m^3$ which is equivalent to a superficial density of 9.16$\mu g/ cm^2$ and can be used effectively to monitor Pb levels as the results are in reasonable agreement with both AAS and XRF. This method has the advantages of being relatively simpler, cheaper and the possibility of having it installed in facilities where *in situ* monitoring of Pb emissions can be carried out continuously.