## EFFECT OF AQUILARIA MALACCENSIS AFTER UNDERGOES VACUUM FAR-INFRARED RADIATION DRYING

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## ABSTRACT

Vacuum Far-infrared Radiation (VFIR) is a technique of drying that has been used actively widely in food processing industry to replace conventional drying as it proven its effectiveness and many other benefits. The VFIR of Aquilaria Malaccensis leaves took place in order to determine the value of this agarwood parts compared to the normal studies of its bark. The purpose of this experiment is to determine the concentration of antipyretic inside the leaves. Antipyretic reagent can be found mainly in acetaminophen product such as paracetamol. Samples are dried under vacuum constant vacuum condition 200 mbar divided to three temperatures, 40 °C, 50 °C and 60 °C for 4 hours. The moisture content of each sample was taken to discover the moisture loss from the samples. Then, the leaves undergone extraction procedure using soxhlet method and analysed by High Performance-Liquid Chromatography (HPLC) under wavelength 200 nm to determine concentration of antipyretic in the leaves using mobile phase Acetonitrile-deionized water (30:70). From the findings, the concentration of antipyretic varies at different temperature of drying. The most optimum to preserve the active compound using VFIR set to be 60 °C based on findings.

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### CHAPTER ONE

### INTRODUCTION

#### **1.1. BACKGROUND STUDY**

### 1.1.1. Vacuum far infrared (VFIR)

Over the time, the revolution of heating and drying process has significantly contributed by the existing of Infrared (IR) Radiation. It provides momentous advantages towards for reducing heating time, uniformly heating, reducing quality losses and nonexistence of solute migration in food material, versatile, simple and compact equipment and majorly in energy saving over the using of conventional heating. Various of processing can be utilized using the Infrared (IR) heating those are including drying, baking, blanching, pasteurization and sterilization. [1]

IR getting its fame due to its high thermal efficiency and fast heating rate and response time compared to conventional heating as well as its characteristics of making more effective than the latter; the efficiency, wavelength and reflectivity to set it apart [2]. IR Radiation can be categorized into 3 parts, which are, near-infrared (NIR), mid-infrared (MIR) and far-infrared (FIR) according to the spectral ranges,  $0.75 - 1.4\mu m$ ,  $1.4 - 3\mu m$ , and  $3 - 1000 \mu m$  respectively. Generally, food materials can absorb FIR energy at most efficient thorugh mechanism changes in the molecular vibrational state, which can cause to radiative heating. The main constituent of food like proteins and starches absorb FIR energy at wavelength from at least  $2.5 \mu m$  and above. It is expected to be the new trending of process for the production of high quality dried food at minimal cost [2]. In other word, during FIR drying, energy can be saved due to electromagnetic waves absorbed directly by the sample without any loss to the surrounding [3]