

Kannika Owcharoen 2012: Effect of Freezing Rates and Freeze-Thaw Cycles on Texture and Pectic Substances of Mango (*Mangifera indica* L. cv. Nam Dok Mai Sri Thong). Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Sanguansri Charoenrein, Ph.D. 103 pages.

Ripe mangoes have a short shelf life. Because of their perishability, freezing is one of preservation techniques that helps preserve their original attributes. However, freezing usually causes textural changes leading to softening in fruit. The quality of frozen-thawed fruit depends on many factors such as optimal freezing rate including proper transportation and distribution chain. These processes had an effect on quality of products. Therefore, the objective of this research was to study the effect of freezing rates (fast freezing (FF), medium freezing (MF) and slow freezing (SF)) and freeze-thaw cycles (1-3 cycles) on texture (instrumental measurement and sensory evaluation), microstructure, drip loss and pectic substances of mango cv. 'Nam Dok Mai Sri Thong' fruit were determined. The pectin contents, i.e. alcohol insoluble solids (AIS), total pectin (TP), water soluble pectin (WSP) and ammonium oxalate soluble pectin (ASP). Fresh mango was use as a control. The results showed that the AIS and TP contents of fresh and freeze-thawed sample with three freezing rates in all freeze-thaw cycles were not significantly different ( $p > 0.05$ ). However, the WSP, ASP and drip loss showed an increase tendency with repeating freeze-thaw cycles. For the 1<sup>st</sup> cycle, SF sample had significantly higher WSP, ASP and drip loss than those with other freezing rates ( $p \leq 0.05$ ). For the 3<sup>rd</sup> cycles, the WSP and ASP of three freezing rates were not significantly different ( $p > 0.05$ ). Whereas a reduction in firmness values and firmness scores were observed after FF, MF and SF as compared with fresh mango. The firmness values and firmness scores were decreased with repeating freeze-thaw cycles. Although freezing reduced firmness values and firmness scores, FF samples had the highest firmness. Furthermore, microstructure showed that the cell wall of frozen samples were destroyed by ice crystal formation thus cell shrinkage and collapse were occurred. The degradation of cell walls was more obvious for SF than for MF and FF of each cycle. This study confirms that freezing rates and repeated freezing and thawing processes have an obvious impact on the quality of soft fruit such as ripe mango.

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