



Corrigendum

Corrigendum to “Gas chromatography–trapped ion mobility mass spectrometry: A highly specific and ultra-sensitive platform for quantifying sub-ppt levels of dioxins and PCBs in food” [Chemosphere 385, 2025, 144557]

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ARTICLE INFO

Keywords

Gas chromatography
Ion mobility
Dioxins
PCBs
POPs
TIMS
EU Regulation 2017/644
Validation
Food and Feed

ABSTRACT

In this study, we evaluated the quantitative capabilities of a GC-APCI trapped ion mobility (TIMS) TOF platform for the determination of ultra-trace levels of polychlorinated dibenzo-p-dioxins (PCDD/Fs) and polychlorinated biphenyls (PCBs) in complex food matrices. Using a Bruker timsTOF Pro 2 instrument, three fat-based proficiency test samples - fish oil, palm oil, and milk fat - were analyzed and compared to a validated GC-sectorHRMS method, in accordance with the criteria set by Commission Regulation (EU) 2017/644. Linearity was confirmed across broad dynamic ranges, with relative response factor (RRF) precision consistently below 20 %. Instrumental limits of quantification (iLOQs) reached the 100–500 fg/μL range for dioxins and low pg/μL for PCBs, while method LOQs (mLOQs) were typically in the high fg/g to low pg/g range. Intermediate precision (RSD_R) remained below regulatory thresholds in 97 % of cases. Furthermore, 80 % of PCDD/Fs and over 87 % of PCB measurements met trueness requirements, with summed WHO₂₀₀₅-TEQ and NDL-PCB concentrations in close agreement with sectorHRMS values. Importantly, the addition of the ion mobility dimension provided distinct benefits. It enabled the separation of coeluting isomers (e.g., 2,3,7,8-TCDD), resolved isobaric interferences (e.g., PeCDD and HxCB 169), and allowed for high-confidence analyte identification using collision cross section (CCS) values. CCS differences between native and ¹³C-labeled standards were consistently below 0.5 %, supporting its use as an additional identification criterion. Overall, while the method showed slightly reduced performance for ultra-trace dioxins, it demonstrated accurate quantification and enhanced selectivity, highlighting the strong potential of TIMS-TOF technology for contaminant analysis in food safety applications.

In the originally published version of this article, the abstract, keywords and acknowledgments section were inadvertently omitted. These sections are included in this corrigendum.

The authors would like to apologise for any inconvenience caused.

Acknowledgements

This work was supported by the French Community of Belgium

through the funding of a FRIA grant (FC 47331) and the Belgian Federal Public Service of Health, Food Chain Safety and Environment (RT22/06 TEQFOOD). The authors thank Bruker Applied Mass Spectrometry (BAMS) for their support and the European Reference Laboratory for Halogenated Persistent Organic Pollutants in Feed and Food (EURL POPs, Freiburg, Germany) for kindly providing the PT samples.

DOI of original article: <https://doi.org/10.1016/j.chemosphere.2025.144557>.

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<https://doi.org/10.1016/j.chemosphere.2025.144599>

Available online 14 August 2025

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