

**APPLICATION OF CHITOSAN-BASED COATING INCORPORATED
WITH CITRIC ACID AND POTASSIUM SORBATE TO DELAY
PERICARP BROWNING, CHILLING INJURY AND
DECAY OF FRESH LONGAN FRUIT**



WITTAYA APAI

**DOCTOR OF PHILOSOPHY
IN POSTHARVEST TECHNOLOGY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University

All rights reserved

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY**

MARCH 2009

**APPLICATION OF CHITOSAN-BASED COATING INCORPORATED
WITH CITRIC ACID AND POTASSIUM SORBATE TO DELAY
PERICARP BROWNING, CHILLING INJURY AND
DECAY OF FRESH LONGAN FRUIT**

WITTAYA APAI

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

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University

All rights reserved

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY**

MARCH 2009

**APPLICATION OF CHITOSAN-BASED COATING INCORPORATED
WITH CITRIC ACID AND POTASSIUM SORBATE TO DELAY
PERICARP BROWNING, CHILLING INJURY AND
DECAY OF FRESH LONGAN FRUIT**

WITTAYA APAI

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

EXAMINING COMMITTEE

Uraporn Sardsud

CHAIRPERSON

Asst. Prof. Dr. Uraporn Sardsud

Vicha Sardsud

MEMBER

Asst. Prof. Dr. Vicha Sardsud

Pichaya Boonprasom

MEMBER

Dr. Pichaya Boonprasom

Benjamas Ratanachinakorn

MEMBER

Dr. Benjamas Ratanachinakorn

Ekachai Chukeatirote

MEMBER

Asst. Prof. Dr. Ekachai Chukeatirote

19 March 2009

©Copyright by Chiang Mai University

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my supervisor Asst. Prof. Dr. Uraporn Sardsud for providing me the biggest challenge and opportunity to do a Ph.D. I am also really grateful to Asst. Prof. Dr. Vicha Sardsud (Director of Postharvest Technology Research Institute) to have welcomed me to Postharvest Technology Research Institute, Chiang Mai University, Thailand and valuable advice throughout my work. I am extremely grateful to Dr. Pichaya Boonprasom to help me to correct papers and provide valuable comment for all my work so as to Dr. Benjamas Ratanachinakorn. I also would like to thank to examining committee: Asst. Prof. Dr. Ekachai Chukeatirote. I gratefully thank to Mr. Pongpan Chungyusuk, Ms. Siree Suwanakatenikom, Mrs. Kunikar Lacharote, Mrs. Atitaya Pongchaiyasit, Ms. Hatairat Klongdee, Mr. Vit Tippanee, Prachavetch Ketinn and everybody at Laboratory of Office of Agricultural Research and Development Region 1 (OARD1). I thank Deputy Permanent Secretary of MOAC Chakarn Saengruksawong, Deputy Chief of DOA Jirakorn Kosaisevi, Director Suwan Hanwiriyaphan, Director Utai Noppakoonwong, Dr. Nipat Sukhvibul, Mr. Sompong Tongdetae and everybody of OARD1 for their kindly help and giving good opportunity. I thank the Postharvest Technology Research Institute, CMU, Electron Microscopy Research and Service Center (EMR Sc CMU), Agricultural Toxic Substance Division, the Postharvest and Processing Research and Development Office including Regional Medical Science Center, Chiang Mai for providing the knowledge and experience and allowing me to use analysis instruments.

The financial support provided from the Department of Agriculture (DOA) Ministry of Agriculture and Cooperative (MOAC), Thailand through the Postharvest Technology Research Institute is acknowledged. Kind help and good cooperation from my colleagues were Mrs. Porntip thavong, Mrs. Pichaporn Suwanakood, Ms. Piyawan Klunmongkol, Mr. Sanong Jarinthon, Mr. Sanong Amaruk and Mr. Manop Hantawee. Finally, the biggest thanks go to my father, my mother, my two older sisters, my father and mother in law, my wife, my lovely daughter and my cousins for all their encouragements with love throughout the years of study.

Wittaya Apai