UNIVERSITI TEKNOLOGI MARA

DRYING KINETICS OF AQUILARIA SUBINTEGRA LEAVES

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ABSTRACT

Technology on drying systems becoming more advanced for the preparation of qualitydehydrated food product continuously optimize the power level above a target value. Typical drying curves occurs in high drying rate which leads to quality damage based on the texture and color. To overcome the issues, the vacuum far infrared system is being proposed that is being assumed to get the optimum in terms of product quality, energy usage and drying time. The aim of this work was to investigate the vacuum far infrared drying towards Aquilaria Subintegra leaves.

Leaves is subjected with different drying temperature (40, 50 and 60oC), to investigate the effect towards the drying kinetics, color and the quality of the leaves. The shortest time taken for constant 70% moisture content within wet basis is 15 minutes for 60oC, followed by 30 minutes for 50oC while 40oC does not give significant constant moisture content reading. Drying temperature also affecting the moisture ratio which the higher the temperature, the reduced the drying time to bring moisture ratio to constant. The drying rate which the higher the temperature, the higher the drying rate. It is observed the longer the drying time, L* decreases, a* and b* increases. The browning effect occurs faster for higher drying temperature. As drying time increases, the color degraded significantly as well as the texture become crumpled and drier. The effect is faster as the higher drying temperature. However, the total color difference, chroma and hue angles values were similar at the end of processing for all temperatures.

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CHAPTER One INTRODUCTION

1.1 Research Background

Agarwood is very fast-growing forest tree based from Aquilaria genus in the plant family of Thymelaeceae. It can be present at the foothills of Himalayas to the rain forests of Papua New Guinea. Grown over 15-40 m tall and 0.6-2.5 m in diameter and blooming white flowers, Agarwood is a large evergreen tree (Akter, Islam, Zulkefeli, & Khan, 2013). Being adaptive towards various habitats, Aquilaria sp. have the capability to live in rocky, sandy or calcareous, well-drained slopes and ridges and land near swamps areas. From early ages, this resinous wood has been transported worldwide and been called with various name that includes oodh, agarwood, aloeswood, eaglewood, gaharu and kalamabak, depending on the regions. Due to its beneficial properties for drugs, incense and fragrances, there have been high demand throughout Europe, Middle East and Asia. First grade Agarwood are labelled as the most expensive natural raw materials in the world which can reach up to US\$30, 000 per kg. Agarwood is currently being used by the premium brand such as Dior, Juicy Couture, Yves St. Laurent and other for their product.

Thus, preservation is required to increase shelf life of the product based on agarwood, which increasing the demand to study of the optimum preservation, such as drying specifically. Drying process of food is to remove moisture from the product to which it can help commercialize it while preserving the food from any microbial contamination. To improve the drying process, the study of drying kinetic have been widely operated both globally and locally. The complex phenomenon of food drying kinetics involves simple representations to predict the drying behavior that eventually improving the drying parameters. It is vital to identify moisture diffusivities and mass transfer coefficients for the various systems since complex mathematical models and correlations require data on specific mass transfer parameters that may lead to better understanding of drying operations (Darvishi, 2017).

Years ago drying have been acknowledge for its function in preserving food and the method is through solar drying. Some disadvantages of solar drying are it involves climate and it is very tedious to maintain the desired product characteristics