

**COMPARISON OF BOVINE AND AVIAN PURIFIED PROTEIN DERIVATIVES  
ON BOVINE TUBERCULOSIS IN CHIANG MAI PROVINCE (THAILAND),  
AND RISK FACTORS**

**TIN TIN LAY**

**MASTER OF SCIENCE  
IN VETERINARY SCIENCE**

**THE GRADUATE SCHOOL  
CHIANG MAI UNIVERSITY  
DECEMBER 2013**

**COMPARISON OF BOVINE AND AVIAN PURIFIED PROTEIN DERIVATIVES  
ON BOVINE TUBERCULOSIS IN CHIANG MAI PROVINCE (THAILAND),  
AND RISK FACTORS**

**TIN TIN LAY**

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

**THE GRADUATE SCHOOL  
CHIANG MAI UNIVERSITY  
DECEMBER 2013**

COMPARISON OF BOVINE AND AVIAN PURIFIED PROTEIN DERIVATIVES  
ON BOVINE TUBERCULOSIS IN CHIANG MAI PROVINCE (THAILAND),  
AND RISK FACTORS

TIN TIN LAY

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

EXAMINING COMMITTEE

*Sumalee Boonmar*.....CHAIRPERSON

Assoc. Prof. Dr. Sumalee Boonmar

*Anucha Sirimalaisuwan*..... MEMBER

Asst. Prof. Dr. Anucha Sirimalaisuwan

*Veerasak Punyapornwithaya*..... MEMBER

Asst. Prof. Dr. Veerasak Punyapornwithaya

THESIS ADVISORY COMMITTEE

*Anucha Sirimalaisuwan*.....ADVISOR

Asst. Prof. Dr. Anucha Sirimalaisuwan

*Nattawooti Sthitmatee*.....CO-ADVISOR

Asst. Prof. Dr. Nattawooti Sthitmatee

*Veerasak Punyapornwithaya*.....CO-ADVISOR

Asst. Prof. Dr. Veerasak Punyapornwithaya

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University  
All rights reserved

3 December 2013

© Copyright by Chiang Mai University

## ACKNOWLEDGEMENTS

First and foremost, I would like to acknowledge the Thailand International Development Cooperation Agency (TICA) for awarding scholarship me to attend the master degree of Veterinary Science (International Program) in Chiang Mai University (CMU), Thailand. I would also thanks Director General Dr. Myint Thein (from Directorate of Livestock and Fisheries Department) & Director General Dr. Myint Than (from Livestock Breeding and Veterinary Department), Ministry of Livestock, Fisheries and Rural Development, Myanmar for providing all of the official arrangements to carry out this course.

I am very much grateful to Assoc. Prof. Dr. Lertrak Srikitjakarn, Dean of the Faculty of Veterinary Medicine, Chiang Mai University, Thailand for recommendation to extend my study period to be finished well done.

I would like to express my deepest appreciation to my advisors Asst. Prof. Dr. Anucha Sirimalaisuan, Asst. Prof. Dr. Nattawooti Sthitmatee, Asst. Prof. Dr. Veerasak Punyapornwithaya (Faculty of Veterinary Medicine, Chiang Mai University) for their invaluable advice, constant guidance, supervision and enormous amount of supports rendered during my entire study period.

I am particularly grateful to Asst. Prof. Dr. Khwanchai Kreausukon, Asst. Prof. Dr. Duangporn Pichpol, Dr. Tongkorn Meeyan and others in VPHCAP, Faculty of Veterinary Medicine, CMU for being so supportive and always help us around during our time of need.

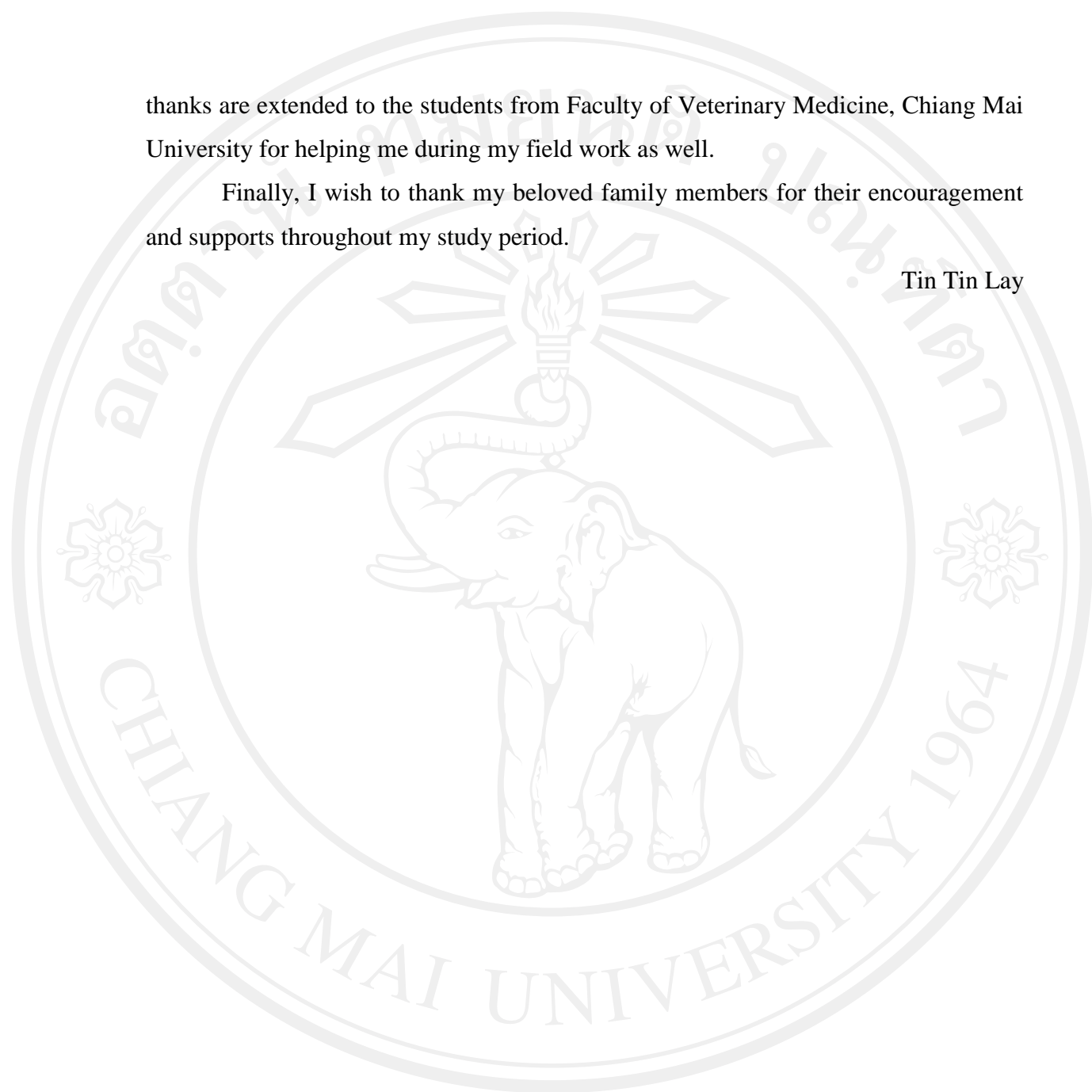
I would also thank to Dr. Tawatchai Singhla from Mae Wang Dairy Cooperative Office for many supports during the entire duration of field work including tuberculin testing and questionnaires answers.

My appreciations are extended to all my teachers, colleagues for their experience sharing, collaboration and cooperation in our study time. I would like to thanks to all of my classmates for rendering necessary cooperation, wonderful experiences, supports and memorable time for the entire study period. My special

thanks are extended to the students from Faculty of Veterinary Medicine, Chiang Mai University for helping me during my field work as well.

Finally, I wish to thank my beloved family members for their encouragement and supports throughout my study period.

Tin Tin Lay



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved