

Quality Changes in Ripened Mango and Litchi Flesh After Cryogenic Freezing and During Storage

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ABSTRACT

This study investigated a methodology to cease the activity of polyphenol oxidase (PPO) enzyme and peroxidase (POD) enzyme on ripened mango flesh cv. Maha Chanok and litchi flesh cv. Hong Huay before storage using liquid nitrogen. The immersion of halved-ripened mango flesh in a mixture solution of 1% citric acid and 1% calcium chloride for 2 min resulted in the optimal activity decrease of PPO and POD at 64.0 and 48.3%, respectively. Compared to the control, which was soaked in the previously stated mixture solution before freezing by liquid nitrogen and kept at -24°C for 6 months, the PPO and POD enzyme activities of the frozen ripened mango flesh only slightly increased during the storage period. The average enzyme activities in the control group were lower by 53.4 and 40.8%, respectively. In case of litchi flesh, the implementation of 0.5% calcium chloride solution for 5 min inactivated PPO and POD enzyme activities by 39.9 and 34.2%, respectively, whereas the texture of the flesh was improved, without leaving a bitter taste. In addition, the measured compression force of the litchi flesh texture, which belonged to the experimental set, was higher than the control set and differed significantly ($p \leq 0.05$) from each other. When the presoaked litchi flesh in 0.5% calcium chloride solution was frozen in the liquid nitrogen and maintained at -24°C for 6 months, the firmness of frozen litchi flesh after thawing was relatively stable throughout the storage period. The activity of PPO enzyme dropped slightly, whereas POD activity only decreased during the first month and the activities increased afterwards. The activities of enzymes in the experimental set were significantly lower than the control set ($p \leq 0.05$).

Keywords: Ripened mango, Litchi flesh, Citric acid, Calcium chloride, Polyphenol oxidase, Peroxidase, Cryogenic, Liquid nitrogen.