

Hardness Analysis of Chuck Steak

Testing the hardness of chuck steak is essential to evaluate its texture, which impacts both cooking suitability and consumer preference. By measuring the peak load and work done to shear the steak, manufacturers can assess its firmness, aiding in quality control for various uses like pot roasts and ground beef.

Background:

- Chuck steak, a tough, thicker cut from the cow's shoulder, is commonly used for its balanced fat and protein content. Its firmness makes it ideal for slow-cooking applications, and this test quantifies the hardness to provide insights into texture.

Equipment:

- CTX Texture Analyzer with 50kg load cell
- Components: Shear Blade Accessory, Fixture Base Table
- Software: Texture Pro Software for controlling test parameters and data analysis



Settings:

- Test Type: Compression
- Target Type: Distance
- Target Distance: 28 mm
- Trigger Load: 100 g
- Pre-Test Speed: 1 mm/s
- Test Speed: 2 mm/s

Sample Preparation:

1. Store the chuck steak sample overnight at room temperature in original packaging.
2. Cut the sample into even rectangular pieces for consistency.

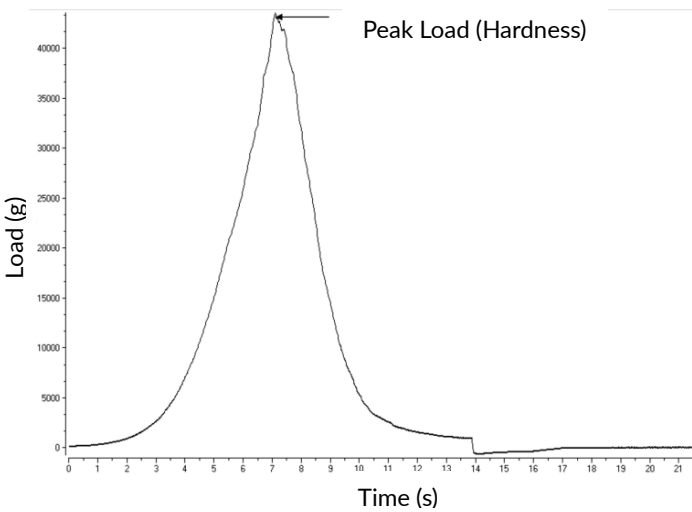
Procedure:

1. Attach the shear blade to the analyzer.
2. Secure the Fixture Base Table with bolts, aligning it with the probe.
3. Place the steak sample centrally on the table under the blade.
4. Position the blade approximately 3 mm above the sample surface.
5. Set test parameters in the Texture Pro software, then start the test.
6. Repeat the procedure for additional samples if required.

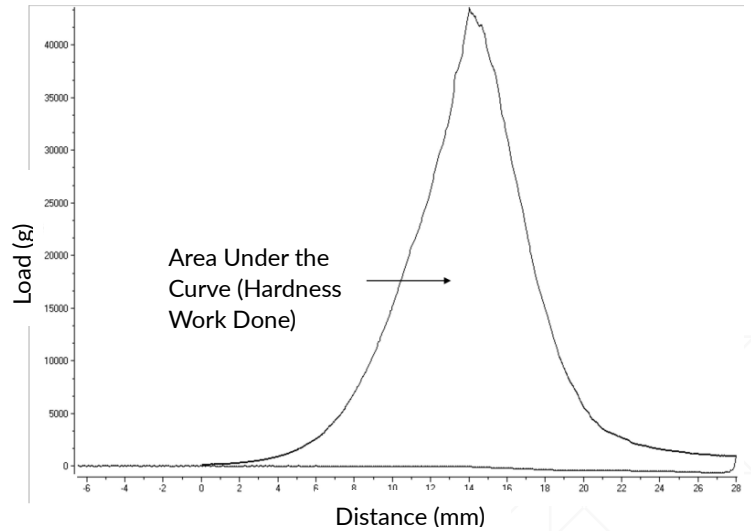
Observations:

- Figure 1: Load vs. Time graph reflects sample hardness, with the peak load showing the maximum force required.
- Figure 2: Load vs. Distance graph indicates the work done to shear the sample over the 28 mm distance.

Hardness of Chuck Steak



Hardness Work Done of Chuck Steak



Results:

- Peak Load (Hardness): 43,475 g
- Hardness Work Done: 2,966.3 mJ

#	Sample Description Product Name	Batch Name	Results Hardness Cycle 1 (g)	Hardness Work Cycle 1 (mJ)
1	Beef	Chuck Steak	43475.00	2966.30

Discussion:

The peak load measures the steak’s firmness, representing the force needed to shear through the sample, while the hardness work done indicates the energy required to chew the steak. Higher values suggest a tougher texture, suitable for slow-cooking or grinding. Proper sample preparation and consistent testing parameters ensure reliable results for quality assessment.