

DETECTION OF *Cryptococcus neoformans* AND *Histoplasma capsulatum* IN SOIL CONTAMINATED WITH AVIAN AND BAT DROPPINGS BY NESTED-PCR

TREEPRADAB NORKAEW

**MASTER OF SCIENCE
IN MICROBIOLOGY**

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY**

OCTOBER 2011

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

DETECTION OF *Cryptococcus neoformans* AND *Histoplasma capsulatum* IN SOIL CONTAMINATED WITH AVIAN AND BAT DROPPINGS BY NESTED-PCR

TREEPRADAB NORKAEW

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

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY**

OCTOBER 2011

DETECTION OF *Cryptococcus neoformans* AND *Histoplasma capsulatum* IN SOIL CONTAMINATED WITH AVIAN AND BAT DROPPINGS BY NESTED-PCR

TREEPRADAB NORKAEW

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

EXAMINING COMMITTEE

K. Chaichum
.....CHAIRPERSON
Assist. Prof. Dr. Kunyaluk Chaicumpar

P. Sriburee
.....MEMBER
Assoc. Prof. Dr. Pojana Sriburee

P. Tharavichitkul
.....MEMBER
Assoc. Prof. Prasit Tharavichitkul

THESIS ADVISORY COMMITTEE

P. Sriburee
.....ADVISOR
Assoc. Prof. Dr. Pojana Sriburee

P. Tharavichitkul
.....CO-ADVISOR
Assoc. Prof. Prasit Tharavichitkul

ACKNOWLEDGEMENTS

I would like to express my gratitude and deepest appreciation to Assoc. Prof. Dr. Pojana Sriburee my thesis advisor, for her invaluable advices, supervision and encouragement throughout this study which enable me to carry out my study successfully. I express my sincere gratitude to Assoc. Prof. Prasit Tharavichitkul my co-advisor, for his guidance and valuable suggestions.

I would like to thank Dr. Yoshitsugu Miyazaki, Dr. Hideaki Ohno and Dr. Koichi Tanabe , Department of Chemotherapy and Mycoses, National Institute of Infectious Diseases, Tokyo, Japan for their helpful guidance and providing some biological and chemical agents. My sincere gratitude is given to the examining committee, Assist. Prof. Dr. Kunyaluk Chaicumpar for her suggestions and helpful advice.

I give deep appreciation to my colleagues, Miss Siriporn Jongkae, Miss Piyawan Takarn, Miss Ariya Tzarphmaag, Mr. Aksarakorn Kummasook, Miss Panjaphorn Nimmanee for their help in laboratory techniques and their valuable suggestions.

Finally, I would like to express my gratitude and deepest appreciation to my family for their understanding and encouragement which never been forgotten.

Treepradab Norkaew