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Mass Spectrometry & Purification Techniques

Commentary

Development and Validation Lichen *Diploschistes Diacapsis* Using Tandem Mass Spectrometry

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DESCRIPTION

Lichens are widely used in food, medicines, and cosmetics due to their unique chemical composition. Lumbsch in an acetone extract, Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC-ESI-MS/MS) was used to make the determination. In the initial examination using LC-MS/MS as a precise analysis, seven *D. diacapsis* lichen species compounds were inconclusively identified. For lichen extraction, the maceration technique worked well and was straightforward. For the detection of 34 Perfluoroalkylated Substances (PFASs) in food-related matrices, the analytical approach UHPSFC-MS/MS, which combines tandem mass spectrometry with ultra-high performance supercritical fluid chromatography, was developed.

A Design of Experiment (DoE) method that used a Central Composite Design (CCD) was used to optimize column temperature, mobile phase flow rate, co-solvent concentration, and an automated back pressure regulator, while two parameters (stationary phase and co-solvent) were chosen and optimized step by step. The Torus 2-PIC column and ammonium acetate (AcoNH4) were chosen as the co-solvent additives. DoE optimization of peak width and resolution allowed for the validation of an optimized model (desirability of 0.613), with the column temperature, AcoNH4 concentration, mobile phase flow rate, and ABPR all set at 38.7°C and 1.9 mL/s, respectively. The validated resultant approach made it possible to meet current EU standards for 97% of PFASs by achieving limits of quantification <0.2 ng/g (w/w).

Whereas, The method was effectively used to characterize a variety (n>30) of food-related matrices, including beef, chicken, eggs, fish, and breast milk, that were gathered in algeria in 2019. The most often found PFASs were found to be PFOA and PFBA, which were found in 96.96% and 90.9% of the samples, respectively. For PFTeDA and PFOS, the greatest quantities were found in fisheries products, reaching up to 4.42 ng/g (w/w) and 0.75 ng/g (w/w), respectively. For the examination of 19 illegal substances and psychopharmaceuticals in untreated and treated wastewater, a direct injection liquid chromatography-tandem mass spectrometry approach was effectively established. Analyses of stimulants, opioids, antipsychotics, anxiety relievers, appetite suppressants, and hallucinogens are all part of the technique.

In treated and raw wastewater, respectively, the technique limits of quantitation range from 5 to 59 ng and 2 to 38 ng, respectively. The drugs with the largest average mass concentrations in raw wastewater were codeine and tramadol, with concentrations of 1800 and 1000 ng, respectively, according to an analysis of raw and treated sewage samples taken daily over the course of a wastewater treatment facility using oxidation ditch technology. The presence of certain substances in treated wastewater samples suggests that illegal narcotics and psychopharmaceuticals were not completely removed during wastewater treatment. Having detection limits in the low nanogram per litre range, this approach provides a quicker screening option for wastewater samples than the existing methods provide without the necessity for sample pre-concentration procedures such solid-phase extraction.

For the first time, ractopamine residue in animal-derived meals was extracted and determined using an easy, sensitive, and precise analytical approach based on Electro Membrane Extraction (EME) and Column Chromatographic Tandem Mass Spectrometry.

CONCLUSION

The kind of Supporting Liquid Membrane (SLM), chemical make-up of the acceptor solution, extraction voltage, and extraction duration are among the factors that were optimized. Under the optimal circumstances, the developed EME-LC-MS/MS technique acquired a wide linear range (1-1000 ng/g), low limit of detection (0.07-0.11 ng/g), good recoveries of 80.3-108.8%, and excellent precision (5.5-7.9%). The developed method demonstrated advantages including being environmentally friendly, having a quick mass transfer rate, being exceptionally clean-up-able, being highly accurate, and being highly sensitive, which illustrated its great potential for keeping track of the unauthorized use of hazardous materials in foods.

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