



## **Aliphatic and polycyclic aromatic hydrocarbons characterisation of Coimbra and Oporto PM2.5 urban aerosol**

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The concentration of organic pollutants in urban areas is mostly due to incomplete combustion from vehicles, industries and domestic heating. Some of these compounds, principally the aliphatic (ALIPH) and polycyclic aromatic hydrocarbons (PAHs) promote harmful effects in human health. The determination of the ALIPH and PAHs concentration levels and their possible emission sources are useful for air quality management and source apportionment studies.

In order to estimate and compare the ambient concentrations and establish the main sources of these compounds, the fine fraction of the atmospheric particulate matter (PM2.5) was collected simultaneously in Oporto and Coimbra during summer and winter seasons using a high volume sampler.

The organic compounds were extracted from the particulate matter, under reflux with dichloromethane and the total organic extract (TOE) was fractionated by flash chromatography using five different eluents with increasing polarity. The hydrocarbon fractions were analysed by gas chromatography/mass spectrometry (GC/MS).

Here we present and discuss the qualitative and quantitative composition of the aliphatic and aromatic fractions present in PM2.5 samples from both cities. The homologous series of C14 to C34 n-alkanes, isoprenoid hydrocarbons (pristane and phytane), PAHs and some petroleum markers have been identified and quantified.

With the purpose of identifying the possible sources, various molecular diagnostic ratios were calculated. The global carbon preference index (CPI) closer to the unity, the large concentration of the unresolved complex mixture (UCM) and the presence of PAHs indicate that motor vehicle exhaust was the main emission source of the aliphatic and polycyclic aromatic fractions of Oporto and Coimbra aerosol, especially in the first city. Also, the remarkable presence of petroleum biomarkers such, as hopanes, confirms the previous results. Concentration ratios between PAHs were calculated and used to assign emission sources. The abundance and the sources of these organic pollutants for the two cities are discussed and compared taking into account the local/regional characteristics.

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