

Dry Lasagna Texture Analysis

Understanding the breaking strength of dry lasagna is crucial for optimizing production consistency, maintaining ideal texture, and ensuring consumer satisfaction. Texture properties such as hardness, fracturability, and flexibility directly affect product quality and sensory preference.

Test Principle:

- Evaluates the breaking strength of dry lasagna sheets using a three-point bend accessory (TA-TPB).

Background:

Three-Point Bend Test:

- Measures parameters including hardness, fracturability (brittleness), and first fracture deformation.
- The flexure probe applies a force until the lasagna sheet snaps, creating a single fracture.

Key Values:

- **Fracturability:** Force required for the first fracture.
- **First Fracture Deformation:** Distance to the snapping point (flexibility indicator).
- **Hardness:** Can equal fracturability if the sample breaks with a single fracture.
- Results help optimize formulation (moisture, mixing time, temperature, gluten strength) and handling during production.



Equipment:

- Instrument: CTX Texture Analyzer with 5 kg Load Cell
- Accessories: TA-BT-KIT Fixture Base Table, TA-TPB Three-Point Bend Assembly
- Software: Texture Pro Software

Test Settings:

- Type: Compression
- Speeds: Pre-test: 2.0 mm/s; Test: 3.0 mm/s; Post-test: 3.0 mm/s
- Target Distance: 5 mm
- Trigger Load: 15 g



Procedure:

1. Attach the flexure probe to the instrument shaft.
2. Position the fixture base table on the instrument base and loosely tighten thumb nuts.
3. Insert the three-point bend assembly onto the fixture base table; secure with thumb screws.
4. Adjust supports to equal distances apart, ensuring proper support for the sample.
5. Align the probe centrally with the supports.
6. Secure the base table and raise the instrument arm.
7. Place the lasagna sheet centrally on the supports.
8. Position the probe close to, but not touching, the sample.
9. Start the test.

Observations:

- Figure 1: Load vs. Time graph shows maximum force (hardness) and force required for the first fracture (fracturability).
- Figure 2: Load vs. Distance graph provides additional measurements of work done (area under the curve) and first fracture deformation (distance to snapping point).

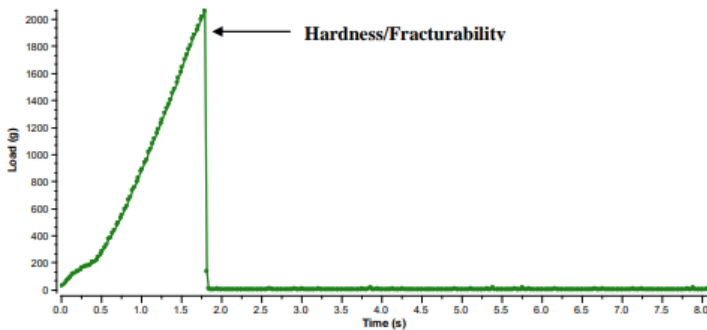


Figure 1

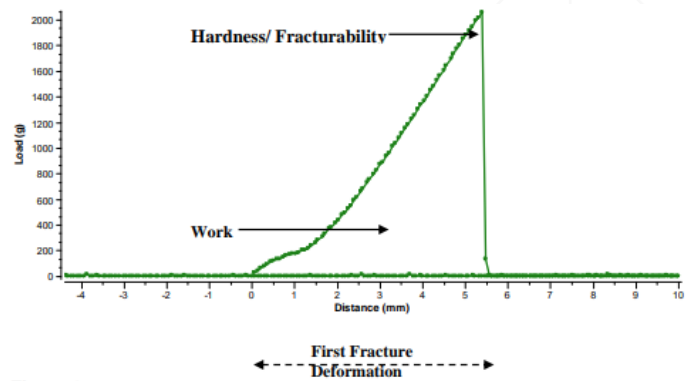


Figure 2

Results:

- Hardness/Fracturability: 2114 g ± 61
- Work Done: 47.9 mJ ± 2.9
- Quantity of Fractures: 1
- First Fracture Deformation: 5.41 mm ± 0.12

Sample	Hardness (g)	Fracturability (g)	Work Done (mJ)	Quantity of Fractures	1 st Fracture Deformation (mm)
Dry Lasagne	2114 ± 61	2114 ± 61	47.9 ± 2.9	1	5.41 ± 0.12

Discussion:

The load/distance graph (Figure 2) shows the work required to break the lasagna (energy needed to overcome internal bonds). The gradient indicates sample stiffness; a steeper gradient means a stiffer sample. The distance to the first fracture reflects sample flexibility.