Title	Non destructive grading for mangosteen based on image processing and ultrasonic method
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Abstract

Mangosteen grading in Indonesia, so far, is done manually based on visual evaluation. The practices cause ununiform quality, since the inside defects of fruits are undetected. Human errors also occur frequently due to the fatigue of the workers. Only 30-40% of the fruit harvested reaches export quality. Many problems appear in all segments of mangos teen production and trade, including the availability of planting materials, orchard management, harvest and post-harvest handling, and the marketing system. Various claims have been imposed to Indonesian mangoesteen due to defects inside the fruits commonly caused by gamboge, and translucent pulp. These quality parameters have been assessed by breaking the mangosteen manually, which is a destructive method. This research aimed to develop a non destructive grading system to evaluate mangosteen quality based on image processing, ultrasonic and neural network. Input data for neural network were parameters obtained from image processing and ultrasonic measurement which had strong relationship with quality characteristics of mangosteen. The accuracy level in evaluation of calyx wholeness using image processing was 100 %. The average of ultrasonic wave velocity for the defect mangosteen was 0.1402 mm/us while for the wholesome mangosteen was 0.1282 mm/us. The accuracy level of neural network prediction for grading mangosteen quality was 95 %, and for the ratio of sugar/acid was 92 %.