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Development of a multi-dimensional screening model to investigate the immune modulatory effects of migrating packaging compounds from foods stuffs

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Statement of the Problem: Bisphenol A or phthalates, compounds used as plasticizers in the production process, have been identified as endocrine disrupting chemicals suspected of influencing the immune system on its regulatory and functional levels. Risk assessment of migrating packaging components in processed foods entails significant analytical challenges due to broad diversity and complexity of samples together with low concentrations of target compounds. Apart from the analytical requirements associated with identification and quantification of these compounds, sample preparation techniques should be optimized with respect to macronutrient composition to obtain reproducibility and reliability of the analytical methods.

Methodology & Theoretical Orientation: Following a defined approach, a broad range of different packaging materials was subjected to harsh extraction procedures to establish an internal reference database of target compounds. A sensitive and selective multi reaction monitoring (MRM) method was set up using gas chromatography -tandem mass spectrometry. Different sample preparation techniques were established considering solvation effects, pH stability and matrix removal. Detected migration compounds were applied to *E. coli* LPS stimulated THP-1 macrophages to evaluate the impact on pro-inflammatory marker production.

Findings: Confirmed target compounds were present at concentration up to 10 ppm. Higher amounts were mainly derived from cross contamination confirmed via analyses of blanks. Sensitivity and selectivity of the analytical setup were largely affected by the fat content. Accordingly, efforts in sample preparation and careful MRM selection were required to achieve a method detection limit of 5 ppb. Incubation of the cells with high concentrations of phthalic acid esters and their degradation products was demonstrated to affect the cellular production of IL-6, IL 8, TNF and IL-1.

Conclusion & Significance: Due to the low amount present in food stuffs, further studies are intended to investigate if chronic exposure to low levels of migrating compounds attenuates the immunological response.

Biography

Miriam M Ehrnhoefer Ressler is a lecturer and Researcher at the FH Joanneum University of Applied Sciences in Graz, Austria, where she is conducting different R&D projects in the field of nutritional programming and lipidomics. There she is also concerned with extractables and leachables studies together with chemical-analytical method development for identification and quantification of known and unknown substances in complex sample matrices by means of GC-MS/MS. She was awarded a three-year Doc-fORTE -scholarship for conducting her PhD studies at an interdisciplinary research group at the University of Vienna investigating the structure related immune-modulatory potential of herbs and spices. During her Master's thesis, she was involved in a public health project aiming to improve the dietary habits as well as the food environment of pregnant and breastfeeding women and children.

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