

Peas Hardness Analysis

Hardness testing of cooked peas is essential for assessing texture consistency, which affects consumer preference and quality standards. By measuring the force needed to compress the peas, manufacturers can ensure consistent product quality across cooking methods.

Background:

- Peas, prepared through different cooking methods (boiling vs. microwaving), are tested to evaluate firmness. The compression test measures hardness by assessing the maximum force required to deform the sample, with the area under the force vs. deformation curve indicating the work done to compress the sample.



Equipment:

- CTX Texture Analyzer with 50 kg load cell
- Components: Ottawa Cell, Fixture Base Table, Extrusion Plate, Catchment Drawer
- Software: Texture Pro for controlling parameters and recording data

Settings:

- Test Type: Compression
- Pre-Test Speed: 2.0 mm/s
- Test Speed: 2.0 mm/s
- Post-Test Speed: Return at test speed
- Target Distance: 6.5 mm
- Trigger Force: 50 g

Sample Preparation:

1. Weigh out 30 g of peas and pour them into the Ottawa Cell, filling approximately half the cell.
2. Spread the peas evenly to create a level surface for consistent testing.

Procedure:

1. Attach the plunger to the instrument's probe shaft.
2. Place the Fixture Base Table onto the base, adjust it for mobility, and align the Ottawa Cell to the plunger.
3. Position a catchment drawer under the cell to capture extruded samples.
4. Lower the plunger to just above the sample surface, ensuring consistent starting distance for all tests.
5. Begin the compression test, recording the force as the plunger penetrates the peas to the target distance.
6. Clean the plunger, extrusion plate, and Ottawa Cell between tests.

Observations:

- Figure 1: Force vs. Time graph shows the hardness of peas after different cooking methods.
 - The peak value represents the hardness, with microwave-cooked peas demonstrating higher firmness than boiled peas.

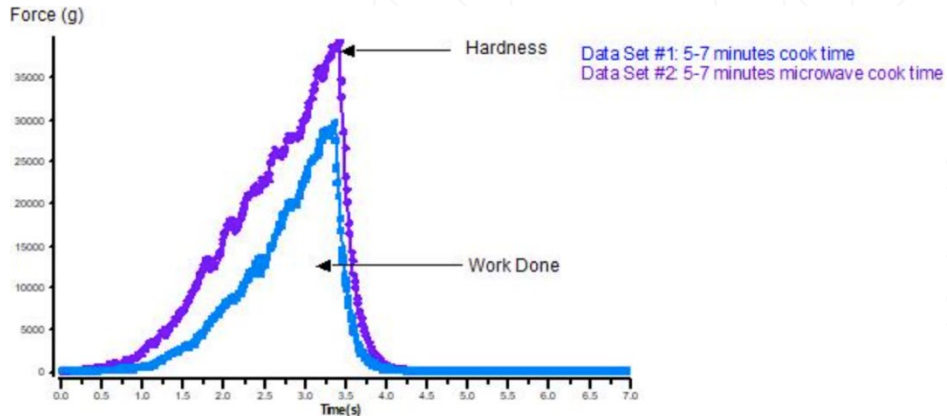


Figure 1

- Figure 2: Force vs. Distance graph reveals the hardness as the plunger compresses the peas over 6.5 mm.
 - Load increases as the plunger compresses the sample, with microwave-cooked peas showing higher force values compared to boiled peas.

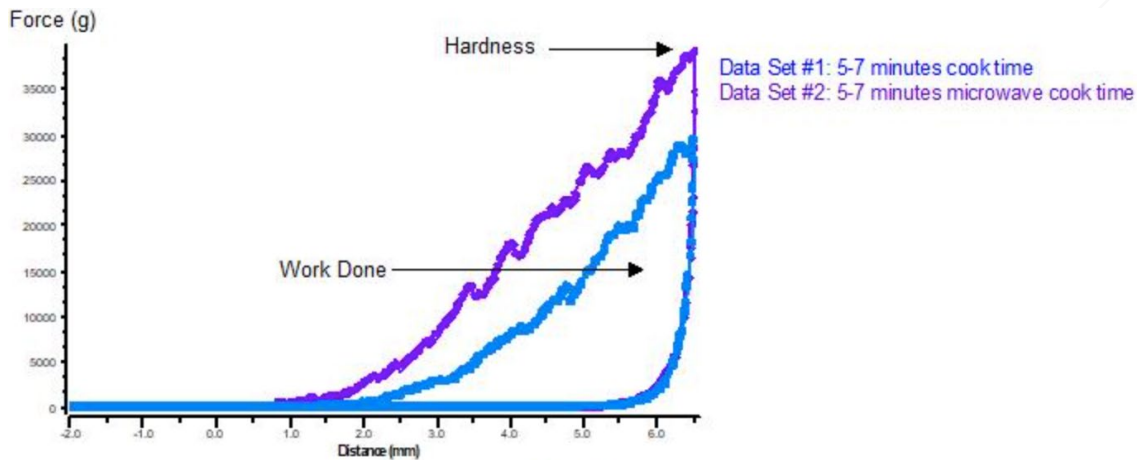


Figure 2

Results:

- Cooked Peas (5-7 minutes): Hardness = 29,475 g, Work Done = 491.7 mJ
- Microwave-Cooked Peas (5-10 minutes): Hardness = 39,455 g, Work Done = 867.8 mJ

Discussion:

The hardness and work done values indicate that microwave-cooked peas are firmer than boiled peas. The peak force reflects the maximum resistance to compression, while the work done represents the energy required to compress the sample. These measurements provide valuable insights into textural differences caused by cooking methods, supporting consistent quality in food processing.