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Study of Rehydration Process of Dried Squash (Cucurbita pepo) at Different Temperatures and Dry Matter-Water Ratios

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Abstract : Air-drying is the most widely employed method for preserving fruits and vegetables. Most of the dried products must be rehydrated by immersion in water prior to their use, so the study of rehydration kinetics in order to optimize rehydration phenomenon has great importance. Rehydration typically composes of three simultaneous processes: the imbibition of water into dried material, the swelling of the rehydrated products and the leaching of soluble solids to rehydration medium. In this research, squash (Cucurbita pepo) fruits were cut into 0.4 cm thick and 4 cm diameter slices. Then, squash slices were blanched in a steam chamber for 4 min. After cooling to room temperature, squash slices were dehydrated in a hot air dryer, under air flow 1.5 m/s and air temperature of 60°C up to moisture content of 0.1065 kg H2O per kg d.m. Dehydrated samples were kept in polyethylene bags and stored at 4°C. Squash slices with specified weight were rehydrated by immersion in distilled water at different temperatures (25, 50, and 75°C), various dry matter-water ratios (1:25, 1:50, and 1:100), which was agitated at 100 rpm. At specified time intervals, up to 300 min, the squash samples were removed from the water, and the weight, moisture content and rehydration indices of the sample were determined.The texture characteristics were examined over a 180 min period. The results showed that rehydration time and temperature had significant effects on moisture content, water absorption capacity (WAC), dry matter holding capacity (DHC), rehydration ability (RA), maximum force and stress in dried squash slices. Dry matter-water ratio had significant effect (p˂0.01) on all squash slice properties except DHC. Moisture content, WAC and RA of squash slices increased, whereas DHC and texture firmness (maximum force and stress) decreased with rehydration time. The maximum moisture content, WAC and RA and the minimum DHC, force and stress, were observed in squash slices rehydrated into 75°C water. The lowest moisture content, WAC and RA and the highest DHC, force and stress, were observed in squash slices immersed in water at 1:100 dry matter-water ratio. In general, for all rehydration conditions of squash slices, the highest water absorption rate occurred during the first minutes of process. Then, this rate decreased. The highest rehydration rate and amount of water absorption occurred in 75°C.

Keywords : dry matter-water ratio, squash, maximum force, rehydration ability
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