

IN VITRO PROPAGATION OF PLOOKAO

(*Houttuynia cordata* Thunb.)

NUTTHANICHA NAIRONG

**MASTER OF SCIENCE
IN BIOTECHNOLOGY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University
All rights reserved
THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
MAY 2013

IN VITRO PROPAGATION OF PLOOKAO

(*Houttuynia cordata* Thunb.)

NUTTHANICHA NAIRONG

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

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University
All rights reserved
THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
MAY 2013

IN VITRO PROPAGATION OF PLOOKAO
(*Houttuynia cordata* Thunb.)

NUTTHANICHA NAIRONG

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

EXAMINING COMMITTEE

Aphichat Chidburee.....CHAIRPERSON

Asst. Prof. Dr. Aphichat Chidburee

Sasitorn Wongrourng.....MEMBER

Asst. Prof. Dr. Sasitorn Wongrourng

S. Sinsuwongwat.....MEMBER

Dr. Supawat Sinsuwongwat

THESIS ADVISOR

Sasitorn Wongrourng.....

Asst. Prof. Dr. Sasitorn Wongrourng

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University
All rights reserved
17 May 2013
© Copyright by Chiang Mai University

ACKNOWLEDGEMENT

I would like to express my profound appreciation and deep gratitude to Assistant Professor Dr. Sasitorn Wongroung, my advisor for her kindness, invaluable advices, generous support, constantly me throughout all of this research work, and also educated me to possess scientific mind of thinking and problem solving. This research would not have been accomplished with her kindness understanding and assistance.

Similarly, I am also grateful to all staffs in the Department of Biology, Faculty of Science and Technology, Chiang Rai Rajabhat University for guide and encouragement on this study. I would like to thank all staffs in the Department of Biotechnology, Faculty of Agro-Industry, Chiang Mai University, for their teaching and guidance. I would like to thanks Institute of Product Quality and Standardization; IQS, Maejo University for Gas chromatography–mass spectrometry (GC-MS) analysis.

Finally, I would like to thank my friends for their encouragement and friendship. I extend special gratitude to my family especially, my parents for their love and encouragement to overcome every difficulty and understanding during the entire period of this study.

This work was supported by The Graduate School, Chiang Mai University and Faculty of Agro-Industry of Chiang Mai University.

Nutthanicha Nairong