

***Interactive comment on* “Quantification of levoglucosan and its isomers by High Performance Liquid Chromatography – Electrospray Ionization tandem Mass Spectrometry and its applications to atmospheric and soil samples” by C. Piot et al.**

Anonymous Referee #1

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This manuscript presents an LC-MS method for the measurement of levoglucosan and its isomers in atmospheric aerosol and soil samples. The accuracy of the LC-MS method was assessed by comparison with the more traditional GC-MS method and the advantages and disadvantages of both methods are indicated. Overall, I can agree with the authors' evaluation of the relative merits of both methods. However, in contrast to what the authors seem to implicate in some sections of their manuscript (e.g., in the

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Abstract), the accuracy was only assessed for levoglucosan and it is not clear at all to which extent the LC-MS and GC-MS data for the isomers mannosan or levoglucosan agreed or disagreed with each other. The authors write on page 4550, lines 13-15, that "Comparison between the two methods was only made for levoglucosan since concentrations of the other monosaccharide anhydrides (mannosan and galactosan) were lower than the detection limit for too many samples". I wonder how the data compared for the (supposedly still several) samples where the mannosan and galactosan levels were not below the detection limit. In any case, the authors should downplay that their method is also valid (i.e., accurate) for mannosan and galactosan. As indicated below, the manuscript contains a number of inaccuracies, which need to be corrected. The manuscript would also benefit from some improvement in English grammar and language.

Specific comments:

1. Page 4542, lines 1-4: The references listed here are not correctly cited, i.e., they deal not with the full year (but with winter) or not with OA (but instead with OC). While Caseiro et al. (2009) deals with the full year, it does not deal with OA but with OC; Yttri et al. (2009), Zdráhal et al. (2002), and Szidat et al. (2006) all deal with winter and OC; finally, Favez et al. (2010) does deal with OA, but during winter.

2. Page 4542, line 13: Stating that the 3 anhydrosugars are formed during pyrolysis of cellulose is inaccurate. According to Caseiro et al. (2010), "Levoglucosan derives from the D-glucose units of the holocellulose molecules (cellulose and hemicelluloses) when those undergo a pyrolysis process (Shafizadeh, 1968, 1984). The less investigated anhydrosugars mannosan and galactosan evolve in a similar way but from the mannose and galactose units of the biofuel's hemicellulose molecules (Otto et al., 2006)".

3. Page 4542, line 16: In recent years the atmospheric stability of levoglucosan has been somewhat questioned, i.e., by Hoffmann et al. (2010) and by Hennigan et al. (2010). A word of caution on the stability would thus be welcome.

4. Page 4543, line 23, page 4547, lines 26-27, and possibly also elsewhere: References in parentheses should be placed in chronological order.
5. Page 4543, line 24: The authors claim here that their LC-MS method is a "new" method. However, on page, 4543, lines 13-14, they mention that Palma et al. (2004) already used HPLC in combination with ESI-MS/MS for measuring levoglucosan. To which extent is the authors' method then "new"?
6. Page 4544, lines 22-25: Although the diameter of the filter is mentioned later in the manuscript, it should (also) already be mentioned here.
7. Page 4545, line 3: "Favez, 2010" is not in the reference list whereas "Favez et al., 2010" is there. Should it perhaps be "Favez et al., 2010" here? "El Haddad, 2011" is not in the reference list.
8. Grammatical and other technical corrections:
 - p. 4542, l. 2, and p. 4556, l. 4: replace "Zdrahal" by "Zdráhal".
 - p. 4542, l. 18: replace "Hornig, 1985" by "Hornig et al., 1985".
 - p. 4545, l. 18: replace "Gelman" by "Gelman".
 - p. 4545, l. 19: replace "samples extract" by "sample extract".
 - p. 4549, l. 22: replace "compounds analysis" by "compound analysis".
 - p. 4551, l. 4: replace "matrixes" by "matrices".
 - p. 4553, l. 19: replace "Environ. Science Technol." by "Environ. Sci. Technol.".
 - p. 4554, l. 16: replace "561-568 pp." by "pp. 561-568".
 - p. 4554, l. 22; replace "Simoni, E. d." by "De Simoni, E.".
 - p. 4554, l. 30: replace "European Atmospheric Conference" by "European Aerosol Conference".

p. 4555, l. 6: This line should be adjusted to the left.

p. 4555, l. 21: replace "v Simoneit" by "Simoneit".

References

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