separations

MDPI

Reply

Reply to Comment on "Uncertainty of Blood Alcohol Concentration (BAC) Results as Related to Instrumental Conditions: Optimization and Robustness of BAC Analysis Headspace Parameters". *Chromatography* 2015, *2*, 691–708

Frank L. Dorman and Haleigh Boswell

Department of Biochemistry and Molecular Biology, The Pennsylvania State University, 107 Whitmore Lab., University Park, PA 16802, USA; fld3@psu.edu (F.L.D.); hab5079@gmail.com (H.B.); Tel.: +1-814-863-6805 (F.L.D.); Fax: +1-814-863-8372 (F.L.D.)

Received: 15 March 2017; Accepted: 15 March 2017; Published: 5 April 2017

The original publication [1] was a short communication paper where a series of experiments were performed using a range of headspace oven temperatures and vial pressures to measure the resulting accuracy and precision of ethanol concentrations using headspace gas chromatography coupled to flame ionization detection (HS-GC-FID) analysis. This instrument is consistent with many used in the forensic community, though the data are specific to the model used in the reported studies. The main premise of this work is that often laboratories merely adopt manufacturers' recommendations regarding the use of their instruments, and may not actually perform studies to determine the robustness of their instrumental parameters. This paper was evaluating two of the more impactful parameters: vial pressurization and vial incubation temperature. In reading the comments authored by Tiscione [2] regarding our publication we have the following additional comments.

(1) This work was merely evaluating the performance of the instrumentation, and was by no means a method validation study intended for commercial laboratory adoption. The authors would hope that any laboratory considering adaptation of their instrumental parameters would perform the necessary validation work to demonstrate compliance to their intended quality assurance plan or other requirements. In no way do we propose that these parameters be blindly adopted. It is not clear how this impression might have been given to Tiscione.

(2) Tiscione mentions that 85 °C may be "questionable", but our work is actually recommending a *decrease* in oven temperature relative to the manufacturers recommendation of 100 °C. Again, our hope was that researchers may find a benefit in the experimental procedure used and the data presented when they consider adapting their laboratory protocols relative to manufacturer recommendations. Even in aqueous standards, we observed a benefit in the lowering of the oven temperature away from the original equipment manufacturer (OEM) specifications.

(3) Tiscione correctly points out that our reported method detection limits (MDL's) of less than 0.002 g/dL are not in compliance with the MDL procedure we referenced [3]. We could have (should?) reacquired the data with a less concentrated standard for those specific studies, but the main point was that the precision of the analysis was positively affected, resulting in a lower calculated MDL. It may have been better to report variance and not MDL, but given how this calculation is performed they are related and we left this in for consistency against our benchmark, OEM, conditions.

(4) Tiscione points out that we used a 500-µL sample volume and states that "many published methods" require a lower sample volume (ca. 100-µL), and cites 2 references including one

of his own. While we have no problem with the goal of using lower sample volumes it was not pertinent to this work, as specifically mentioned in the conclusion: "*Variations in sample preparation were of no interest in this analysis.*"

(5) Tiscione mentions the obvious coelutions of the *t*-butanol with various target compounds on both the Agilent DB-ALC1 and the DB-ALC2 columns. Again, this is outside the scope of this publication, and was not a factor given that we were working with reference materials and not live samples that would be more complex. This issue is easily solved by the choice of either a different internal standard (*n*-propanol) for which we also reported data, or by the choice of alternative GC columns. The publications point was that the two common internal standards (*n*-propanol and *t*-butanol) do not necessarily behave equally as various instrumental parameters are changed.

Overall, while we appreciated the comments on the paper, and agree with those regarding the reporting of MDL when variance would have been more appropriate, we are not sure why Tiscione feels so strongly about the rest. This publication is, again, a short communication where we evaluated essentially two important instrument parameters in a commercial HS-GC-FID system designed for BAC analysis and found that the OEM conditions were not ideal when working with reference materials. Commercial laboratories would be hopefully validating their conditions, though we have seen several forensic laboratory reports from commercial labs where the manufacturers' conditions were being followed as written. Maybe our work might stimulate these laboratories to consider performing studies of their own, and if so, then this publication would be successful in its intent.

Conflicts of Interest: The author declares no conflict of interest.

Reference and Note

1. Boswell, H.A.; Dorman, F.L. Uncertainty of Blood Alcohol Concentration (BAC) Results as Related to Instrumental Conditions: Optimization and Robustness of BAC Analysis Headspace Parameters. *Chromatography* **2015**, *2*, 691–708. [CrossRef]
2. Tiscione, N. Comment on: Uncertainty of Blood Alcohol Concentration (BAC) Results as Related to Instrumental Conditions: Optimization and Robustness of BAC Analysis Headspace Parameters. Chromatography 2015, 2, 691–708. *Separations* **2017**, *2*, 12. [CrossRef]
3. Calculate MDL using Environmental Protection Agency (EPA) method for detection of MDL, 40 CFR Part 136. APPENDIX B, revision 1.11.

© 2017 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).