

Nudchanad Chaiwong 2015: Effect of Osmotic Dehydration Conditions and Types of Sugar on the Quality of Dried Osmotic Dehydrated Papaya. Master of Science (Agro-Industrial Product Development), Major Field: Agro-Industrial Product Development, Department of Product Development. Thesis Advisor: Associate Professor Rungnaphar Pongsawatmanit, D.Agr. 113 pages.

Osmotic dehydration (OD) is widely used to remove the water content in fruit with mass transfer of water and sugars between the hypertonic solution and fruit. However, an increase in consumer awareness of high sugar content in the product has led to high demand for modifying a lower solute uptake. Papaya cube (0.8x 0.8x 0.8 cm) and K-carrageenan (K-cgn) were selected for the fruit model and coating material, respectively for the study. Therefore, the objective of the first stage was to study the effect of the ratio of fruit to osmotic solution (1:1, 1:1.5, 1:2 and 1:4) and sucrose concentration (35, 45, 55 and 65 °Brix) on quality of OD papaya. The result showed that the solid gain (SG) values and water loss (WL) of papaya increased with increasing OD time, sucrose concentration and osmotic solution to fruit ratio. The faster equilibrium of SG and WL was observed in lower ratio of osmotic solution. The higher ratio of osmotic solution to fruit yielded a higher SG value. The ratio of fruit to osmotic solution at 1:2 and 1:4 showed no significant difference in water diffusivity ($p>0.05$). Therefore, the ratio of fruit to osmotic solution (F:S) = 1:2 and syrup concentration at 65 °Brix were selected for further study. When the effect of osmotic dehydration pretreatment (vacuum application prior to OD process and K-cgn coating) on quality of OD papaya, the results showed that pretreatment with vacuum impregnation prior to OD process enhanced the SG and WL of papaya during the OD time <3 h. The K-cgn coating (0, 0.5 and 1.0%) revealed lower values of SG for all OD process temperatures whereas higher soaking temperatures enhanced SG of all OD samples with and without K-cgn coating. Effects of sugar types (invert syrup and sucrose solution) and K-cgn coating on qualities of dried OD papaya were determined. The water activity (a_w) of OD papaya decreased whereas those of dried OD fruit increased with increasing OD time. Coating with K-cgn showed lower a_w values than those without coating for both OD and dried OD papaya prepared from both invert syrup and sucrose solution. For storage stability, the color parameters ($L^* a^* b^*$) of dried OD papaya decreased whereas moisture content, a_w , ΔE^* , reducing sugar and pH increased with increasing storage temperature and time.

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Thesis Advisor's signature

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