Triacylglycerol and Fatty Acid profiles characterization in vegetables oils by High Temperature GC-(IT)MS

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Nowadays the characterization of fat extracts on food products is an important issue. Lipids are present naturally in many foods, such as meats, dairy products, and in prepared foods, such as bakery foodstuffs, potato chips etc.

Lipids are a diverse group of biological substances made up primarily of triacylglycerols (TAGs). In addition to triacylglycerols, it also includes mono- and diglycerides, phosphatides, sterols, terpenes, fatty alcohols, fatty acids, fat-soluble vitamins, and other substances. TAGs involving more than 98% of fat composition are determined by the structure of the esterified fatty acid on the glycerol backbone.

The method most commonly employed in the analysis of TAGs has been High-Performance Liquid Chromatography (HPLC) since it offers, apparently, significant advantages over Gas Chromatography (GC). Moreover, TAGs analysis has not been developed enough by GC due to the low volatility of these compounds and the requirements of high temperatures in the chromatographic system. However, the advances in the last years in GC, have enabled the analysis of TAGs.

The aim of this work is to separate and characterize the TAGs in the total fat extracts from different types of commercially foodstuffs, (bakery, high spiced cold meat and potato chips) which contain olive oils as valuable ingredient. For this objective, a High Temperature Gas Chromatography coupled to an ion trap-mass spectrometer detector (HTGC-(IT)MS) method has been developed. The method was performed with a VARIAN GC 3800 gas chromatograph and a Varian 4000 ion-trap mass spectrometer. All separations were performed with a thermostable polar columns with a low bleeding, where the TAGs were separated at 350ºC according to the degree of instauration and the positions and configurations of double bonds in the fatty acids.