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Multi-residual determination of developmental neurotoxic compounds in human milk

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Recently, there is a growing number of children with developmental disorders (autism spectra disorders ASD, attention deficit hyperactivity disorder ADHD, learning problems). The EU project DENAMIC investigates harmful neurotoxic effects of selected compounds in order to reveal possible links between exposure to the compound mixtures and the cause of developmental problems of children. One part of the research includes development of a sensitive method for determination of possible neurotoxic compounds, i.e. persistent and non-persistent pesticides (organochlorine pesticides OCPs and pyrethroids), polybrominated diphenyl ethers (PBDEs), novel flame retardants (NFRs), marker polychlorinated biphenyls (PCBs) and PBDE and pyrethroid metabolites in human matrices, especially in breast milk and human urine. The chemical properties of many of these compounds (part of OCPs and NFRs, all pyrethroids and their metabolites) require non-destructive clean-up methods during sample preparation. After pressurized liquid extraction of a milk sample, the dialysis with LDPE membrane was chosen as a simple and efficient method for fat removal. Additional clean-up with solid phase column with two different sorbents was added for complete lipid removal. Different instrumental methods were tested in order to lower limits of quantification and reduce the effect of matrix. GC-HRMS and APGC-MS/MS for pyrethroid analysis with softer ionization allowed us to determine ultra-trace levels of developmental neurotoxicants in breast milk from European cohorts.

Biography

Eliska Cechova is a 3rd year PhD student of Environmental Chemistry in Masaryk University, Czech Republic with the main focus on development of new analytical methods for determination of organic pollutants and their metabolites in human matrices such as human milk. She is working on EU project Denamic, which is looking for relationship between the presence of mixture of common environmental pollutants and possible effects to child health.

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