

Production: DOUGH

Objective: Measurement of dough stickiness

Type of action: Adhesion test

Test setting:

Speed	Test mode	Trigger	Target	Hold
0.5 mm/s	Adhesion	40 gf	40 gf	0.1 sec

Accessory:

Dough adhesion rig, ϕ 25 mm cylinder probe. Acrylic

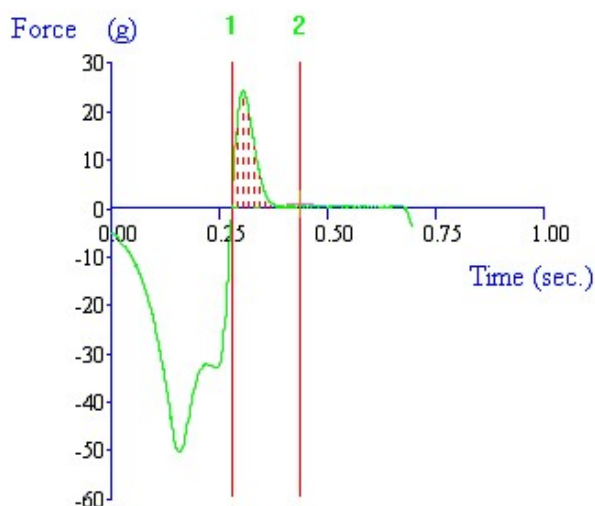
Test Set-Up:

Before using the cell, rotate the internal screw to move the piston and increase the sample chamber to its maximum capacity. Place a small quantity of prepared dough into the chamber and remove the excess dough with a spatula so that it is flush with the top of the chamber. Screw on the extruder lid. Rotate the internal screw a little way to extrude a small amount of dough through the holes and remove this first extrusion from the lid surface using a spatula. Rotate the screw once again to extrude a 1mm high dough sample. Place the perspex cap over the exposed sample surface to minimise moisture loss*, whilst allowing the prepared dough surface to rest for 30 seconds to release the stress produced by extrusion. After this time remove the cover and place the cell directly under the 25mm cylinder probe attached to the load cell. Commence the adhesive test.

The dough can then be removed from the lid surface and extruded again to repeat the test, using the above procedure.

* Note: if moisture loss appears to be a problem, whilst waiting for the dough to relax, place a moist piece of filter paper under the perspex cap.

Typical plots:



Observations:

The negative region of the plot when the test commences is a result of 40g of force being applied for 0.1s to compress the sample slightly. The positive region of the plot however is of overall importance. The maximum force reading, i.e. highest +ve peak, the positive area and the distance between the anchors set ('travel'), are all indicators of the stickiness or rheological properties of the dough.

Data Analysis:

- ☒ Max Force
- ☒ Area (+)
- ☒ Point selection by user (Dough extension distance)

Notes:

- When extruding the sample ensure that at least 1mm of dough is extruded to avoid base effect contribution, which will cause erroneous results.
- The operator must ensure that when the lid is screwed onto the cell dough contained in the chamber does not come into contact with the lid, to prevent the dough from twisting during lid placement, therefore eliminating a torsional stress.
- If a long contact time is required before probe withdrawal it may be preferable to use the delay acquisition feature in the software rather than compromise by reducing the data acquisition rate. When the delay acquisition feature is used the probe: product contact part of the test will be performed by the Texture Analyzer, but data will not be collected. Data will only be captured upon probe withdrawal i.e. the important section of the graph required for data analysis.
- An applied force of 40g has been selected, in this instance, as this value was considered most suitable to achieve full contact between the sample and the probe surface. If one was to consider testing samples of much firmer consistency then it may be necessary to increase the force value if full contact is not achieved. This will also be true if one chooses to use a cylinder of larger diameter.
- The test may be modified to contact the sample with a greater force or for a longer probe contact duration. This will subsequently increase both the Stickiness and Work of Adhesion values. Any values obtained are only relative at the specified contact force and time for which they are tested. The speed of probe: dough separation (i.e. the Post-Test Speed) will also greatly affect the magnitude of the adhesive parameters. Again any comparisons made between test results can only be based on the same testing conditions.
- 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.