

**AIR POLLUTION MONITORING USING NUCLEAR
RELATED ANALYTICAL TECHNIQUE
-ENERGY DISPERSIVE X-RAY FLUORESCENCE (ED- XRF)
IN COLOMBO**

M.C.S. Seneviratne¹, V.A. Waduge¹, H.L.Handagiripathira¹,
P.D. Mahakumara¹, T.N. Attanayake¹, K.G.S. Jayawardena²

¹Atomic Energy Authority, ²Central Environmental Authority

Abstract

The aim of the project is to enhance the use of a nuclear analytical technique – ED – XRF in the field of air pollution studies through long-term monitoring and to identify origins using source apportionment techniques. Air Particulate Matter (APM) of two size fractions (Fine- PM_{2.5} and coarse – PM_{10-2.5}) were collected using a low volume sampler “Gent” stacked filter unit during the period of 2000 to 2004 from the Air Quality Monitoring Station (AQM) , Colombo. The annual average of PM 10 and PM 2.5 were measured as 79 µg/m³ and 32 µg/m³ respectively and they exceed the USEPA recommended values (50 µg/m³ and 15 µg/m³). ED-XRF is one of the few non-destructive techniques that can be used to identify the elemental composition of APM in two size fractions, P.M_{2.5} and PM_{10-2.5} collected in Colombo area. Elemental Black Carbon (BC) was measured using Stain Smoke Reflectance and the average BC measured during this period is 17 µg/m³. The monitoring data were treated statistically to assess air pollution sources using Principal Component Factor Analysis (PCA) and Positive Matrix Factorization (PMF). Concentration of 10 elements for fine particulates, is used for PCA and PMF to identify the source contribution.

The result of this project complements the National Air Quality Monitoring Programme, which monitors gaseous pollutants to establish the air quality management.