Production: PEARS

Objective: Firmness or 'Bio yield Point' measurement of pears by penetrating

Type of action: Penetration test

Test mode settings:

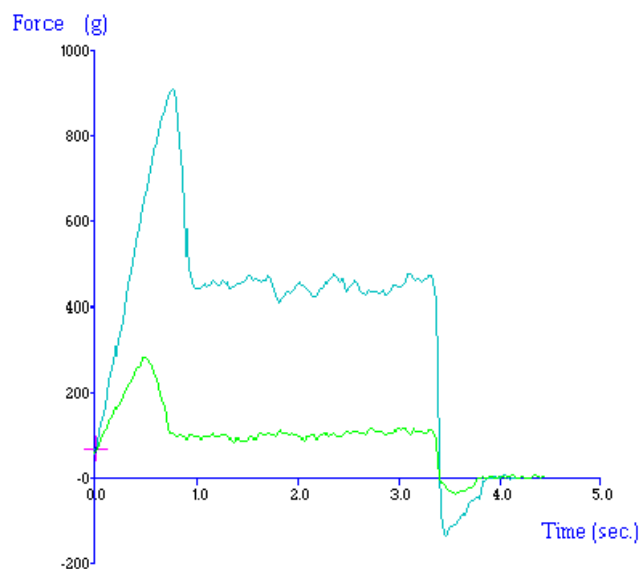| Speed	Test mode	Trigger	Target	Hold
1.5 mm/s	Distance (c)	25 gf	5 mm	0 sec

Accessory:
φ 2 mm cylinder probe, Platform

Test Set-Up:
Secure the Heavy Duty Platform to the base of the machine. Position the sample centrally on the blank plate of the platform and commence the penetration test around the mid-region of the fruit.

Typical plots:

The above curves were produced from testing a ripe and an unripe St. William pear.

Observations:

Once a trigger force of 25g has been achieved the probe proceeds to move down onto the pear and an initial rapid rise in force is observed. During this stage the sample is deforming under the applied force but there is no puncturing of the tissues. This stage ends abruptly when the probe punctures through the skin and begins to penetrate into the sample flesh, which event is represented by the sudden change in slope called the 'bio yield point'. The bio yield point occurs when the probe begins to penetrate into the fruit, causing irreversible damage. The third phase of the puncture test, namely, the plateau of the force after the bio yield point is an indication of the underlying flesh firmness of the fruit. As expected the results show that the unripe batch is firmer than the ripe batch of pears.

Data Analysis:

☒Max Force

Results

Sample	Mean Max. Force 'Bio yield Point' (+/- S.D.) (g)	Mean Plateau Force 'Flesh Firmness' (+/- S.D.) (g)
Unripe	914.2 +/- 64.8	456.2 +/- 18.4
Ripe	284.4 +/- 14.3	101.2 +/- 10.8

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.

● 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.