

P77 - Identification of non-volatile compounds in bio-based and/or biodegradable packaging materials using a non-targeted LC-HRMS method

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Through the “Farm to Fork Strategy” the EU promotes the use of sustainable packaging solutions utilizing environmentally friendly materials. Bio-based and biodegradable polymers are being developed and already being used to replace petroleum-based plastics for food packaging applications, it is expected to continue to grow. However, it is important to highlight that the critical issue of chemical safety is often overlooked. The migration of compounds from the packaging can affect food safety and needs to be evaluated. The potential migrants include IAS such as monomers and additives and the so-called NIAS, such as reaction and degradation products and impurities. In the present work, a non-targeted analysis using LC-HRMS to investigate non-volatile compounds extracted from packaging materials labeled as bio-based and/or biodegradable and intended to be in contact with food was performed. The samples, characterized by FTIR, include polyester based materials, polylactic acid (PLA), and polypropylene. After extraction with acetonitrile at 40 °C for 24 h, the resulting extracts were analyzed by Q-Exactive-LCMS. Data were acquired in full scan mode and processed using an interface under the open-source programming R environment [1]. Both IAS, such as the additives antioxidants (e.g., Irganox 1076), slip agents (e.g., erucamide) and plasticizers (e.g., DEHP), and NIAS were detected in the samples. Among NIAS, oligoesters based on different combinations of diols (ethylene glycol 1,3-butanediol, neopentyl glycol, etc.) and diacids (adipic, phthalic, and sebacic acids) were tentatively identified. As in a previous study, most of them presented a cyclic structure [2]. Particular attention should be paid to NIAS, since most of them are unknown compounds and their toxicity has not been evaluated.

References:

[1] Omer et al. (2018) Anal. Bioanal. Chem. <https://doi.org/10.1007/s00216-018-0968-z>.

[2] Lestido-Cardama, et al. (2022) Polymers, 14, 487. <https://doi.org/10.3390/polym14030487>

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