

Swittra Bai-ngew 2011: Process Development of Durian Chip by Using Microwave Vacuum Drying. Master of Science (Agro-Industrial Product Development), Major Field: Agro-Industrial Product Development, Department of Product Development. Thesis Advisor: Assistant Professor Nantawan Thredthai, Ph.D. 115 pages.

Fried durian chips are one of the most popular durian products. However, fried durian chips may not be accepted by some consumers that concern their health. Drying is one of the alternative methods to produce oil-free snack products. This research was aimed to develop durian chip by using microwave vacuum drying. Effect of pretreatment prior to drying (chilling at 4°C, freezing at -18°C and freezing - thawing) and levels of microwave power intensity (3.88 W·g<sup>-1</sup>, 5.49 W·g<sup>-1</sup> and 7.23 W·g<sup>-1</sup>) during drying under pressure controlled at 13.33 kPa on drying rate and quality of durian chips was investigated. Freezing prior to drying caused a lower dielectric constant and loss factor than other pretreatment methods. The drying kinetics under various drying conditions were simulated using thin layer models. The Page model was found to be the best for explaining the drying characteristics of durian chips. The effective moisture diffusivity of durian chips was in the range of 0.7162×10<sup>-7</sup>-1.9948×10<sup>-7</sup> m<sup>2</sup>·s<sup>-1</sup>. An increase in the microwave power intensity increased the drying kinetic rate constants. In addition, pretreatment prior to the drying and the microwave power intensity significantly affected color change (p≤0.05). Scanning electron microscopy indicated that freezing and freezing-thawing prior to drying caused expansion of the durian pore and thereby reduced hardness of the dried durian chips. In addition, the microwave vacuum dried durian chip had 2.18 – 3.01 % fat content that was much less than the fried durian chip (36.54%). From sensory evaluation, freezing and freezing-thawing prior to drying at 7.23 W·g<sup>-1</sup> for 7 min produced the durian chip with the highest liking scores on appearance, durian odor, crispness, durian flavor, taste and overall liking. From consumer acceptance test, freezing prior to drying at 7.23 W·g<sup>-1</sup> for 7 min produced durian chip with the highest liking score (p≤0.05). In addition, providing good information about the product could significantly increase acceptability of consumer (p≤0.05). During storage in aluminium foil bags for 56 days, moisture content, water activity and thiobabaturic acid were increased. Storage temperature (25, 35 and 45 °C) had significant impact (p≤0.05) on quality changing rate. Effect of the temperature could be described by Arrhenius equation.

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Thesis Advisor's signature