

Production: CHOCOLATE NUTRITION BARS

Objective: Resistance of chocolate nutrition bars to penetration at different shelf life stages

Type of action: Penetration test

Test mode settings:

Speed	Test mode	Trigger	Target	Hold
1 mm/s	Distance (c)	10 gf	6 mm	0 sec

Accessory:

φ 4 mm cylinder probe, Platform

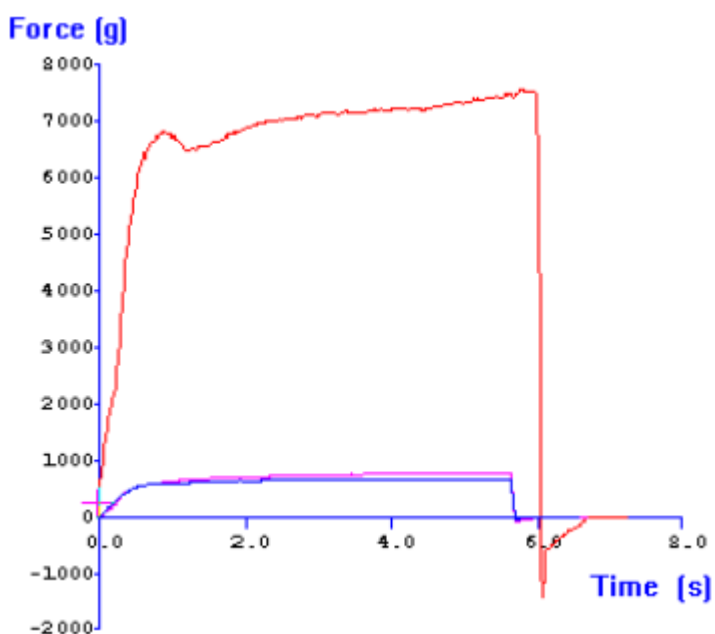
Sample Preparation:

Remove samples from their packaging just prior to testing.

Test Set-Up:

Place the sample centrally under the probe and commence the penetration test.

Typical plots:



The above curves were produced from chocolate nutrition bars at 3 different 'shelf-life' storage times of 1 week, 3 months and 6 months, stored and tested at 17C.

Observations:

Once the trigger force has been attained, the probe proceeds to penetrate 6mm into the sample. The force is seen to increase rapidly as the probe penetrates the surface of the sample and then plateaus as the probe moves down towards the centre of the bar. A greater resistance to penetration after just 1 week of storage indicates that most of the texture deterioration occurs between 1 week and 3 months storage. There is not much difference between the hardness of the bars after 3 months and 6 months storage, which suggests that very little further softening occurs after 3 months storage.

Data Analysis:

☒ Cursor mark (Find 5.5 mm by user)

Results

Storage Time	Mean Penetration Force 'Hardness' (+/- S.D.) (g)
1 week	7042.1 +/- 202.7
3 months	851.0 +/- 65.4
6 months	800.6 +/- 19.0

Notes:

- The test may be modified to penetrate to a lesser/greater depth into the sample. This will subsequently decrease/increase the 'Hardness' values. Any values obtained are only relative at the specified distance to which they are penetrated.
- Storage, packaging and handling of the sample before testing are considered variable conditions under which the sample is tested. It is important to identify these conditions and keep them constant when reporting results of firmness tests for comparison purposes.
- When attempting to optimize test settings it is suggested that the first tests are performed on the hardest samples to anticipate the maximum testing range required and ensure that the force capacity allows testing of all future samples.