

UNIVERSITI TEKNOLOGI MARA

**EFFECT OF ULTRASONIC
PRETREATMENT ON GAHARU
ESSENTIAL OIL USING
SUPERCRITICAL CARBON
DIOXIDE EXTRACTION**

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ABSTRACT

Gaharu or commonly known as Agarwood, is a resinous heartwood in trees of *Aquilaria* genus and *Thymelaeaceae* family which is widely known as one of the most highly precious fragrant woods as it produces essential oil that is economically significant. However, conventional extraction method without the pretreatment produced small oil yield. Therefore, this experiment was carried out to determine the effect of ultrasonic pretreatment on gaharu essential oil using supercritical carbon dioxide extraction. Ultrasonic pretreatment was done at 30°C, 40°C and 50°C for 1 hr. The optimum temperature for ultrasonic pretreatment was 40°C. The extraction was carried out at temperature of 40°C, 45°C, 50°C and pressure of 3000 psi, 4000 psi and 5000 psi. Gaharu from the species of *Aquilaria Malaccensis* was used in this experiment. The optimum temperature and pressure for the extraction was 50°C and 5000 psi respectively at which the highest oil yield was obtained (0.1867%) for the pretreated gaharu. The chemical compounds present in the essential oil were analyzed by using Gas Chromatograph Mass Spectrometry (GC-MS).

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

Gaharu or commonly known as Agarwood, is a resinous heartwood in trees of *Aquilaria* genus and *Thymelaeaceae* family which is widely known as one of the most highly precious fragrant woods because it can produce essential oil that is economically significant (Yoswathana, 2013). It can also be called as Eagle wood and Aloewood (Wetwitayaklung *et al.*, 2009). This plant produces aromatic resin when it is infected by parasitic mould in respond to the infection (Hazwani *et al.*, 2013). Agarwood trees can be broadly traced in South and South East Asian countries such as in India, Pakistan, Malaysia, Thailand, Cambodia and Laos (Sulaiman *et al.*, 2015). There are 15 species of agarwood can be found in Asia, for example, *Aquilaria crassna*, *Aquilaria malaccensis*, *Aquilaria subintegra* and *Aquilaria baillonil* (Sulaiman *et al.*, 2015). In Malaysia, *Aquilaria malaccensis* is the major species of gaharu that can be found lying beneath the forests among other species (Hazwan *et al.*, 2013)



Figure 1.1 Cross-section of Infected Agarwood Tree

Note/Source: (“What is Agarwood?,” n.d.)