

TAILORED SAMPLE PREPARATION FOR OLIVE OIL ANALYSIS BY ¹H-NMR: APPLICATIONS IN SENSORY EVALUATION, ORIGIN CLASSIFICATION AND POLYPHENOL DETERMINATION

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The ¹H-NMR analysis of olive oil after dilution in CDCl₃ has been exhaustively described in many scientific studies already. Due to the inherently low sensitivity of NMR, this approach provides little information about minor components present in the sample like polyphenols and volatiles.

An alternative sample preparation technique was developed and tested for its potential in addressing three important analytical issues. By employing a simple extraction with acetonitrile, a drastic enrichment of polyphenols and other polar compounds can be achieved. ¹H-NMR analysis of these extracts can be used to classify olive oils according to geographical origin with striking success. In addition, markers attributable to the different sensory defects can be detected by the newly developed method, as demonstrated by the analysis of a large sample set of oils of different quality grades (extra virgin, virgin, lampante) which were assessed in parallel by sensory analysis. Affording extracts enriched in polyphenols, the method can also be used to determine the amount of polyphenols present in the oil. Employing the determination of phenolic content by the Folin Ciocalteu method, PLS-regression was used to predict the phenolic content from the NMR spectra. A high correlation between NMR data and the results from Folin Ciocalteu method was observed.

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