

ANALYSIS OF COMPOSITION OF TRANSGESTERIFIED OF
SUNFLOWER OIL AND OLIVE OIL BY HPLC METHOD
Determination of the Effect of Temperature

CHEMISTRY II

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SUNFLOWER OIL AND OLIVE OIL BY HPLC METHOD

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**FATTY ACID COMPOSITION OF TRANSESTERIFIED OF COD LIVER
OIL AND OLIVE OIL BY IMMOBILIZED *Rhizomucor miehei* LIPASE IN
HEXANE**

By

Chew Meng Li

**Research Report submitted in partial fulfillment of
the requirements for the degree of
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PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

Fatty Acid Composition of Transesterified of Cod Liver Oil and Olive Oil by
Immobilized Rhizomucor miehei Lipase In Hexane

oleh Chew Meng Li, No. Matrik UK 6323

telah diperiksa dan semua pembedaan yang disarankan telah dilakukan. Laporan ini
dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan
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LIST OF ABBREVIATIONS / SYMBOLS

AA	Arachidonic acid
ALA	α -linolenic acid
CLA	Conjugated linoleic acid
CLO	Cod liver oil
DHA	Docosahexaenoic acid
DPA	Docosapentaenoic Acid
EPA	Eicosapentaenoic acid
FFA	Free fatty acid
GLA	γ -linolenic Acid
HDL	High-density lipoprotein
LA	Linoleic acid
LDL	Low-density lipoprotein
MUFAs	Monounsaturated fatty acids
OO	Olive oil
PUFAs	Polyunsaturated fatty acids
SFAs	Saturated fatty acids
ω -3/ n-6	Omega-3 fatty acid
ω -6/ n-6	Omega-6 fatty acid

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ABSTRACT

The degree of incorporation of polyunsaturated fatty acids (PUFAs) into olive oil by transesterification reaction with cod liver oil using an immobilized *Rhizomucor miehei* lipase was studied. The extent of transesterification was studied based on whether there was an increase in the PUFAs composition. Analyses on the fatty acids composition by using gas chromatography (GC) were carried out. The PUFAs were successfully incorporated into olive oil because from the results it was clearly shown that the composition of PUFAs was increased. The effect of different blends of cod liver oil and olive oil (1:1, 2:3, and 3:2) after transesterification was studied by using immobilized *Rhizomucor miehei* lipase. Among the three different blends, the cod liver oil and olive oil at ratio 3:2 showed the highest degree of incorporation. The highest degree of hydrolysis was the 1:1 blend (2.33%), followed by 2:3 blend (2.26%) and 3:2 blend (2.19%). The degree of hydrolysis is based on the percentage of the free fatty acids removed.

ABSTRAK

Darjah pergabungan asid lemak politaktepu ke dalam minyak zaitun dengan menggunakan *Rhizomucor miehei* lipase yang telah disekat-gerak dalam proses transesterifikasi telah dikaji. Transesterifikasi bergantung kepada samada terdapat penambahan dalam kandungan asid lemak politaktepu. Analisa terhadap kandungan asid lemak dijalankan dengan menggunakan kromatografi gas (GC). Asid lemak tak tepu berjaya digabungkan ke dalam minyak zaitun kerana berdasarkan keputusan yang didapati telah menunjukkan peningkatan dalam kandungan asid lemak politaktepu. Kesan transesterifikasi terhadap campuran nisbah yang berbeza antara kandungan minyak ikan kod dengan minyak zaitun (1:1, 2:3, 3:2) telah dikaji. Daripada ketiga-tiga nisbah yang berbeza ini, didapati nisbah 3:2 (minyak ikan kod: minyak zaitun) menunjukkan darjah pergabungan asid lemak taktepu yang tertinggi. Darjah hidrolisis yang paling tinggi ialah campuran nisbah 1:1 (2.3%), diikuti dengan campuran nisbah 2:3 (2.26%) dan akhir sekali ialah campuran nisbah 3:2 (2.19%). Darjah hidrolisis adalah berdasarkan peratus asid lemak bebas yang disingkirkan.