

MOLECULAR ARRANGEMENT OF TRIACYLGLYCEROL IN
SELF-ASSEMBLED AGGREGATE OF SINGULAR AND
MIXED AMPHIPHILIC SYSTEM

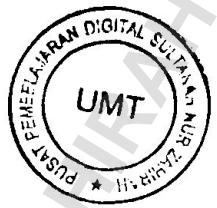
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MASTER OF SCIENCE
UNIVERSITI MALAYSIA TERENGGANU

2013

1100090612

Pusat Pembelajaran Digital Sultan Nur Zahirah (U)
Universiti Malaysia Terengganu



thesis
QD 381 .D6 2013



1100090612
Molecular arrangement of triacylglycerol in self-assembled aggregate of singular and mixed amphiphilic system / Doreen N. Sean Hui.

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**MOLECULAR ARRANGEMENT OF TRIACYLGLYCEROL IN
SELF-ASSEMBLED AGGREGATE OF SINGULAR AND
MIXED AMPHIPHILIC SYSTEM**

DOREEN NG SEAN HUI

**Thesis Submitted in Fulfillment of the Requirement for the
Degree of Master of Science in the Faculty of Science and
Technology Universiti Malaysia Terengganu**

February 2013

ACKNOWLEDGEMENTS

In my opinion, doing research is like running an off-road track. We may know in which direction we want to go; however, we can't foresee what will be coming along the way. The various natures of challenge we meet stimulate our mind and the passage of each obstacle gives a feeling of satisfaction and adds to the excitement of what is to come. Now, close to the finishing line of this run, I would like to address my sincere gratitude to the persons who have accompanied me along the course and those who have been there by the side to support me.

Special thanks to my supervisor, Associate Prof. Dr Mohd. Zul Helmi Rozaini and co-supervisor, Prof. Dr Hamdan Suhaimi for their utmost support as well as their willingness to share their impressive knowledge. Thank you for having confidence in me, encouraging me in every step to become an independent researcher and for giving me the opportunity to conduct this study.

I am also grateful to the Prof. Dr. Shahidan for allowing me to use the small angle x-ray scattering facility in his lab at UKM.

Last but not least, I would like to direct my deepest gratitude to my family and friends for their enormous support and encouragement.

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfillment of the requirement for the degree of Master of Science

**MOLECULAR ARRANGEMENT OF TRIACYLGLYCEROL IN
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DOREEN NG SEAN HUI

FEBRUARY 2013

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Faculty : Science and Technology

A study was conducted to examine the lamellar liquid crystalline structure formed by surfactant, Dodecytrimethylammonium bromide (DTAB) in the presence of alcohols (various alkyl chain lengths) and secondary surfactant, Aerosol OT (AOT) as well as the effects on the liquid crystalline structure with additional of triacylglycerol into the system. Several ternary phase equilibriums were constructed using DTAB, AOT, water and various alcohols. The results showed that the DTAB/Water/Alcohol and DTAB+AOT/Water/Alcohol systems were able

to formed self-assembled aggregates like micelle, reversed micelle, and lyotropic liquid crystalline. From the optical pattern (POM observation), of the liquid crystalline samples, it was found that two types of liquid crystalline were formed, namely the hexagonal and lamellar liquid crystalline. Followed by that, medium-chain triglycerides (MCT) was added accordingly into the obtained lamellar liquid crystalline to examine the effect it drew upon the liquid crystalline. It is found that the DTAB/Water/Alcohol systems were able to accommodate approximately 4 to 5% of MCT before transforming into other structures. From the SAXS spectrum, it was found that the water concentration, alcohol's chain lengths and the presence of MCT had tremendous effects on the lattice spacing of the lamellar liquid crystalline.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk Ijazah Master Sains

**PENYUSUNAN MOLEKUL TRIASILGLISEROL SECARA
AGREGAT HIMPUNAN SENDIRI DALAM SISTEM
AMFIFILIK TUNGGAL DAN TERCAMPUR**

DOREEN NG SEAN HUI

FEBRUARY 2013

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Suatu kajian telah dijalankan untuk mengkaji struktur hablur cecair lamela yang terbentuk oleh surfaktan, dodecyltrimethylammonium bromide (DTAB) dengan kehadiran alkohol (kepanjangan rantai alkil yang berbagai) dan surfaktan sekunder, Aerosol OT (AOT), seterusnya, kesan pada struktur hablur cecair lamela dengan penambahan triasilgliserol dalam sistem juga turut dikaji. Dalam kajian ini, beberapa gambaraja tiga fasa telah dibina dengan menggunakan DTAB, air dan alkohol yang pelbagai. Keputusan menunjukkan bahawa sistem

DTAB/Air/Alkohol dan DTAB+AOT/Air/Alkohol boleh membentuk agregat himpunan sendiri seperti misel, misel berbalik dan hablur cecair "lyotropic". Daripada corak optik (pemerhatian daripada mikroskop berikutub) sampel hablur cecair, dua jenis hablur cecair telah diperhatikan, iaitu hablur cecair heksagon dan lamela. Triasilglicerol berantai sederhana (MCT) telah ditambahkan ke dalam sampel hablur cecair lamela untuk mengkaji kesan kehadirannya dalam sistem. Keputusan menunjukkan bahawa lamela DTAB/Air/Alkohol boleh menampung kira-kira 4 hingga 5% MCT sebelum berubah kepada struktur yang lain. Spektrum Sinaran X Berselerak Sudut Kecil menunjukkan bahawa kepekatan air, kepanjangan rantai alkil alkohol dan kehadiran MCT mempunyai kesan yang amat besar terhadap jarak kekisi hablur cecair lamela.