Kanitta Pattanapa 2010: Process Development of Osmotically Dehydrated Mandarin cv. *(Sai-Namphaung)*. 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. 137 pages.

The research aimed to develop the process of osmotically dehydrated mandarin cv. *(Sai-Namphaung)*. Mandarin was peeled and osmotically dehydrated in osmotic solutions including various mixtures of sucrose and glycerol (9:1, 8:2, 7:3, 6:4 and 5:5 w/w) at 57±3°C with the agitation of 40 rpm. The ratio of mandarin to osmotic solutions was 1:5. Increasing glycerol ratio in the mixture significantly increased rate of water loss and solid gain during osmotic dehydration. After that, osmotically dehydrated mandarin was dried using hot air drying at 70°C for 360 min. During drying process, the Page model had higher capacity than the Lewis model for moisture ratio. Correlation coefficients (rs) between actual and simulated values were higher than 0.9 and root mean square error (RMSEs) were in the range of 0.0205 to 0.0372. For quality of dried mandarin, samples immerged in 9:1 (sucrose: glycerol ratio) solution contained the highest L* value ($p \leq 0.05$). Increasing glycerol ratio could decrease a* value, water activity, hardness, moisture content and reducing sugar of dried mandarin ($p \leq 0.05$). From sensory evaluation, the use of 7:3 (sucrose: glycerol ratio) solution produced the dried mandarin with the highest liking score on appearance, color, sweetness, overall taste and overall liking. Therefore, this solution ratio was selected to prepare dried mandarin under hot air drying, microwave vacuum drying and combination of hot air and microwave vacuum drying. Microwave vacuum system could reduce drying time. The highest values of L*, a* and b* were observed when mandarin was dried by microwave vacuum drying either at 1,280 W for 5 min or 960 W for 7 min. The combination of hot air and microwave vacuum drying produced the lowest water activity. Moreover, both microwave vacuum drying and combined drying reduced product hardness, compared with hot air drying. From sensory evaluation, the microwave vacuum dried mandarin had higher liking score on color but less overall liking score than the hot air dried samples. For consumer testing, liking scores of appearance, texture and overall liking were moderately liking. In addition, 87.33% of consumers accepted the product. During storage in OPP30/Adhesive/LLDPE65 bags, L*, a* and b* values were decreased as storage time was increased. Based on mathematical models, the estimated shelf life of osmotically dehydrated mandarin storage at 25, 35 and 45°C were 68, 24 and 8 days, respectively.

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