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MEETING ABSTRACT OP

New measurement techniques for determination of DMB in extra virgin olive oil: Methodology and method validation

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Abstract: The identification of bioactive compounds in extra virgin olive oil has been popular due to its potential health benefits. Among these compounds, 3,3-dimethyl-1-butanol (DMB) has as it has biological activity and potential effects on metabolic and cardiovascular health. Recent studies have explored analytical strategies involving derivatization reagents such as acetyl chloride (ACL), benzoyl chloride (BCL), and propyl chloroformate (PCF) to improve the detection and characterization of bioactive molecules in complex food matrices. In this study, a novel analytical method based on headspace gas chromatography–mass spectrometry (HS-GC/MS) was developed for the identification and quantification of DMB in extra virgin olive oil (Kiritsakis et al., 2025). Several alcohols (isopropanol, *n*-butanol, *n*-pentanol, and 2-pentanol) were evaluated as potential internal standards, and 2-pentanol was selected due to its clear chromatographic separation and distinctive mass spectrum. The method was validated according to the Eurachem–CITAC Guide, assessing key analytical parameters such as sensitivity, specificity, linearity, accuracy, and precision. Two calibration ranges (0–100 µg/L and 100–5000 µg/L) demonstrated excellent linearity with correlation coefficients of $R^2 = 0.9983$ and $R^2 = 0.9989$, respectively. Measurement uncertainty was estimated as 7.0% and 8.22% (k = 2), confirming the robustness and reliability of the method. The validated method was applied to olive oil samples from Greece and Türkiye, where DMB concentrations ranged from 1.5 to 11.4 µg/L, depending on olive variety and harvest conditions. Early harvest oils generally mostly exhibited higher DMB levels. Overall, the combination of HS-GC/MS analysis with derivatization approaches using acetyl chloride (ACL), benzoyl chloride (BCL), and propyl chloroformate (PCF) might provide new opportunities for improving the detection and characterization of bioactive compounds in olive oil and supports the development of advanced analytical techniques for functional food research.

Keywords: HS-GC/MS, 3,3-dimethyl-1-butanol (DMB), extra virgin olive oil, bioactive compounds, method validation

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Kiritsakis, A., Gimatdin, R., Gören, H. Y., Sakellaropoulos, N., Kiritsakis, K., Anousakis, C., Shahidi, F. & Gören, A. C. (2025). Quantification of 3,3-dimethyl-1-butanol (DMB) in olive oil: A rapid and novel method. *Journal of Food Bioactives*, *30*(21), 40–46. DOI: 10.26599/jfb.2025.95030413.

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