

Title:

Identification and Quantification of Major Components in Selected South African produced Vegetable Oils by ^{13}C NMR Spectroscopy

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Gas Chromatography (GC) is probably the most widely used analytical technique for the identification and quantification of the major components in vegetable oils. More recently ^1H and ^{13}C NMR spectroscopy has been applied for the analysis of particularly olive oils (1-3), in view of its relatively rapid and non-destructive nature, yielding additionally high-resolution information about the molecular structure of the major components present in such food oils. ^{13}C NMR has also been shown to be a rapid technique with which to detect any adulteration of high-value olive oils with other vegetable oils.

We have become interested in using ^1H and ^{13}C NMR spectroscopy for the assignment and quantification of major components locally produced South African vegetable oils, namely apricot kernel, avocado pear, grape seed, macadamia nut, mango kernel and marula oils. In this context we have developed a simple novel method for the rapid assignment of the major triacylglycerols in these vegetable oils, exploiting remarkably linear chemical-shift correlations of individual components in these mixtures. Moreover the major components in these oils could be acceptably quantified for all these oils. Our results show that ^{13}C NMR spectroscopy is indeed a sufficiently accurate and precise method for the quantification of vegetable oils, giving results comparable to GC analysis of major fatty acid methyl esters. Our results suggest that ^{13}C NMR spectroscopy should be considered a viable alternative to GC analysis, in view of the inherent rapidity and simplicity of the technique.

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- (2) Mannina, L., and Segre, A. High resolution Nuclear Magnetic Resonance: From chemical structure to food authenticity, *Grasas y Aceites*, **2002**, *53* (1), 22-33.
- (3) Mavromoustakos, T., Zervou, M., Theodoropoulou, E., Panagiotopoulos, D., Bonas. G., Day, M. and Helmis, A. ^{13}C NMR analysis of triacylglycerol composition of Greek olive oils, *Magn. Reson. Chem.*, 1997, *35*, S3-S7.