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BOOK OF ABSTRACTS

Method Development in LC-MS/MS Focused on Derivatization and Sample Pre-treatment for Determination of Glyphosate, Glufosinate, and AMPA at Low Concentration in Urine for Chronic Exposure Assessment

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Since its classification as probably carcinogenic by IARC in 2015, concerns have grown over agricultural and general population exposure to glyphosate, the world's most widely used pesticide since the advent of herbicide-resistant genetically modified crops. Exposure to pesticides can be assessed in various ways, including through biomarkers and pesticides residues such as AMPA, the co-formulated glufosinate and glyphosate itself. Urine is an excellent matrix for glyphosate biomonitoring, as it is easy to collect, store, and reflects excretion of the compound largely as the parent active ingredient. Urine analysis for glyphosate detection and quantification can be effectively performed using liquid chromatography coupled with mass spectrometry, due to its high detectability and sensitivity; however, optimized performance is required for population assessment of chronic exposure at ng/mL. This study presents an LC-MS/MS method to detect glyphosate, glufosinate, and AMPA in urine, using FMOC-Cl derivatization to improve sensitivity. In addition to derivatization, a solid-phase extraction (SPE) step will be optimized using Supelco Supelclean LC-SAX cartridges. The chromatographic system includes a microbore Acquity UPLC BEH C18 column, in an Acquity UPLC M-CLASS/Xevo™ TQ-S Micro system from Waters, coupled to a Waters Xevo TQ-S Micro mass spectrometer. The selected mobile phases are ammonium acetate in water with 0.1% acetic acid (mobile phase A) and pure methanol (mobile phase B). The method aims to achieve a high detection frequency in human samples with low limits of quantification (between 0.1 and 1 ng/mL) and is expected to provide a reliable tool for large-scale biomonitoring of chronic pesticide exposure in human populations.

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