Title Effect of Pre-load, Vibration Frequency, Temperature and Specific Gravity of Potato Tissue on Visco-elastic Vibration Damping and Complex Modulus Properties

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Citation Biosystems Engineering, Volume 94, Issue 3 , July 2006, Pages 415-427

Keywords potato; vibration frequency

**Abstract**

Specimens of potato tissue with various specific gravity were tested in a single degree of freedom vibration experiment at various temperatures. Different pre-load masses were put on top of the specimens to change the vibration frequency of the visco-elastic system. The instrumentation comprised a hammer with a force transducer for the impact excitation and an accelerometer to measure the dynamic response of the system. By analysing the frequency response function, the complex modulus data were obtained, providing information on the stiffness and the damping characteristics of the potato tissue. The reduced variables technique was used to combine the effects of (1) vibration frequency and specific gravity, and (2) vibration frequency and temperature. A fractional derivative model was fit through the complex modulus data as a function of the reduced vibration frequency. This model equation allowed the numerical calculation of the visco-elastic impulse response of the dynamic system in the time domain.