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ABSTRACT BOOK

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C AND H STABLE ISOTOPE RATIO ANALYSIS USING GC-IRMS FOR VANILLIN AUTHENTICATION

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Vanilla extracts are widely used as flavouring ingredients in foods and beverages and aromatic compounds in perfumes and pharmaceuticals. Due to the high cost of producing high-quality natural extracts from *Vanilla planifolia*, synthetic or natural identical biosynthetic vanillin (from natural precursors such as guaiacol, ferulic acid, eugenol and lignin) are often used as a substitute [1].
To verify the authenticity of vanilla extracts from *Vanilla planifolia*, one of the most commonly used methods is stable isotope ratio analysis (SIRA) of $^{13}C/^{12}C$ (expressed as $\delta^{13}C$), since it has been found that different plants discriminate differently against ^{13}C and differently from the synthetic source. Today this analysis is no longer enough to discover vanillin adulteration, due to the practice of adding ^{13}C to the methylic site of synthetic vanillin [2].
In this study, we combined analysis of $^{13}C/^{12}C$ with that of $^{2}H/^{1}H$ (expressed as $\delta^{2}H$) using GC-IRMS [3]. 16 authentic samples of *Vanilla planifolia,* 16 natural identical, 5 synthetic vanillin and 20 commercial extracts were considered. Authentic natural vanillin from *Vanilla planifolia* and natural identical vanillin are characterised by $\delta^{2}H$ values much lower than those of synthetic vanillin.
The isotopic values of all the commercial extracts declared to be from *Vanilla planifolia* (N=20), had $\delta^{13}C$ within the typical range for natural vanillin, but $\delta^{2}H$ outside the range and more similar to that of synthetic vanillin.
The combination of $\delta^{13}C$ with $\delta^{2}H$ GC-IRMS analysis of vanillin can therefore be proposed as a suitable tool for improving the detection of vanilla extract adulteration.

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