

Sirirak Siramard 2014: Quality Improvement of Frozen Mango Using Calcium Lactate, Pectin and Sucrose. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Sanguansri Charoenrein, Ph.D. 153 pages.

The objective of this study was to improve the quality of frozen mango. The effect of ripening stage and infusion with calcium lactate, pectin and sucrose on the quality and microstructure of frozen mango was investigated. This thesis consists of 3 main parts. The first part, effect of ripening stage and infusion with calcium lactate and sucrose on the quality of frozen mango was studied. The partially ripe and ripe mango cubes were infused in 1% calcium lactate solution or a combination of 1% calcium lactate and 50% sucrose solution before freezing at -20°C and stored for 14 days. After thawing, both the partially ripe and ripe mango treated with the combination of calcium lactate and sucrose exhibited the highest firmness value, sensory firmness score, lowest drip loss and less cell wall damage. Furthermore, partially ripe mango could better withstand freezing damage than ripe mango due to its stronger cell wall structure. The second part, the reduction of pectin's molecular structure by acid hydrolysis was studied in order to improve the quality of frozen mango. Commercial apple pectin was subjected to 0.1 M HCl at 80°C for 6 to 96 h. The results showed that the increase of hydrolysis time caused the decrease of the average molecular weight, degree of esterification, glass transition temperature, apparent viscosity and microstructure of pectin. The third part, utilizing of partially ripe mango infused with calcium lactate, sucrose, pectin and hydrolyzed pectin on the quality of frozen mango was examined. The partially ripe mango was infused with the combination of 1% calcium lactate and 50% sucrose and the combination of 1% calcium lactate, 50% sucrose and 4.9% commercial apple pectin or 6h or 48h-hydrolyzed pectin before freezing at -80°C and stored at -20°C for 14 and 150 days. The results demonstrated that the highest firmness, lowest drip loss and strongest cell wall structure was found when the mango treated with the combination of calcium lactate and sucrose. However, the infusion of combination of calcium lactate, sucrose and 48h-hydrolyzed pectin showed better texture preservation of frozen mango compared with the others pectin pretreatment. The freezing did not affect alcohol insoluble solid content whereas the increase in water soluble pectin content was found after freezing and thawing. The storage time affected the quality of frozen mango. The longer storage time caused the decrease in firmness and increase in drip loss. It can be concluded that using of the partially ripe mango pretreated with calcium lactate and sucrose could improve the quality of the frozen mango.

Student's signature

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