Osmotic dehydration of ginger using maltitol solutions as emerging osmotic agents

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Ginger is a rhizome with refreshing sensory characteristic due to its pungency, besides of its high contents of bioactive compounds. The high moisture content in the raw ginger results in a high level of perishability - thus, generating consumer unpleasantness when acquiring it few days after harvesting or minimally processing. In this sense, food industries have been evaluating processes that increase the shelf life of food, such as osmotic dehydration. Although it is considered a conventional technique for reducing moisture content, the quality of the resulting product can be improved with the use of non-conventional osmotic solutions. For this, maltitol was used in this study as a sweeteners with reduced calorie content to perform osmotic dehydration of ginger. Saturated solutions of maltitol at 298.15, 308.15, 318.15 and 328.15 K were applied with processing times ranging from 1 to 24 hours. Ginger samples cut in a plate format (4.2 length x 4.2 width x 0.5 cm thickness) were immersed in the saturated solutions without mechanically agitating using a 1:10 ratio for ginger to saturated osmotic solution. After 24 hours of process, water losses by the ginger samples obtained ranged from 16.45±1.52% to 25.18±2.52% for 25 °C and 55 °C, respectively. The solids gain reached values of 9.12±1.18% at 11.45±1.51 at 25°C and 55°C, respectively. The increase in processing time caused greater mass transfer by keeping osmotic solution saturated over the processing time, leading to the maximum gradient for mass transfer between the food and the osmotic solution. In addition, the increase in temperature caused a decrease in the viscosity of the solutions, also facilitating the diffusion mechanisms of maltitol molecules into the food matrix. The fitting procedure showed a good fit accuracy of the Peleg model to the experimental data, predicting water loss and solid gain with R2?0.994; RMSE?0.408 and R2?0.995; RMSE?0.222, respectively. It is, then, concluded that temperature and time of osmotic dehydration play an important factors when dealing with saturated solutions during osmotic dehydration. Moreover, maltitol demonstrated to be a potential sweetener to be used in osmotic dehydration for producing low-calorie food products with extended shelf-life.