Application manual No. 090

Production: PEACHES

Objective: Measurement of the firmness of peaches by shearing

Type of action: Cutting test

Test mode settings:

Speed	Test mode	Trigger	Target	Hold	Count
5 mm/s	Distance (c)	0 gf	38 mm	0 sec	10

Accessory:
Blade of Warner Bratzler, Platform

Introduction:
Over the past five years a method has been developed for testing peach firmness for the peach industry. Newly harvested peaches can be extremely firm, so a bulk testing method such as using a kramer shear cell is not possible on single column instruments. Measured forces with a kramer shear cell can easily exceed 100 kg. Peaches are also not well suited to puncture tests since a puncture test picks up too much of a peach's spot-to-spot firmness variability. This test method is designed for an ongoing testing program for quality control purposes for peach wedges. The method is simple yet effective. With a single test run an operator can accomplish ten tests in approximately two minutes.

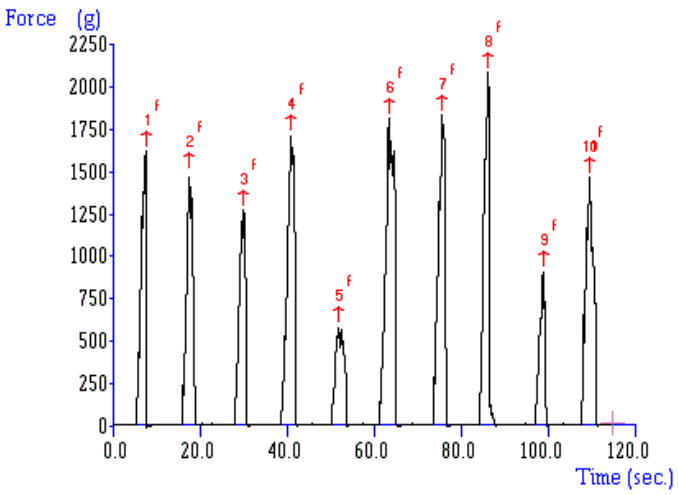
Sample Preparation:
Slice the peaches into ten wedges of similar size. It is preferable to start with similarly sized peaches.

Test Set-Up:
Attach the reversible blade to the load cell carrier. Calibrate the blade to start from a set distance apart for each test e.g. 40 mm (see probe calibration below).

Position a peach wedge under the blade on the base of the machine and commence the test. Once the blade has sheared the first peach wedge, quickly remove the cut wedge and replace with an uncut wedge. Repeat until all ten wedges have been tested. When doing this, extreme caution must be taken to avoid personal injury.

Probe Calibration:
Lower the blade so that it is close to the base. Click on CALIBRATE Height. The distance that the blade is to start from the base for each test is specified, e.g. 40mm is suggested.

Typical plots:



The left curve was produced from shearing ten newly harvested peach wedges at 20C.

Observations:
Once the OK button is clicked the test begins and the graph proceeds to plot the shearing of the first peach wedge to 2mm above the base. As the blade returns to 40mm the force drops to 0g. The next sample is positioned under the blade and the force is seen to rise as it shears through the second wedge. This pattern is observed for all ten peach wedges. The greater the maximum force the firmer is the sample. It is quite clear there is variability in the firmness of the peach wedges and it is for this reason that the average shear force of ten wedges is taken.

Data Analysis:
☒Max Force

Results

Sample	Mean Max. Force 'Resistance to Shear' (g)
A	1484.6

Notes:

- Before commencing each test, ensure that there are no bruises along the exposed sample testing region which would result in a lower force value.
- Peach size, geometry and orientation of individual fruit to the sun should be considered when preparing samples for comparison.
- The data analysis given is a general example for the analysis of a curve such as the one above, any changes made to the test parameters or significant differences to the shape of the curve profile may require optimization of this macro.
- It is possible that an individual stroke may have two or more 600 gram peaks. In those cases either increase the force threshold, or rewrite the macro to drop anchors before and after each downstroke and calculate one Force Maxima for each of the ten pairs of anchors.
- The operator must be careful and attentive throughout all ten repetitions of the tests so as to not catch a finger under the knife blade during the test's strokes. All operators must be educated as to the sharpness of the blade and the manner by which the instrument can be turned off in a safety situation. *Note that the emergency switch is activated by simply pressing it down.*
- 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.
- The method and results for this application study have been kindly provided by Texture Technologies Corp., USA.