Polynuclear aromatic compounds (PAC's) from natural or anthropogenic origins occur widely in the environment, and constitute one of the most important classes of chemical pollutants.

As the combustion of vegetal biomass is a known source of PAC's, it was assumed that forest fires, which occur often and with great intensity during hot seasons in Mediterranean countries, may lead to the accumulation of these compounds in burned soils.

The application of a sensitive and cost-effective analytical method for the control of this possible contamination was the aim of this work. The method has been already successfully applied to measure the concentration of PAC's in compost and compost-amended soils (González-Vila et al., 1988) and basically consists in a solid phase extraction from alumina micro-columns (Sep-pack cartridges) of the crude methylene chloride (MeCl) soil extracts, previously partitioned in isooctane. Sequential elution with n-hexane and MeCl yield fractions enriched in n-alkanes and PAC's respectively, which can be directly submitted to GC-MS analysis. A Hewlett Packard 5730 A gas chromatograph equipped with FID detector and a Hewlett Packard 5988A GC-MS computer system were used for separation, identification and quantitation of individual components. Separation of compounds were achieved using a 12 m (0.32 mm i.d.) SE-52 fused silica capillary column, with the oven temperature programmed from 50 (1 min) to 100 °C at a rate of 30 °C/min, and then from 100 to 280 °C at 6 °C/min, with 15 min final hold. Helium at a flow rate of 1.5 ml/min was used as carrier gas. All further experimental details were given in the above mentioned work. The soil samples for this study were taken from the 0-10 cm superficial layer before and after a pine forest wildfire (PF-B and PF-A) and the controlled burning of grain straw (GS-B and GS-A).

A great variety of two to four rings PAC's covering a wide range of concentrations were detected in the different samples, along to other not condensed aromatic compounds mainly of biphenyl type. From these results the following conclusions can be drawn:
a) Compounds of naphtalene type were only present in the sample PF-A, being eudalene and cadalene the most prominent peaks. These compounds are generated by thermal aromatization of vegetal sesquiterpenes (Simonneit and Mazurek, 1982), and usually are accumulated in the gaseous phase of smoke (Atlas et al., 1985) and not detected in burned soils. The high concentrations of sesquiterpenes in conifers (Guenther et al., 1975) might explain the detection of naphtalene compounds after the pine forest fire.

b) The amounts of compounds of phenanthrene type increase in the burned soils, being norabietatriene, pimanthrene, retene and methyl dehydroabietic acid the most prominent homologues identified. Again the higher concentrations of three cycles PAC's in the pine forest burned soil (PF-A) in comparison with the grain straw burned soil (GS-A) can be due to the higher concentration of diterpenes in conifers. Moreover, diterpenes are in higher concentrations than sesquiterpenes (Gleizes et al., 1984), which may in part explain that three cycles PAC's were more abundant than two cycles PAC's after the fire of the pine forest (PF-A), even considering the lost of naphtalenic compounds in smoke phase.

c) Compounds of fluorene type were also detected only after the fire of pine forest (PF-A), being fluorene and fluorenolene the most abundant homologues. Both are characteristic products of oxidation and decarboxilation of alkylphenanthrenes (Yu and Hites, 1981), under conditions of large concentrations of these compounds (observed in the soil before the fire, PF-B) and good aeration.

d) PAC's of more than three cycles were detected only in the sample GS-B, being pyrene and chrysene the condensed PAC's more abundants. Compounds of this type are generated by pyrolysis, condensation and cyclation of n-alkanes (Blumer, 1976), which are present in great concentration in grain straw. In any case the concentration of potential carcinogenic PAC's accumulated in the soil (5-10 ng/g) were too low to give concern, in particular if the various detoxification mechanisms (absorption, leaching, biodegradation, etc.) that occur in soils are considered.

References