UNIVERSITI TEKNOLOGI MARA

ANTIFUNGAL ACTIVITIES OF *Alpinia galangal*, *Curcuma longa* AND *Zingiber officinale* EXTRACTS AGAINST *Pyricularia oryzae*, PATHOGEN OF RICE BLAST DISEASE

NUR HIDAYATUR NABILA BINTI MAT LAPI

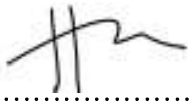
MSc

September 2021

AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This dissertation has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Nur Hidayatur Nabila binti Mat Lapi
Student I.D. No.	:	2017995761
Programme	:	Master of Science (Crop Protection) – AT734
Faculty	:	Plantation and Agrotechnology
Dissertation Title	:	Antifungal Activities of Alpinia galangal, Curcuma longa and Zingiber officinale Extracts against Pyricularia oryzae, Pathogen of Rice Blast Disease
Signature of Student	:	 ……..
Date	:	September 2021

ABSTRACT

This study screened the potential of natural product from Zingeberacea family like *Alpinia galangal*, *Curcuma longa* and *Zingiber officinale* crude extracts as biofungicides and their antifungal activities against *Pyricularia oryzae* which is the pathogen of rice blast disease both *in vitro* and *in vivo*. The objectives of this study were to evaluate and observe the efficacy of *A. galangal*, *C. longa* and *Z. officinale* crude extracts as an antifungal agent against *P. oryzae* and to determine the active compound in *A. galangal*, *C. longa* and *Z. officinale* crude extracts that act as antifungal agent. Results from the study showed that *A. galangal* hexane crude extract possessed highest antifungal activity and showed greater inhibition zone against *P. oryzae* with 52.9% growth inhibition (1.88 cm radial growth) followed by *C. longa* hexane extract with 49.2% inhibition (2.03 cm radial growth) and *Z. officinale* methanol extract with 43.5% of inhibition (2.18 cm). Other crude extracts also showed slight inhibition towards *P. oryzae*. Furthermore, *A. galangal* hexane crude extract showed inhibition effect nearly equal as the commercial fungicide (Mancozeb) that is commonly used in controlling rice blast. The crude extracts have the effective inhibitory concentration (EIC) at 250,000 ppm concentration and LC_{50} was determined at 365,129 ppm. Based on microscopic observation, it was found that antifungal activity of *A. galangal* crude extract caused stunted, lysis, burst and disruption of *P. oryzae* mycelia and conidia. The active antifungal properties in *A. galangal* hexane crude extract were detected and the presence of phytochemical was screened using qualitative phytochemical screening and GC-MS analysis. These results were able to detect the presence of alkaloids, saponin, phenols, phenylpropanoids, eucalyptol and eugenol. The *in vivo* study showed that *A. galangal* hexane crude extract have the potential to be used as curative control against blast disease in the rice field.

ACKNOWLEDGEMENT

All praises, gratitude and thanks are due to Allah S.W.T for His ever ending blessing to complete the research work and to prepare this dissertation successfully. I would like to express the deepest appreciation to my supervisor Dr. Neni Kartini binti Che Mohd Ramli for being a really great supervisor, for her sincere interest, scholastic guidance, constructive criticisms, valuable suggestions and continuous encouragement during the entire period of the research work and preparation of this dissertation. I an extremely grateful and indebted to her and without her guidance and persistent help, this research would not have be done.

Special thanks for Prof Madya Dr. Nor Yuziah binti Mohd Yunus for her guidance throughout the research work. Not forgotten to all the laboratory assistant involved, Mr. Rosdi and Mr. Fauzi for providing me with all necessary facilities, help, suggestion, cooperation and encouragement to complete my research. All their supportive and kindness will never be forgotten.

Not forget to my beloved parents, brother and sister as well as wellwishers, who always inspired me with their good wishes, sacrifice, understanding, and provided me with the best of everything in my life. Last but not least, thank you to everyone who involved directly or indirectly for your kindness, help and cooperation throughout my study period.

TABLE OF CONTENT