

Petroleum Jelly Texture Analysis

Understanding the spreadability and firmness of petroleum jelly is critical for product formulation, ensuring proper application, and enhancing user experience. Spreadability impacts how easily the product can be applied to the skin, while firmness correlates with the jelly's resistance to deformation.

Test Principle

- This analysis evaluates the spreadability of petroleum jelly at two temperatures (4°C and 21°C) using male and female conical probes. The test measures the force required to compress and spread the jelly, simulating real-world application.



Equipment:

- Instrument: CTX Texture Analyzer with a 5 kg load cell
- Software: Texture Pro

Accessories:

- Spreadability Fixture (TA-SF), Fixture Base Table (TA-BT-KIT)

Settings:

- Test Type: Compression
- Pre-Test Speed: 1.0 mm/s
- Test Speed: 3.0 mm/s
- Post-Test Speed: 3.0 mm/s
- Target Distance: 13 mm
- Trigger Force: 5 g

Sample Preparation:

1. Fill four female cones with the petroleum jelly sample using a spatula, ensuring no air pockets.
2. Press the sample to remove visible air pockets and level the surface.
3. Leave the sample to set at the specified temperature (4°C or 21°C).

Procedure:

1. Secure the fixture base table and align the male and female conical probes.
2. Position the male probe slightly above the sample.
3. Start the test, allowing the probe to compress the jelly until the target distance of 13 mm is reached.
4. Ensure proper alignment to avoid overload and fluctuations due to air pockets.

Observations:

- Figure I: Load vs. Time graph shows the spreadability of petroleum jelly at 4°C and 21°C.

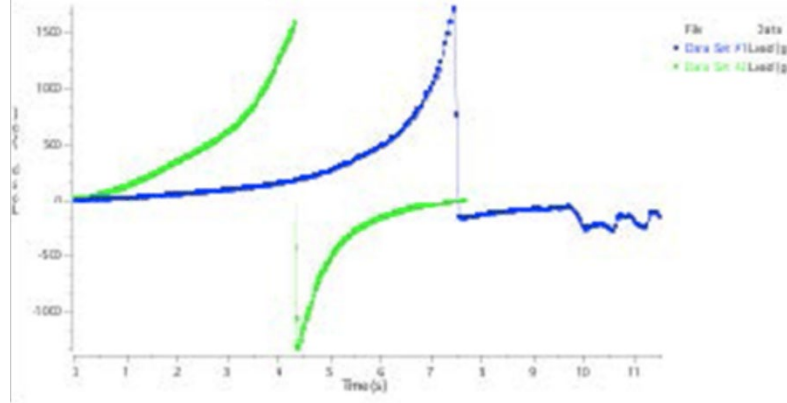


Figure I

- Figure II: Load vs. Distance graph illustrates the firmness and adhesiveness at both temperatures.

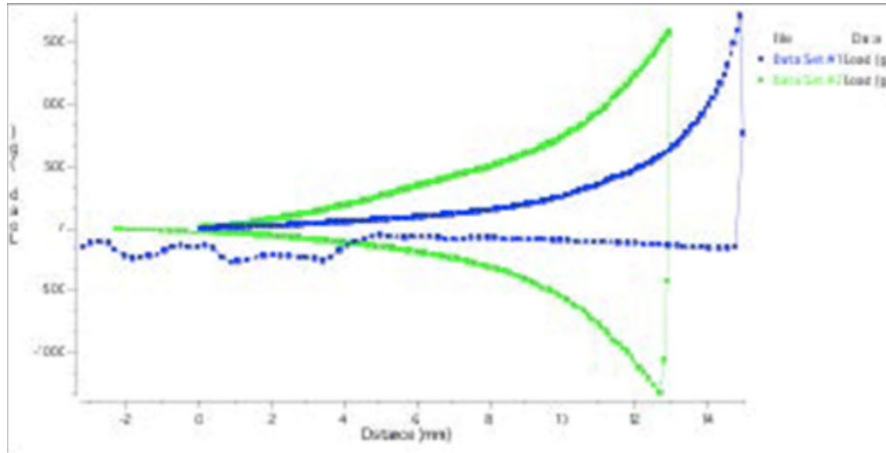


Figure II

- The force increases as the probe penetrates, indicating sample firmness.
- Higher forces at 4°C reflect a firmer jelly, while the 21°C sample is softer and more easily spreadable.

Results:

Petroleum Jelly at 4°C:

- Hardness: 1854.5 g ± 70.9
- Hardness Work Done: 67.13 mJ ± 12.35

Petroleum Jelly at 21°C:

- Hardness: 1001.3 g ± 93.7
- Hardness Work Done: 27.04 mJ ± 9.53

Test Number (°C)	Hardness (g)	Hardness Work Done (mJ)
4	1854.5 ± 70.9	67.13 ± 12.35
21	1001.3 ± 93.7	27.04 ± 9.53

Conclusion:

The analysis shows that petroleum jelly is significantly firmer at 4°C compared to 21°C. This data helps manufacturers fine-tune formulations for optimal spreadability across different temperatures, ensuring product consistency and performance.