

# Cheddar Cheese Texture Analysis

Hardness testing of cheddar cheese is essential for determining texture consistency, which is crucial for quality control and consumer satisfaction. By measuring the peak load and hardness work done, manufacturers can assess the firmness and structural integrity of cheddar cheese.

## Background:

- Cheddar cheese is typically hard, with aging times ranging from 3 to 18 months, affecting its texture.
- This test simulates the force needed to shear cheddar cheese, providing data on its firmness.

## Equipment:

- CTX Texture Analyzer with 5 kg load cell
- Probe and Fixture:
  - 0.33 mm Thin Cutting Wire Probe (TA53)
  - Wire Shear Plate Jig (TA-WSP)
  - Fixture Base Table (TA-BT-KIT)
- Software: Texture Pro for setting test parameters and recording data



**Figure 1**  
CTX Texture Analyzer with Wire Shear Plate (TA-WSP)

## Settings:

- Test Type: Compression
- Target Type: Distance
- Target Distance: 30 mm
- Trigger Load: 40 g
- Test Speed: 2 mm/s



**Figure 2**  
TA-WSP 0.33 mm diameter wire probe used for testing



**Figure 3**  
Sample for testing

## Sample Preparation:

1. Store cheese samples in the refrigerator overnight.
2. Cut cheese into rectangles (5 cm x 6 cm) before testing to standardize sample size.

## Procedure:

1. Attach the TA-WSP probe to the analyzer.
2. Secure the Fixture Base Table on the analyzer and adjust the alignment.
3. Center each sample on the table and position the probe 3 mm above the sample.
4. Set the test parameters in Texture Pro, then start the test.
5. After each test, wipe the probe and base plate clean, then repeat for all samples.



**Figure 4**  
Sample before testing

## Observations:

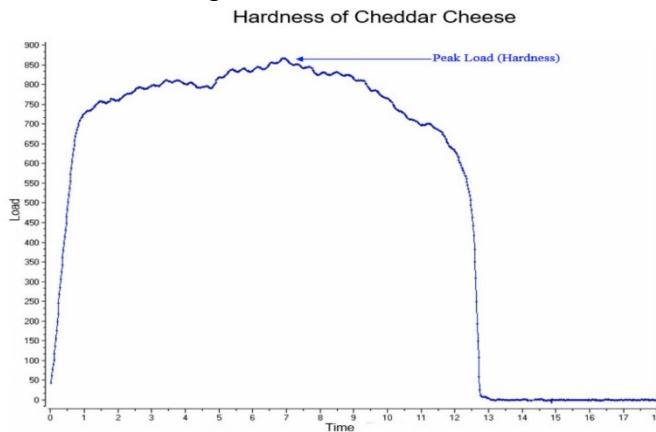
- Figure 6: Load vs. Time graph shows the peak load required to shear each cheddar cheese sample, with an average peak load of 846 g, indicating the firmness level.
- Figure 7: Load vs. Distance graph displays hardness work done, averaging 185 mJ, which reflects the energy needed to cut through the cheese.



**Figure 5**  
Sample during testing

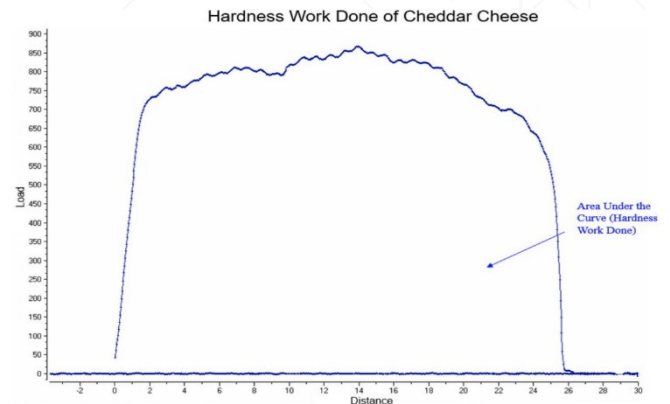
## Results:

- Average Hardness (Peak Load): 846 g
- Average Hardness Work Done: 185 mJ
- Statistical results (Figure 8) show consistent measurements with minimal variation across samples, confirming uniform texture.



**Figure 6**

Average Hardness (Peak Load) needed to shear through cheddar cheese sample is 846 gm force  
Typical Load vs. Time plot



**Figure 7**

Average Hardness (Peak Load) needed to shear through cheddar cheese sample is 185 mJ  
Typical Load vs. Distance plot

#	Sample Description		Results	Hardness	Hardness
	Product Name	Batch Name	Sample	Cycle 1	Work Cycle 1
				g	mJ
1	Cheese	Med Cheddar	6	910.00	195.88
2	Cheese	Med Cheddar	7	868.50	187.83
3	Cheese	Med Cheddar	8	761.50	171.01
			Minimum	761.5	171.01
			Maximum	910.0	195.88
			Average	846.0	184.91
			Standard Deviation	76.3	12.69

**Figure 8**

Statistical results of the tests performed on the cheddar cheese samples.

## Discussion:

Peak load measures sample firmness, with higher values indicating a firmer texture. Hardness work done represents the energy required to cut through the cheese, reflecting internal structural bonds. Consistent sample preparation and testing conditions are critical for reproducible results, providing valuable data on cheddar cheese texture quality.