

Characterization of Slovenian apple and strawberry aromas for authenticity assessment using stable isotope approach

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It has been reported that synthetic flavours are sometimes sold as natural ones. At the moment, gas chromatography isotope ratio mass spectrometry (GC-C-IRMS) is perhaps one of the most specific and sophisticated method for determining food authenticity. For authenticity assessment of aroma compounds, several steps need to be taken including sample and standard selection, sample preparation, compound identification, $\delta^{13}\text{C}$ measurements, data processing, database creation. The authenticity of the aroma compounds can then be verified by comparison of the $\delta^{13}\text{C}$ value of the analysed sample with the values from a created database. The established protocols and methods were used in our study to investigate natural and commercially available apple and strawberry recovery aromas.

GC-MS identification analysis results of laboratory produced and commercial apple and strawberry recovery aromas show a difference in the presence or absence of certain aromatic components as well as the relationships between them. Commercial samples have more uniform composition compared to laboratory samples obtained, where variability is due to the different apple varieties. However further analysis is required for better understanding the meaning of presence or absence of certain aroma compounds. Since a rather small amount of components contributes to apple and strawberry aroma, we decided to investigate active aromatic components, which are also possible to be detected with GC-C-IRMS. For such analysis the selection of reference material and appropriate processing and interpretation of the results obtained is crucial. For this purpose, samples of pure synthetic aroma compounds have been first analysed on EA-IRMS and compared with literature data where we observed good agreement. One of the main objectives of the present research was to establish the database of $\delta^{13}\text{C}$ values for several most common flavour compounds present in apple and strawberry recovery aromas. Analysis of commercial recovery aromas, labelled as natural, revealed that the $\delta^{13}\text{C}$ value of the majority of the compounds present was within the expected authentic range. The data also revealed some possible falsifications of mainly strawberry samples. Our data also reveals some differences in $\delta^{13}\text{C}$ value between natural apple and strawberry recovery aromas, which requires further investigation. Although the method was developed to differentiate between natural and synthetic apple and strawberry aroma compounds it can be easily transferred also to other commodities. Research is implemented in the framework of SPS: Food for Future.