

**PROTEOMIC AND TRANSCRIPTOMIC  
ANALYSES OF SALIVARY GLANDS OF  
*Anopheles campestris*-like MOSQUITO,  
A POTENTIAL VECTOR OF  
*Plasmodium vivax***



**SRIWATAPRON SOR-SUWAN**

**DOCTOR OF PHILOSOPHY**

**IN PARASITOLOGY**

ลิขสิทธิ์ © โดย มหาวิทยาลัยเชียงใหม่  
Copyright © by Chiang Mai University  
All rights reserved

**GRADUATE SCHOOL  
CHIANG MAI UNIVERSITY  
APRIL 2015**

**PROTEOMIC AND TRANSCRIPTOMIC ANALYSES OF  
SALIVARY GLANDS OF *Anopheles campestris*-like  
MOSQUITO, A POTENTIAL VECTOR OF  
*Plasmodium vivax***

**SRIWATAPRON SOR-SUWAN**

**A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY  
IN PARASITOLOGY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved

**GRADUATE SCHOOL, CHIANG MAI UNIVERSITY  
APRIL 2015**

**PROTEOMIC AND TRANSCRIPTOMIC ANALYSES OF  
SALIVARY GLANDS OF *Anopheles campestris*-like  
MOSQUITO, A POTENTIAL VECTOR  
OF *Plasmodium vivax***

SRIWATAPRON SOR-SUWAN

THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILLOSOPHY  
IN PARASITOLOGY

**Examination Committee:**

**Advisory Committee:**

*Piyanuch Niamsup* ..... Chairman  
(Asst. Prof. Dr. Piyanuch Niamsup)

*Narissara Jariyapan* ..... Advisor  
(Assoc. Prof. Dr. Narissara Jariyapan)

*Narissara Jariyapan* ..... Member  
(Assoc. Prof. Dr. Narissara Jariyapan)

*Udom Chaithong* ..... Co-advisor  
(Assoc. Prof. Dr. Udom Chaithong)

*Udom Chaithong* ..... Member  
(Assoc. Prof. Dr. Udom Chaithong)

*Atiporn Saeung* ..... Co-advisor  
(Asst. Prof. Dr. Atiporn Saeung)

*Pongsri Tippawangkosol* ..... Member  
(Assoc. Prof. Dr. Pongsri Tippawangkosol)

*Atiporn Saeung* ..... Member  
(Asst. Prof. Dr. Atiporn Saeung)

30 April 2015

Copyright © by Chiang Mai University

## ACKNOWLEDGEMENTS

I would like to express my deep sincere appreciation and gratitude to my advisor, Associate Professor Dr. Narissara Jariyapan, Department of Parasitology, Faculty of Medicine, Chiang Mai University, for her kindness, expert guidance, valuable suggestion, support and generous encouragement which enable me to complete my study and research and gave me the opportunity of my education in Chiang Mai.

I would like to express my deep sincere appreciation and gratitude to my co-advisor, Professor Dr. Wej Choochote, Associate Professor Dr. Udom Chaithong and Assistant Professor Dr. Atiporn Saeung, Department of Parasitology, Faculty of Medicine, Chiang Mai University, for their kindness, meaningful criticism, useful suggestion and problem solving in a part research work that fulfilled my thesis.

I would like to express my deep sincere appreciation and gratitude to my overseas co-advisor, Professor Dr. Paul A Bates, Division of Biomedical and Life Sciences, Faculty of Health and Medicine, Lancaster University, United Kingdom, for his kindness, valuable suggestion, meaningful criticism, emotional support and warm hospitality. I also would like to thank my colleagues at Division of Biomedical and Life Sciences, Faculty of Health and Medicine, Lancaster University for their kind help, friendship and encouragement while I carried out my research in their Laboratory.

Sincere appreciation the Thailand Research Fund through the Royal Golden Jubilee Ph.D. scholarship (Grant No. PHD/0149/2551), for financially supporting throughout my graduated study and to the Faculty of Medicine Research Fund, Chiang Mai University, Thailand, for Research Publication for its financial support in defraying publication costs and laboratory instruments.

I sincerely thank Dr. Sorawat Thongsahuan, Dr. Kritsana Taai and all my friends at the laboratory and at the Department of Parasitology for their friendship, kind help, encouragement and give moral support throughout my study.

Finally, I would like to express my deepest gratitude to my hard-working parents, and my family for their love, encouragement, patience and moral support throughout my study.

Sriwatapron Sor-suwan



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved