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Atmospheric Measurement Techniques Discussions

Interactive comment on "Quantitative and enantioselective analysis of monoterpenes from plant chambers and in ambient air using SPME" *by* N. Yassaa et al.

N. Yassaa et al.

nyassaa@usthb.dz

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For clarity we transcribe each referee comment/suggestion, and then follow this with our answer.

General comments This study demonstrates a method to extract, identify and quantify enantiomeric and non-enantiomeric monoterpenes from plant chamber and ambient air using SPME and GC-MS. Multiple SPME fibre coatings are tested and results are compared to two other established techniques for optimisation of the system and validation of the method. Synthetic, biogenic and ambient emissions of monoterpenes are

all used. In general this is a well written, well structured manuscript with a high degree of relevance to realistic emissions of monoterpenes. The experimental setup, methods and optimisation procedures are all clearly described. The authors present a convincing argument for the use of SPME to quantify monoterpene emissions, although the method is perhaps limited in terms of the maximum volume mixing ratio that can be quantified. However, it appears to be a valuable technique, which allows a full investigation the ability of terpenoids to form secondary organic aerosol. The conclusions are clearly drawn and well supported by the results. Overall this is a very good quality manuscript and I would recommend publication with a few minor amendments and corrections outlined below.

We would like to thank the anonymous referee #2 for the comments, suggestions and appreciations. Below are the responses to each specific comment:

Specific comments 1. Section 2.2.1 Description of cuvette chamber. The air scrubbing system that is described seems very thorough and of high quality. However; I have one concern regarding the re-humidification of the air. The authors state that "the air was bubbled through a vessel filled with tap water" (line 14). Given that this is placed after the scrubbing system, please state what material the vessel is constructed from to make it clear this will not contaminate the airflow. Please also comment on the use of tap water rather than distilled water, as the use of purified water would have minimised any contaminants added to the air stream after the scrubbing system.

We would like to thank the referee to point out the nature of water. In fact, it was a mistake in the text and rather deionised water was used throughout the experiments. The humidification vessel was made of glass and we have never observed any evidence of contaminations. The sentence is now corrected as follow : the air was bubbled through a glass vessel filled with deionised water.

2. Please add more description of the blank chamber measurements or background subtraction of blanks from samples. If this has been done in an earlier study, please

reference the relevant paper.

The following paragraph has been added to the text of the manuscript: Previous investigations have shown that this FEP film nearly completely transmits photosynthetically active radiation (Schäfer et al., 1992) and does not show any interferences with trace gases tested such as organic acids (Schäfer et al., 1992; Kesselmeier et al., 1997), monoterpenes and isoprene (Kesselmeier et al., 1996, 1997; Kuhn et al., 2000), as well as reduced sulfur compounds (Kesselmeier et al., 1993).

3. Figure 3. The bars shown in this figure should be averages of a number of extractions or measurements for each terpenoid to ensure accuracy. Please add the number of repetitions to the figure legend and add error bars to the figure. If they are not replicated please state this and explain why.

Since the gas standard contains all monoterpenes shown in Fig. 3, therefore the experiments were repeated three times for each SPME fibre coating.

4. Please could the authors comment on whether they have tried quantifying other terpenoids (e.g. sesquiterpenes) using the technique they describe. Could they include a comment in the discussion section on the applicability of SPME and GC-MS to other terpenoids?

This technique could b extended to measure sesquiterpenes. However owing to the difference of volatility, sesquiterpene gas standards could not be readily generated together with monoterpenes using the capillary diffusion system employed in this work.

Technical corrections 1. Section 4, Conclusions, line 10. Missing word in sentence "This easily automated method when combined: : :" should be "This is an easily automated method: : :"

It is now corrected.

2. Text in all figures needs to be larger and clearer in general (the exception to this is figure 8 which is fine).

Figures with better resolution are now provided.

3. Figure 6 caption. Typo "efficiens" should be "efficiencies"

It is now corrected.

4. Figure 7. There is no explanation of which colour is which terpenoid. Please add.

In this figure and at this stage, the colors represent only the Kovats Indices (KI) of each compound.

5. Figure 9. Resolution appears to be particularly poor – please improve for clarity.

It is now replaced with better resolution.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 3345, 2010.