

Kedsadaphon Wongsim 2007: Evaluation of Apple Shelf-life using Multiple Characteristics. Master of Engineering (Food Engineering), Major Field: Food Engineering, Department of Food Engineering. Thesis Advisor: Associate Professor Anupun Terdwongworakul, Ph.D. 94 pages.

This research studied evaluation of apple shelf life using multiple parameters. “Fuji” variety apple was stored at 10°C and 20°C with 90-95% humidity. Every week 10 apples were measured for a number of parameters until they appeared unacceptable externally (8 weeks). The measured physical parameters were acoustic impulse transmission velocity, acoustic impulse frequency, parameters from relationship between compression force and deformation (e.g. maximum compression force, work from start to maximum force, deformation from start to maximum force and compression fatigue), moisture percentage, weight and specific gravity. The measured chemical parameters were soluble solids content and titratable acidity.

The results indicated that the acoustic impulse transmission velocity and acoustic impulse frequency correlated significantly with the maximum compression force at both 10°C ($r = 0.786$ and $r = 0.698$ respectively) and 20°C ($r = 0.463$ and $r = 0.6$ respectively) storage. The classification of apple into each group of shelf life week was done by discriminant analysis using all physical and chemical parameters as independent variables and validated by cross validation. The differentiation was found to be corrected at 86.3 and 72.5% for 10°C and 20°C storage respectively. However, at 10°C apple was classified into 4 groups of shelf life week i.e group 1 is storage 1 week and 2 week, group 2 storage 2 week and 3 week, group 3 storage 5 and 6 week and group 4 storage 7 and 8 week and the most contributed variable was acoustic impulse frequency, maximum load and velocity 5 respectively. As for 20°C storage, apple was classified into 3 groups of shelf life week i.e group 1 is storage 1 week, group 2 storage 2 week group 3 storage 3 and 4 week and the most contributed variable was acoustic impulse frequency, moisture content and velocity 5.

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