

**COMBUSTION AND MASS TRANSFER OF PALM - DIESEL
EMULSION**

JEERAWICH NARKPAKDEE

**DOCTOR OF PHILOSOPHY
IN MECHANICAL ENGINEERING**

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
MARCH 2012**

**COMBUSTION AND MASS TRANSFER OF PALM - DIESEL
EMULSION**

JEERAWICH NARKPAKDEE

**A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
IN MECHANICAL ENGINEERING**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University
All rights reserved
THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
MARCH 2012

**COMBUSTION AND MASS TRANSFER OF PALM - DIESEL
EMULSION**

JEERAWICH NARKPAKDEE

THIS THESIS HAS BEEN APPROVED
TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
IN MECHANICAL ENGINEERING

EXAMINING COMMITTEE

N. Dussadee CHAIRPERSON

Asst. Prof. Dr. Natthawud Dussadee

T. Kiatsiriroat MEMBER

Prof. Dr. Tanongkiat Kiatsiriroat

Nat Vj MEMBER

Asst. Prof. Dr. Nat Vorayos

Ana P MEMBER

Asst. Prof. Dr. Anucha Promwungkwa

N. Tipayawong MEMBER

Assoc. Prof. Dr. Nakorn Tipayawong

V. Changrue MEMBER

Dr. Viboon Changrue

THESIS ADVISORY COMMITTEE

T. Kiatsiriroat ADVISOR

Prof. Dr. Tanongkiat Kiatsiriroat

Nat Vj CO-ADVISOR

Asst. Prof. Dr. Nat Vorayos

Ana P CO-ADVISOR

Asst. Prof. Dr. Anucha Promwungkwa

N. Tipayawong CO-ADVISOR

Assoc. Prof. Dr. Nakorn Tipayawong

22 March 2012

© Copyright by Chiang Mai University

ACKNOWLEDGEMENTS

I would like to express my sincerest gratitude to my advisor. I sincerely appreciate Prof. Dr. Tanongkiat Kiatsiriroat's willingness to include me to work on the creation of my dissertation. Their helpful comments and criticisms have been always enlightening and inspiring.

I would also like to gratefully acknowledge Asst. Prof. Dr. Nat Vorayos, Asst. Prof. Dr. Anucha Promwungkwa and Assoc. Prof. Dr. Nakorn Tippayawong for their helpful suggestions and valuable comments.

I would also like to thank Asst. Prof. Dr. Nattawud Dussadee for their valuable suggestions and kindly served as the thesis examining chairperson.

I deeply thank to all of my friends in the Chiang Mai University and Rajamangala University of Technology Lanna. Special thank to Dr. Anusarn Permsuwan for their helpful.

I would like to thank my beloved parents and my family for their support that sustained me throughout my study at Chiang Mai University and their encouragement and perseverance.

Jeerawich Narkpakdee