

Significance of chemical quality parameters for extra virgin olive oils with reference to the example of fatty acid alkyl and wax esters

Maurus Biedermann, Zurich Cantonal Laboratory, Switzerland

The quality of an olive oil can be correlated with the quantities of fatty acid methyl esters, ethyl esters, and wax esters that it contains. Olive oils with sensory defects usually have increased ester concentrations [1]. Both the EU and the Switzerland now have fixed limits for alkyl and wax esters in extra virgin olive oils [2, 3].

Alkyl esters are formed during storage of the olives before pressing. Methanol and ethanol are formed during fermentation, and a certain quantity of these alcohols is esterified with fatty acids. This reaction mainly takes place through transesterification with triglycerides.

Overripe olives have a shrivelled, partially decomposing skin. During the pressing process this causes an increased transfer of wax esters from the skin of the olives to the oil.

Both the alkyl and the wax esters of inferior olives can also be detected in gently evaporated oils.

Analysis of alkyl and wax esters is based on fully automated on-line HPLC-GC coupling. Liquid chromatography is used to isolate the ester fraction. This is then transferred into gas chromatography for further separation via large volume transfer on-line. The quality of the analysis is monitored by means of several verification standards.

References:

- [1] Fatty acid methyl and ethyl esters as well as wax esters for evaluating the quality of olive oils, M. Biedermann, A. Bongartz, C. Mariani, K. Grob, Eur. Food Res. Technol. 228 (2008) 65-74.
- [2] EU Implementation Regulation 1348/2013
- [3] Swiss Department of Internal Affairs (EDI) Ordinance on edible oil, edible fat and their products, 817.022.105