

Application of Gas Chromatography-olfactometry/mass Spectrometry for the Analysis of Aroma-active Volatile Compounds Derived from Edible Oils

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Lipid oxidation of edible oils may cause quality defects in food products. In addition to the sensory evaluation of food samples, the analysis of volatile compounds (e.g. by means of static or dynamic headspace analysis) are sensitive tools to detect changes of aroma-active compounds which may affect the overall food quality properties of the food. GC-olfactometry (GC-O) refers to the use of human assessors as a sensitive and selective detector for aroma-active compounds often used in combination with a mass spectrometry detector. GC-O techniques have been used to analyze key aroma compounds and assess the quality of olive oils [1] and to investigate the odor significance of lipid oxidation products [2].

The present study investigated aroma-active volatile compounds derived from lipid oxidation (1) to identify volatile compounds, that are of importance for the aroma of conventional and high-oleic vegetable oil samples (conventional and high-oleic sunflower oil, conventional and high-oleic rapeseed oil) and (2) to examine how GC-O techniques could detect flavor changes in vegetable oil samples of different oxidative status in order to assess the quality of the oils. For that purpose, headspace-solid phase microextraction (HS-SPME) was used for the extraction of the volatile compounds. Moreover, GC-O (detection frequency) was combined with a mass spectrometry detector to analyse these lipid oxidation products (HS-SPME-GC-O/MS). Obtained data sets were processed by multivariate statistical methods to differentiate the oil samples of various oxidative status.

[1] J. Agric. Food Chem. 2012, 60, 394–401

[2] J Am. Oil Chem. Soc. 2000, 77, 1303–1313