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Optimization of extraction conditions, identification and quantitative analysis of xenobiotics (e.g., pesticides, dyes, bisphenols) in natural and biological samples and food products using high-performance liquid chromatography (HPLC) combined with modern detection techniques (DAD, MS, MS/MS)

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Bisphenols are a class of chemicals with two hydroxyphenyl functionalities, which include bisphenol A (BPA) and several analogues such as BPS, BPB, BPF, BADGE, BADGE•2H_2O, and BADGE•2HCl. The release of BPA into the food depends on the type, pH and lipid content of food, temperature, and contact time. Due to their fat content, both breast and dietary milk could be polluted by many xenobiotics characterized by lipophilic properties. Milk and dairy products are widely consumed by infants, children, and many adults throughout the world, and occurrence of quantifiable amounts of BPA represents a matter of public health concern. European Commission (EU) has established a migration limit of 0.6 mg/kg for BPA in food or food simulant from plastic materials and articles intended to come in contact with foodstuffs (Regulation (EU) No. 10/2011) and has interdicted the BPA use in the fabrication of baby bottles (Regulation (EU) No.321/2011). Considering that many estrogenic effects caused by BPA occur at concentrations below the recommended safe daily exposure and that children are particularly vulnerable, a new risk assessment has been strongly recommended for consumer health protection.

The aim of the experiments was to determination of xenobiotics (BPA and its analogues, pesticides, dyes, medicines) in natural and biological samples (e.g., breast milk) and food products. Author proposed a rapid, efficient, and reliable method for extraction of different class/groups of xenobiotics from natural samples, based on modified QuEChERS procedure. The novelty of the experiments concern possibility of utilizing relatively new and innovative zirconium based sorbents (Z-Sep and Z-Sep Plus) for clean-up of analyzed extracts. Average recovery; repeatability and matrix effect were accounted for finally selected extraction conditions. Validation of the chromatographic methods (linearity, limits of detection (LODs) and quantification (LOQs)) was also carried out.

Biography

Tuzimski T is an Adjunct Professor in the Department of Physical Chemistry at Faculty of Pharmacy with Medical Analytics Division, Medical University of Lublin, Poland. He received MA Degree and PhD (in 1995 and 2002, respectively), and Doctor of Sciences (habilitation) Degree (in 2012) at the Faculty of Pharmacy with Medical Analytics Division, Medical University of Lublin. His scientific interest includes the theory and application of liquid chromatography, extraction (QuEChERS) and detection techniques. He is authored or co-authored more than 77 scientific papers (IF=100, H-index=17). He is a Member of an Editorial Board of the *Acta Chromatographica*. He is a Quest Editor of special sections on pesticide residues analysis in the *JAOAC International*. He is co-authored and co-edited with Professor Joseph Sherma the book entitled "*High Performance Liquid Chromatography in Pesticide Residue Analysis*" (2015) and the book "*Determination of Target Xenobiotics and Unknown Compounds Residue in Food, Environmental and Biological Samples*" (2018; CRC Press). Dr. Tuzimski is a promoter of one doctorate (2017) and research work of six masters of pharmacy, and supervised the research work of 10 masters of pharmacy.

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