

Charoen Kunprom 2007: Optimum Procedure for Ripening Mango (*Mangifera indica* L.) cv. Nam Dokmai #4 at Commercial Scale. Master of Science (Postharvest Technology), Major Field: Postharvest Technology, Interdisciplinary Graduate Program. Thesis Advisor: Ms. Apita Bunsiri, Ph.D. 170 pages.

'Nam Dokmai' mangoes ripened with calcium carbide ( $\text{CaC}_2$ ) and ethylene ( $\text{C}_2\text{H}_4$ ) at the different concentrations, ripening temperatures, bagging materials and maturity stages were studied. The results revealed that the suitable concentration for ripening mango fruit was 20 g/kg fruit of  $\text{CaC}_2$  and 200  $\mu\text{l/l}$  of  $\text{C}_2\text{H}_4$ . It was found that the temperature inside containers during ripening had 5°C higher than the temperature of ripening room. The relative humidity during ripening was 85-98%.  $\text{CO}_2$  of fruit ripened with  $\text{CaC}_2$  increased after 54 h while that of fruit ripened with  $\text{C}_2\text{H}_4$  had the highest concentration of 1.8%. The fruit after ripening had the highest skin color development from green to yellow. The optimum temperature for ripening mango fruit with  $\text{CaC}_2$  and  $\text{C}_2\text{H}_4$  was ambient temperature. The results showed that the temperature inside containers during ripening and 5°C higher than the temperature of ripening room and the relative humidity was 85-98%.  $\text{C}_2\text{H}_4$  of fruit ripened with  $\text{CaC}_2$  reached to the maximum concentration at 3 h. However, there was  $\text{CO}_2$  concentration lower than 1%. It was found that fruit ripened with  $\text{CaC}_2$  had the lowest L-value, +b-value and firmness, but the highest TSS/TA and Vitamin C. For fruit ripened with  $\text{C}_2\text{H}_4$ , it was revealed that the fruit reached the highest concentration of  $\text{CO}_2$  at 3.9%. In addition, the fruit ripened at ambient temperature had higher TSS/TA, sweetness score and preference score than that ripened at 20°C and 25°C. Preharvest bagging of 'Nam Dokmai' mango at the maturity stage of 40% with the different kinds of bagging materials: newspaper, white cloth, black cloth and 2-layer paper (brown outside and black inside) bag had higher total carotenoids, TSS and TSS/TA but lower TA and vitamin C than non-bagged fruits. The result showed that the suitable bag for preharvest bagging was a 2-layer paper bag (brown outside and black inside). It was found that bagged fruit with 2-layer paper bag had the highest skin color development from green to yellow, L, +a and +b values but the lowest chlorophyll. After fruit was floated in the water, sunk in the water and/or in 1 and 2% NaCl, it was found that fruits and the maturity stage of 80% floated in water while those of 85 and 90% sunk in the water and 1%NaCl, respectively. The fruits and the maturity stage of 80, 85 and 90% had the age after 50% full bloom 85, 92 and 99 days, respectively. In addition, fruits at each maturity stage had the heat unit of 1,204.5, 1,261.25 and 1,314.25 CDD, respectively. The results showed that the optimal maturity stages were 85 and 90%. The fruits at the maturity of 85 and 90% ripened with  $\text{CaC}_2$  had higher skin color development from green to yellow, +a value of skin and TSS that those of 80%, while those ripened with  $\text{C}_2\text{H}_4$  had greater +b value of skin, TSS and TA than those of 80%. After the optimal concentrations of  $\text{CaC}_2$  and  $\text{C}_2\text{H}_4$ , including with other optimal factors was applied for the commercial scale and assessed sensory evaluation by farmers and exporters, there were no significant difference with physical, chemical and eating qualities.



Student's signature



Thesis Advisor's signature

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