

Home

Online Library ACP

Recent Final Revised Papers

Volumes and Issues

Special Issues

Library Search

Title and Author Search

Online Library ACPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper



Volumes and Issues Contents of Issue 16

Atmos. Chem. Phys., 7, 4267-4279, 2007

www.atmos-chem-phys.net/7/4267/2007/

© Author(s) 2007. This work is licensed under a Creative Commons License.

## Ambient aerosol concentrations of sugars and sugar-alcohols at four different sites in Norway

K. E. Yttri<sup>1</sup>, C. Dye<sup>1</sup>, and G. Kiss<sup>2</sup>

<sup>1</sup>Norwegian Institute for Air Research, P.O. Box 100, 2027 Kjeller, Norway

<sup>2</sup>Air Chemistry Group of the Hungarian Academy of Sciences, University of Veszprém, P.O. Box 158, 8201 Veszprém, Hungary

**Abstract.** Sugars and sugar-alcohols are demonstrated to be important constituents of the ambient aerosol water-soluble organic carbon fraction, and to be tracers for primary biological aerosol particles (PBAP). In the present study, levels of four sugars (fructose, glucose, sucrose, trehalose) and three sugar-alcohols (arabitol, inositol, mannitol) in ambient aerosols have been quantified using a novel HPLC/HRMS-TOF (High Performance Liquid Chromatography in combination with High Resolution Mass Spectrometry – Time of Flight) method to assess the contribution of PBAP to PM<sub>10</sub> and PM<sub>2.5</sub>. Samples were collected at four sites in Norway at different times of the year in order to reflect the various contributing sources and the spatial and seasonal variation of the selected compounds.

Sugars and sugar-alcohols were present at all sites investigated, underlining the ubiquity of these highly polar organic compounds. The highest concentrations were reported for sucrose, reaching a maximum concentration of 320 ng m<sup>-3</sup> in PM<sub>10</sub> and 55 ng m<sup>-3</sup> in PM<sub>2.5</sub>. The mean concentration of sucrose was up to 10 times higher than fructose, glucose and the dimeric sugar trehalose. The mean concentrations of the sugar-alcohols were typically lower, or equal, to that of the monomeric sugars and trehalose. Peak concentrations of arabitol and mannitol did not exceed 30 ng m<sup>-3</sup> in PM<sub>10</sub>, and for PM<sub>2.5</sub> all concentrations were below 6 ng m<sup>-3</sup>.

Sugars and sugar-alcohols were associated primarily with coarse aerosols except during wintertime at the suburban site in Elverum, where a shift towards sub micron aerosols was observed. It is proposed that this shift was due to the intensive use of wood burning for residential heating at this site during winter, confirmed by high concurrent concentrations of levoglucosan. Elevated concentrations of sugars in PM<sub>2.5</sub> were observed during spring and early summer at the rural background site Birkenes. It is hypothesized that this was due to ruptured pollen.

Final Revised Paper (PDF, 460 KB) Discussion Paper (ACPD)

Citation: Yttri, K. E., Dye, C., and Kiss, G.: Ambient aerosol concentrations of sugars and sugar-alcohols at four different sites in Norway, Atmos. Chem. Phys., 7, 4267-4279, 2007. Bibtex EndNote Reference Manager



Search ACP

Library Search

Author Search

News

- Sister Journals AMT & GMD
- Financial Support for Authors
- Journal Impact Factor
- Public Relations & Background Information

Recent Papers

01 | ACP, 17 Dec 2008: Characterizing ozone production and response under different meteorological conditions in Mexico City

02 | ACP, 17 Dec 2008: Significant impact of the East Asia monsoon on ozone seasonal behavior in the boundary layer of Eastern China and the west Pacific region

03 | ACP, 17 Dec 2008: Carbonyl sulfide in air extracted from a South Pole ice core: a 2000 year record

