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Caratterizzazione del PM10 in differenti situazioni ambientali: indagine in due siti urbani ed in un sito rurale

L. Arrizza, B. De Berardis*, L. Paoletti*
Centro di Microscopia Elettronica dell'Università dell'Aquila, Roio Poggio, L'Aquila
* Istituto Superiore di Sanità, Roma

Key words
PM10; SEM/EDX; particle analysis; cluster analysis

Summary
«Characterization of PM10 in different environmental situations: investigations in two urban sites and one rural site». Background: *Among the atmospheric pollutants detectable in the environment, the inhalable airborne particulate (PM10) is regarded with increasing concern. Indeed a number of epidemiological studies support the correlation between both acute and chronic adverse health effects and the presence of PM10 levels even lower than the WHO guide lines. Despite these epidemiological findings, it is yet unclear and still widely debated which characteristics of particulate matter are responsible for the observed health effects. The identification of one or more components of PM10 related to the health effects observed in the urban population is a research subject of primary importance for the coming years.* Objectives: *The aim of the present study was to characterise from a physical-chemical point of view the "coarse" (PM10-2.1) and the "fine" (PM2.1) fractions of the airborne particulate matter (PM10) sampled in three different sites dissimilar with regard to the weather conditions, the residential density and industrial activities.* Methods: *The particles were collected by an eight-stage cascade impactor (Andersen particle fractionating sampler) with a pre-separator stage able to remove particles with aerodynamic diameter >10 μm. Analysis of the particle samples was performed by a scanning electron microscopy (SEM) equipped with a thin-window system for X-ray microanalysis by energy dispersion spectrometry.* Results: *The Hierarchical Cluster Analysis (HCA) of the analytical data revealed the presence of seven different particulate types (particle clusters) in the sampling sites: C-rich particles (cluster 1); Ca and Mg carbonates (cluster 2); Ca sulphates (cluster 3); silica particles (cluster 4); silicates (cluster 5); Fe-rich particles (cluster 6); metal compounds (cluster 7).* Conclusions: *Data obtained in this study demonstrated a significant correlation between the "coarse" fraction (PM10-2.1) composition and the characteristics of the sampling site. On the contrary the "fine" fraction (PM2.1) composition showed an unexpected uniformity in all the environments.*

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Corrispondenza: Dott. Luigi Paoletti, Laboratorio di Ultrastrutture, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Roma - Tel. 0649902236 - Fax 0649387140 - e-mail: paoletti@iss.it