

Title Monitoring of firmness evolution of peaches during storage by combining acoustic and impact methods  
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Citation Journal of Food Engineering, Volume 77, Issue 4, December 2006, Pages 926-935  
Keywords Non-destructive methods; Fruit quality; Firmness; Peach; Acoustic technique; Impact technique

### **Abstract**

Firmness is a very important quality property in peach. The storage of peach affects its subsequent softening process and shelf life. The temperature and duration of storage mainly influence the firmness of stored fruit, and monitoring the evolution of fruits enables producers to manage its commercial life. The objective of the present study was to use non-destructive acoustic and impact tests to estimate firmness of peaches and to elucidate the influence of storage temperature and of time on the softening process of peach. Continuous and classification models based on variables obtained from non-destructive methods were developed. Parameters obtained from non-destructive methods were compared to destructive reference tests. The maximum force in ball compression correlated well with the maximum acceleration from impact test ( $r^2 = 0.75$ ), and with a band magnitude parameter from acoustic test ( $r^2 = -0.71$ ). Combining impact and acoustic parameters, the multiple correlation coefficient increases up to 0.91 (adjusted  $R^2 = 0.82$ ) in the prediction of the maximum force in ball compression. Classification models based on both non-destructive parameters and sorting peaches into two classes of firmness, showed scores of well classified higher than 90%.