

Development of minimally processed fruit and vegetable products by vacuum osmotic dehydration

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ABSTRACT

Osmotic dehydration (OD) is one of the most important processes to produce intermediate moisture foods (IMF); however, this process is very time-consuming. Vacuum osmotic dehydration (VOD) and pulse vacuum osmotic dehydration (PVOD) are expected to improve the dehydration effect, but there are some operation variables required further studies. In this research, celery and green papaya were used as the materials. Celery in lengths of 1, 1.5 and 2cm were soaked in 55Brix sugar solutions at 25, 40, 55°C, and 10, 20 and 30inch vacuum were applied for 120min. for VOD and PVOD. On the other hand, green papaya in length of 1cm was soaked in 55Brix sugar solution at 40°C, and factors such as pulse length, pulse number and pulse timing in PVOD were investigated to determine the optimal process factors, with the help of sensory evaluation. Physical properties of the product, such as color, hardness, dehydration rate and sugar uptake were determined, and samples from OD were the control. The results showed that at normal pressure (1atm), dehydration rate and sugar uptake increased with solution temperature, but decreased with sample size. As VOD was applied, both dehydration rate and sugar uptake increased two times within the first 60min, compared with OD at the normal pressure. However, this increasing effect was not continued to the next 60min, only if high temperature soaking was used in VOD. Samples from VOD showed dark color, and VOD in high vacuum was not very helpful on increases of dehydration rate and sugar uptake. For celery in VOD, the major effect was showed on the increase of dehydration; for green papaya, it was on sugar uptake. For PVOD, both dehydration rate and sugar uptake results were found better than OD and VOD, and the samples from PVOD were with the smallest hardness change. Comparing the results of physical property determination and sensory evaluation, it showed that the optimal process factors of PVOD were: pulse should be applied at the first half of process, pulse length should be controlled within 5 to 10mins, and pulse numbers should be within 2 - 3.

Keywords : celery ; green papaya ; vacuum osmotic dehydration ; pulse vacuum osmotic dehydration ; intermediate moisture foods

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