

Laboratory simulation of vibration effects met at vehicular road transportation of fruits and vegetables

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Abstract

For studying and controlling the vibration effects present at vehicular road transportation, the quantitative estimation and laboratory simulation of the same becomes vital. Using an accelerometer, the vibration acceleration was measured in terms of power spectral density (PSD) in dB/Hz unit. Average of the maximum vertical vibration (PSDmax) levels produced by the truck over the time of experiment were 0.005 dB/Hz, 0.01 dB/Hz and 0.05 dB/Hz at the front, middle and rear of the truck-bed respectively. Vertical vibration acceleration levels present at actual vehicular road transportation were simulated at the laboratory using a fabricated electro-dynamic vibrator. PSDmax levels met at the actual road transportation by truck were simulated at the laboratory by varying the eccentric mass and the loaded-weight of the vibrator. Eccentric mass adjusted in between 200 g and 300 g permits generation of PSDmax levels of interest on the vibrator at no-load. Loading a weight in the range from 15 kg to 60 kg allows generation of the required PSDmax levels when the eccentric mass is set to 400 g. By adjusting mutually the eccentric mass and the loaded-weight, the vibrator is capable of simulating the PSDmax levels of the interest.

Keywords: Vibration sensor, Accelerometer, Vibration simulator, Vehicular vibration, Fruit quality degradation