Title Textural Properties of Thai Java Apple Fruits

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Abstract

The purpose of this research was to investigate textural properties of Thai java apple fruit of five cultivars (i.e. Tubtimjan, Toonklao, Pechsampran Pechsairung and Tongsamsi). Methodology comprised of determination of physical characteristics and mechanical properties of fully mature java apples, 480 fruits per cultivar, by the use of the Universal Testing Machine INSTRON 5569 and the Impact Tester. Experimental design was of factorial in CRD with two control factors, i.e. cultivar and fruit size.Results showed that the cultivar and the fruit size significantly influenced parameters of physical characteristics and mechanical properties, at the significance level of 1%. The longest and the shortest fruit was Tubtimjan (88-74 mm) and Pechsampran (69-62 mm), respectively. The widest and the most narrow fruits were Toonklao (78-67 mm) and Tubtimjan (63-54 mm), respectively. Average moisture and specific gravity of the fresh java apples were 67 to 70% and 0.81 to 0.96, respectively. Pechsairung had the highest total soluable solid (averagely 11.75% brix). Small Pechsairung showed the maximum rupture force of 3.57 N. Average rupture deformation and force of the java apple ranged from 0.40 to 0.45 mm and from 2.85 to 3.57 N, respectively. Medium Pechsampran and small Toonklao featured the greatest (1.36 N-mm) and the smallest (0.6 N-mm) toughness, respectively. Small Tubtimjan and small Toonklao showed the highest (7.88 N/mm) and the lowest (6.47 N/mm) average firmness, respectively. The maximum initial firmness (3.97 N/mm) happened with small Tubtimjan, whĩle the minimum initial firmness (= 3.56 N/mm) was with medium and big Tonsamsri. Small Pechsairung and small Tooklao exhibited the highest (2.36 N) and the lowest (1.8 N) penetrating force, respectively. Small Tubtimjan and small and medium Toonklao showed the maximum (9.86 N-mm) and the minimum (7.36 N-mm) penetrating energy, respectively. The highest modulus of elasticity by plunger compression was with small Tubtimjan (222 KPa). The greatest modulus of elasticity using a prepared cylindrical sample was with small Pechsairung (245 KPa). The maximum and the minimum modulus of elasticity by the impact test happened with small Pechsairung (298 KPa) and big Pechsampran (238 KPa). Application of total soluble solids and specific gravity to sort the fresh java apple fruit is likely.