

Interactive comment on “Technical Note: Gas Phase Pesticide Measurement Using Iodide Ionization Time-of-Flight Mass Spectrometry” by Trey Murschell et al.

Anonymous Referee #2

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Murschell et al. describe the application of iodide ToF-CIMS for on-line detection of four current-use pesticides. They devised a heated injection system to calibrate gas-phase concentrations of the target compounds. The reported sensitivities are sufficient for detecting the target pesticides near application zones and during laboratory studies, but not in remote regions. I think the experimental work was well done and the paper was generally well written. I recommend publication following minor revisions, as suggested below.

Specific comments:

Lines 95-98 and Table 1: Report the standard concentrations as either ng/uL or ug/mL. They are equivalent, so the reason for mixing units is not clear.

C1

Line 154: “. . .the known mass of pesticide injected on, and volatilized from, the filter.” The volatilized mass is not known, it is assumed. Remove that reference from the sentence.

Line 217: “Metolachlor sensitivity decreased substantially during the injections at 23°C and 100°C, due to the inability of the pesticide to volatilize. Permethrin sensitivity decreased 70% during the room temperature injection.” Lack of volatilization would change the analyte concentration rather than change conditions that should affect sensitivity (ncps/ppbv). So was there really a change in instrument sensitivity at lower temperatures or was the calculated ppbv merely overestimated by assuming complete volatilization where little occurred? Please clarify.

Line 223: Increased from what value? The measured sensitivities in the presence of O₂ have not yet been reported. Would the percent increase be more suitable here?

Line 240: “Further, replicate injections at multiple volumes are normally distributed for atrazine, metolachlor, and trifluralin, suggesting that uncertainties are random, while incomplete volatilization would likely produce systematic error, and thus non-Gaussian distributions.” Why would incomplete volatilization lead to non-Gaussian distributions if the resulting mixing ratios were within the linear dynamic range of the instrument? Incomplete volatilization could simply shift the distributions in Fig. S3 and would be difficult to detect without an independent measurement.

Line 263: “Relative humidity effects are essential to include RH measurements with ambient field measurements of pesticides. . .” This phrase is awkward- reword.

Line 285: Change “. . .adducts of iodide molecular fragments” to “iodide adducts of molecular fragments”.

Section 3.3 should be moved up and likely merged with earlier text (perhaps the paragraph starting on line 212) to remove redundancies. If left as a separate section, it could be better organized.

C2

Fig 3b. Why aren't the endpoints of the low injection volume calibration curves visible like in the other panels? Can the panel be zoomed out? Also, the black curve is thicker than in the other panels.

Showing representative desorption time periods for each pesticide (either in the SI or overlaid in Fig. 1) would help with deciphering the ppbv ranges accessed in each case. The atrazine experiments seem as though they should yield the highest ppbv range (highest mass injected and lowest molecular weight), yet atrazine has the lowest ppbv range in Fig 3. That only makes sense if the desorption rate of atrazine was much slower than the other compounds, but that information is not currently available.

Table 2: Add the "ug/m3" units to the column headings for the four pesticides to reduce clutter within the table.

Technical corrections:

Line 65: Correct the citation format ("44").

Line 191: Change "perm tube" to "permeation tube".

Line 251: Change "of" to "or".

Line 308: Change "identify" to "identity".

Lines 404 and 410: These references are not in alphabetical order.

Fig S2 caption: Change "Each mass spectra are..." to "Each mass spectrum was..."

SI: Under the section 'Relative Humidity Effects' there are several superscripted citations.

SI: The Brophy and Farmer reference lists AMT Discussions as the journal, rather than AMT.

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