

**Production:** CREME FRAICHE

**Objective:** Comparison of consistencies of full-fat, half-fat and organic creme fraiche by back extrusion

**Type of action:** Extrusion test

**Test mode settings:**

Speed	Test mode	Trigger	Target	Hold
1 mm/s	Distance (c)	10 gf	30 mm	0 sec

**Accessory:**

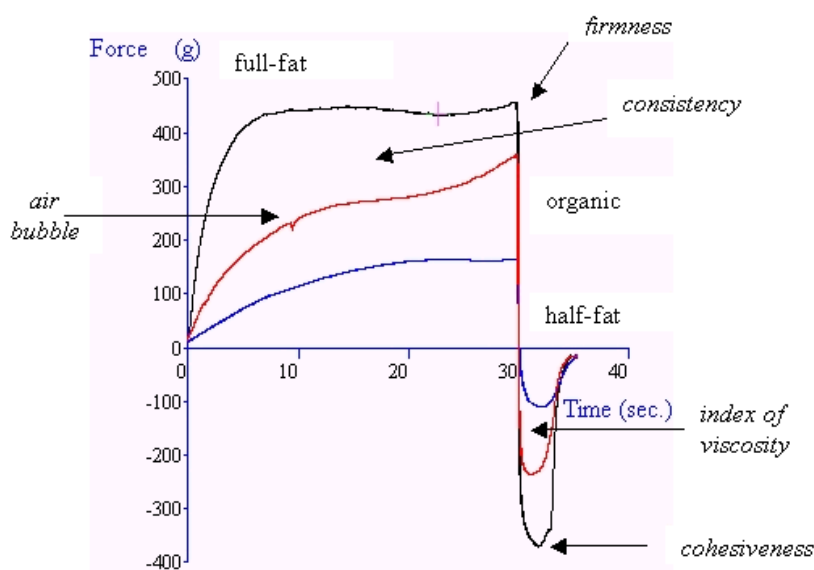
Back extrusion rig

**Test Set-Up:**

Tests are carried out either in a standard size back extrusion container (50mm diameter) approximately 75% full or in the original container\* (with a similar or larger diameter) immediately after removal from storage. The extrusion disc should be positioned centrally over the sample container.

For comparison of cohesiveness and 'work of cohesion' the probe must return to the same position above the samples after each test. To do this it is necessary to calibrate the probe to a distance that is a starting distance of e.g. 30mm, above the top of the container or the sample surface. When the probe is returning to the start (i.e. pulling out of the sample) it is recommended that the container is held to prevent it from lifting.

**Typical plots:**



The above curves were produced from tests of full-fat, half-fat & organic creme fraiche carried out in their original retail 200ml containers, which had been stored at 5C.

**Observations:**

When a 10g surface trigger is attained (i.e. the point at which the disc's lower surface is in full contact with the product) the disc proceeds to penetrate to a depth of 30mm (\*or other specified distance). At this point (most likely to be the maximum force), the probe returns to its original position. The 'peak' or maximum force is taken as a measurement of firmness - the higher the value the firmer is the sample. The area of the curve up to this point is taken as a measurement of consistency - the higher the value the thicker the consistency of the sample. The negative region of the graph, produced on probe return, is as a result of the weight of sample which is lifted primarily on the upper surface of the disc on return, i.e. due to back extrusion and hence gives again an indication of consistency/resistance to flow off the disc. The maximum -ve force is taken as an indication of the cohesiveness of the sample - the more negative the value the more 'cohesive' is the sample. The area of the negative region of the curve may be referred to as the 'work of cohesion' - the higher the value the more resistant to withdrawal the sample is which is an indication of the cohesiveness and also consistency/viscosity of the sample. As shown on the graph, the full-fat creme fraiche requires the highest penetration force & work of cohesion, followed by the organic & half-fat counterparts respectively.

**Data Analysis:**☒Max Force☒Min Force☒Area (+)**Results**

Creme Fraiche Type	Mean Max. +ve Force 'Firmness' (+/- S.D.) (g)	Mean +ve Area 'Consistency' (+/- S.D.) (g s)	Mean Max.-ve Force 'Cohesiveness' (+/- S.D.) (g)	Mean -ve Area 'Index of Viscosity' (+/- S.D.) (g s)
full-fat	457.0 +/- 35.4	12367.7 +/- 1031.7	-360.6 +/- 20.0	-932.0 +/- 251.7
organic	380.7 +/- 23.7	7365.5 +/- 320.0	-244.7 +/- 17.8	-753.2 +/- 51.0
half-fat	158.1 +/- 16.1	3630.3 +/- 356.0	-107.84 +/- 8.7	-376.4 +/- 32.8

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**Notes:**

- Depending upon the regularity of the surface (i.e. the contents of the container may not have settled as a flat surface), it may be necessary to increase the trigger force value slightly. Consideration should be taken to ensure that when the test begins to plot data the extrusion disc should be in such a position so as to be in full contact with the product surface but should not have not started penetrating to any considerable depth.
- Testing the product directly from the container in which it was originally dispensed may be preferable. However, when comparing different samples ensure that the temperature, container size and the volume of product dispensed are the same (and should always be specified) when reporting results.
- The distance of extrusion to be set in the Test mode 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 not be greater than 75% of the depth of the sample, so as to avoid the disc coming into contact with the base of the container during testing which could produce an erroneous result.
- During penetration of the disc, a large blip in the otherwise smooth curve may be observed. This is due to the compression of an air pocket within the product close to the disc, so it is important to minimise the presence of air pockets if filling the extrusion container.
- The terms consistency, cohesiveness etc. relate to the sensory properties of the samples used in this case. Although the measurement points of the curve are likely to be useful in each case, the terms relating to sensory analysis may however need to be renamed.
- The test is best performed directly from the sample container. This is because transferring to another vessel may disrupt the set-nature of the product & therefore affecting to obtain validity of results. In turn, when comparing different samples, the container size and volume of product dispensed should be the same.
- 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