OPTIMIZATION OF MICROWAVE DRYING OF AQUILARIA MALACCENSIS LEAVES

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This report is submitted in partial fulfilment of the requirements needed for the award of Bachelor in Chemical and Bioprocess Engineering (Hons)

FACULTY OF CHEMICAL ENGINEERING

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SHAH ALAM

2016

ACKNOWLEDGEMENT

First and foremost, I would like to express my sincere gratitude to my supervisor, Madam Nurul Asyikin Md. Zaki and co-supervisor, Madam Nur Shahidah Ab. Aziz for their continuous support and motivation in completing my project report. They were always full of enthusiasm to share their knowledge and time with me during my project. I am forever grateful to have them as my supervisors.

Besides my supervisors, I would like to thank all the people that have contributed in my project especially my family and friends. I wish to express my greatest appreciation to my family for their support, endless encouragement, and unconditional love during my happy and hard times. I also want to thank my fellow friends for the stimulationg discussions, critics, and insightful comments everytime i came to them when i have problems with my project. But most of all, thank you for all the wonderful memories we had in the last four years.

Last but not least, to the Great Almighty, the holder of all the knowledges and wisdoms.

ABSTRACT

The purpose of this study is to determine the optimum operating condition of microwave drying of *Aquilaria malaccensis* leaves by Response Surface Methodology using existing data from the previous study. It is found that the extract from the *A. malaccensis* leaves have a promising potential in treating diabetic patients because of its anti-diabetic properties. The medicinal contents in the leaves can inhibit the alpha-amylase enzyme activity in diabetic patients and serve as a natural alternative to the other synthethic alpha-amylase inhibitors that possess many side-effects. In order to retain the valuable anti-diabetic properties, the leaves were preserved using microwave drying prior to extraction process. However, drying conditions such as drying temperatures and the method of drying to be employed can influence the quality of the dried product. Therefore, operating parameters of the microwave drying, such as power output and drying time, must to be optimized to obtain a better quality dried product for the research. Response surface methodology (RSM), a face-centered Central Composite Design was employed to optimize the microwave drying process conditions. It was performed using the ANOVA analysis in the Design Expert Version 7.1.3 software program. At the end of this study, the optimum operating conditions for the microwave drying process were obtained. The optimized operating conditions selected by the software for the microwave drying process are at power input of 150W and drying time of 9.35 minutes in which gave the desired lowest moisture content of 0.158538 kg H_2O/kg dry solids. The dried leaves obtained from these optimized conditions would result a maximum percentage of α-amylase inhibition of 96.77% with a combination of using ethanol solvent during the extraction process. Based on this research, a high percentage of α-amylase inhibition activity can be obtained from the extracts of *Aquiliria malaccensis* leaves that was preserved at optimized microwave drying conditions as stated here. These valuable extracts can be used as a safer alternative for the current synthethically alpha-amylase inhibitors.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

With the rise of diabetes mellitus cases around the world today, it is becoming essential to find a safe and effective treatment for this disease without any undesirable side effects. Recently, many scientists and biologist turn their focus on medicinal plants to find a natural cure for diabetes. It is found that the extract from *Aquilaria malaccensis* leaves have a promising potential in treating diabetic patients because of its anti-diabetic properties. Therefore processing and preservation of the *A. malaccensis* leaves are crucial to protect and maintained their medicinal properties. This research is focusing on the preservation process of the leaves by microwave drying and the optimization of the microwave drying process. This chapter will guide you the flow of this research. In this chapter, the background information of this research is explained in Section 1.1 which will help to familiarize with the terms used in the research. Next, in Section 1.2, the problem statement generally outlined the problem arises from this disease, why it matters and the solutions that we can introduced to solve the matters quickly. In Section 1.3, the aim of this research is outlined. The final section in this research which is Section 1.4 describes the limitations in the methodology parameters that will restrict the research findings.