

**Title** Non-destructive maturity classification of mango based on physical, mechanical and optical properties

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### **Abstract**

Mango is a popular tropical fruit and right maturity at harvest is important for eating quality and shelf life. Therefore, harvesting needs skilled pickers otherwise fruit of varying levels of maturity will be collected. This research investigated maturity classification of mango fruits (cv. Nam Dokmai) using physical, mechanical and optical properties. Variation in size, sphericity, specific gravity, total soluble solids, total acidity, surface color, acoustic response (stiffness coefficient based on the resonant frequency and the weight of the fruit), impact response (peak acceleration/corresponding time) were followed during a number of days after fruit set from 77 to 115 days. On discriminant analysis, mangoes of three maturity classes based on days after fruit set could be separated using non-destructive parameters (95%). Cluster analysis was applied based on destructive parameters (total soluble solids and total acidity) and days after fruit set to pre-allocate each fruit into four different maturity classes. The 89.0% accuracy of classification into four levels of maturity could be achieved by simplified non-destructive model. The best applicable variables of physical, mechanical and optical properties were SG, stiffness coefficient and diffuse reflectance at 670 nm, respectively.