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**CHARACTERIZATION OF TRACE ELEMENTAL COMPOSITION
IN PM10 SAMPLES MONITORED IN THE CITIES OF PIEDMONT
REGION (ITALY)**

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Atmospheric pollution resulting from airborne particulate matter, especially PM10 fraction, continues to be a major problem despite remarkable improvements having been made in terms of air quality over the last decades. Nowadays it has become very important to know the elemental composition and the sources of the airborne particulate matter in order to identify possible emergency situations in the environment resulting from bad air quality and consequently take action and implement recovery plans specific for the problems encountered.(1,2,3)

In this study we determined the concentration of the following elements: As, Ba, Cd, Co, Cr, Cu, Fe, Hg, K, Mn, Mo, Ni, Pb, Pt, Se, Si, Ti, V, Zn e Zr in airborne PM10 samples collected in Piedmont region: in particular, in two sampling sites in Turin (one located in the historical center of the town, the other on the northern outskirts of the town) and one in Biella. The samples were collected in different months in 2007. The analytes concentrations were determined using ICP-OES and ICP-MS.

Before the analysis of the real samples, an optimization of the procedure was made analyzing two certified materials, BCR 176 and NIST SRM 1649a.

The application of multivariate chemometric techniques (Principal Component Analysis and Hierarchical Cluster Analysis) to the experimental results allowed us to identify correlations among the investigated elements and to reveal similarities and differences between sampling sites, highlighting the existence of the main emitting sources as vehicular traffic/fossil fuel combustion and soil dust.

(1) C.A. Pope, D.W. Dockery, Epidemiology of particle effects, in: S.T. Holgate, J.M. Samet, H.S. Koren, R.L. Maynard (Eds.), Air pollution and health. Academic Press, London, 1999, pp. 673-706.

(2) B. Brunekreef, S.T. Holgate, Air pollution and health 360 (2002) 1233-1242.

(3) M. Malandrino, M. Di Martino, G. Ghiotti, F. Geobaldo, M. M. Grosa, A. Giacomino, O. Abollino, Microchemical Journal. In press.