proceedings

MDPI

Abstract

Chasing Pollutants Concerning Public Health: From Food to Smoke †

Urška Šunta, Polonca Trebše, Borut Poljšak and Mojca Bavcon Kralj *

Faculty of Health Sciences, University of Ljubljana, 1000 Ljubljana, Slovenia; urska.sunta@zf.uni-lj.si (U.Š.); polonca.trebse@zf.uni-lj.si (P.T.); borut.poljsak@zf.uni-lj.si (B.P.)

* Correspondence: mojca.kralj@zf.uni-lj.si; Tel.: +386-1-300-11-11

† Presented at the International Conference EcoBalt 2023 "Chemicals & Environment", Tallinn, Estonia, 9–11 October 2023.

Keywords: solid-phase microextraction; food aromas; microplastics identification; smoking comparison; volatile organic compounds

Sample preparation is the key step in determining low concentrations of pollutants from food, biological, plant, industrial, and environmental matrices. Solid-phase microextraction (SPME) is a solvent-free, cost-effective, robust, and high-throughput sample preparation technique [1] usually coupled with gas chromatography (GC). It is especially versatile for sampling volatile organic compounds (VOCs) not only present in the analysis of wine bouquet or cheese aromas [2], but also in cigarette smoke [3], or in the identification of microplastics (MPs) [4]. The sorption of VOCs on the SPME fibre in the headspace (HS) of the sample depends on numerous parameters: the type of fibre, the extraction time, and the temperature. Mixed-polarity phase SPME fibres (DVB/CAR/PDMS; Supelco, Bellefonte, PA, USA) were used in all analyses, from Nanos cheese to MP identification to cigarette smoke. The HS-SPME method enabled the VOCs' profile study of Nanos cheese. The evolved cheese aroma profiles were affected by cheesemaking parameters: the amount of starter culture, ripening temperature, and media, and were independent of the geographical origin of raw milk as well as the location of ripening [2]. Further, by employing the HS-SPME-GC–MS method, identification of the five most common polymer types (PVC, PS, PET, PP, and PE) of MPs was possible. The well-controlled melting process, which generates characteristic compounds of each polymer, enabled the classification of MPs from real mixtures. Studying other VOCs concerning public health also included HS-SPME of flavours in tobacco products [classic cigarettes (CCs), electronic cigarettes (ECs), and heat-no-burn products (HNB)]. Flavours are the most common reason for promoting smoking initiation and duration, and they make smoking cessation more difficult among adolescents. However, the lack of simple smoke/aerosol/vapour (S/A/V) analyses for comparison of CCs, ECs, and HNB makes legislation or prohibition of such products impossible. It would be of general interest if a simple, standardised method existed.

Author Contributions: Conceptualisation, M.B.K.; methodology, U.Š. and M.B.K.; validation, U.Š.; formal analysis, M.B.K. and U.Š.; investigation, M.B.K., P.T., U.Š. and B.P.; resources, P.T.; data curation, M.B.K.; writing—original draft preparation, M.B.K., P.T., U.Š. and B.P.; writing—review and editing, M.B.K., P.T. and U.Š.; visualisation, M.B.K.; supervision, M.B.K. and P.T.; project administration, P.T. and B.P.; funding acquisition, M.B.K., P.T. and B.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by ARRS P3-0388 for support through the programme "Mechanisms of Health Maintenance" and the post-graduate research funding programme Young Researchers (SP-0510/21 and 100-22-0510).

Institutional Review Board Statement: Not applicable.

Citation: Šunta, U.; Trebše, P.; Poljšak, B.; Kralj, M.B. Chasing Pollutants Concerning Public Health: From Food to Smoke. *Proceedings* **2023**, *92*, 60. https://doi.org/10.3390/proceedings2023092060

Academic Editors: Monika Mortimer, Anne Kahru, Ivo Leito, Riin Rebane and Villem Aruoja

Published: 29 November 2023

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: The authors acknowledge Iva Boltar for contributing to this research work.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Jalili, V.; Barkhordari, A.; Ghiasvand, A. A comprehensive look at solid-phase microextraction technique: A review of reviews. *Microchem. J.* **2020**, *152*, 104319. [CrossRef]
2. Boltar, I.; Majhenič, A.Č.; Jarni, K.; Jug, T.; Kralj, M.B. Research of volatile compounds in cheese affected by different technological parameters. *J. Food Nutr. Res.* **2019**, *58*, 75–84.
3. Poljšak, B.; Gošnak Dahmane, R.; Podobnik, L.; Bavcon Kralj, M. Comparing smoke and aerosols from classic and electronic cigarettes, and from «heat-not-burn» devices. In *Proceedings of the 22nd European Meeting on Environmental Chemistry: Book of Abstracts, Ljubljana, Slovenia, 5–8 December 2022*, 1st ed.; Bavcon Kralj, M., Trebše, P., Prosenc, F., Šunta, U., Čižmek, L., Eds.; University of Ljubljana Press: Ljubljana, Slovenia, 2022; ISBN 978-961-297-035-2.
4. Šunta, U.; Trebše, P.; Kralj, M.B. Simply applicable method for microplastics determination in environmental samples. *Molecules* **2021**, *26*, 1840. [CrossRef] [PubMed]