IMPROVING THE EFFECTIVENESS OF OSMOTIC DEHYDRATION BY MICROWAVE PRETREATMENT

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ABSTRACT

In this research, microwave pretreatments were studied to enhance the effectiveness of osmotic dehydration. Papaya and guava were used as experimental materials, and were respectively water-bathed at 95oC for 1min and 15sec as control. On the other hand, microwave pretreatments were conducted for either 480W-10min or 800W-6min. The conventional osmotic dehydration process was first experimented; 45Brix sugar solution was used at the beginning, with 10Brix increased every 3hr till 65Brix. Using data of control as the standard curve, it could be found that in the first 3hr process, the sugar uptake of samples pretreated by microwave were much higher than standard curve, and similar to that of controlled samples after 4.5hr process. This result was used to design the improved osmotic dehydration process, in which the 55Brix soaking was reduced to 1.5hr for microwave-pretreated samples. The results showed that the final sugar uptake of these samples was still much higher than standard curve. In the reduced osmotic dehydration process, the 55Brix soaking was eliminated, and similar final sugar uptake was found for all samples. This result indicates that microwave pretreatments could enhance the effectiveness of osmotic dehydration up to 33%. For papaya samples, data of physical properties showed that the color turned yellow after blanching, and turned red after osmotic dehydration. Sample pretreated by 800W microwave in the reduced osmotic dehydration process showed similar color characteristics as compared with the controlled sample. Also the controlled sample always showed the highest hardness. The final products of all process showed similar moisture content (20 to 22%) and water activity (0.37 to 0.39), which indicated similar preserving conditions and shelf lives. For guava samples, data of physical properties showed that the color turned yellow-green after blanching, and turned yellow-red after osmotic dehydration. Samples pretreated by microwave were lighter in color than the controlled sample. Similarly, the controlled sample always showed the highest hardness, and the final products of all process showed similar moisture content (27 to 32%) and water activity (0.37 to 0.40), which also indicated similar preserving conditions and shelf lives.Data of sensory evaluation showed that papaya and guava samples pretreated by 800W microwave in the reduced osmotic dehydration process, as well as guava samples pretreated by 480W microwave in the improved osmotic dehydration process received the highest scores. This indicated that microwave pretreatments could not only enhance the effectiveness of osmotic dehydration, but also increase product quality.

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