UNIVERSITI TEKNOLOGI MARA

DETERMINATION OF LIPASE INHIBITORY COMPOUND FROM *AQUILARIA SUBINTEGRA* MATURED LEAVES EXTRACT VIA PRETREATMENT USING BATH SONICATOR: EFFECT OF SONICATION TEMPERATURE

AMANINA BINTI ABDUL MANAN

Thesis submitted in fulfilment
of the requirements for the degree of
Bachelor of Engineering Chemical and Bioprocess

Faculty of Chemical Engineering

July 2017

ABSTRACT

Obesity is recognized as the most widespread metabolic disease worldwide. This disease is believed to be treated by reducing fat absorption through the inhibition of pancreatic lipase. The natural resources as polyphenol compound can be used as pancreatic lipase inhibitor. Pancreatic lipase is a key enzyme in dietary triacylglycerol absorption, hydrolysing triacylglycerol to monoacylglycerol and fatty acid**.** This compound can be found in *Aquilaria subintegra*, a type of leaf of Gaharu. This study was conducted in two different types of parameter where the leaves were ground to 0.25 mm, 0.5 mm and 1.0 mm and pre-treated by ultrasonification with temperature of 40°C, 50°C, 60°C, 70°C and 80°C. The presence of phenolic and flavonoid compound in *A. subintegra* leaves extract was analyzed by using Masterizer Malvern 2000E and High performance liquid Chromatography (HPLC) to validate the presence of phenolic and flavonoid compound. From the analysis, the best temperature of ultrasonication is 60°C and the sample size 0.25 mm has the largest concentration both in flavonoid and phenolic.

ACKNOWLEGMENT

In the name of Allah, The Most Gracious and The Most Merciful. Peace and blessing upon the Prophet Muhammad SAW and his relatives. Alhamdulillah, all praise and thankfulness to Allah, with His willingness has allowed me to complete my research project.

First of all, I would like to say thank you to my research project supervisor, Prof. Dr. Ku Halim Ku Hamid and co-supervisor, Miradatul Najwa Muhd Rodhi for being such good guider for me and for spending their precious time in helping me to finish this project. They also make sure me understand everything they told before I begin to work on the experiment about this research.

I also appreciate the faculty of chemical engineering in Universiti Teknologi MARA for the research facility. I wish to thank the lab assisstants, En. Zairul, En. Amin, En Faeez, En. Irwan and Pn. Amizan for their kindness in guiding me using the equipments, lending the apparatus and helping me to understand well the method I used.

My special thanks goes to my group members, Nurul Aqilah and Nurul Farhana who has together with me in conduction research, experiment and give beneficial information upon completing the research project.

Finally, a great thanks to my family and friends who tried their best give their support for me by giving me a lot of encouragement for keep up with this research project. I dedicated this thesis to my beloved parents who always give me encouragement and support to success.

TABLE OF CONTENTS

CHAPTER 1
INTRODUCTION

1.1.RESEARCH BACKGROUND

In the earliest time, people have been used naturally produced resins by plants in traditional medicine. Treatment of several diseases are been used worldwide by using plants and their exudates and novel drugs continue to be developed through phytochemical research. Following the modern and drug research advancing, chemically synthesized drugs have been replaced plants as the source of most medicinal agents. However, in developing countries, the majority of the world population cannot afford pharmaceutical drugs (Lorenzo Carmada et al., 2011). *Aquilaria* species is the one of plants contains phytochemicals that can be used to replace the drugs.

Aquilaria species (family: Thymelaecaeae) are known to produce dark resinous heartwood. It's also known as Agarwood, Oud, Oodh and agar. There are 15 tree species in the Indomalesian Agarwood (Mabberley, 1997). Agarwood produce *Aquilaria* species includes *Aquilaria beccariana*, *A. crassna*, *A. hirta*, *A. malaccensis*, *A. microcarpa*, *A sinensis* and *A.subintegra* (Subhash J, 2013). Currently, Indonesia, Malaysia, Thailand and Vietnam are the major producers of agarwood as there is huge demand for agarwood there.

For the past few years, due to the health benefits, *Aquilaria spp.* leaves have been investigated for use as natural health products. Agarwood is known to have many pharmacological functions such as analgesic, anti-inflammatory, anti-microbial, immunomodulatory, and wound healing properties (Waraporn Putalun, 2013). Due to cultivation condition and various species of *Aquilaria* are available in the market such as *Aquilaria crassna* and *Aquilaria subintegra*, the source of the plants and their activities are varied.