Title Assessment of apple (*Malus* × *domestica* Borkh.) fruit texture by a combined acoustic-mechanical profiling strategy

Author Fabrizio Costa, Luca Cappellin, Sara Longhi, Walter Guerra, Pierluigi Magnago, Duilio Porro, Christos Soukoulis, Silvio Salvi, Riccardo Velasco, Franco Biasioli and Flavia Gasperi

Citation Postharvest Biology and Technology, Volume 61, Issue 1, July 2011, Pages 21-28

Keywords Apple; Fruit texture; Crispness; Acoustic and mechanical profile; Post harvest quality

Abstract

Texture of apple fruit originates from anatomic traits related to cell wall architecture and is one of its most important quality characteristics, thus there is the desire to better understand the different factors which contribute to apple texture. Here we present a novel approach based on the simultaneous profiling of the mechanical and acoustic response of the flesh tissue to compression, using a texture analyzer coupled with an acoustic device. The methodology was applied to a 86 different apple cultivars, measured after two months postharvest cold storage and characterised by 16 acoustic and mechanical parameters. Statistical treatment of the data with principal component analysis (PCA) allowed for the identification of three groups of variables, the mechanical ones being clearly distinguished from the acoustic ones. Moreover, the distribution of the apple cultivars in the multivariate PCA plot allowed characterisation of the cultivars according to their textural performance. Each cultivar was analyzed also with non-destructive vis/NIR spectroscopy in order to determine impartially the ripening stage. Sensory evaluation by panellists was performed on a selected group of cultivars and sensory data correlated with the acoustic-mechanical data. The results demonstrate the good performance of our combined acoustic-mechanical strategy in measuring apple crispness as it is perceived by human senses.