

Jaitip Wanitchang 2010: Physical, Mechanical, Physiological, and Light Properties of Dragon Fruits as Related to Quality Grading. Doctor of Philosophy (Postharvest Technology), Major Field: Postharvest Technology, Interdisciplinary Graduate Program. Thesis Advisor: Associate Professor Anupun Terdwongworakul, Ph.D. 175 pages.

The objective of this research was to investigate the physical, mechanical, physiological, and light properties of dragon fruits that related to quality grading. The dragon fruit of concern included both varieties *Hylocereus undatus* and *Hylocereus polyrhizus*. The fruits were harvested at 23-40 days after fruit setting.

The study revealed that the physical properties, mechanical properties, physiological properties, and light properties were related to days after fruit set (DAFS). The best quality performed at the mature stage which was 28-30 DAFS. Light reflectance ratio Log (R680/R550) showed the highest correlation with the maturity. All of the mention properties can be used to classify dragon fruit according to the maturity stage and varieties by using discriminant analysis with 94.9 and 91.4 % correctly classified in *Hylocereus polyrhizus* and *Hylocereus undatus*, respectively. The multivariate maturity index (MMI) was performed with destructive properties and DAFS by using principal component analysis (PCA). The Partial Least Square Regression Model with color values a, b and Log (R680/R550) can predict not only MMI of *Hylocereus polyrhizus* but also MMI of both varieties precisely. Whereas MMI of *Hylocereus undatus* used visible spectrum at 400-700 nm as predictors. The prediction result was not significantly different from the model with physical properties and visible spectrum at 400-700 nm as predictors. So these nondestructive properties can be used in the design of the quality grading machine for dragon fruit.

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Thesis Advisor's signature

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