Biomonitoring of phthalates in the Swiss population

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Phthalates are found in many everyday objects, mainly as plasticizers, but some have been classified as endocrine disruptors, and their use has been restricted or banned in recent years [1]. The Federal Food Safety and Veterinary Office has organized two large-scale human biomonitoring campaigns in Switzerland as part of health studies, and various substances, including phthalates, are measured in the biofluids of adults and children.

Population exposure is measured by analyzing phthalate metabolites in human urine, thus avoiding the need to deal with ubiquitous environmental contamination. Thirty metabolites, representing 16 phthalates, are selected and analyzed with liquid chromatography–mass spectrometry. The mass spectrometer is operated in negative ionization mode, using a scheduled multiple reaction method by selecting two transitions per standard (one quantifying and one qualifying transition) to ensure selectivity. Corresponding isotopically-labelled standards are added in equal amounts to all samples to ensure robustness and follow up with two transitions.

The analytical challenge of this study is to handle more than 2500 samples. Method development efforts focus on optimizing sample preparation and analysis time based on a published method [2]. First, a transfer from a column of high-pressure to ultra-high-pressure is evaluated to shorten the analysis time. Secondly, simplified sample preparation is evaluated by comparing online and offline solid-phase extraction. These two steps are currently being evaluated, and initial results are presented.

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