

Acknowledgement

I would like to express my gratitude to all those who gave me the possibility to complete this thesis. I want to thank the Institute of Biological Sciences and Department of Chemistry, Faculty of Science, Universiti Malaya for giving me permission to commence this thesis in the first instance, to do the necessary research work and to use departmental resources. I have furthermore to thank the Universiti Malaya and Yayasan Felda Berhad for their stimulating financial support.

I am deeply indebted to my supervisor Prof. Dr. Norzulaani Khalid and Prof. Dr. Noorsaadah Abd. Rahman from the Institute of Biological Sciences and Department of Chemistry, Faculty of Science, Universiti Malaya whose help, stimulating suggestions and encouragement helped me in all the time of research for and writing of this thesis.

My former colleagues, Wong Wei Chee, Zarina Zainudin, Lindayani, Tan Siew Kiat, Asnita Abu Harirah, Azmi Muda, Siti Saizah Said, Mahanom Jalil, Maslenda Markom, Norazlina Abdul Rahman from the Plant Biotechnology Incubator Unit and Ahmad Bachtiar Baharuddin from the Institute of Biological Sciences and Lee Yean Kee, Loh Hwee Ying, Rozana Othman, Nasr Yousef Omar and Chee Chin Fei from the Drug Design Research Group, Department of Chemistry, Faculty of Science, Universiti Malaya who supported me in my research work. I want to thank them for all their help, support, interest and valuable hints. Especially I am obliged and also want to thank Dr. Vilasini Pillai and all of her staffs at Biotechnology Laboratory, Biotechnology Centre, Malaysian Agricultural Research and Development Institute, Serdang, Selangor for all of their assistance on the ministerial resources as well as Dr. Ahmad Hazri Abdul Rashid and Mazita Mohd Diah from Chemical

Analysis Laboratory, Standard and Industrial Research Institute of Malaysia, Shah Alam, Selangor who offering suggestions for improvement.

Especially, I would like to give my special thanks to my parents Mohamad Bukhori Karim and Che Som Md. Yusof, my wife Norul Hidayah Mohd Nor, my daughter Khadija Medina Mohamad Fhaizal, my brothers Mohamad Fhaizul Mohamad Bukhori and Mohamad Fhazril Mohamad Bukhori and also family in law whose patient love enabled me to complete this work.