

Determination of VOCs and PMs in the indoor air of hair saloons

ABSTRACT

Humans are occupationally exposed to air pollutants, and specifically to Volatile Organic Compounds (VOCs) and Particulate Matters (PMs), almost every day in their houses and industrial workplaces. This daily exposure is of concern, due to the hazardous effects of these chemicals on the individual's health. The aim of this study was the analysis of ambient air in various institutes of personal care, and specifically in hair saloons, in which the employee performs different actions; *e.g.* haircutting, haircoloring, hair-drying, hair-washing and keratin treatment. The indoor air analysis was performed through monitoring of the emitted VOCs, as well as the PMs.

The sampling of the air pollutants was performed inside the hair saloon environment by adsorption the respective pollutants. Towards this, two different coatings of porous materials were tested; Tenax TA tubes, and the Bio Monitoring tubes (packed with Tenax TA/Carbograph 5TD). Finally, for the air sampling, Tenax TA sorbent tubes were selected and the analysis was accomplished using Thermal desorption coupled with gas chromatography/mass spectrometry (TD-GC/MS). Simultaneously with the VOCs' sampling, PMs of 10 μm aerodynamic diameter (PM_{10}) were measured using the DustTrack 11 Aerosol Monitor.

The results obtained showed that a variety of VOCs are emitted in low ppb_v levels; among the main compounds were benzene, toluene, ethylbenzene, and xylene, known as BTEX, as well as phenol, siloxanes, furan and its derivatives, hydrazine, diethyl phthalate, *etc.* The measuring levels of the PMs revealed violations of the international standards set by EPA and WHO related to the permissible limit concentrations in all actions, but mostly in keratin treatment.