Application manual No. 080

Production: APPLES

Objective: Measurement of the bruising potential of apples by continual static compression

Type of action: Compression test

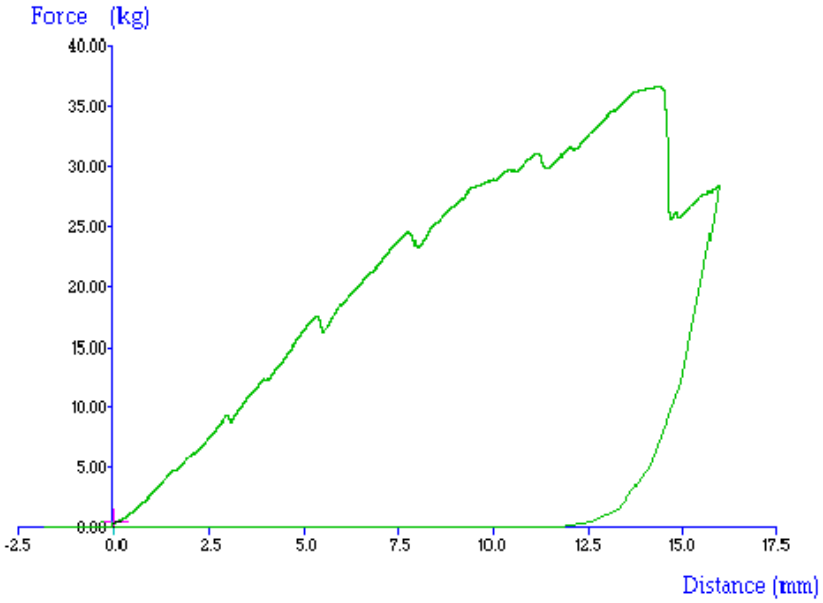
Test mode settings:

Speed	Test mode	Trigger	Target	Hold
0.2 mm/s	Distance (c)	100 gf	16 mm	0 sec

Accessory:
ϕ 75 mm compression plate

Test Set-Up:
Secure the Heavy Duty Platform onto the machine base. Position samples centrally with the core at right angles to the direction of force, on the blank plate of the Platform or directly on the machine base. Commence the static compression test of the whole fruit.

Typical plots:



The above curve was produced from an average sized Royal Gala apple

Observations:
Once a trigger force of 100g has been achieved the compression platen proceeds to move down onto the apple and a rapid rise in force is observed. During this stage the sample is deforming under the applied force but there is no apparent breakdown of the product. As the compression distance increases small peaks are seen on the graph profile, each peak indicating a compressive failure of the sample which contributes to the formation of a bruise. This stage ends abruptly when the sample splits or cracks and is indicated by a large decrease in force. The greater the distance that this occurs, the greater is the ability to withstand compression without sample breakage.

It is usually desired that, whilst being ripe, the fruit still maintains a high degree of mechanical strength to protect the fruit from damage, such as bruising, during transport and handling. The level of damage suffered by the crop during harvesting and handling can considerably affect its marketable life.

Notes:

- Because the ripening process itself varies from fruit to fruit, a large variation in firmness may sometimes be found among individual fruits in the same containers or harvested at the same time.
- The test may be modified to compress samples to a greater distance. This will subsequently increase the 'hardness' values if this is the case a 250kg load cell would be recommended for higher force range. Any values obtained are only relative at the specified distance to which they are compressed.
- When attempting to optimize test settings it is suggested that the first tests are performed on the hardest samples to anticipate the maximum testing range required and ensure that the force capacity allows testing of all future samples.