

Gummy Sweet Candy Texture Analysis

Understanding the extensibility and tensile strength of gummy sweets is crucial for ensuring product consistency and consumer satisfaction. This analysis provides key insights into the elastic and plastic deformation of gummy candies, helping manufacturers optimize formulations for ideal texture and performance. Monitoring these properties is critical for ensuring the product remains stretchy without breaking prematurely.

Test Objective:

- To evaluate the extensibility and tensile strength of gummy sweets using a Texture Analyzer and Kieffer Extensibility Fixture (TA-KF). The test measures the force needed to stretch and rupture the gummy candy, determining its elastic and plastic deformation characteristics.



Equipment:

- Instrument: CTX Texture Analyzer with a 1 kg Load Cell
- Fixture: Kieffer Extensibility Fixture (TA-KF)
- Software: Texture Pro

Settings:

- Test Type: Tension
- Pre-Test Speed: 1.0 mm/s
- Test Speed: 1.0 mm/s
- Target Distance: 35 mm
- Trigger Load: 5 g

Procedure:

1. Place the fixture base table on the base of the instrument and slightly tighten the thumbscrews for mobility.
2. Insert the Kieffer Extensibility Fixture into the base table and secure it by tightening the thumbscrews.
3. Attach the hooked probe to the probe shaft of the instrument.
4. Lower the arm of the instrument until it is approximately 10 mm above the clamp surface of the Kieffer Extensibility Fixture.
5. Align the hooked probe centrally with the fixture's aperture by repositioning the base table.
6. Lower the hooked probe until it passes through the aperture without touching the sides of the fixture.
7. Tighten the thumbscrews of the fixture base table to prevent further movement after alignment.
8. Lower the hooked probe until it nearly touches the base of the fixture, about 100 mm in total.
9. Remove the sample plate from the Kieffer Extensibility Fixture by lowering the clamp lever.
10. Place the gummy sweet strip onto the grooved sample plate.
11. Push the clamp lever down, insert the sample plate into the fixture, and release the lever slowly to clamp the sample.
12. Reposition the hooked probe to a few millimeters below the gummy sample surface and begin the test.



CTX Texture Analyzer

Observations:

- Figure 1: The Load vs. Time graph shows the tensile strength (elastic limit) of the gummy sweet. Below the peak force, the sweet can recover fully (elastic deformation). After reaching the peak, plastic deformation begins, followed by necking and rupture.

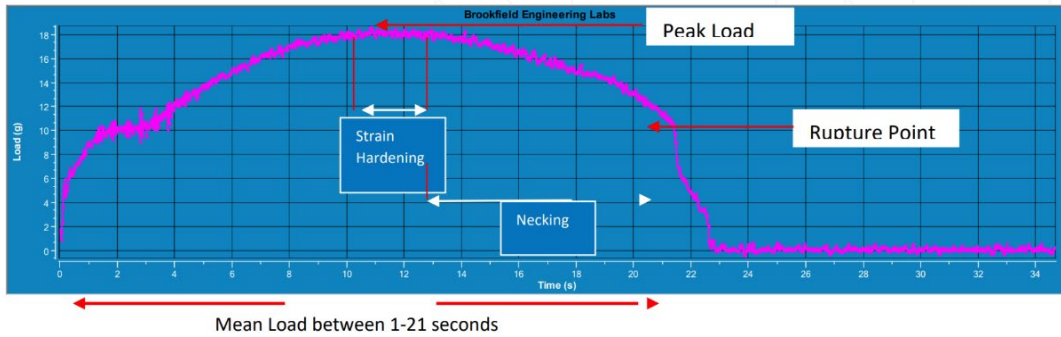


Figure 1 - The Load/Time graph for the hardness and extensibility of a gummy sweet using a 6 mm cylinder probe.

- Figure 2: The Load vs. Distance graph illustrates the strain hardening, necking, and eventual breaking point of the gummy sweet.

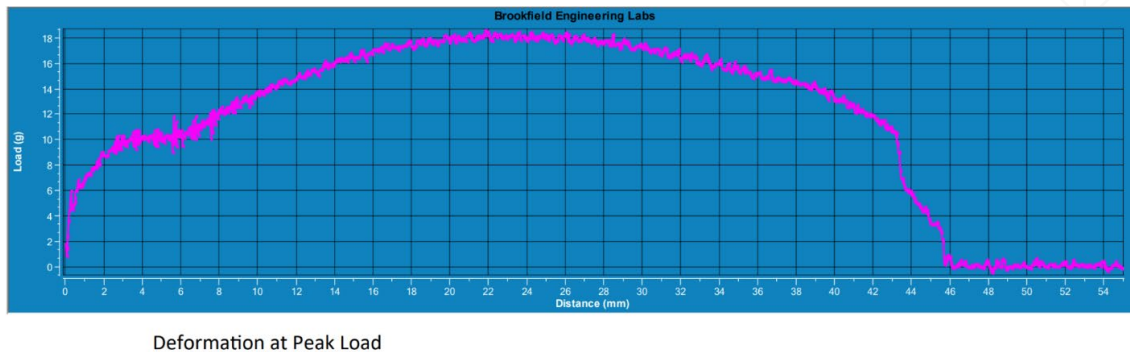


Figure 2 - The Load/Distance graph for the hardness and extensibility of a gummy sweet using a 6 mm cylinder probe.

Results:

- Mean Load: 18.3 g
- Work Done: 14.8 g
- Peak Load (Tensile Strength): 18.3 g
- Deformation at Peak Load: 21.37 mm

#	Sample	Peak Load g	Mean Load g	Work Done g	Deformation at Peak Load mm
1	Gummy Sweet	18.3	14.8	7.01	21.37

Conclusion:

This test method is essential for quality control and shelf-life studies of gummy sweets. It ensures consistent texture, optimizing both elastic recovery and extensibility for a satisfying consumer experience. The analysis helps manufacturers maintain production consistency, crucial for meeting consumer expectations regarding texture and stretchiness.