

**Production:** HOUMOUS

**Objective:** Comparison of the penetration forces and consistency of full-fat and low-fat houmous using a cylinder probe.

**Type of action:** Penetration test

**Test mode settings:**

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

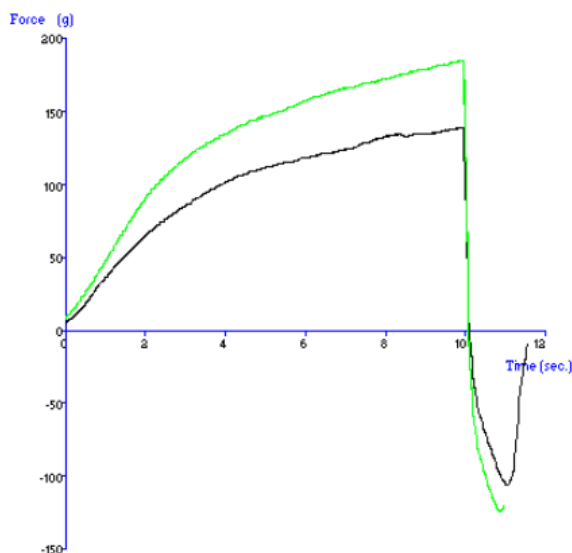
**Accessory:**

φ 25 mm cylinder probe Aluminum, Platform

**Test Set-Up:**

Remove the houmous from place of storage and position the pot directly under the line of penetration of the probe. Commence the test immediately. Penetrate into each pot only once.

**Typical plots:**



The above curves were produced from samples tested in containers with a diameter of 100mm and a depth of 50mm. The samples were tested immediately on removal from the refrigerator (5.0C).

**Observations:**

Force is seen to gradually increase as penetration depth increases in each case. The low-fat houmous however appears to require a considerably higher force to penetrate to the specified depth compared to the full-fat version and so is the firmer and thicker of the two types.

**Data Analysis:**

☒ Max Force

**Results**

Type	Mean Maximum Force 'Firmness' (+/- S.D.) (g)	Mean Area 'Consistency' (+/- S.D.) (g)
Low-Fat Houmous	181.2 +/- 3.2	1258.1 +/- 1.4
Full-Fat Houmous	139.1 +/- 10.6	911.1 +/- 99.4

**Notes:**

- Depending on the regularity of the surface (i.e. the pot contents may not have settled as a flat surface), it may necessary to flatten as best as possible and/or increase the trigger force value slightly so that the test trigger start point is when the probe and product have full contact.
- The product may be tested directly from the container in which it was originally dispensed. However, when comparing different samples one should try to ensure that the temperature, container size and the volume of the product dispensed are the same (and should always be specified) when reporting results.
- The distance of penetration to be set in the test mode settings will depend upon the depth of the sample within the container, the depth of the container, and whether the chosen container is tapered towards the base or not. The chosen depth should be such that the cylinder probe does not come into contact (or indeed approach very close) to either the walls or the base during testing which could produce an erroneous result. As a general guide, the penetration distance is not normally greater than 75% of the product depth.
- During penetration of the cylinder, a large blip in the otherwise smooth curve may be observed. This is due to the compression of an air pocket or particulate within the product which is sometimes present.
- The two parameters that have been measured i.e. the area under the curve and the maximum force have here been expressed as 'Firmness' and 'Consistency' and have been shown to be discriminatory between different samples. In most cases these parameters will rank different samples in the same order and therefore these parameters may be a measurement of the same property. Sensory evaluation tests may confirm this point.
- If the dip is of a flowing consistency, a backward extrusion test may be an alternative to the penetration test suggested above.
- When testing products of a thin consistency one may find that the resulting forces are very low. In such cases a larger cylinder probe is recommended. This will prove to magnify the resulting forces due to an increase in the probe: product contact area and is likely to be more successful for sample differentiation.
- 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.