

QUANTIFICATION OF FATTY ACIDS BY ESI-FTICR-MS UTILIZING AN INTERNAL STANDARD

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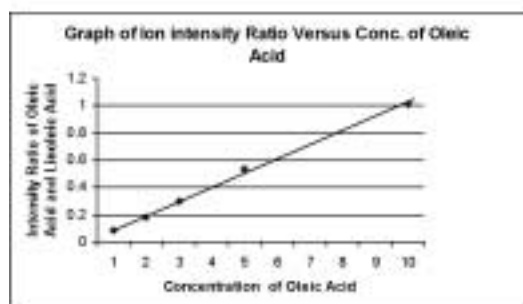
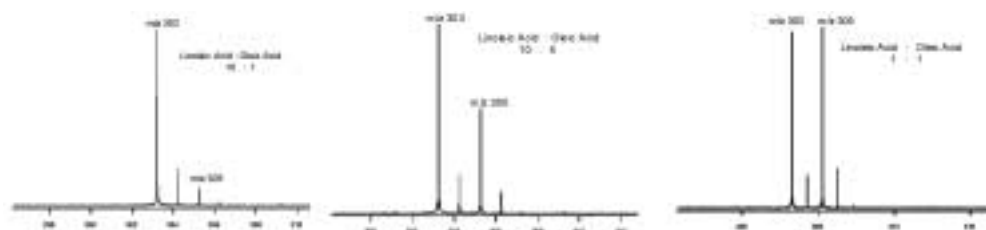
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Fatty acids are long chain macromolecules that have found application in medicine for the treatment of inflammatory disease¹. Therefore, it is important to develop methods for the complete study of quantification of fatty acids in natural oils. Fourier transform ion cyclotron resonance mass spectrometry (FT-ICR-MS) is well known for its capabilities in structural characterization of molecule^{2,3}. Recent developments in excitation, linearized trapping, and accumulation of ions generated from external sources have improved the potential of FT-ICR-MS for quantitative analysis⁴. A method utilizing external electrospray ionization (ESI) coupled with FT-ICR-MS, employing a linearized ion trap (the Infinite Cell) and an ion accumulation procedure in which ions are deflected off axis and injected into the trap, was developed as a facile and rapid method to quantify bioactive fatty acids in oils.

Under our experiment conditions both oleic acid and linoleic acid form mono-sodiated adducts when electrosprayed, and only singly charged $[M + Na]^+$ species were observed (see Figures). Because both compounds are hydrophobic, are prepared in methanol, and are similar in mass (nearly identical composition), it is expected that both will behave similarly as they compete for charge during the ion formation process. It is important that these molecules exhibit similar properties therefore linoleic acid to be considered a suitable internal standard.

In this paper we will report the results of high-resolution ESI FTICR-MS peak intensities of at different concentration of fatty acids such as oleic acid, linoleic acid, linolenic acid, ecosenoic acid and erucic acid with comparison to internal standard.

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Figures: ESI FTICR-MS of oleic acid at different concentrations and linoleic acid used here as internal standard and graph of ion intensity ratio versus concentration of oleic acid.