



UNIVERSITI PUTRA MALAYSIA

CONTROL OF MANGO ANTHRACNOSE USING PLANT TONIC

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FP 2017 41

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UNIVERSITI PUTRA MALAYSIA
SERDANG, SELANGOR DARUL EHSAN
2016/2017

ENDORSEMENT

This project report entitled Control Of Mango Anthracnose Using Plant Tonic prepared by Nurul Izzati Binti Daten Mustafa and submitted to the Faculty of Agriculture in fulfilment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

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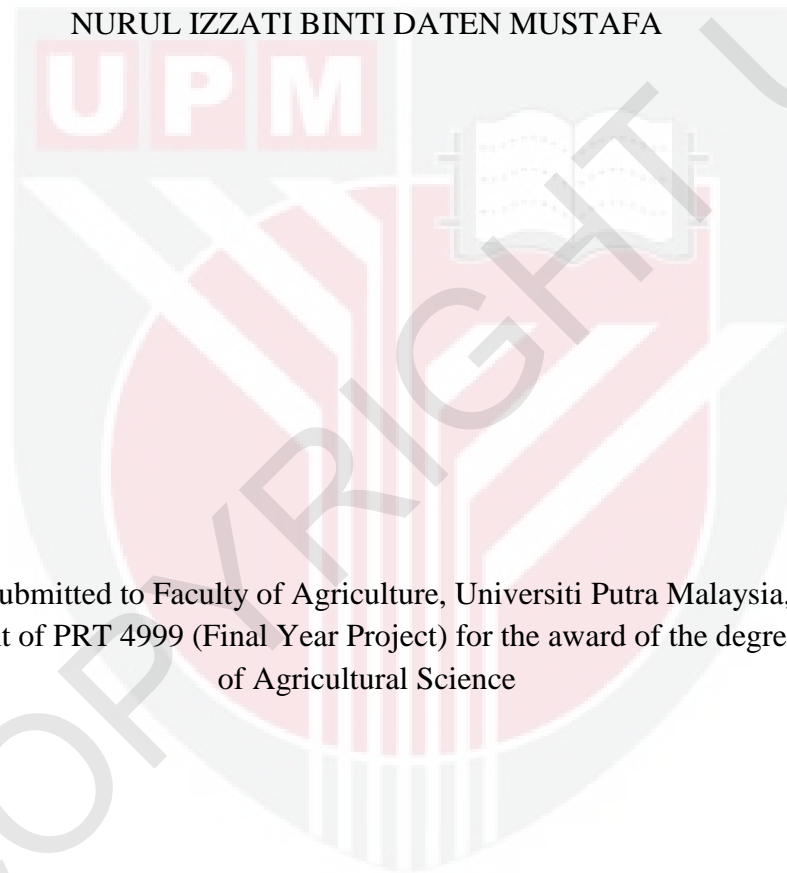
Date:



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BY

NURUL IZZATI BINTI DATEN MUSTAFA



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Faculty of Agriculture
Universiti Putra Malaysia
2016/2017

ACKNOWLEDGEMENTS

First of all, I am grateful to the God for giving me good health and opportunity to complete this book.

I wish to express my sincere thanks to the Prof. Dr Abdul Shukor Juraimi, Dean of the Faculty, for providing me with all the necessary facilities for me to do research.

I am also thanks and grateful to my supervisor, Associate Professor Dr Jugah Bin Kadir, also a lecturer, in the Department of Plant Protection. I am tremendously thankful and appreciative to him for sharing expertise, sincere and valuable guidance and encouragement for me to complete this research in a short period of time.

I take this opportunity to express gratitude to all of the staff members especially Encik Razali for the help. I also would like to thank my parents for the unceasing encouragement, support and attention. I am also grateful to my partner who supported me throughout this project which are Nur Farzana Binti Roshaidi, Nur Farihin Binti Yusof and Nur Syahirah Binti Abdul Halim.

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ABSTRACT

Anthrachnose is a disease which is one of the major problem that reduce world mango production (Yahia, 2011). It is a postharvest disease that cause because of the high rainfall and high humidity that promote infestation of mycelium of fungus *C. gloeosporioides* (Fitzell and Peak, 1984; Jeffries et al., 1990; Dodd et al., 1992). Black lesion of the disease make the fruit is in bad appearance and reduce its taste. This is serious can be control physically, chemically and biologically. Nowadays, demand for biological approach being elevated since people now more aware about food production localize from natural alternatives . This is study will be conducted to identify plant tonic as a biological approach to control anthracnose on mango. Plant extract or Plant Tonic will be used to suppress *C. gloeosporioides*. This method is still new but there is evidence that it will be effective to control anthracnose. Therefore, this study were conducted to evaluate more about potential of Plant Tonic as a biocontrol surfactant to control anthracnose. Plant Tonic made up of natural ingredients that contain some of free fatty acid such as lauric acid, caprylic acid, acpric acid or myristic acid that helps to against pathogen by a few regulations. Result from this study is mango was free from black lesion of anthracnose after treat with plant tonic. This were indicate that black lesion of anthracnose were suppressed as a result of suppression by plant tonic that have ability to inhibit the growth of *C. gloeosporioides* on the mango.

ABSTRAK

Antraknos adalah satu penyakit yang menjadi salah satu masalah terbesar yang mengurangkan pengeluaran mangga dunia (Yahia, 2011). Ia adalah penyakit lepas tuai yang disebabkan oleh kadar hujan yang tinggi dan kelembapan yang tinggi yang menggalakkan serangan myselium dari kulat *C. gloeosporioide* (Fitzell and Peak, 1984; Jeffries et al., 1990; Dodd et al., 1992). Simptom oleh penyakit tersebut menyebabkan mangga kelihatan tidak elok dan mengurangkan rasanya. Penyakit yang serius ini boleh dikawal secara fizikal, kimia dan secara biologi. Permintaan pendekatan biologi semakin meningkat oleh kerana manusia semakin sedar akan pengeluaran makanan yang bersumberkan alternatif semulajadi. Kajian ini dijalankan untuk mengenal pasti tonik tumbuhan daripada ekstrak buah kelapa sawit sebagai salah satu pendekatan biologi untuk mengawal antraknos pada mangga. Ekstrak dari tumbuhan atau tonik tumbuhan daripada buah kelapa sawit akan digunakan untuk menindas *C. gloeosporioides* kaedah ini masih lagi baru tetapi terbukti ia akan menjadi efektif untuk mengawal antraknos. Tonik tumbuhan ini diperbuat daripada bahan-bahan semulajadi yang mengandungi asid lemak seperti asid laurik, asid caprylic, asid acpric atau asid myristic yang membantu untuk melawan pathogen dengan beberapa cara. Keputusan daripada kajian ini ialah mangga akan bebas daripada luka hitam oleh antraknos selepas dirawat dengan tonic tumbuhan. Ini akan menunjukkan symptom disebabkan oleh antraknos akan ditindas oleh tonik tumbuhan yang mempunyai kebolehan untuk menghalang pertumbuhan *C. gloeosporioides* pada mangga.

Chapter 1

Introduction

Mango is one of the oldest and most important fruits (Yahia, 2011). Yahia also stated that global production of mangoes was about 30 million tons (MT) in 2010 and it is the second largest tropical fruit crop in the world, after banana. Mango has been cultivated in India for more than 4000 years, and today grows in more than 80 countries in tropical and sub-tropical regions. There are various mango cultivars around the world. Different countries have different cultivars. For example in India include 'Bappakai', 'Chandrakaran', 'Goa', 'Kurukkan', 'Olour', 'Bellary', 'Kasargod', 'Mazagaon', 'Nileswar Dwarf' and 'Salem' (Kalra *et al.*, 1994). Whereas Malaysia also has its own cultivars such as Apple Mango (MA 194), Malgoa, Harumanis (MA 128), MAHA 65 (MA 165), Lebai Mohamad (MA 127), and Golek (MA 162). This is as stated in 'The Archives of The Rare Fruit Council of Australia'.

Like other tropical fruits, mango also faces with disease such as decay which is one of the most important diseases that cause postharvest losses in mango (Yahia, 2011). Yahia also mentioned there are some diseases related to decay are anthracnose, alternaria spot and stem-end rot. The most serious postharvest disease in mango that will give major implications to the production is anthracnose disease, caused by *C. gloeosporioides* which is associated with high rainfall and humidity (Fitzell and Peak, 1984; Jeffries *et al.*, 1990; Dodd *et al.*, 1992). Anthracnose, meaning blackening, are diseases of foliage, stems, or fruits that typically appear as dark-coloured or sunken lesions with a slightly raised rim (Sharma, 2006).

There are a few control methods to reduce the incidence of anthracnose including chemical methods, biological methods or cultural methods. Chemical methods appear to be the most effective, but present ecological risks (Mbogne *et al.*, 2015). Mbogne *et al.* also stated that inadequate application of chemical treatments can induce resistance in the pathogen. For

biological method of control, effective biocontrol agents offer great potential to develop alternative methods that are economical and suited for adoption by the small-scale mango industry (Kefialew et al., 2008). Kefialew et al. also mentioned that among the limited isolates, a nonpathogenic strain of *Colletotrichum magna* (Prusky et al., 1993), isolate 558 of *Pseudomonas fluorescens* (Koomen and Jeffries, 1993), a strain of *Bacillus* sp. (De Jager et al., 2001), *Bacillus licheniformis* (Govender and Korsten, 2006), and preharvest application of the yeast *Rhodotorula minuta* (Patiñoverta et al., 2005) have been found effective for the control of postharvest diseases of mango.

Nowadays, researcher had found out new biological control method in controlling anthracnose which is by using Plant Tonic which is made from natural ingredients. Based on research by Sovereign Innovations Sdn. Bhd., plant tonic has very small size of the ingredients within the colloidal sub-strata, which are absorbed into the plant's system and cannot be washed off by rain or irrigation. Once inside the system, they are able to destroy the pathogens, and because of the nature of the nano particle, resistance is not of concern, as it is with conventional pesticides.

Hence, objective of this study was to evaluate effect of using plant tonic as a biological control to control *C. gloeosporioides* on mango. Different concentration of plant tonic were used to measure different parameters which are spore germination on Plant Tonic, mycelial growth and spore production of *C. gloeosporioides*. Hypothesis of this study were effect of spore germination, mycelial growth and spore production on different concentration of Plant Tonic.

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