

**COMPARATIVE STUDY OF LIME OIL PROPERTIES BY
FERMENTATION WITH BIO-FERMENTED
PRODUCTS**



JAIPAN LAOTHAMYONG

**A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF SCIENCE
IN PHARMACEUTICAL SCIENCES**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

**GRADUATE SCHOOL
CHIANG MAI UNIVERSITY**

MARCH 2006

ISBN 974-9890-35-3

**COMPARATIVE STUDY OF LIME OIL PROPERTIES BY
FERMENTATION WITH BIO-FERMENTED
PRODUCTS**

JAIPIAN LAOTHAMYINGYONG

THIS THESIS HAS BEEN APPROVED
TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN PHARMACEUTICAL SCIENCES

EXAMINING COMMITTEE

Surapol N. CHAIRPERSON
Asst. Prof. Dr. Surapol Natakankitkul

Panee Sirisa-ard MEMBER
Assoc. Prof. Panee Sirisa-ard

A. Apisariyakul MEMBER
Dr. Amphawan Apisariyakul

Nantarit Chokethaworn MEMBER
Asst. Prof. Dr. Nantarit Chokethaworn

8 March 2006

© Copyright by Chiang Mai University

ACKNOWLEDGEMENT

I wish to express my sincere gratitude to my advisor, Asst. Prof. Dr. Surapol Natakankitkul and my co-advisors; Assoc. Prof. Panee Sirisa-ard and Dr. Amphawan Apisariyakul for their invaluable guidances and encouragements throughout my research work.

I would like to thank Asst. Prof. Dr. Nantarit Chokethaworn, for his valuable discussions to complete this thesis as my final examining committee.

I wish to express Assoc. Prof. Dr. Boonsom Liawruangrath for the great-appreciated guidance and advice on this research work.

I wish to acknowledge the Department of Pharmaceutical Sciences, Faculty of Pharmacy, Chiang Mai University for providing all laboratory facilities and the Graduate School, Chiang Mai University for presentation financial support.

I would like to acknowledge the Pathom Asoke Community, Mrs. Yooppayong Manasuk, Mrs. Lim Chaiping, Mrs. Kim, Mrs. Srifa Chawananthakit, Ms. Palangdao Duangporn, Ms. Sakorn Sriha-ngo, Mr. Winyu, Mr. Pangput Chaohinfa, and Mr. Binklai Tamrang for partial financial support.

I owe a special dept of gratitude to my parents, my brother and his family and all Santi Asoke Buddhist relatives for their tender loves, care and endless encouragements.

I would like to grateful to all persons whose name are not listed here who contribute directly or indirectly to the success of this research works.

Finally, I would like to express my infinite gratitude and appreciation to Sammana Bodhiraksa for his kind Buddha's fundamental teachings throughout my spirit, my soul and my life.

Jaipian Laothamyinyong