

Fatty acids profile determination in bakery products by gas chromatography with flame ionization detection (GC-FID)



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ABSTRACT

Fatty acids are biomolecules which provide the principal energy source through daily fat intake. There are a wide variety of fatty acids, determined by the number of carbon atoms and the presence of double or simple bounds between them (1,2). Since the 60-70s of last century, food industry started to introduce innovative processes and feedstock modifications. Those innovations like total or partial hydrogenation of fats and oils were carried out with the object of increase productivity and products lifetime which led to a significant increase of harmful fat intake related to a rising fast food consumption in the last decades (3). As a result, it is necessary to analyze fatty acids profile contents in food products in order to include it in nutritional labelling. For this purpose, it has been developed different analytical and instrumental techniques, among which gas chromatography stands out (4).

Most fatty acids are not in free form on food but are usually esterified, being part of different lipids. Therefore it is necessary to carry out several steps previous to characterization of fatty acids profile by gas chromatography. First, fatty acids extraction is carried out followed by derivatization process with the objective of increasing volatility and reducing polarity of the analyte. This contribute to reduce operating temperature avoiding degradation of fatty acids and to get differentiated chromatographic peaks. The purpose of this project is to compare fatty acids composition of different types of bakery and pastries products which are commonly manufactured using refined oils and fats. To achieve this objective Folch fatty acids extraction method was used (5) and the conversion to Fatty Acids Methyl Esters (FAME) derivatization process (6) was carried out. Folch extraction methods consist on using a 2:1 mixture of organic solvent, which are chloroform and methanol, respectively. Then, a saline solution (0.9% NaCl) is added to achieve biphasic separation by centrifugation, being the lower fraction containing chloroform used to fatty acids profile determination. This fraction is transferred to a round-bottomed flask, solvent is evaporated by rotavapor and fat extracted is determined by gravimetry. Finally, fatty acids profiles were obtained by gas chromatography with flame ionization to obtain by.

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