

One-step-microwave-assisted extraction and derivatization followed by comprehensive two-dimensional chromatography coupled with flame ionization detector to analyze fatty acid methyl esters (FAMES) in complex food matrices.

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The analysis of fatty acids (FAs) is crucial from different viewpoints, as it can provide valuable insights into the composition of fats for instance for industrial processes or their impact on nutrition and health. Typically, the analysis of FAs involves extracting lipids from the matrix and subsequently undergoing a derivatization process to convert them into FAMES before gas chromatography (GC) analysis. This work aims to characterize the FAs profile of complex matrices using a one-step microwave-assisted extraction and derivatization (MAED) method used to simultaneously extract and derivatize the lipid fractions in FAMES, followed by a flow-modulated (FM) two-dimensional comprehensive gas chromatography – flame ionization detector (GC×GC-FID) analysis. The use of FM-GC×GC enhances interpretation capabilities, and the structured chemical patterns generated in the 2D plot allow for precise characterization of the FAMES profile based on specific chromatogram positions, ensuring reliable identification without the need for MS. Moreover, the use of FM allowed to obtain the same profile as a cryogenic modulator. FAMES were tentatively identified through standards, literature data, and the 2D-GC plot position. The MAED method proved to be a robust, greener, and rapid alternative to the more time-consuming routine methods normally in use.

Commentato [DF1]: It will be also about the mussle sample..... add all the author from Ferrara?