Tomasz Tuzimski, Biochem Pharmacol (Los Angel) 2018, Volume 7
DOI: 10.4172/2167-0501-C1-009



# Optimization of extraction conditions (QuEChERS/d-SPE) and quantitative analysis of xenobiotics (pesticides, dyes, medicines and bisphenols) in food products and biological samples using high-performance liquid chromatography combined with modern detection techniques

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Bisphenols are a class of chemicals with two hydroxyphenyl functionalities, which include bisphenol A (BPA) and several analogues such as bisphenol S (BPS), bisphenol F (BPF), and bisphenol B (BPB). As industrial chemical, BPA is widely used in the production of polycarbonate plastics (used in food contact materials, such as food containers, baby food and water bottles), epoxy resins (used as internal coating in canned food and beverage to prevent the food to get in contact with the metal wall and the deterioration of cans) and as an antioxidant in polyvinyl chloride (PVC) plastics in materials intended to come into contact with food (packaging cling films). Considering the similarity in the structure of various analogues can migrate from food containers. Due to their fat content, both breast and dietary milk could be polluted by many xenobiotics characterized by lipophilic properties. Breast milk, milk of lactating cows 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. Due to the ability to accumulate in organisms and in the food chain, BPA may also affect the development of subsequent generations. The breastfeeding could represent a source of exposure to infants, because BPA tends to persist for extended periods of time and infants can be more susceptible to adverse effects resulting from chemical exposures, due to the rapid mental and physical changes that take place during prenatal and neonatal periods. Despite the reported levels in food are generally considered safe, the occurrence of BPA residues in breast milk and dairy products should be considered significant in terms of potential human-health risk. The aim of the paper was determination of xenobiotics (bisphenols, pesticides, dyes, medicines) in breast milk samples and food products.

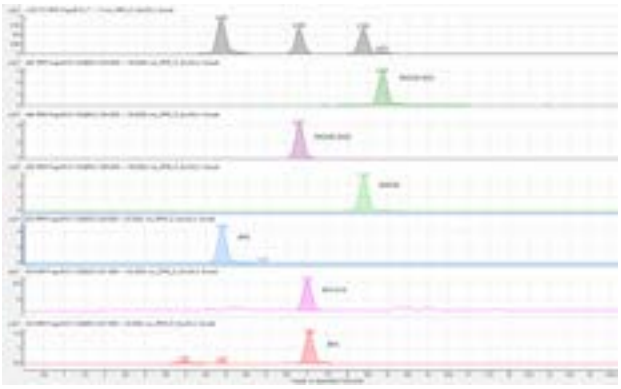

**Fig:** MRM Chromatogram showing separation of the bisphenols standards by LC-QqQ-MS/MS

## Recent Publications

1. Mercogliano R and Santonicola S (2018) Investigation on bisphenol A levels in human milk and dairy supply chain: a review. Food and Chem Toxicol. 114: 98–107.
2. Arcaro K F, et al. (2014) Determination of free bisphenol A (BPA) concentrations in breast milk of US women using a sensitive LC/MS/MS method. Chemosphere 104: 237–243.
3. Rejczak T and Tuzimski T (2017) Application of high-performance liquid chromatography with diode array detector for simultaneous determination of 11 synthetic dyes in selected beverages and foodstuffs. Food Analytical Methods 10(11):3572–3588.

4. Rejczak T and Tuzimski T (2017) method development for sulfonylurea herbicides analysis in rapeseed oil samples by HPLC–dad: comparison of zirconium-based sorbents and EMR-lipid for clean-up of QuECHERS extract. Food Analytical Methods 10(11):3666–3679.

**Biography**

Tomasz Tuzimski is an Adjunct Professor in Department of Physical Chemistry at Faculty of Pharmacy with Medical Analytics Division, Medical University of Lublin, Poland. He has completed MA degree and PhD degree in 1995 and 2002, respectively, and Doctor of Sciences in Habilitation in 2012 at the Faculty of Pharmacy with Medical Analytics Division, Medical University of Lublin. His scientific interests include the theory and application of liquid chromatography, extraction (QuEChERS) and detection techniques. He has authored or co-authored more than 62 scientific papers (IF=100, H-index=17). He is a member of the Editorial Board of the *Acta Chromatographica*. He is Quest Editor of special sections on pesticide residues analysis in the JAOAC Int. He has co-authored and co-edited with Professor Joseph Sherma the book entitled *"High Performance Liquid Chromatography in Pesticide Residue Analysis"* and the book *"Determination of Target Xenobiotics and Unknown Compounds Residue in Food, Environmental and Biological Samples".*

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