

Cheese Texture Analysis

Understanding the texture of different types of cheese is essential for product development, quality control, and consumer satisfaction. Texture properties such as softness, spreadability, and firmness impact mouthfeel, flavor release, and overall sensory experience. This analysis helps to compare full-fat, light, and extra light cheeses, ensuring that lower-fat alternatives meet desired texture profiles.

Test Principle:

- Compare the softness and spreadability of full-fat, light, and extra light soft cheeses using a 45° cone probe.



Background:

Soft Cheese Characteristics:

- Moisture content between 48% and 80%.
- Full-fat cheeses: $\leq 60\%$ moisture, $> 20\%$ fat.
- Stabilizers increase solids, viscosity, and enhance texture and flavor.

Cheese Variants Tested:

1. **Full fat:** 30% fat, 8% protein
2. **Light:** 15% fat, 12% protein
3. **Extra light:** 6% fat, 15% protein

Texture analysis is crucial for developing low-fat foods to mimic the texture of full-fat counterparts.

Equipment:

- Instrument: CTX Texture Analyzer with 1500 g Load Cell
- Probe: Conical Probe 45° (TA15)
- Software: Texture Pro Software

Settings:

- Test Type: Compression
- Test Speed: 1 mm/s
- Target Value: 20 mm
- Trigger Force: 4.5 g

Procedure:

1. Remove cheese samples from the refrigerator (6.8°C).
2. Place samples beneath the test probe in their original containers.
3. Conduct three replicate tests per sample with a three-minute interval between the first and last test.

Results:

- **Figure I:** Force deformation curves illustrate the textural differences between cheese types.
 - **Full fat cheese:** Highest values for modulus, hardness, and adhesion, indicating a firmer texture.
 - **Light cheese:** Softest texture with the lowest values.
 - **Extra light cheese:** Intermediate characteristics between full fat and light cheeses.

Parameters:

- **Hardness (g):** Peak positive load; force needed to achieve deformation.
- **Adhesive Force (g):** Peak negative load; force needed to pull the probe from the sample.
- **Modulus (g/cm²):** Represents sample rigidity; ratio of stress to strain during the first compression cycle.

Typical Results:

- **Hardness:**
 - Full fat: 897 g
 - Light: 180 g
 - Extra light: 356 g
- **Adhesive Force:**
 - Full fat: -140 g
 - Light: -33 g
 - Extra light: -60 g
- **Modulus:**
 - Full fat: 34.6 g/cm²
 - Light: 5.7 g/cm²
 - Extra light: 11.1 g/cm²

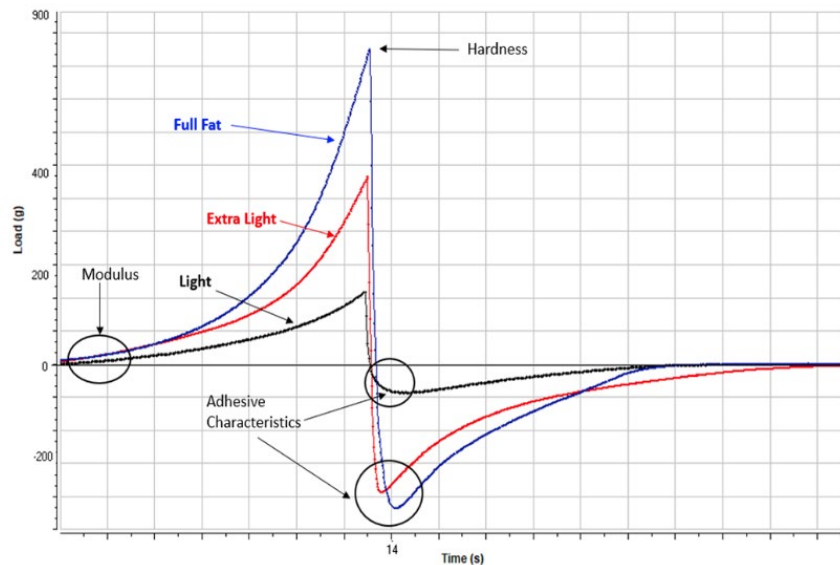


Figure I

Conclusion:

The full-fat cheese has the firmest texture, while the light cheese is the softest. The extra light cheese has a consistency between the two, but its texture does not fully mimic the full-fat sample due to the differences in stabilizers and milk protein content.