

Title Physical properties of fresh young Thai coconut for maturity sorting
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Abstract

Young mature coconut is a widely consumed fruit consisting of soft white flesh and sweet white transparent aromatic juice. Judging the maturity of young coconut is difficult and thus a harvested crop typically features fruit of varying levels of maturity, which currently require manual grading. In an attempt to help reduce the time and costs associated with the grading process, the correlations between the physical, mechanical, physiological and acoustic properties of coconuts and their maturity levels were investigated. The analyses showed that specific gravity, husk rupture force and husk firmness showed a decreasing trend with progressing days after pollination. Other properties including resonant frequency, shell rupture force, shell firmness, total soluble solids, flesh thickness, wet flesh weight and dry flesh weight indicated an increase in values with days after pollination. The flesh thickness was the parameter best correlated with days after pollination. Maturity index based on the flesh thickness can be quantitatively predicted by multivariate partial least squares model. The best model used a combination of husk rupture force, shell firmness, shell rupture force, wet flesh weight and husk firmness ($R^2 = 0.991$, standard error of prediction of 0.133 and bias of 0.004). A non-destructive model based on resonant frequency gave relatively good accuracy of prediction with $R^2 = 0.927$, standard error of prediction 0.386 and bias of 0.034.