Abstract

During mechanised harvest and post-harvest handling, perishable fruit and vegetables undergo intensive mechanical impacts that can lead to appreciable produce damage and further quality losses. In order to detect the actual causes of damage, so called “electronic fruit” are used simulating the real produce and acquiring data on mechanical total. These devices represent an artificial case built similar to fruit size and weight, with embedded autonomous sensing unit able to acquire impact acceleration or impact pressure and to store or to transmit the detected impact data. Usually, these impact acquisition devices are spherically shaped in order to ensure symmetrical geometry of measuring characteristics. However, the actual motion of a real product through harvesting and post-harvest handling equipment depends not only on size and weight, but also on geometrical shape, elasticity and surface friction. Therefore, major differences between “electronic fruit” and real produce can cause significant deviations of the motion and according different results. That means, the data of impact measurements of “electronic fruit” are not satisfactory transferable to real produce. Better fitting to geometrical and mechanical properties of real product could improve the measuring results and help to improve the identification of actual damage sources in production lines. The paper reports a project on development of a miniaturized impact detector. The dimensions of miniaturised system are smaller than a Mignon battery. This impact detector can be implanted into a real produce like potato tuber, carrot or apple fruit. A tri-axial acceleration sensor is used to acquire impact events with peak values up to 250 G (G = 9.81 m/s^2) at sampling rate of 3 kHz. Measured acceleration data of each axis are wireless transmitted in real time to an external receiver for further evaluation with PC.