

Production: CHEESE

Objective: Comparison of hardness and brittleness of four types of hard cheese using the Fracture Wedge Set

Type of action: Cutting test

Test mode settings:

Speed	Test mode	Trigger	Target	Hold
2 mm/s	Distance (c)	5 gf	10 mm	0 sec

Accessory:

Dual wedge rig, Platform

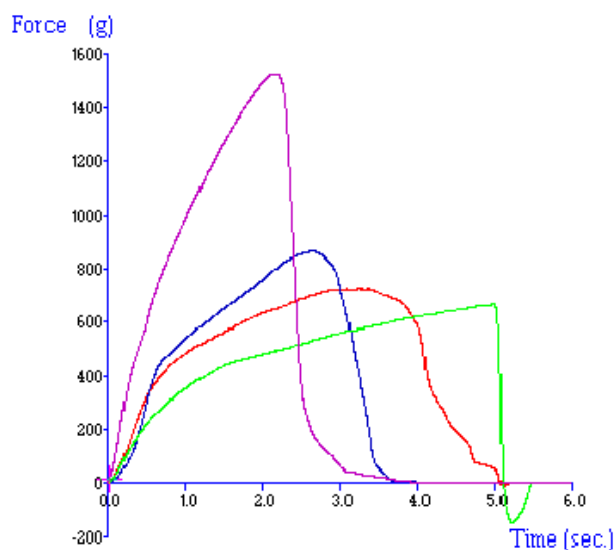
Sample Preparation:

Cut the cheeses into equal dimensions, cover and equilibrate at a chosen storage temperature e.g. 5C. Remove from place of storage just prior to testing.

Test Set-Up:

Place the sample on the lower wedge and gently hold in place. Commence the test and as soon as the upper wedge contacts the cheese sample surface the release the hold on the sample.

Typical plots:



The above curves were produced from the following 4 types of hard cheese (10mm x 20mm x 30mm), tested at 5C: Parmesan, Cheshire, Cheddar and Edam.

Observations:

When a 5g surface trigger is attained the upper wedge proceeds to penetrate to a depth of 10mm. Within this time three of the four samples are seen to yield and break with the application of force. The maximum force and distance at which this occurs is an indication of the 'Hardness' and 'Brittleness', respectively, of the sample. After the wedges have penetrated the sample to 10mm the probe returns to its original position at maximum speed (e.g. 10.0 mm/s).

Edam cheese is seen to yield but resists, however, to break (due to its more rubbery nature) and therefore the force at 10mm is taken as the Hardness at 10mm and the distance at break is not applicable. It appears that Parmesan is the hardest and most brittle cheese sample, followed by Cheshire then Cheddar.

Data Analysis:

☒Max Force

☒Peak Distance

Results

Cheese Type	Mean Maximum Force 'Hardness' (+/- S.D.) (g)	Mean Distance at Break 'Brittleness' (+/- S.D.) (mm)
Parmesan	1465.8 +/- 68.4	4.0 +/- 0.2
Cheddar	765.2 +/- 34.3	6.9 +/- 0.7
Cheshire	836.9 +/- 96.3	5.5 +/- 0.6
Edam	539.0 +/- 127.4	N/A

Notes:

- 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.