Authenticity and Traceability of Vanilla Flavour by Analysis of Stable Isotopes

For authentication of vanilla flavours, vanilla pods of the type Vanilla planifolia and Vanilla tahitensis from different geographical habitats were extracted and analyzed together with vanilla flavours made by fermentations and chemical synthesis. Isotopic delta values were determined using Gas Chromatography Isotope Ratio Mass Spectrometry (GC-IRMS). The main contributor to the characteristic vanilla flavour is 4-hydroxy-3-methoxybenzaldehyde, also called vanillin. Delta13C values of vanillin originating from the vanilla plant differ from delta13C values from vanillin made synthetically or by fermentation. Furthermore, the results showed that there was a significant difference in the isotopic composition of vanillin for the two types of vanilla plants analyzed, where Vanilla tahitensis contained more 13C than Vanilla planifolia.

Delta2H values of precipitation at different geographic locations of vanilla plantations are reflected in the water the vanilla plant takes up and incorporates in the biosynthesis of aroma components. Therefore, analysis of delta2H can provide information about the geographic origin. Results show a tendency towards depletion of 2H in areas with high precipitation.

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