Differentiation of lard, chicken fat, beef fat and mutton fat by GCMS and EA-IRMS techniques

ABSTRACT

A study was conducted to differentiate lard, chicken fat, beef fat and mutton fat using Gas Chromatography Mass Spectrometry (GC-MS) and Elemental Analyzerï Isotope Ratio Mass Spectrometry (EA-IRMS). The comparison of overall fatty acid data showed that lard and chicken fat share common characteristics by having palmitic, oleic and linoleic acid as major fatty acids while beef and mutton fats shared common characteristics by possessing palmitic, stearic and oleic acid as major fatty acids. The direct comparisons among the fatty acid data, therefore, may not be suitable for discrimination of different animal fats. When the fatty acid distributional data was subjected to Principle Component Analysis (PCA), it was demonstrated that stearic, oleic and linoleic acids as the most discriminating parameters in the clustering of animal fats into four subclasses. The bulk carbon analysis of animal fats using EA-IRMS showed that determination of the carbon isotope ratios (ŭ13C) would be a good indicator for discriminating lard, chicken fat, beef fat and mutton fat. This would lead to a faster and more efficient method to ascertain the source of origin of fats used in food products.

Keyword: Animal fats; EA-IRMS; Food authentication; GC-MS; Lard; PCA