



UNIVERSITI PUTRA MALAYSIA

**EVALUATING GINGER EXTRACT FOR CONTROLLING POSTHARVEST
ANTHRACNOSE OF MANGO**

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BY

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Faculty of Agriculture

Universiti Putra Malaysia

2015/2016

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A project report submitted to Faculty Agriculture, Univesriti Putra Malaysia, in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Horticultural Science

Faculty of Agriculture

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CERTIFICATION

This project report entitled evaluating ginger extract for controlling postharvest anthracnose of mango is prepared by Amirah Binti Malek and submitted to the Faculty of Agriculture in fulfillment requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Horticultural Science.

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LIST OF ABBREVIATIONS

°C	Degree celcius
g	Gram
mL	Mililiter
rpm	Rotation per minute
mm	Milimeter
μL	Microliter
LCB	Lactophenol cotton blue
ANOVA	Analysis of variance

ABSTRAK

Colletotrichum gloeosporioides (Penz.) Sacc ialah agen penyebab penyakit bintik berpusar yang menyerang pada kebanyakan pokok buah-buahan terutama pokok buah mangga. Oleh itu, halia bentong (*Zingiber officinale rosc*) di pilih sebagai agen penghalang penyakit berdasarkan potensi halia mempunyai aktiviti antimikrob untuk menghalang pertumbuhan patogen. Penyelidikan ini, melihat aspek luaran (in vitro) aktiviti anti-kulat pada buah mangga, *Colletotrichum gloeosporioides* dengan penggunaan ekstrak daripada halia. Tambahan, penggunaan bahan racun kulat kimia yang selalu digunakan di dalam pengurusan kawalan penyakit bintik berpusar telah menyebabkan penghasilan kulat yang tahan racun tersebut. Oleh itu, kaedah pengawalan biologi penyakit bintik berpusar yang berkesan dikaji menggunakan cara ekstrak mentah. Penyelidikan terhadap kesan ekstrak mentah yang daripada halia bentong melalui kaedah penggunaan etanol dan air suling telah di uji kaji pada *C. gloeosporioides* untuk melihat perencatan pertumbuhan kulat tersebut. Secara keseluruhannya, pengurangan yang signifikan terhadap pertumbuhan kulat *C. gloeosporioides* berhubung kait dengan kaedah ekstrak tumbuhan yang dikaji.

ABSTRACT

Colletotrichum gloeosporioides (Penz.) Sacc. (*C. gloeosporioides*) is a causal agent of anthracnose disease in many tropical fruit trees, especially mango trees. Therefore, ginger, (*Zingiber officinale rosc*) has been used as naturopathy due to their antimicrobial activity potential to inhibit the growth of different microbial pathogens. This study investigated the *in vitro* potential of antifungal activities of rhizome extract from *Z. officinale rosc* to control *Colletotrichum gloeosporioides* on post-harvest anthracnose of mango. In addition, the common use of chemical fungicides to manage anthracnose disease causes the development of fungal resistance. Hence, effective bio-control methods for managing anthracnose diseases were investigated. The effect of crude extracts obtained from *Z. officinale rosc* through ethanol and water extraction methods were tested against *C. gloeosporioides*. Both of these crude extracts were efficient in inhibiting the growth of *C. gloeosporioides*. However, ethanol was found to be most effective at concentration of 50%. Overall, a significant reduction in the growth of *C. gloeosporioides* was found to be associated with the plant extract tested.

CHAPTER 1

INTRODUCTION

Anthrachnose is a group of diseases that has symptoms that resembles dark, sunken lesions on leaves, stems, flowers, and fruits. Anthracnose is common on many deciduous and evergreen trees and shrubs, and in some regions infects turf grass and post-harvest such as mango. This disease is very harmful and can cause spoilage and rotting of plants by resulting in low yield and poor quality of the fruits (Peraza-Sánchez et al. 2005).

These diseases have been controlled using chemical pesticides and are effective in reducing the loss of post-harvest products. They also use of chemical fungicides is the most common choice for management of anthracnose disease, but this also causes the development of fungal resistance (Brent and Hollomon, 1998). In addition, continuous and inappropriate use of chemical fungicides to manage anthracnose disease is not considered to be the long-term solution because this can increase the investment expenses, the risk of having high levels of toxic residues, and also the concerns in human health and environmental settings (Latha et al., 2009).

Due to these reasons, several attempts to search for an alternative measure to control the anthracnose especially on fruits were performed. One of the alternative controls is the use of bio pesticides. Bio pesticides are effective in controlling some post-harvest disease without leaving any harmful effect to environment and humans. Recently,

there are many medical plants extracts that gained attention as potential antimicrobial agents because they are assumed to be more acceptable and less hazardous than the synthetic compounds (Tripathi et al. 2008). In addition, the integration of number of practices aiming to reduce or eliminate negative side effects that is caused by chemical pesticides for controlling major mango diseases is the most realistic option for solving this problem (Chowdury and Rahim, 2009). Hence, the aimed of this study was to use ginger crude extract as an herbal plant for controlling postharvest anthracnose disease caused by *Colletotrichum gloeosporioides* on mango.

OBJECTIVE

The aimed of this study was to evaluate the *in vitro* antifungal activities of rhizome extract of ginger on *Colletotrichum gloeosporioides* growth.

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