

Wood burning contribution to PM₁₀ in three Austrian cities

Anhydrosugars, such as levoglucosan, mannosan and galactosan, are formed in pyrolysis process of cellulose and hemicellulose containing materials (e.g. wood, straw, paper) . Levoglucosan was found to be the most abundant of the identified compounds in wood burning emission PM_{2.5}, accounting for 3-30% of the fine particle organic compound mass emitted (100±40mg/gOC). Similar results (4-15%) were found in the PM₁₀ emissions of residential combustion of different kinds of wood commonly grown in central Europe.

Due to these high emission rates, levoglucosan is a good candidate for use as a molecular marker for biomass burning, which can be an important source of particulate matter in the atmosphere in certain communities during the cold season. Other required properties of a good chemical tracer is the stability in the atmosphere and its uniqueness. Recently, the potential of mannosan and galactosan was suggested for differentiating the contribution of hard and softwoods to the PM₁₀ load.

PM₁₀ samples were collected at 10 locations within three cities (4 sampling sites in Vienna, 3 in Salzburg and Graz each) during one year. Levoglucosan, mannosan, galactosan were measured in those samples using high performance anion-exchange chromatography coupled with pulsed amperometric detection. In this work, we combine those results with the findings of previous source studies to quantify the contribution of biomass smoke to PM₁₀.

Papers:

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