

Teerada Visalakkij 2012: Process Development of Dried Mangosteen by using Microwave Vacuum Drying. Master of Science (Agro-Industrial Product Development), Major Field: Agro-Industrial Product Development, Department of Product Development. Thesis Advisor: Associate Professor Nantawan Therdthai, Ph.D. 152 pages.

The study was subjected to microwave vacuum drying of mangosteen (*Garcinia mangostana* Linn.) with and without osmotic dehydration. Prior to the microwave vacuum drying, mangosteen (containing seed and seedless parts) was divided into 2 parts (without and with osmotic dehydration) and then frozen until the product temperature reached -18°C. The osmotic dehydration was carried out in sucrose solution (65 g/100g w/w) at 40±2°C. The osmotic dehydration prior to drying affected moisture content, water activity, colour, texture, reducing sugar, total sugar and total acidity significantly ( $P \leq 0.05$ ). With osmotic dehydration, moisture content, water activity and total acidity of seedless and containing seed samples were decreased, but L\*- value and hardness were increased to 62.59 - 75.04 and 37.89 – 73.28 N, respectively. In addition, osmotic dehydration could reduce drying time by 40 – 70 % depending on microwave power. An increase in the microwave power from 1200 W to 1680 W enhanced drying kinetic rate constant of moisture ratio; as a result, drying time could be reduced to by 30 - 40 %. Scanning electron micrograph indicated that samples with osmotic dehydration had fine and porous structure, thereby their rehydration ability was improved ( $P \leq 0.05$ ). From sensory evaluation using 30 untrained panelists, overall liking scores of all dried mangosteen were in the range of slightly like and moderately like. Based on preference mapping, overall liking score could be increased by decreasing water activity, moisture content and total acidity, but increasing hardness, regardless of parts of mangosteen (containing seed or seedless). During storage in aluminium foil bag at 4, 25 and 35 °C, moisture content of the dried mangosteen without osmotic dehydration was increased to over the quality standard limit of the dried fruit at the 3<sup>rd</sup> and 4<sup>th</sup> week. Osmotic dehydration before drying increased activated energy (Ea) of changes in moisture content, water activity and texture. Therefore, quality of the dried seedless mangosteen kept at 4, 25 and 35 °C could be maintained at least 8 weeks. Comparing to the dried seedless mangosteen, the dried mangosteen containing seed had lower Ea of changes in moisture content and texture. Thus, its quality (stored at 25 and 35 °C) could be only maintained for 4 weeks. From consumer test, the acceptability of the dried seedless mangosteen with osmotic dehydration was 88.64 %, while the acceptability of the dried mangosteen containing seed with osmotic dehydration was 80.68 %.

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Student's signature

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Thesis Advisor's signature