

UNIVERSITI TEKNOLOGI MARA

**DETERMINATION OF POWDERY
MILDEW CAUSAL PATHOGEN OF
ROCKMELON IN MALAYSIA AND
SCREENING THE POTENTIAL
ENDOPHYTIC MICROORGANISM
TO CONTROL THE DISEASE**

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Dissertation submitted in partial fulfilment of the
requirement for the degree of
Master of Science

Faculty of Plantation and Agrotechnology

November 2016

ABSTRACT

Powdery mildew is a common and serious disease attacks on greenhouse crops especially cucurbits. Fungal pathogens *Podospaera xanthii*, *Golovinomyces orontii* and *G. cichoracearum* were generally reported as the causal agents of powdery mildew in cucurbits. In this study, it was found that *G. cichoracearum* is the pathogen of powdery mildew on rock melon in Malaysia. The germ tube of this pathogen emerges laterally with a clubbed germ tube. The conidia are oval to ellipsoid shape with two to eight conidia per chain. Based on the three establishment inoculation methods conducted, it was found that detached entire leaf method is the best suit method to preserve the inoculum during the experiment especially to measure the severity index of powdery mildew. It is convenient, practical and easy to handle as well as able to maintain turgidity of the leaves sample for a long time compared to leaf disc method. Thus, this study on understanding powdery mildew pathogen could lead to an effective management strategy to control the disease. Lack of knowledge on the pathogen itself consequently caused misleads to make a wise decision for controlling the disease. Nowadays, people tend to switch from chemical control to biological control due to their awareness of using more environmentally safe products and fungicide resistance problem. Two methods of isolation were conducted via serial dilution by crushing and centrifuging the asymptomatic leaves. Screening process was conducted on dual culture test and detached leaf. The most promising bacterial isolate was identified as *Pseudomonas aeruginosa* through the morphology, microscopic characteristics and biochemical tests. This negative rod bacterium showed the highest PIRG value of 78% against tested phytopathogenic fungi which could promising as potential biocontrol agent against *G. cichoracearum*. *Pseudomonas aeruginosa* is always been reported by many reports on its potential and effectiveness as the biological control agent. The result showed that this biological control agent has a big potential to control the disease. The use of biological control could reduce the application of chemical fungicides which are not environmental friendly and health concern.

ACKNOWLEDGEMENT

In the name of Allah The most Gracious and The Most Merciful. All praise goes to Him for all His guidance, blessing and strength with the presence of many persons around me assisted me to complete this project successfully. He is the best motivator helped me to endure the hard times and difficulties throughout the project.

First and foremost, I would like to express my very great appreciation to Dr. Zaiton Sapak for her continuous support, guidance and advice for me to complete this project. She gave me valuable and constructive suggestions during the planning and development of this research work. The foster critiques inspired me to keep on track and excel well from one day to the next to be a better researcher.

My grateful thanks are also extended to Mr. Mohd Shahfie Md Latip, assistant lab of UiTM postgraduate laboratory of Faculty of Plantation and Agrotechnology, Mr. Nizam, assistant lab of Faculty of Applied Science, and Ms Fatimah, assistant lab of Faculty of Pharmacy for their support and advices during the laboratory work. Assistance, advices and encouragements given by the agriculture officer, Mr. Abdullah Taher Abd. Aziz, rock melon entrepreneurs, Mr. Bahauddin Mohamad, and Mr. Shahrom Tumiran, and the post-graduate student, Mr. Farit, were very appreciated. They taught me a lot in conducting the experiment and gave me a useful support and comments to improve myself.

Finally an honorable mention goes to my family and friends for their understanding and supports in assisting me to complete the research within the limited time-frame. Without the help of particular mentioned above, it would be difficult for me to successfully complete this final year project. I am very grateful for their constant support and help.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Melon (*Cucumis melo* L.) is well known commercialized fruits in most countries around the world. It is commonly called worldwide as cantaloupe. Most are cultivated in the temperate region as it can adapt to the temperate soil and climate easily (Zulkarami et al., 2011). The melon originally from Africa but it is diversely cultivated in Asia from Turkey to Japan (Pitrat et al., 1997). Rockmelon fruit have a high demand during summer and become popular because of the sweet taste of pulp and nice aroma (Villanueva et al., 2004). In Malaysia, the rock melon type of 'Glamour' cultivar which is locally known as 'Golden Langkawi' become a popular one due to its striking golden yellow colour (Zulkarami et al., 2011). Rock melon cv. Glamour is nourished by many nutrients that capable of lessen the risk of heart disease, cancer and asthma (Sidik et al., 2012).

Powdery mildew is a serious disease attacks on melon worldwide (McCreight, 2006). The causal pathogens for powdery mildew recorded by Epinat et al. (1992) in France as *Sphaerotheca fuliginea* and *Erysiphe cichoracearum*. *Sphaerotheca fusca* was confirmed as the main pathogen of powdery mildew on Cucurbitaceae in Crete, Grece from 1993 to 1994 (Vakalounakis and Klironomou, 1995) which recently been reclassified as *Podosphaera fusca* (Braun and Takamatsu, 2000). This was supported by disease incidence recorded in Brazillian Northeast where *P. xanthiii* as the causal agent for the outbreak of powdery mildew on melon (Sales Júnior et al., 2011). *Podosphaera xanthii* (Castagne) U. Braun and N. Shishkoff is also known as *Sphaerotheca fusca* (Fr.) *S. blumer* and *S. fuliginea* (Schlechtend.:Fr.) Pollacci (Shishkoff, 2000). In Malaysia, there is lack of data presented on the loss of melon production caused by powdery mildew disease. However, it can caused 80-100 % total loss to the farmer if the disease is not controlled.

Powdery mildew disease produces signs on the abaxial and adaxial leaf surfaces as white fungal colony patches, powdery mold that can extend to the developing stem and petiole (Pollack, 1994). The white patches on leaves infected by *P. fusca* show up