

Report to the manuscript „Quantification of 21 sugars in tropospheric particulate matter by ultra-high-performance liquid chromatography tandem mass spectrometry”

This manuscript presents a complete method to analyze sugars from particulate matter samples with ultra-high-performance liquid-chromatography tandem mass spectrometry. The authors made an in-depth validation of the overall method in terms of common analytical criteria and provide precise instructions including its limitations. The method is also exemplarily applied to several real samples from a station at the “Jungfrauoch”, spanning a time series of five years. Clearly observed are seasonal trends for three of the investigated sugars.

In accordance with AMTs referee guideline, following aspects are addressed:

1. Does the paper address relevant scientific questions within the scope of AMT?

--- Yes. For scientists in this field this manuscript provides insightful and well evaluated details on how to setup a sensitive HPLC-MS/MS method to analyze sugars from particulate matter.

2. Does the paper present novel concepts, ideas, tools, or data?

--- From my perspective the analysis of sugars with LC-MS is not new, many papers and thesis in this regard are out there dealing with that topic, in particular in the field of food and plant sciences. In fact, I wonder why the authors do not mention papers from these fields. Of course, the sample treatment is different, but the LC-MS methods should be quite comparable, if I am not mistaken. Therefore, I suggest that the authors provide and discuss some references also to these fields.

3. Are substantial conclusions reached?

--- Despite the insightful LC-MS development on that specific instruments no further substantial conclusions are reached.

4. Are the scientific methods and assumptions valid and clearly outlined?

--- The applied analytical method is sound and clearly outlined.

5. Are the results sufficient to support the interpretations and conclusions?

--- Not applicable, since no major conclusions are drawn. It is more a presentation of the validity of the method itself.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

--- Yes.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

--- As pointed out in 2., the authors should probably check on publications in the field of food and plant sciences for LC-MS methods on sugars and also reference those.

8. Does the title clearly reflect the contents of the paper?

--- Yes.

9. Does the abstract provide a concise and complete summary?

--- Yes.

10. Is the overall presentation well-structured and clear?

--- Appropriate.

11. Is the language fluent and precise?

--- Yes.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

--- Yes.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

--- In table 1, the number of decimals for the Q1 and Q3 settings should be reduced to one, so instead of 166.906 please write 166.9. The quadrupoles of that instrument are not able to resolve the m/z by the third digit, so providing these in the list of settings might be misleading to as providing data of a high-resolution mass spectrometer.

14. Are the number and quality of references appropriate?

--- As stated in point 2. and 7., the authors should probably check on publications in the field of food and plant sciences for LC-MS methods on sugars and also reference those.

15. Is the amount and quality of supplementary material appropriate?

--- Yes.

In compliance with the AMT referee guideline I do recommend publishing this article, however, with some minor changes/additions and requested comments presented in the following:

(i) Please, also look at publications from the field of food and plant sciences dealing with the analysis of sugars by LC-MS. As far as I am aware, there are several available, which in principal use similar MS methods and should thus be referenced and compared to your own method.

(ii) In table 1, the number of decimals for the Q1 and Q3 settings should be reduced to one, so, e.g., instead of 166.906 please write 166.9. The instrument used is not a high-resolution mass spectrometer.