Title Pear dynamic characteristics and firmness detection

Author Jun Wang, Bin Teng and Yong Yu

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Abstract

An experimental system was set up to generate the impact force, measure the response signal and analyse the frequency spectrum for physical property detection of biological products. The pear dynamic resonance frequencies were obtained based on analysis of the dynamically measured frequency response of an excited pear with changes in the excitation points, the detection points, the impact intensity and the excitation material, and under different pear firmness and mass conditions. As a result of the analysis, it was found that the dominant frequency was significantly affected by the pear firmness and mass. The excitation point, the detection point, the excitation intensity and the impacting material did not significantly affect the dominant frequency. The dominant frequency increased with increasing pear firmness and decreased with increasing pear mass. A good relationship was obtained between the dominant frequency and the pear firmness or the pear mass, and the firmness index regressed on the Magness–Taylor firmness also showed a good relationship.