Abstract

Judging watermelon quality based on its apparent properties such as size or skin color is difficult. A non-destructive method is employed based on vibration response spectrum, to determine the quality indices of watermelon *(Crimson sweet)*. The responses of samples to vibration excitation were recorded by Laser Doppler Vibrometry (LDV). The phase shift between input and output signals were extracted over a wide frequency range. The total soluble solids (TSS), titratable acidity (TA) and TSS/TA ratio also measured as watermelon quality characters. Multiple linear regressions (MLR) with stepwise method as well as partial least square regression (PLS) were applied to extracted vibration spectrums to construct prediction models of watermelon quality. The results showed that performance of MLR models were better than PLS. The determination coefficients (R^2) ofMLR validation models were 0.9996, 0.9996 and 0.999 for TSS, TA and TSS/TA respectively. This study demonstrated the feasibility of mentioned method for predicting the quality of watermelons in an industrial grading system.