

1.016 Chemical Composition of PM₁₀ a background site in Leicester, UK: Correlation between Levoglucosan and PNSD.

Early Career Scientist

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Abstract:

Exposure to particulate matter has been shown to have detrimental effects on health, in particular in vulnerable groups such as the elderly, children, and those with pulmonary or cardiovascular disease.

Particle number size distribution (PNSD) was measured by an ultrafine particle monitor (UFP TSI model 3031), black carbon (BC) was measured by a MAAP (Thermo-5012). Particulate matter samples (PM₁₀) were collected from April 2013 to May 2014 at an urban background site in Leicester, UK. In order to characterize the chemical composition, several chemical components were analysed: water-soluble ions (chloride, nitrate, sulphate, sodium, potassium, ammonium, calcium, and magnesium), monosaccharide anhydrides (levoglucosan (Lev), mannosan (Man), and galactosan (Gal)), and the elemental and organic carbon (EC/OC). The measurements were taken at the Automatic Urban and Rural Network (AURN) monitoring site at University of Leicester. The monitoring was performed as part of the EU project Joint Air Quality Initiative (JOAQUIN, www.joaquin.eu) supported by the INTERREG IVB NWE programme. The samples were collected daily (24 hour exposure) onto 47 mm quartz filters (Pall TissuquartzTM filters, 2500 AQT-UP) using a sequential sampler (Leckel SEQ47/50) with PM₁₀ inlet, running at 2.3 m³/h for 24 h per filter. Filters were weighed before and after sampling in order to determine total PM₁₀ collection, and monosaccharides quantified by using a previously validated GC-MS method (Cordell et al., 2014). The highest concentrations of Lev was found in November and December (126, 95 ng/m³, respectively), the lowest average concentration of Lev was observed in summer (20 ng/m³). The correlation between Lev and PNSD and BC will be investigated. The influence of wind speed and direction on the Lev concentration will also be discussed.