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Determination of short-term changes in levoglucosan and dehydroabietic acid in aerosols with Condensation Growth Unit – Aerosol Counterflow Two-Jets Unit – LC-MS

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Abstract

Residential areas in urban agglomerations and also in the countryside are often burdened with high concentrations of aerosol in winter, this originating from local combustion sources. Aerosol sources can be identified by a monitoring of organic markers of biomass burning. Abundant markers of biomass and softwood burning are levoglucosan and dehydroabietic acid, respectively. The aim of this research was to develop an analytical method for the determination of levoglucosan and dehydroabietic acid in aerosol over short time periods involving aerosol sampling into liquid samples, quantitative pre-concentration of analytes, and their determination by liquid chromatography – mass spectrometry. A Condensation Growth Unit – Aerosol Counterflow Two-Jets Unit (CGU-ACTJU) sampler was used for the quantitative collection of aerosol directly into water. Dehydroabietic acid was pre-concentrated from the aqueous phase by solid phase extraction (C-18). Afterwards, levoglucosan in water samples was concentrated on a vacuum evaporator. The detection limits of levoglucosan and dehydroabietic acid were 28 ng m^{-3} and 5.5 ng m^{-3} , respectively. The results obtained by the developed method were compared with an independent determination of both markers in aerosol by means of the sampling of aerosols on a filter and subsequent analysis by GC-MS. The developed method demonstrated sufficient agreement with the

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