

Analysis, composition, exposure and risk assessment of atmospheric particulate matter and characteristic pollutants supporting public organizations

Human exposure to fine and ultrafine particulates generated increasing concern as evidence of their toxicity grows, with consequent negative effects on human health. The size and chemical composition of the particles and the type of exposure are important for health effects. The dimensions determine the degree of penetration inside the respiratory tract while the chemical characteristics determine the ability to react with other pollutants (PAH, heavy metals, SO₂). Particles with a diameter of less than 10 µm (PM₁₀) can be inhaled and accumulate in the respiratory system and cause inflammation; those with a diameter of less than 2.5µm, also called respirable fraction (PM_{2.5}), are deposited in the tracheobronchial tract and can cause constriction, reduction of the purifying capacity of the respiratory system, aggravate chronic respiratory diseases (asthma, bronchitis and emphysema) and are involved in the onset of malignancies of the respiratory system. Sufficient *in vitro* and *in vivo* experimental evidence demonstrate the adverse and toxic effects of exposure to fine and ultrafine particles, and many epidemiological studies correlate exposure to PM_{2.5} particles with morbidity and mortality from respiratory and cardiovascular diseases. The groups most sensitive to the toxicity of atmospheric particulate matter are asthmatics and patients suffering from bronchial diseases, but the elderly and children are also subject to risk. Their exposure to pollutants occurs mainly in the three habitual living environments, definable as civil indoor (living environments), "occupational" indoor (school), and outdoor (environment). Considering the impact of environmental pollutants on human health, their monitoring, speciation and therefore the expansion of scientific knowledge in this area are of fundamental importance. The PhD project has the objective of developing research activities aimed at providing, for the living environments of areas with strong environmental pressure of the Campania Region, cognitive and scientifically rigorous elements on the qualitative-quantitative and morphological composition of atmospheric particulate matter and characteristic pollutants and relative assessment of exposure and risk associated with them. The results of the PhD project could represent a valid support to public government agencies which operate in the field of environmental monitoring and assessment of the impact of pollutants on public health.

REFERENCES

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