# A Study on Fatty Acids Compositions of Oils through Fourier Transform Infrared (FTIR) Spectroscopy and Gas Chromatography (GC)

Cheah Pooi Yee

Library Services
UCSI Education Sdn. Bhd. (185479-U)
No. 1, Jalan Menara Gading, UCSI Heights,
56000 Kuala Lumpur, Malaysia.
Tel: 603-9101 8880 Fax: 603-9102 3606
Website : www.ucsi.edu.my

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School of Applied Science

University College Sedaya International

# ABSTRACT

Marine oils and some plant oils such as flaxseed oil are widely used as nutritional supplements due to their essential fatty acids content; while most plant oils, i.e. canola oil, corn oil, olive oil and palm oil are commonly used as cooking oils. This research is initiated to study the fatty acids profiles of marines and plants oils through chromatographic method. Types of fatty acid present from each source were identified through Gas Chromatographic (GC) analysis. Iodine value (IV) test was carried out to determine the degree of unsaturation of oils from each source. Besides, Fourier Transform Infrared (FTIR) spectra of fresh oils and oxidized oils were obtained through spectroscopic method. Finally, the comparisons between fresh and oxidized oil were made in order to evaluate the oil stability. Results indicate that oils from same source are composed of same fatty acids profiles but vary in fatty acids composition. Long chain fatty acids such as EPA and DHA only can be found from marine source, while plant oils are rich sources of ALA and linoleic acids especially flaxseed oil and corn oil. High degree of unsaturation was found in flaxseed oil, marine oils and canola oil while high degree of saturation was found in palm oil. FTIR spectra showed that during oil oxidation period, decrease of C=C and C=O bonds were detected at 1655 $cm^{-1}$ and 3470 $cm^{-1}$. Oxidation of oils are believed to cause the production of secondary oxidative products such as ketones, and aldehydes which raised C=O stretching band in region 1770 to 1720 $cm^{-1}$. It was found that there was also an increase band in 980 to 960 $cm^{-1}$ due to transformation of *cis* to *trans* double bond configuration.

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