

Padungsak Wanitchang 2011: Physical, Mechanical, Physiological and Optical Properties of Thai Mango as Related to Maturity. Doctor of Philosophy (Postharvest Technology), Major Field: Postharvest Technology, Interdisciplinary Graduate Program. Thesis Advisor: Associate Professor Anupun Terdwongworakul, Ph.D. 287 pages.

The objective of this research was to investigate the physical, mechanical, physiological and optical properties of 4 Thai mangoes included Nam Dokmai, Chok Anan, Maha Chanok and Keiw Savoey cultivars as related to maturity. To formulate the mango maturity and to classify mango fruit according to the maturity stage by using the physical, mechanical, physiological and optical properties.

The study revealed that the physical, mechanical, physiological and optical properties were related to days after fruit set. In the first year of study 4 mangoes cultivar were used. The PLSR and discriminant analysis using nondestructive properties to classify the maturity in 3 stages as Immature, Mature and Overmature. The discriminant analysis showed %correctly classified more than 80. In the second year of study 2 mangoes cultivar were used: Nam Dokmai and Chok Anan. The discriminant analysis using 5 models of nondestructive properties to classify the maturity in 3 stages. The result showed highest %correctly classified as 95 and 94.3, respectively. The reduction of parameter decrease % correctly classification. The cluster analysis using nondestructive properties to classify the maturity in 4 stages. The discriminant analysis using 36 parameter of nondestructive properties can be classify the maturity in 4 stages as 84.3 and 93.3 %correctly classified, respectively. After reduced SG gave nearly the same results with 84.0 and 89.0% correctly classified, respectively. The best applicable nondestructive parameter of Nam Dokmai were SG, size, sphericity and R640/R530. While, Chok Anan were SG, size, sphericity, impact firmness index and acoustic firmness index. These nondestructive properties can be used in the modification of the maturity devices for mango.

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Thesis Advisor's signature