

Title Mechanical Behaviour of Apples, and Damage during Sorting and Packaging  
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### **Abstract**

In sorting and packaging lines, fruits are submitted to impacts that can involve alterations to the flesh. For this study, impact measurements were taken at critical points on Italian machines at a domestic packing house. These impacts were then reproduced in the laboratory to analyse the damage and the mechanical behaviour of apples of four cultivars (*Golden Delicious*, *Stark Delicious*, *Granny Smith* and *Rome Beauty*). Using multiple linear regressions, correlations were determined between the characteristics of the apples, impact levels, subsequent damage and parameters describing the mechanical behaviour of the fruits. The deterioration of the flesh observed on the impacted apples does not represent serious commercial damage to the product, excluding the deterioration due to an accessory feeding line that employs a dry bin dumper. In this last case, damage can consist of darkening of the flesh and fractures having a depth of 4–5 mm and a diameter of 12–15 mm. The research emphasized the need to consider characteristics such as the impact radius, the flesh firmness and the sugary content of the flesh when studying the effects of dynamic stresses on apples. The sample of *Stark Delicious* showed the highest susceptibility to impacts.