

Production: HYDRATED SWEETCORN

Objective: Comparison of two varieties of canned sweet corn by shearing

Type of action: Cutting test

Test mode settings:

Speed	Test mode	Trigger	Target	Hold
2 mm/s	Distance (c)	0 gf	50 mm	0 sec

Accessory:

Kramer shear cell - 10 blades, Platform

Sample Preparation:

Remove the sweet corn from their cans, drain and weigh out into equal portions. It is important that this weighed amount is enough to fill the Shear Cell by 50% of its capacity.

Test Set-Up:

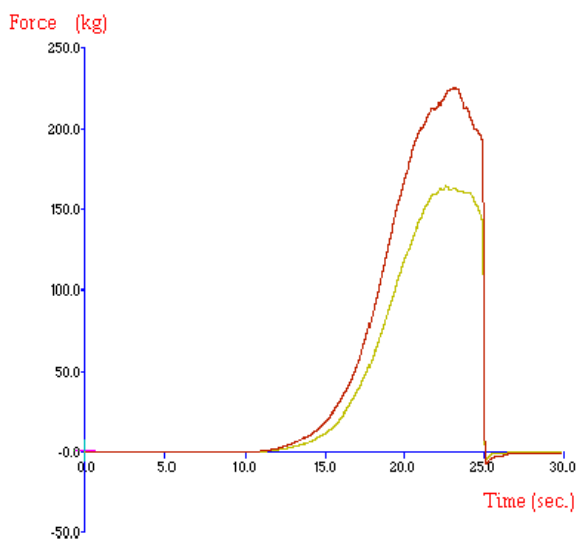
The empty Shear Cell (perspex front forward) is secured in the Heavy Duty Platform, which is loosely fixed onto the machine base. The blades are attached to the load cell carrier by means of the rapid locating adapter and lowered slowly into the sample cell and through the base slots. The Platform is then manoeuvred until clearance is visible between the blades and their respective slots. The Platform can then be screwed into place.

Before carrying out the test using a 'zero' trigger one must calibrate the blades to acknowledge the bottom of the cell as a zero position. To do this, lower the blades, so that they close to the bottom of the cell. Click on **CALIBRATE Height**. Specify the distance that you want the blades to start from for each test - e.g. **55mm** is suggested. (Note: place a piece of thin flat card in the bottom of the cell to calibrate and then remove this before testing.)

The blades will move down and touch the card and then move up to the specified start distance. For the comparison of results it is crucial that the test always begins at the same distance from the bottom of the cell, this distance can be programmed into the **CONTROL PROBE** feature.

Prior to each test ensure that there is good clearance around the blades to avoid frictional effects, i.e. so that the blades are not touching the sides of the cell. A 'blank' test i.e. a test without any sample in the shear cell can be run to check this. The blades are then raised above the cell to allow for placement of the test sample. Running a spatula (or other) horizontally across the outside edges of the blades is recommended to ensure that the blades are hanging freely. Place the sample into the cell, distribute pieces evenly and run the test. In between tests clean the blades and the grooves of the cell to remove any remaining sample, as this will cause variable results.

Typical plots:



The left curves were produced from testing 100g of drained sweet corn at 20C.

Observations:

The graphs indicate that sample A requires a significantly higher force to shear and compress the sample and is hence significantly harder than sample B. Calculating the area under the curve can also be indication of the hardness/firmness. In some cases where the sample is not very homogenous the area is more repeatable than the maximum force.

Data Analysis:

☒ Max Force

Results

Sample	Mean Max. Force 'Hardness' (+/- S.D.) (kg)
A	223.4 +/- 4.9
B	164.7 +/- 2.0

Notes:

- The term 'Hardness' may also be referred to as 'Firmness'.
- The Kramer shear cell is a multi-bladed device. The sample to be sheared is often variable configuration or structure. The result is an average of the forces required to cut through the sample of variable geometry.
- If the sample is firmer it is preferable to shear to a greater extent, a 500kg load cell would be recommended for a higher force range.
- 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.
- Difference in sweet corn hardness values may be as a result of one or more of the following factors:
 - Harvest time
 - Sweet corn varieties
 - Blanching time