EFFECT OF MICROWAVE PRETREATMENT ON GAHARU ESSENTIAL OIL USING HYDRODISTILLATION METHOD

FILZAH ANATI BINTI KASIM

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FACULTY OF CHEMICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
SHAH ALAM

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ABSTRACT

Gaharu (*A.malaccensis*) is a valuable resinous heartwood trees that belong to Thymelaeceae family. The objectives of this research were to study the effect of microwave pretreatment on gaharu essential oil using hydrodistillation method, the effect of microwave processing time on gaharu's oil yield and to study the effect of hydrodistillation time on gaharu's oil yield. Gaharu sample were pre-treated with microwave irradiation at the power of 800 kW at three different times, which are 1, 2 and 3 minutes. After the pretreatment, gaharu sample were extracted using hydrodistillation method for 30 and 47 hours. The oil produced were weight to determine the percentage of oil yield. Effects of microwave pretreatment were determined using gas chromatography-mass spectrum analysis to study the chemical composition of oil. Hydrodisillation process with microwave pretreatment produce higher yield (0.0379%) of gaharu essential oil compare to non-pretreatment extraction (0.0286%). In addition, higher microwave time (3-min) during the pretreatment also will produce greater amount of oil (0.0877%). As it will break the structure of gaharu for better extraction. Hydrodistillation processing time also gives effect on the amount of produced oil as longer the extraction time, higher the oil yield. Major component of oil contains sesquiterpene such as gurjunene, α-parasinsene, spathulenol and guaiene that were known to offer the sweet wood fragrant in the oil.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Gaharu is a resinous heartwood trees that belong to Thymelaeceae family. A few of the other names for Gaharu are agar, agarwood, eaglewood, aloeswood etc. The scientific name of Gaharu is *Aquilaria malaccencis*. It is a large classic tree growing over 15-30 m tall and 1.5- 2.5 m in diameter, and has white flowers, (Barden et.al., 2000). *A. malaccencis* is a quickly developing, ancient forestry tree, with reflects of its well-known and variety of usages. As recorded in Sahih Muslim, Gaharu is very useful for medical purposes.

A. malaccensis is generally disseminated in south and south east Asia. There are contrasting records of the nations in which it happens. As indicated by Barden et al. (2000), *A. malaccensis* is found in Bangladesh, Bhutan, India, Indonesia, Iran, Malaysia, Myanmar, Philippines, Singapore and Thailand. Figure 1.1 shows Gaharu tree (*Aquilaria malaccensis*) from Malaysia.

Based on a research study conducted by Chua (2008), *Aquilaria malaccensis* is nowhere to be found in Sarawak while the other species of this genus are informed as unique and rare whereas *Aetoxylon sympetalum*, one of the species sources of gaharu, was noted as being locally visit in the heath backwoods in the West of Sarawak.

The existing body of organization on gaharu suggest that, there is 21 species names accepted out of 49 scientific plant names of species rank for the genus Aquilaria (Plantlist.org, 2010). All of these names, one is recorded as invalid, one is recorded as illegitimate, and one is recorded as a spelling variant.