

Cooked Chicken Texture Analysis

Understanding the hardness and firmness of cooked chicken is critical for quality control, optimizing cooking methods, and ensuring consistent texture that meets consumer expectations. Texture influences mouthfeel and overall eating experience, making it essential for maintaining product quality.

Test Principle:

- Evaluate the hardness/firmness of cooked chicken using a five-bladed Kramer Shear Cell (TA-KSC002) to measure the force required to shear the meat.

Background:

Factors Affecting Meat Texture:

- Water Holding Capacity (WHC): Higher WHC leads to a stronger structure and drier texture; lower WHC results in softer, moister meat.
- Rigor Status, Marbling Fat, Connective Tissue Content, and Muscle Bundle Size: Also influence meat hardness and structure.
- The Kramer Shear Cell uses multiple blades to shear samples of varying geometry, providing an average force measurement for hardness and work done. This fixture incorporates compression, shearing, and extrusion methods.



Equipment:

- Instrument: CTX with 50 kg Load Cell
- Accessory: TA-KSC002 Kramer Shear Cell, TA-BT-KIT Fixture Base Table
- Software: Texture Pro Software

Settings:

- Test Type: Compression
- Pre-Test, Test, and Post-Test Speed: 2.0 mm/s
- Target Type: Deformation
- Target Value: 35 mm
- Trigger Load: 5 g



Procedure:

1. Remove the sample from storage and weigh equal amounts for testing.
2. Attach the blade-containing probe to the instrument shaft.
3. Place the fixture base table on the instrument base and loosely tighten the thumb nuts.
4. Fix the Kramer Shear Cell to the fixture base table with the Perspex side facing forward.
5. Lower the instrument arm and align the blades with the shear cell slots to avoid friction.
6. Tighten the thumb nuts to secure the fixture base table.
7. Remove the blades to place the sample in the shear cell, then reattach the blades.
8. Lower the instrument arm so the blades are just above the sample.
9. Start the test.
10. Clean the fixture between tests to avoid contamination.

Observations:

- At a trigger force of 5 g, the blades compress and penetrate the chicken sample at 2 mm/s over 35 mm.
- Figure 1: Load vs. Time graph shows maximum peak force, indicating sample hardness/firmness.

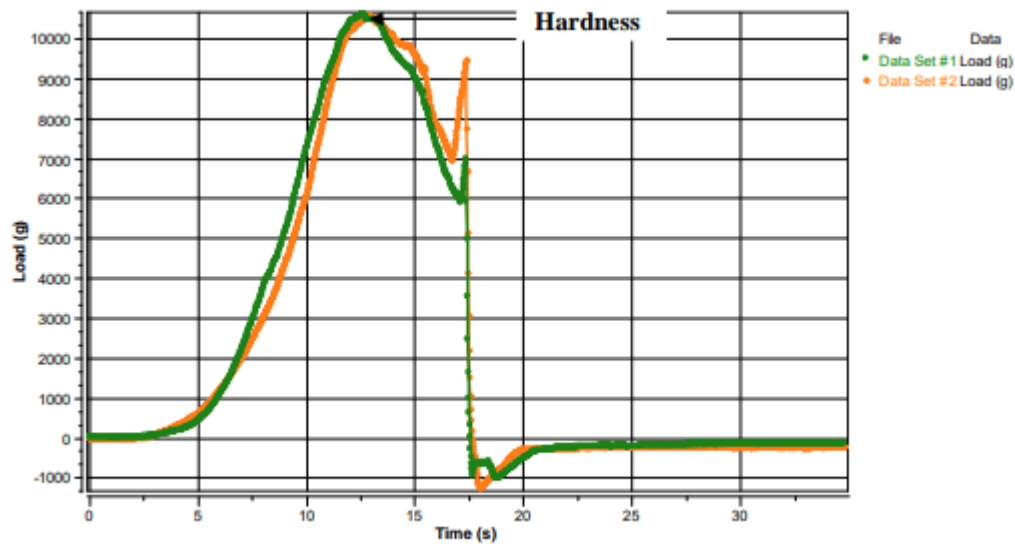


Figure 1

- Figure 2: Load vs. Distance graph provides additional measurements, including work done (area under the curve).

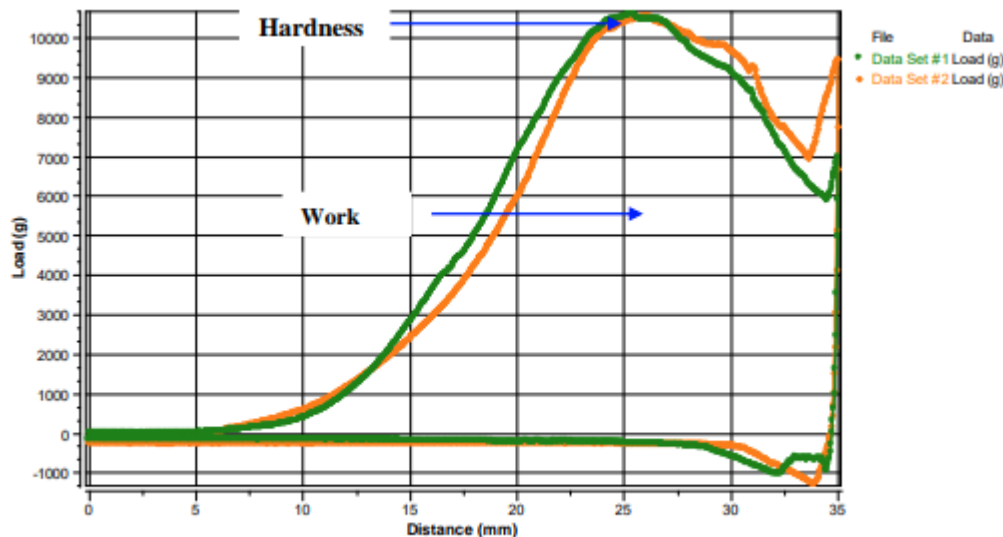


Figure 2

Results:

- Hardness: 14,548 g \pm 600
- Work Done: 1,344.3 mJ \pm 29.4

Discussion:

- Maximum Force Value: Indicates sample hardness/firmness, correlating with the force needed to compress the sample (Figures 1 and 2).
- Work Done: Area under the graph from start to target distance measures the energy required to break internal bonds within the sample; higher values indicate more energy needed (Figure 2).

Conclusion:

The CTX Texture Analyzer with the Kramer Shear Cell is effective for evaluating the hardness and firmness of cooked chicken, providing critical data for quality control and ensuring consistent product texture.