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Rapid evaluation of fatty acid composition in edible oils using ¹H NMR spectroscopy

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Identifying and evaluation of fatty acid composition of vegetable oils can significantly promote the consumption of oils rich in essential fatty acids and improved human health. The evaluation of fatty acid in edible vegetable oils also essential for their quality control in food industry. Gas Chromatography (GC) has been well-established analytical method in evaluation of fatty acids in vegetable oils. However, GC method is laborious, time and chemical consuming. The extraction step before saponification-esterification and need for fatty acids standards can also be troublesome. The present study aimed to develop a simpler, more rapid and less expensive analysis method with no sample pre-treatment to evaluate the fatty acids composition in edible oils based on the fact that the area of the signals of the ¹H NMR spectra is proportional to the number of hydrogens of each group in compounds. Both the fatty acid compositions and their ratios can be determined through the relation between the areas from the characteristic signals of each fatty acyl chain using some mathematical equations. This method has been successfully applied to determine the fatty acid profile of hemp seed oil with a high content of linoleic acid (18:2, ω -6) to alpha-linolenic (18:3, ω -3). The results were consistent with the results given by GC. It can be concluded that due to simplicity and accuracy, ¹H NMR spectra analytical method can be an alternative procedure for evaluation of fatty acid composition in edible oils.

Biography

Yigong Guo was majoring in pharmacy during my undergraduate and graduate studies at Shanghai Jiao Tong University. My focus was on analytical research with a few publications. These work triggered my curiosity in exploring more in this field. Food science is such an area that has an overlap with my previous studies so that I am able to make full use of my knowledge into my future research of nanoparticle encapsulation. My research interests are conducted around: Encapsulating insoluble compounds through hemp oil.

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