Streamlined Methods for Supporting Fatty Acid Claims (TFA, PUFA and LC-PUFA) in Food Products by Gas-Chromatograhy

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To ensure compliance and authenticity of foods, industry needs reliable methods. Accurate identification and quantification of fatty acids in finished products is challenging mainly because: 1) Precise quantification of TFA can be problematic due to the occurrence of various positional and geometrical isomers originating from different sources such as animal fats or processed vegetable oils and fats. The risk of underestimating TFA amounts is particularly high when inappropriate gas-chromatography conditions are used. 2) Fragile fatty acids (e.g. LC-PUFA) that are frequently added to food products for their nutritional effects could be partially degraded during the analysis (e.g. fat extraction). 3) Complexity and variability of food matrices is continuously increasing. In order to address these aspects we developed streamlined methods to ensure cost-effective and high-throughput analyses for supporting nutritional claims for fatty acids. Methods involving the direct preparation of fatty acid methyl esters (FAME) from the food samples without preliminary extraction of lipids showed interesting advantages in comparison to indirect methods. When fatty acids are analysed using highly polar 100 m capillary column and are quantified using internal standard with experimentally determined response factors, an accurate quantification of all fatty acids (e.g. TFA, PUFA, LC-PUFA) is possible in a wide range of food products only by changing the sample preparation. The validity of the direct quantification has been confirmed by collaborative studies involving also private quality control laboratories.

Those methods have been proposed to be officialised at the 122nd AOAC meeting (Dallas, September 2008) and as a new work item at the Analytical Week IDF-ISO meeting (Sochi, May 2009).