

Title:

Positional Distribution of Fatty Acids in Triacylglycerols and Phospholipids of different Fish Species obtained by HR ^{13}C NMR

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High resolution (HR) ^{13}C NMR has arisen as a valuable tool in the analysis of lipids, including fish lipids. In addition to fatty acid composition, the technique renders information on the positional distribution of fatty acids in triacylglycerols and phospholipids. Since the distribution of fatty acids in sn1/3 or sn2 position of fish oil is quite characteristic for certain species, this information may be used for authentication purposes. The aim of this work, was to use ^{13}C NMR to elucidate prospective differences in positional distribution of fatty acids in triacylglycerols and phospholipids of different fish species. Muscle lipids were extracted from the fat fish species salmon, mackerel and herring, and the lean fish species cod, saithe, haddock and pollack. Peakfitting was applied to the carbonyl-region of the ^{13}C NMR spectra, and the positional distribution of 1) DHA, EPA and 18:4 in triacylglycerols (of salmon, mackerel and herring)- and 2) of DHA in the phospholipids PC and PE (of cod, saithe and pollack) was calculated. The results indicate that it is possible to distinguish fish lipids of salmon, herring and mackerel by the positional distribution of fatty acids in triacylglycerols. Analysis on phospholipids showed less pronounced differences between cod, saithe, haddock and pollack. The most important advantage of the NMR technique compared to traditional methods in stereospecific analyses, is that it can be applied on intact fish lipids without extensive sample preparation.