Analizador de Textura

TVT-300XP

Guía de Aplicaciones

www.consumiblesdelaboratorio.com
www.texvol.com.mx

Contenidos

CONSUMIBLES DE LABORATORIO
Apdo 97
28691 Villanueva de la Cañada (Madrid) –ESPAÑA
www.consumiblesdelaboratorio.com
info@consumiblesdelaboratorio.com
Tel.: +34 918 168 973
Fax: +34 918 168 594
www.texvol.com.mx
info@texvol.com.mx

Productos de Panadería

Pan

Compresión de miga de pan para la medición de firmeza. Ensayo estándar AACC (74-09)

Compresión de miga de pan blanco para la medición de firmeza. Procedimiento estándar AIB.

Doble compresión en miga de pan para la medición de firmeza y elasticidad.

Ensayo de mantener tiempo para la medición de firmeza

Ensayo de penetración para la medición de firmeza y rigidez en panecillos. AIB Método estándar

Ensayo de penetración para la medición de firmeza en bagels

Galletas

Enayo de penetración para la medición de dureza y fracturabilidad en galletas.

Ensayo de flexión para la medición de dureza y fracturabilidad en galletas y crackers

Ensayo de corte para la medición de dureza y fracturabilidad en galletas y crackers

Medición de dureza y fracturabilidad en galletas y crackers

Ensayo de fractura para la medición de dureza y flexibilidad en galletas. Procedimiento Estándar AIB

Ensayo de penetración para la medición de resistencia y dureza en masa de galletas

Ensayo de penetración para la medición de fuerza máxima y adhesividad en masa

Aperitivos

Ensayo de penetración para la medición de la fuerza máxima y dureza de snacks

Tartas/Bollos

Ensayo de mantener tiempo para la medición de firmeza y elasticidad en tartas

Ensayo de ciclos múltiples para la medición de firmeza y elasticidad en tartas

Ensayo de penetración para la medición de firmeza en tartas

Ensayo de penetración para la medición de firmeza en tartas. Procedimiento Estándar AIB

Ensayo de corte para la medición de firmeza en croissant

Ensayo de mantener tiempo para la medición de la vida de muffins. Procedimiento Estándar AIB

Ensayo de penetración para la medición de la firmeza de la canela en rama. Procedimiento Estándar AIB

Otros productos

Ensayo de penetración para la medición de extensibilidad en crepes y productos de panadería finos

Ensayo de compresión para la medición de extensibilidad, punto de ruptura y fuerza de ruptura en tortillas. Procedimiento Estándar AIB

Ensayo de tensión para la medición de extensibilida en tortillas y otros productos de panadería finos

Ensayo de fractura para la medición de la fuerza de ruptura de tortillas. Procedimiento Estándar AIB

Ensayo de fractura para la medición de fracturabilidad y crugibilidad la sonda de flexión de tres puntos

Bread crumb

The bread crumbs are compressed to measure the firmness. This is a standard test AACC (74-09)

Settings:

Test mode:	Single cycle
Probe:	PCy36R
Rig:	
Compression:	40 %
Trigger force:	20 g
Pre-test speed:	1.0 mm/s
Test speed:	1.7 mm/s
Post-test speed:	5.0 mm/s
Data Acquisition Rate:	250 pps

Sample preparation: Slice the bread in slices of 2.5 cm thick or compress two bread slices of 1.25 cm each at the same time. Avoid taking the 3 slices nearest the end of the loaf, since they are normally harder than the rest of the slices. Put the sample quickly below the probe, since contact with air dries out the bread and makes it harder. Put the sample centrally under the probe, but avoid having irregularities straight under the probe. If a sample is irregular avoid using it in the test. This test could be done with or without the bread crust. Avoid getting the probe too close to the edges.

Test: When the probe reaches the trigger force the test commences. The probe will compress the sample to 40% of its height and then the compression stops, Figure 1. The irregularity in the slope of the graphs shows that there have been harder parts in the slices.

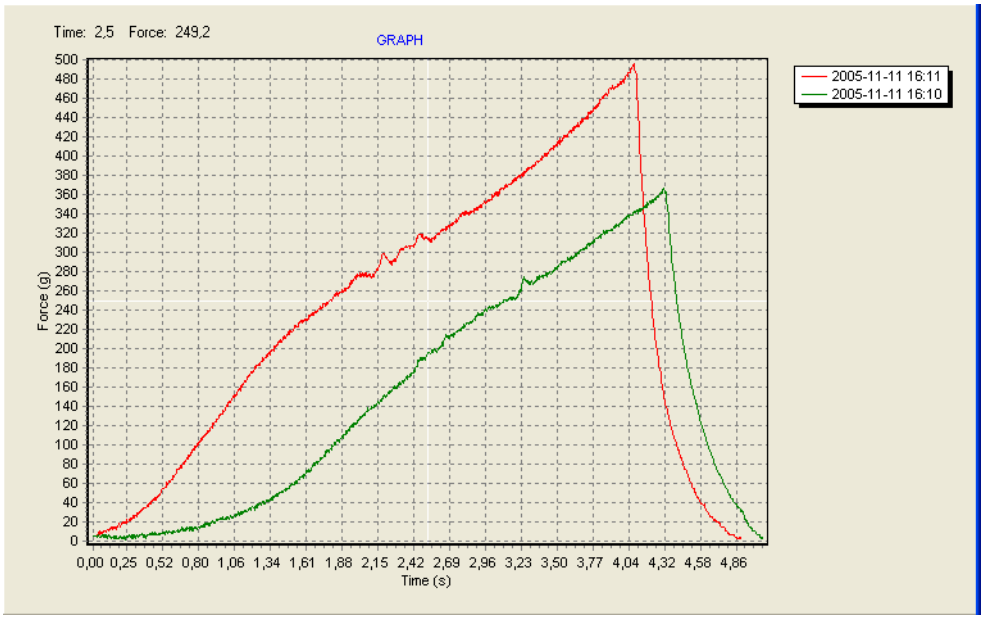

Figure 1 Compression of two different breads

Bread crumb

Compression test to measure the firmness of crumb of white pan bread, AIB Standard Procedure.

Settings:

Test mode:	Single cycle
Probe:	P-Cy25S
Rig:	
Compression:	6.2 mm
Trigger force:	20 g
Pre-test speed:	2.0 mm/s
Test speed:	1.7 mm/s
Post-test speed:	1.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Leave the new-baked loaves to cool down for 1 hour before they are packed in double bags. Do measurements for example on day 1, 3 and 7 from baking. Slice the bread in slices of 2.5 cm thick or compress two bread slices of 1.25 cm each at the same time. Avoid taking the 3 slices nearest the end of the loaf, since they are normally harder than the rest of the slices. Start to test slice 4 from the end and do 6 measurements per loaf. Test 2 loaves every day. Put the sample quickly below the probe, since contact with air dries out the bread and makes it harder. Put the sample centrally under the probe, but avoid having irregularities straight under the probe. If a sample is irregular avoid using it in the test. This test could be done with or without the bread crust. Avoid getting the probe too close to the edges.

Test: When the probe reaches the trigger force the test commences. The probe will compress the sample 6.2 mm and then the compression stops. The irregularity in the slope of the graphs shows that there have been harder parts in the slices. The maximum peak is the firmness of the bread.

Bread crumb

The bread crumbs are compressed in a double-cycle to measure the firmness and springiness.

Settings:

Test mode:	Multiple cycles: 2
Probe:	P-Cy25S
Rig:	
Approx. height	50 mm
Compression:	20 %
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample preparation: Slice the bread in slices of 5.0 cm thick or compress several bread slices at the same time. Avoid taking the 3 slices nearest the end of the loaf, since they are normally harder than the rest of the slices. Put the sample quickly below the probe, since contact with air dries out the bread and makes it harder. Put the sample centrally under the probe, but avoid having irregularities straight under the probe. If a sample is irregular avoid using it in the test. This test could be done with or without the bread crust. Avoid getting the probe too close to the edges.

Test: When the probe reaches the trigger force the test commences. The probe will compress the sample to 20% of its height and then the compression stops, Figure 2. The springiness of the sample is the length from the beginning of the second compression to the maximum peak divided to the length from the beginning of the first compression to its maximum peak and represents how well the product springs back. This value is dependent of the time between the cycles; a long pause will make the spring back almost 100 %.

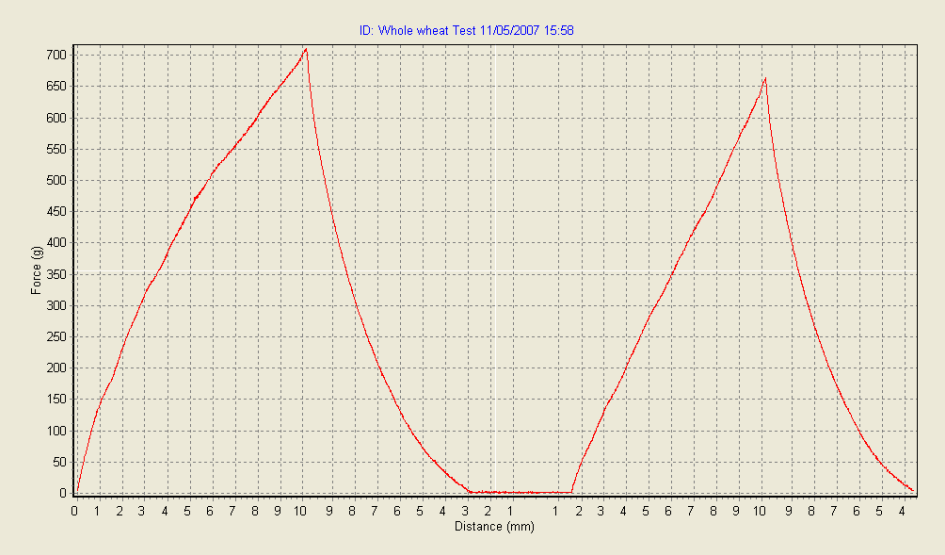

Figure 2 Compression with 2 cycles

Bread crumb

Hold until time test to measure the firmness.

Settings:

Test mode:	Hold until time, 32 s Initial force 6.25 cm Break of data 30 s
Probe:	PCy36R
Rig:	
Compression:	7 mm
Trigger force:	20 g
Pre-test speed:	1.0 mm/s
Test speed:	1.7 mm/s
Post-test speed:	
Data Acquisition Rate:	250 pps

Sample preparation: Slice the bread in slices of 2.5 cm thick or compress two bread slices of 1.25 cm each at the same time. Avoid taking the 3 slices nearest the end of the loaf, since they are normally harder than the rest of the slices. Put the sample quickly below the probe, since contact with air dries out the bread and makes it harder. Put the sample centrally under the probe, but avoid having irregularities straight under the probe. If a sample is irregular avoid using it in the test. This test could be done with or without the bread crust. Avoid getting the probe too close to the edges.

Test: When the probe reaches the trigger force the test commences. The probe will compress the sample 7 mm and then the compression holds on for 32 s, Figure 3. The maximum force of the bread is taken after 6.25 mm and this is called Force A and translated as the firmness of the bread slice. The force during compression is taken after 30 s of compression and is called Force B. The elasticity of the sample is Force B / Force A.

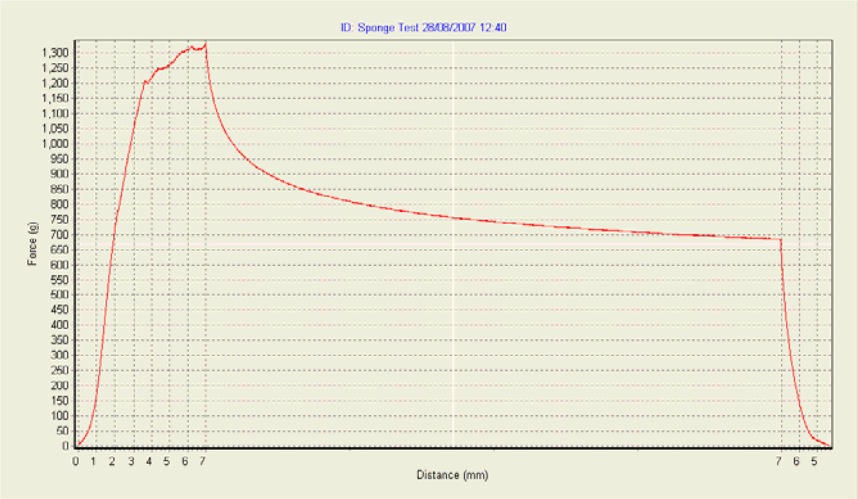

Figure 3 Hold until time test of bread crumb

Hamburger bun

Puncture test to measure the firmness and toughness of bun crust, AIB Standard Procedure

Settings:

Test mode:	Single cycle
Probe:	P-Cy03
Rig:	
Compression:	5 mm
Trigger force:	10 g
Pre-test speed:	2.0 mm/s
Test speed:	1.7 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: After cooling for one hour, the buns are double bagged and hold at room temperature until testing. Test the buns for example day 1, 3 and 7 and test 2-5 buns of each variable each testing date. Place the bun centrally under the probe and start the test. A bun can be punctured several times depending of its size

Test: When the probe reaches the trigger force the test commences. The probe will compress the sample a distance of 5 mm. The maximum force represents the firmness of the bun crust.

Bagel

Puncture test to measure the firmness of bagel crumb, AIB Standard Procedure

Settings:

Test mode:	Single cycle
Probe:	P-Cy03
Rig:	
Compression:	6.2 mm
Trigger force:	10 g
Pre-test speed:	2.0 mm/s
Test speed:	1.7 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: After cooling for one hour, the bagels are double bagged and hold at room temperature until testing. Test the bagels for example day 1, 3 and 7 and test 5 buns of each variable each testing date. Slice the bagels (26 mm of thickness) and place a bagel centrally under the probe and start the test. A bagel can be punctured three to five times depending of its size.

Test: When the probe reaches the trigger force the test commences. The probe will compress the sample a distance of 6.2 mm. The maximum force represents the firmness of the bagel.

Biscuits and cookies

The hardness and fracturability of biscuits/cookies are measured by penetration.

Settings:

Test mode:	Single cycle
Probe:	PCy02
Rig:	Rig with small hole in the middle
Compression:	2 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	0.5 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps

Sample preparation: Attach the rig to the load cell. Calibrate the probe movement and tare the load cell before starting the test. Take the biscuits from their packaging just before starting the test. Put it centrally over the hole of the rig. The hole of the rig should be centrally under the probe.

Test: When the trigger force of 5 g has been reached the probe penetrates the biscuit to the specified distance. The graph shows more or less fluctuations, which is due to the variable hardness of the same biscuit. Because of these fluctuations the area under the curve indicates the hardness of the biscuit and the distance to the top of the curve indicates the fracturability.

Biscuits and cookies

Bending test to measure the hardness and the fracturability of biscuits, cookies and crackers

This is a way of determine the first bite force of a product

Settings:

Test mode:	Fracturability
Probe:	P-BP70A
Rig:	R-TPBR
Compression:	5 mm
Trigger force:	50 g
Pre-test speed:	1.0 mm/s
Test speed:	3.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps

Sample and test preparation: Attach the 3-point bending rig to the instrument. Calibrate the probe movement and tare the load cell before starting the test. Choose the distance between the plates so that they support the biscuit, e.g. 40mm. If the biscuits lie too little on the support plates it is a risk that it is falling down and if it the distance between the support plates are too close there is a risk that the blade is penetrating the biscuit instead of bending it. Put the biscuit at the support just prior to the test. The biscuits should be stored and treated the same way before the tests. Put the biscuit in the same orientation every test if there are differences of the two sides of the biscuit.

Test: The force increases until the biscuit breaks, Figure 4. The peak of the curve indicates the hardness of the biscuit and the distance to the peak is the fracturability. A short distance means high fracturability. The trigger force may be needed increase if the biscuit surface is uneven and variable, in order to avoid early trigger. There could be large variations in the tests due to variations of the structure and inclusions (like chocolate) of the biscuits.

N.B. To be able to compare the different samples the distance between the support plates should be constant and the diameter of the biscuits should be equal. A larger diameter means larger contact area and would require more force to fracture. If the support plates were moved closer that would require a larger fracture force as well.

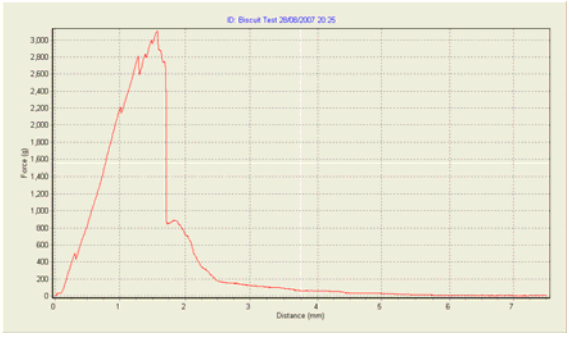

Figure 4 Fracture test of biscuit

Biscuits and cookies

Fracture test to measure the hardness and the flexibility of cookies, AIB Standard Procedure

This is a way of determine the first bite force of a product

Settings:

Test mode:	Single cycle
Probe:	P-BP70A
Rig:	R-TPBR
Compression:	15 mm
Trigger force:	20 g
Pre-test speed:	2.5 mm/s
Test speed:	2.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample and test preparation: Attach the 3-point bending rig to the instrument. For the cookie used in this test (3/8 inch thick with a 3 inch diameter) a gap is set to 60 mm. The gap should be half the diameter of the cookie used, if using other sized cookies. Calibrate the probe movement and tare the load cell before starting the test. The biscuits should be stored and treated the same way before the tests. Put the biscuit in the same orientation every test if there are differences of the two sides of the biscuit.

Test: The force increases until the biscuit breaks and the pre-defined distance is reached. The peak of the curve indicates the hardness of the biscuit and the distance to the peak is the softness or flexibility.

Biscuits and cookies

Cutting test to measure the hardness and the fracturability of biscuits, cookies and crackers

Settings:

Test mode:	Single cycle
Probe:	P-CBK
Rig:	
Compression:	5 mm
Trigger force:	25 g
Pre-test speed:	1.5 mm/s
Test speed:	2.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps

Sample and test preparation: Put the sample centrally under the knife blade and start the test. Be sure that the samples are stored and treated the same way in all tests. Put the biscuit in the same orientation every test if there are differences of the two sides of the biscuit.

Test: The force increases until the biscuit starts to break. The first peak of the curve is when the biscuits are cut into two pieces. The next peaks are fractures of the broken biscuit and therefore smaller.

N.B. To be able to compare different samples the diameter of the biscuits should be equal. A larger diameter means larger contact area and would require more force to fracture.

Biscuits and cookies

Fracture test to measure the hardness and the fracturability of biscuits, cookies and crackers

Settings:

Test mode:	Single cycle
Probe:	P-CW9004
Rig:	Break rig 34
Height:	
Compression:	5 mm
Headroom above object:	5 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	3.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps

Sample and test preparation: Put the sample centrally under the probe and start the test. Be sure that the samples are stored and treated the same way in all tests. Put the biscuit in the same orientation every test if there are differences of the two sides of the biscuit.

Test: The force increases until the biscuit breaks. The maximum peak is when the biscuits are cut into two pieces. If there are small peaks afterwards they are fractures of the broken biscuit. In this test the original biscuit was harder than the light product, Figure 5.

N.B. To be able to compare different samples the diameter of the biscuits should be equal. A larger diameter means larger contact area and would require more force to fracture.

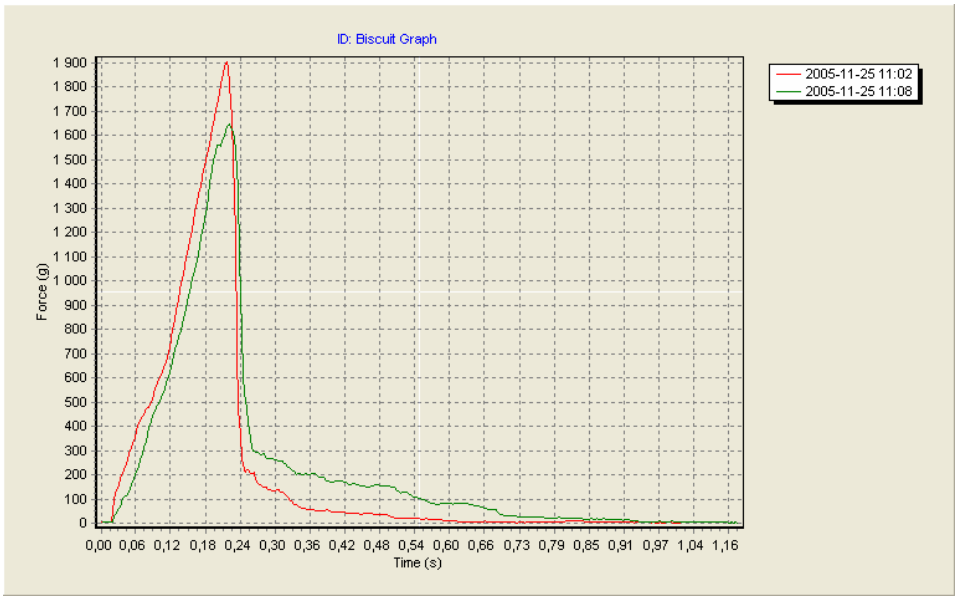

Figure 5 Comparison of Digestive Original (red) and Digestive Light (green)

Dough of biscuits and cookies

Penetration test to measure the maximum force and the hardness of the dough of biscuits

Settings:

Test mode:	Single cycle
Probe:	P-Cy06
Rig:	
Compression:	5 mm
Trigger force:	25 g
Pre-test speed:	1.5 mm/s
Test speed:	3.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps
Adhesiveness	Activate,

Sample and test preparation: Put a certain amount of dough in the cell centrally under the probe and start the test. Be sure that the dough is treated the same way in all tests and always use the same amount of dough.

Test: The probe begins to penetrate the dough, when the trigger force of 25 g is reached. The force increases until the maximum penetration depth is reached and this value indicates the hardness of the dough at this depth. The force decreases, when withdrawn from the dough. The length of the negative values of the force is the measurement of the stringiness of the dough and the area of the negative values is the adhesive force.

N.B. Air bubbles and uneven surface in the dough could lead to variations in the results.

Dough

Penetration test to measure the maximum force and the adhesiveness of the dough

Settings:

Test mode:	Single cycle
Probe:	P-Cy45
Rig:	
Compression:	20 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps
Adhesiveness	Activate, Height above trigger: 30 mm

Sample and test preparation: Put a certain amount of dough of the height of 3 cm centrally under the probe and start the test. Be sure that the dough is treated the same way in all tests and always use the same amount of dough.

Test: The probe begins to penetrate the dough, when the trigger force of 5 g is reached. The force increases until the maximum penetration depth is reached and this value indicates the hardness of the dough at this depth, Figure 6. The force decreases, when withdrawn from the dough. The length of the negative values of the force is the measurement of the stringiness of the dough and the area of the negative values is the adhesive force.

N.B. Air bubbles and uneven surface in the dough could lead to variations in the results.

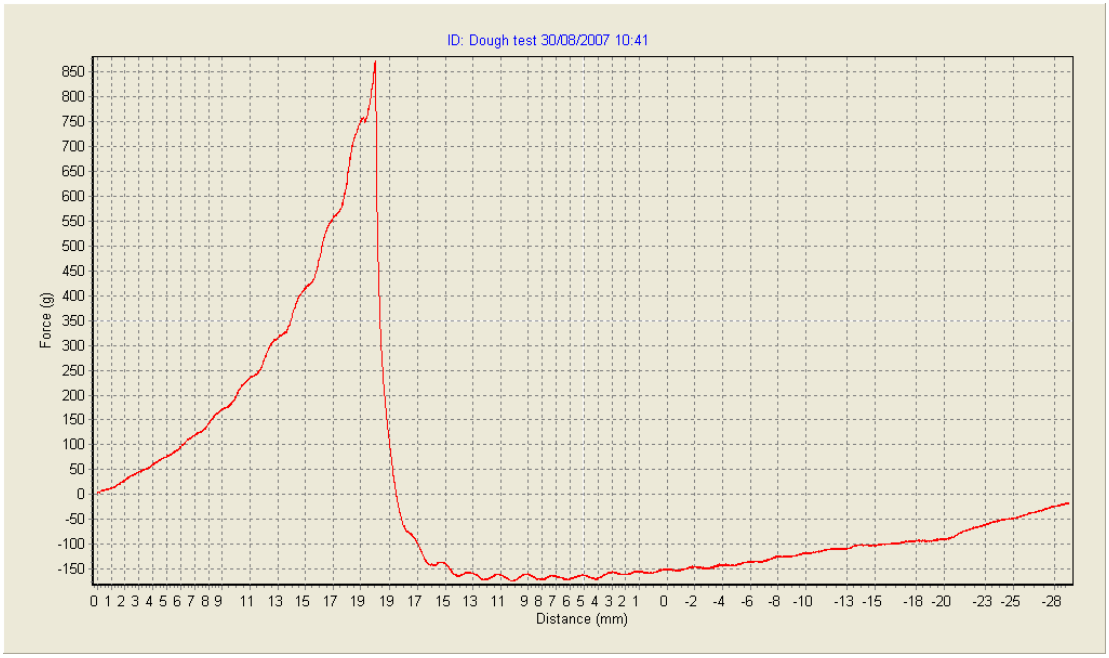

Figure 6 Puncture test of dough

Extruded snack

Penetration test to measure the maximum force and the hardness of extruded snack

Settings:

Test mode:	Single cycle
Probe:	P-Cy03
Rig:	
Compression:	25 mm
Trigger force:	5 g
Pre-test speed:	0.8 mm/s
Test speed:	0.8 mm/s
Post-test speed:	
Data Acquisition Rate:	250 pps
Adhesiveness	Activate,

Sample and test preparation: Put the snack centrally under the needle probe and start the test. Be sure that the snack is treated the same way in all tests and always use the same amount. Do ten repetitions of each sample, but do not penetrate too close to another hole.

Test: The probe begins to penetrate the sample, when the trigger force of 5 g is reached. The force increases until the maximum penetration depth is reached and this value indicates the hardness of the snack at this depth.

Sponge cake

Hold until time test to measure the firmness and springiness (elasticity) of cakes

Settings:

Test mode:	Hold until time
Probe:	P-Cy36R
Rig:	
Compression:	25%
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps
Time	60 s

Sample and test preparation: Put the sample centrally under the probe and avoid irregularities of the sample. Always have the same size of the cake to be able to compare the different measurements. The diameter of the sample is assumed to be bigger than the probe diameter.

Test: The probe compresses the sample until the specified compression is reached. This compression is hold for 60 s, before the probe returns to its starting position. Firmness is the force required to compress the sample to the pre-defined compression. The springiness or elasticity could be measured by measuring the value at a specific time and dividing with the maximum force. This is a value of the recovery of the sample.

Sponge cake

Multiple cycles test to measure the firmness and springiness of cakes

Settings:

Test mode:	Multiple cycle, 2
Probe:	P-Cy75A
Rig:	
Compression:	25%
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample and test preparation: Cut the sponge cake in pieces with the height of 2 cm. Put the sample centrally under the probe and avoid irregularities of the sample. Always have the same size of the cake to be able to compare the different measurements. The diameter of the sample is assumed to be bigger than the probe diameter.

Test: The probe compresses the sample until the specified compression is reached. The probe returns to its starting position and a second cycle begins, Figure 7. Firmness is the force required to compress the sample to the pre-defined compression, during the first compression. The springiness is how well the sponge cakes springs back and is calculated by dividing the length from the beginning of the second cycle to its peak to the length from the beginning of the first cycle to its peak.

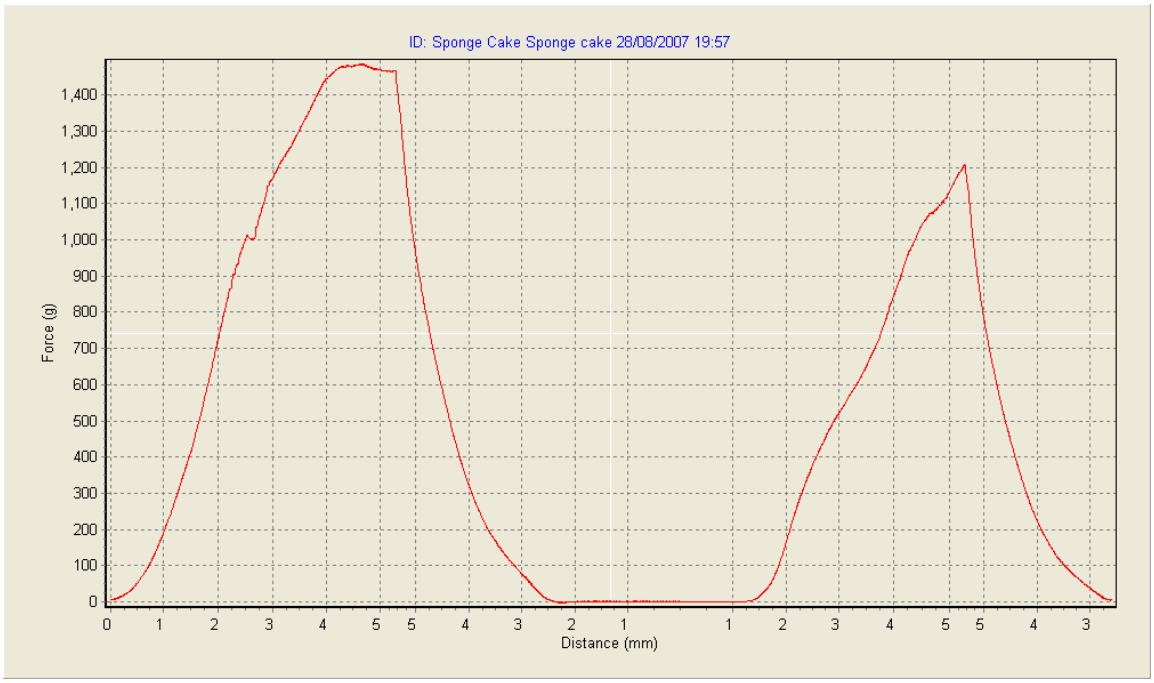

Figure 7 A double-cycle compression of sponge cake

Sponge cake

Puncture test to measure the firmness of cakes

Settings:

Test mode:	Single cycle
Probe:	P-Cy5S
Rig:	
Compression:	15 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample and test preparation: Cut the sponge cake in pieces with the height of 3 cm. Put the sample centrally under the probe and avoid irregularities of the sample. Always have the same size of the cake to be able to compare the different measurements. The diameter of the sample is assumed to be bigger than the probe diameter.

Test: The probe penetrates the sample until the specified distance is reached and the probe returns to its starting position, Figure 8. Firmness is the force required to penetrate the sample to the pre-defined compression.

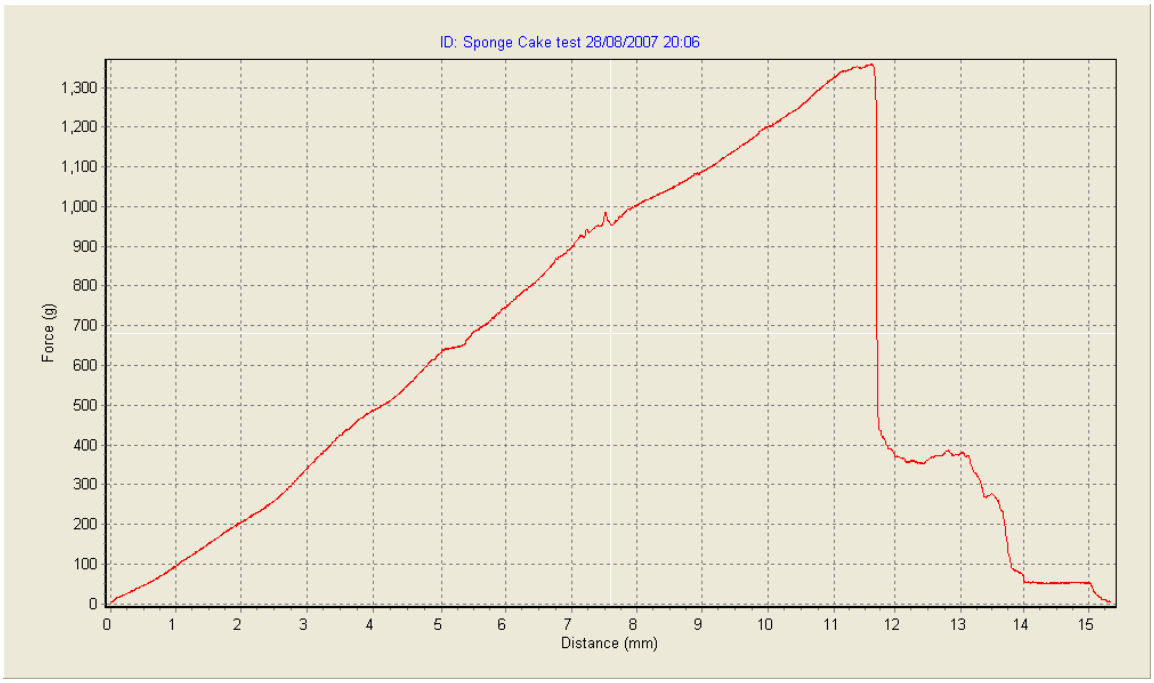

Figure 8 Penetration of sponge cake

Sponge cake

Puncture test to measure the firmness of cakes, AIB Standard Procedure

Settings:

Test mode:	Single cycle
Probe:	P-Cy25R
Rig:	
Compression:	6.0 mm
Trigger force:	20 g
Pre-test speed:	3.0 mm/s
Test speed:	1.7 mm/s
Post-test speed:	10 mm/s
Data Acquisition Rate:	200 pps

Sample and test preparation: This test was designed for a round cake of 8 inch of diameter. A 9 inch long and 1 ½ inch wide template is used to cut the sponge cake in pieces. Start in the center of the cake and then take two samples nearest the first sample in the center. Use a good quality bread knife and a gentle sawing motion to cut the cake slices. Let the slice rest on one side on the template before the measurement starts to avoid moisture loss. Test the sample three times in areas nearest the center. There should be a space of 1/8" – 1/4" between the tests if the compression is 6.0mm. If the distance is increased the space between the tests should also be increased. Compress two different cakes a day.

Test: The probe penetrates the sample until the specified distance is reached and the probe returns to its starting position. Firmness is the force required to penetrate the sample to the pre-defined compression.

N.B. This test could also be done as a multiply cycle test to get a TPA.

Croissant

Cutting test to measure the firmness of croissant

Settings:

Test mode:	Single cycle
Probe:	P-CBK
Rig:	
Compression:	55 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	
Data Acquisition Rate:	250 pps

Sample and test preparation: Put the sample centrally under the probe.

Test: The knife penetrates the sample until the specified distance is reached. Firmness is the peak of the curve. The larger value, the firmer is the sample.

Muffin

Hold until time to measure the shelf life of muffins, AIB Standard Procedure

Settings:

Test mode:	Hold until time, 32s
Probe:	P-Cy18R
Rig:	
Compression:	7.0 mm
Trigger force:	5 g
Pre-test speed:	2.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10 mm/s
Data Acquisition Rate:	200 pps

Sample and test preparation: Make a cube sample by cutting the bottom and top crust and the sides off the muffin to a size of approximately 25 x 25 x 25 mm. Put the sample centrally under the probe and repeat the test for 6 muffins. Cut the top of the muffin to get the height of mm.

Test: The probe penetrates the sample until the specified distance is reached. The probe stops at this distance for 32 s, before returning to its starting position. Firmness is the peak of the curve. The larger value, the firmer is the sample. The elasticity of the muffin is a ratio of the force at 30 s to the initial force at 7.0 mm.

Cinnamon Roll

Puncture test to measure the firmness of cinnamon rolls, AIB Standard Procedure

Settings:

Test mode:	Single cycle
Probe:	P-Cy25
Rig:	
Compression:	6.2 mm
Trigger force:	20 g
Pre-test speed:	2.0 mm/s
Test speed:	1.7 mm/s
Post-test speed:	10 mm/s
Data Acquisition Rate:	200 pps

Sample and test preparation: Store the cinnamon rolls in the same way prior to the measurement, e.g. in double plastic bags. Test the rolls e.g. on days 3, 7, 10 and 14 after baking. Cut off the sides and the top of the rolls. Make sure that it is the same dimensions for every test. A good way of getting the same height is to place the roll in a box and cut the roll to the height of the box. In this test 18 rolls (two pans) were tested each day.

Test: The probe penetrates the sample until the specified distance is reached. Firmness is the peak of the curve. The larger value, the firmer is the sample.

Crisp bread

Fracture test with 3-point bend rig to measure the fracturability

Settings:

Test mode:	Fracturability
Probe:	P-BP70A
Rig:	R-TPBR
Compression:	
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps

Sample and test preparation: Attach the rig to the load cell. Calibrate the probe movement and tare the load cell before starting the test. Put the sample centrally under the probe and start the test. The crisp bread should be put in the same position every time. The crisp bread should have been stored in the same conditions to be able to compare different tests.

Test: When the probe has reached the trigger force the penetration is made until the crisp bread breaks, Figure 9. The top of the curve represents the fracturability.

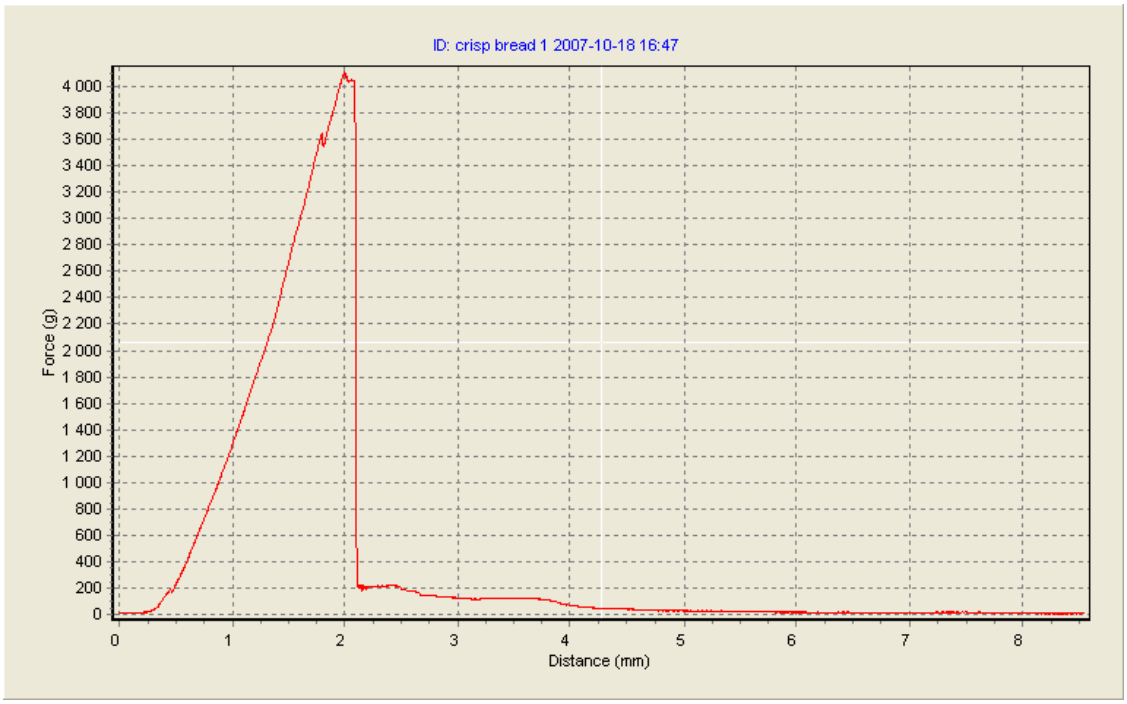

Figure 9 Fracture test of crisp bread

Pancake

Puncture test to measure the extensibility of pancakes and thin bakery products

Settings:

Test mode:	Single cycle
Probe:	P-Sp
Rig:	Base plate with hole big enough for probe to go through
Compression:	40 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	

Sample preparation: Attach the base plate to the load cell and calibrate. Attach the sample to the base plate and make sure that the part of the sample over the hole is not broken or deformed in any way. Try to make it flat. Store and treat the samples the same prior to measurement. Run the test as soon as the product is placed in order to avoid moisture loss.

Test: When the trigger force is reached the probe penetrates the sample until the sample is broken. This is the maximum force in the curve. The greater the distance before the pancake breaks, the more elastic sample.

Tortilla

Compression test to measure the stretchability, breaking point and rupture force of tortillas, AIB Standard Procedure

Settings:

Test mode:	Single cycle
Probe:	P-Cy18R
Rig:	Plate with cylinder opening big enough for the probe to go through and attachment of the tortilla
Compression:	30 mm (could be required more depending of the break point of the tortilla)
Trigger force:	20 g
Pre-test speed:	6.0 mm/s
Test speed:	1.7 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Attach the platform to the instrument and calibrate. After cooling for 30 min, tortillas are double bagged and stored at room temperature until testing. Test the tortillas for example day 1, 3 and 7. Put the tortilla under the probe and attach it. Try to have the sample in air contact as little as possible to avoid moisture loss of the tortilla.

Test: The probe is penetrating the tortilla until the pre-defined distance. The maximum force of the curve is when the sample snaps. The greater the distance to the maximum force, the more extensible is the sample.

Tortillas

Tension test to measure the extensibility of tortillas and other thin, baked products

Settings:

Test mode:	Single cycle, Tensile
Probe:	P-STRG
Rig:	R-STRG
Compression:	15 mm
Trigger force:	
Pre-test speed:	1.0 mm/s
Test speed:	10.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps

Sample preparation: Attach the tension grip to the instrument and calibrate. Cut rectangular samples of the product and make sure the dimensions are always the same. To get a representative and uniform sample, hold it in the air and chose an area. The sample should represent the structure of the whole tortilla. Try to have the sample in air contact as little as possible to avoid moisture loss of the tortillas.

Test: When starting the test the tortilla is pulled until it snaps. The maximum force of the curve is when the sample snaps. The greater the distance, the more extensible is the sample.

Tortilla Chip and Tostada Shell

Fracture test to measure the breaking force, AIB Standard Procedure

Settings:

Test mode:	Single cycle
Probe:	**Chips:** P-Sp0.5 **Shell:** P-BP70A
Rig:	**Chips:** Platform with a ~18 mm cylinder opening **Shell:** R-TPBR (gap of 2 inches)
Compression:	6 mm
Trigger force:	10 g
Pre-test speed:	3.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Attach the rig to the instrument and calibrate the probe movement. Try to have the sample in air contact as little as possible to avoid moisture loss. Put the sample centrally under the probe and start the test.

Test: The probe penetrates the sample until the pre-defined distance. The maximum force is the break force of the sample. The greater the distance to the maximum force, the less brittle is the sample.

Confitería

Chocolatinas

Ensayo de penetración para la medición de dureza en barras de chocolate

Caramelos

Ensayo de penetración para la medición de dureza, pegajosidad y elasticidad en caramelo

Caramelos blandos

Ensayo de penetración para la medición de dureza y pegajosidad en caramelos blandos

Ensayo de compresión para la medición de firmeza y elasticidad en caramelos blandos

Caramelos duros

Ensayo de fractura para la medición de fracturabilidad y dureza en caramelos duros

Chocolate bars

Penetration test to measure the hardness of chocolate bars

Settings:

Test mode:	Single cycle
Probe:	P-Cy03S
Rig:	
Height:	10 mm
Headroom above object:	5 mm
Compression:	4 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	0.5 mm/s
Post-test speed:	5.0 mm/s
Data Acquisition Rate:	200 pps

Sample and test preparation: Put the chocolate bar under the probe and start the test. Make sure that the bar always is positioned in the same direction and that the bars always have the same temperature to be able to compare different tests.

Test: When the probe has reached the trigger force the penetration is done until the pre-defined compression is reached, Figure 10. The maximum force is the hardness of the product. This can be used to evaluate the bite force needed for the product.

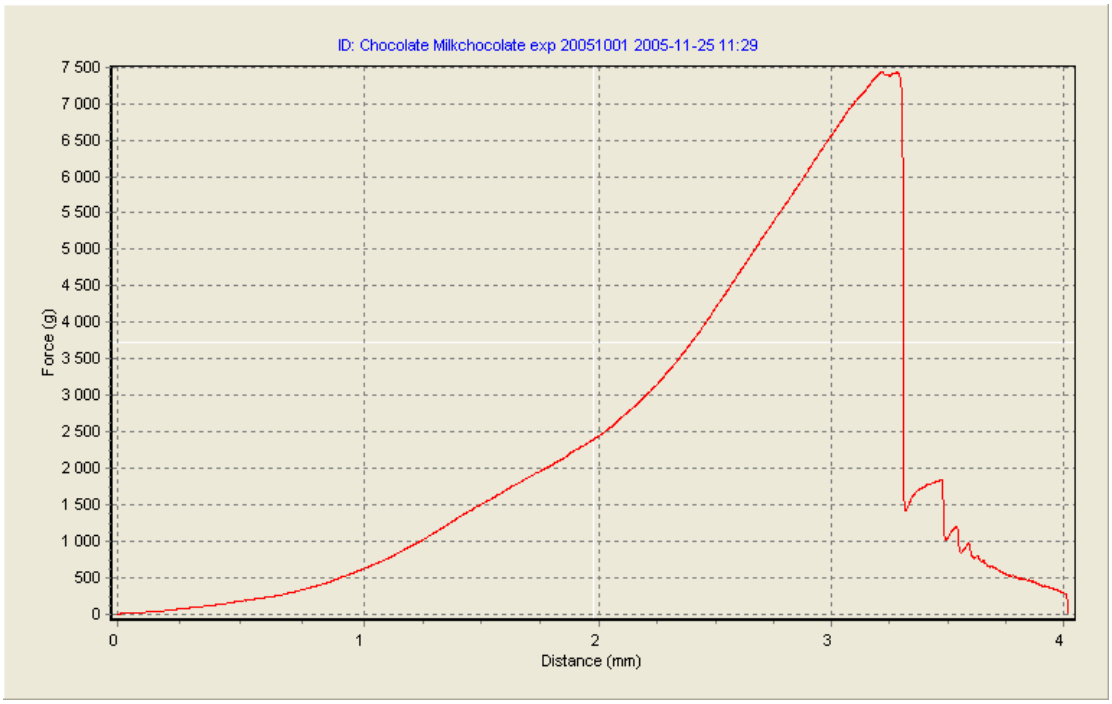

Figure 10 Penetration test of chocolate bar

Caramel

Puncture test to measure the hardness, stickiness and stringiness of caramel

Settings:

Test mode:	Single cycle
Probe:	P-Sp01
Rig:	
Compression:	2 mm
Trigger force:	5 g
Pre-test speed:	5.0 mm/s
Test speed:	5.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	333 pps

Sample and test preparation: Put the sample centrally under the probe and start the test. The caramels should have the same temperature every test to be able to compare different tests.

Test: When the probe has reached the trigger force the penetration is made until the specified distance. The probe is withdrawn from the sample. The maximum positive force represents the hardness of the caramel, the maximum negative value represents the stickiness and the stringiness is decided by the distance of the negative forces.

Soft confectionary

Puncture test to measure the hardness and stickiness of chewy confectionary

Settings:

Test mode:	Single cycle
Probe:	P-Cy06
Rig:	
Compression:	2 mm
Trigger force:	20 g
Pre-test speed:	1.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	333 pps

Sample and test preparation: Put the sample centrally under the probe and start the test. The candy should have the same temperature every test to be able to compare different tests.

Test: When the probe has reached the trigger force the penetration is made until the specified distance. The probe is withdrawn from the sample. The maximum positive force represents the hardness of the candy; the maximum negative value represents the stickiness and is decided by the distance of the negative forces.

Soft confectionary

Compression test to measure the firmness and elasticity of soft, gummy confectionary

Settings:

Test mode:	Hold until time, 60 s
Probe:	P-Cy35
Rig:	
Compression:	20 %
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample and test preparation: The diameter of the sample should be smaller than the diameter of the probe, for getting a compression. Put the sample centrally under the probe and avoid irregularities. Start the test. The candy should have the same temperature every test to compare different tests.

Test: When the probe has reached the trigger force the compression is made until the probe has reached 20 % of its original height. The probe is held in this position for 60 s, before withdrawn from the sample. The maximum positive force represents the firmness of the candy and the force at 60 s divided by the maximum force represents the elasticity of the sample. This is a way of measure the recovery of the sample after a compression. If the compression is increased / decreased, the force will increase / decrease. Therefore always have the same compression if comparing different measurements.

Hard candy

Fracture test to measure the fracturability and hardness of a candy

Settings:

Test mode:	Fraction test
Probe:	P-CBK
Rig:	
Compression:	
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps

Sample and test preparation: Put the sample centrally under the probe and avoid irregularities. Start the test. The candy should have the same temperature every test to be able to compare different tests.

Test: When the probe has reached the trigger force the penetration is made until the candy breaks. The maximum force represents the hardness and fracturability of the candy, Figure 11.

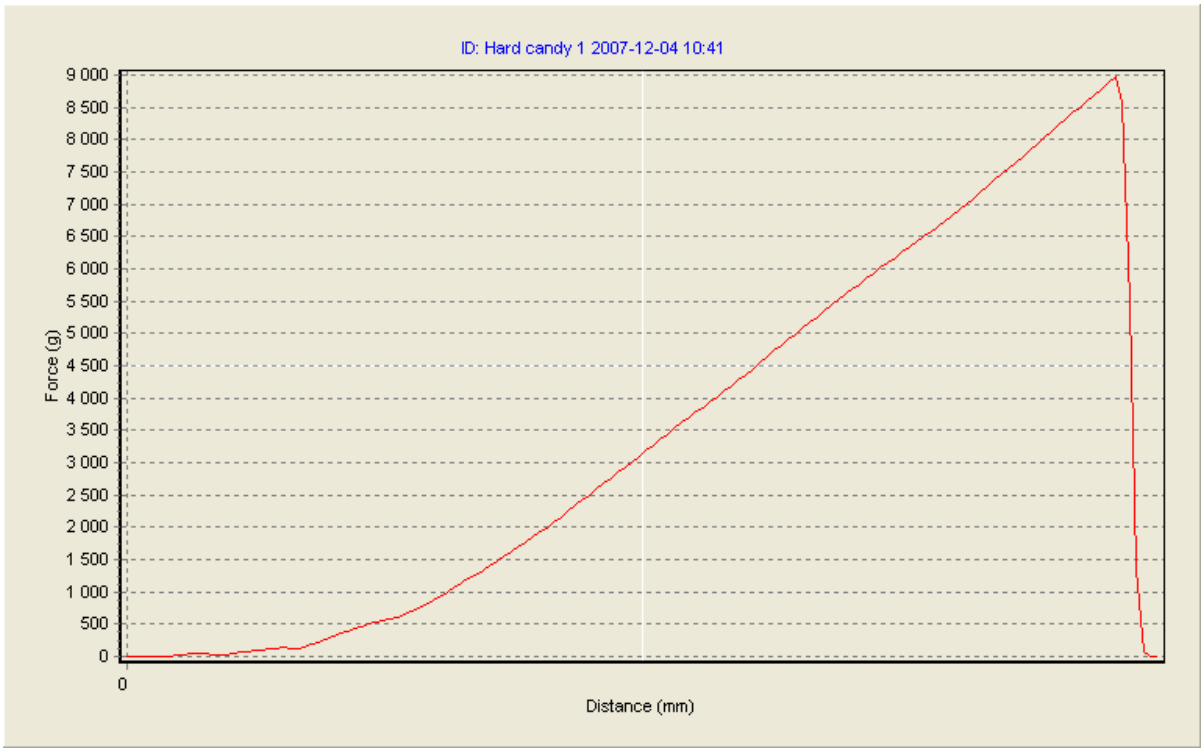

Figure 11 Fracture test of candy

CONSUMIBLES DE LABORATORIO
Apdo 97
28691 Villanueva de la Cañada (Madrid) –ESPAÑA
www.consumiblesdelaboratorio.com
info@consumiblesdelaboratorio.com
Tel.: +34 918 168 973
Fax: +34 918 168 594
www.texvol.com.mx
info@texvol.com.mx

Productos Lácteos

Queso

Ensayo de corte para la medición de firmeza y fuerza de corte en queso

Helado

Ensayo de corte para la medición de fuerza de corte en helado

Margarina

Ensayo de penetración para la medición de firmeza en margarina

Ensayo de penetración para la determinación de firmeza en margarina con sonda cónica

Medición de firmeza y resistencia al corte en margarina

Mayonesa

Ensayo de penetración para la medición de consistencia en mayonesa

Ensayo de extrusión inversa para la medición de consistencia en mayonesa

Espuma de leche

Ensayo de extrusión para la medición de fuerza en espuma para café

Mousse

Ensayo de penetración para la medición de consistencia en mousse

Queso fresco

Ensayo de penetración para la medición de dureza y pegajosidad en queso fresco y queso de untar

Ensayo de compresión para la medición de untabilidad en queso

Yogur

Ensayo de extrusión inversa para la medición de consistencia en yogur

Ensayo de compresión para la medición de consistencia en yogur

Margarine

Puncture test of margarine for determination of the firmness

Settings:

Test mode:	Single cycle
Probe:	P-Cy05
Rig:	
Compression:	12 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	2.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Put the margarine below the probe. The probe should penetrate in the middle of the sample, or at least not too close to the edges. If the same margarine is used for several measurements, be sure that there is sufficient of space between the different penetrations of the probe.

Test: When the probe penetrates the surface and reaches the trigger force the measurement begins. Smaller value means a softer product, Figure 12.

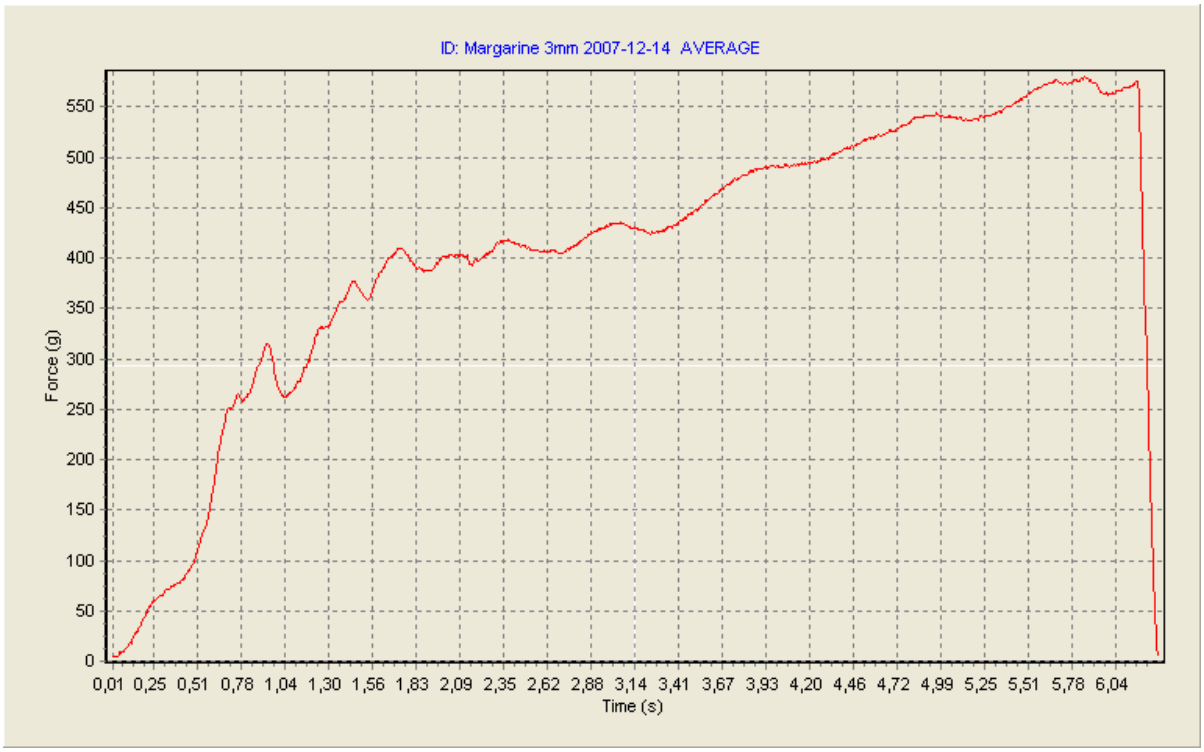

Figure 12 Puncture test of margarine

Margarine

Puncture test of margarine with a conical probe for determination of the firmness

Settings:

Test mode:	Single cycle
Probe:	P-Co45S
Rig:	
Approx. height	60 mm
Compression:	15 %
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	0.5 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample preparation: Put the margarine below the probe. The probe should penetrate in the middle of the sample, or at least not too close to the edges. If the same margarine is used for several measurements, be sure that there is sufficient of space between the different penetrations of the probe.

Test: When the probe penetrates the surface and reaches the trigger force the measurement begins. Smaller value means a softer product, Figure 13.

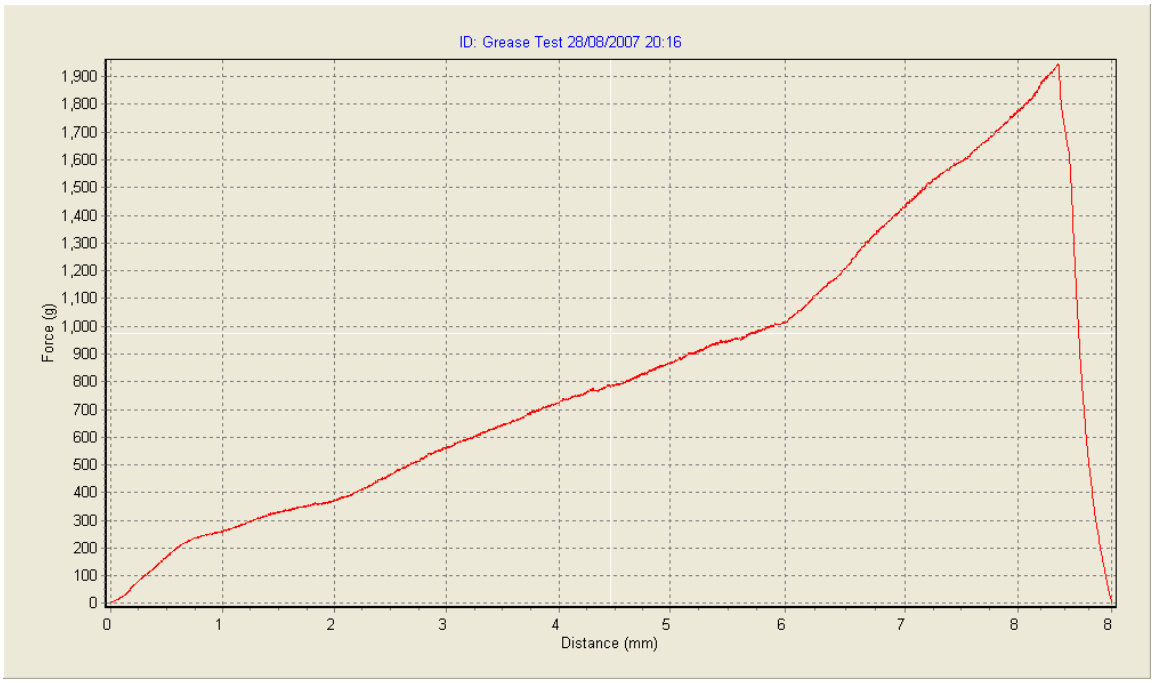

Figure 13 Penetration of margarine using a conical probe

Margarine

Cutting of margarine to measure the firmness and the cutting force resistance

Settings:

Test mode:	Single cycle
Probe:	P-CW9004
Rig:	
Compression:	25 mm
Trigger force:	50 g
Pre-test speed:	1.0 mm/s
Test speed:	0.5 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Put the margarine centrally under the probe. Have the same size and temperature of the samples to be able to compare the results.

Test: When the wire cutter has penetrated the whole sample the curve is stabilised. The force when the curve is stabilised is indicating the cutting force resistance of the margarine. When the pre-defined distance is reached the force decreases rapidly.

Mayonnaise

Puncture test of mayonnaise to measure the consistency

Settings:

Test mode:	Single cycle
Probe:	P-Cy25
Rig:	
Compression:	10 mm
Trigger force:	10 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Put the sample centrally under the probe and attach it to avoid it following the probe when the probe is returning to its start position. Have the same size and temperature of the samples to be able to compare the results. If the surface seem very irregular it can be necessary to increase the trigger force.

Test: The force increases as the probe penetrates the sample, Figure 14. The maximum force is the firmness of the sample. The negative forces are the adhesiveness of the sample and the work required for the probe to leave the sample.

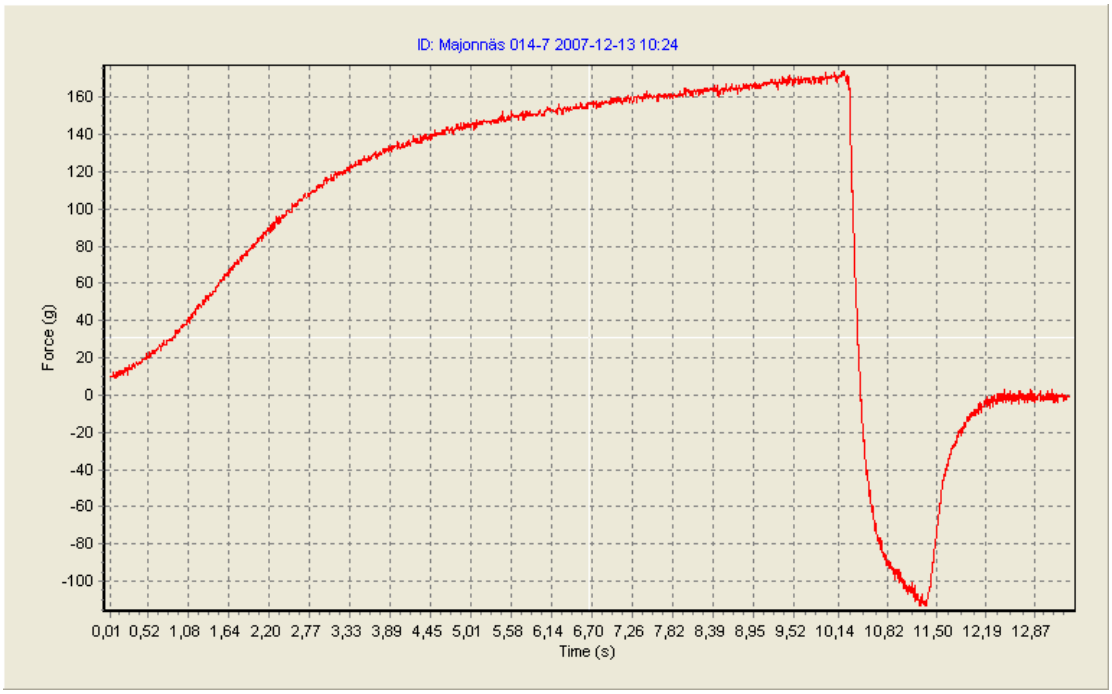

Figure 14 Puncture test of mayonnaise

Mayonnaise

Back extrusion test of mayonnaise to measure the consistency

Settings:

Test mode:	Single cycle
Probe:	P-Cy35
Rig:	
Compression:	50 mm
Trigger force:	10 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Put the sample centrally under the probe and attach it to avoid it following the probe when the probe is returning to its start position. Have the same size and temperature of the samples to be able to compare the results. This probe was used to a container of 50 mm in diameter. If the surface seem very irregular it can be necessary to increase the trigger force.

Test: The force increases as the probe penetrates the sample, Figure 14. The maximum force is the firmness of the sample. The negative forces are the adhesiveness of the sample and the work required for the probe to leave the sample. The more negative, the more cohesive is the sample.

Ice cream

Cutting test to measure the shearing force of ice cream

Settings:

Test mode:	Single cycle
Probe:	P-CBK
Rig:	
Compression:	35 mm
Trigger force:	20 g
Pre-test speed:	2.0 mm/s
Test speed:	3.0 mm/s
Post-test speed:	
Data Acquisition Rate:	250 pps

Sample and test preparation: The ice cream in its pot is put centrally under the knife.

Test: The knife penetrates the sample until the specified distance is reached. The peak is the maximum force at this specified distance indicating the hardness of the sample. The larger value, the harder is the sample. The negative value of the force is an indication of the adhesive forces.

N.B. The compression should not be more than 75 %, as the platform could indicate the result.

Soft cheese

Puncture test to measure the hardness and stickiness of cheese spread and soft cheeses

Settings:

Test mode:	Single cycle
Probe:	P-Sp
Rig:	
Compression:	5 mm
Trigger force:	2.5 g
Pre-test speed:	1.5 mm/s
Test speed:	2.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps
Adhesiveness	Activate, Height above trigger: Auto

Sample and test preparation: Put the cheese centrally under the probe and start the test. The cheese should have been stored and treated in the same ways to be able to compare the results. The temperature of the cheese should be kept constant.

Test: When the trigger force is attaint the probe penetrates the sample until the specified distance is reached. The peak is the maximum force at this specified distance indicating the hardness of the sample. The larger value the harder is the sample. The negative value of the force is an indication of the adhesive forces of the sample.

Cheese

Cutting test to measure the firmness through the cutting force of cheese

Settings:

Test mode:	Single cycle
Probe:	P-CW9004
Rig:	
Compression:	25 mm
Trigger force:	50 g
Pre-test speed:	0.5 mm/s
Test speed:	0.5 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample and test preparation*:* Put the cheese centrally under the wire cutter and start the test. The cheese should have been stored and treated in the same ways to be able to compare the results. The temperature and the size of the cheese should be kept constant.

Test*:* When the wire cutter has penetrated the whole cheese the curve is stabilised. The force when the curve is stabilised is indicating the firmness of the cheese. When the pre-defined distance is reached the force decreases rapidly.

Soft cheese

Compression to measure the spreadability

This test can also be used for margarine.

Settings:

Test mode:	Single cycle
Probe:	P-Co45
Rig:	
Compression:	90 %
Trigger force:	5 g
Pre-test speed:	2.0 mm/s
Test speed:	3.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps
Adhesiveness	Activate, Height above trigger: Auto

Sample preparation*:* Fill the cheese spread in small containers and put centrally under the probe. Be sure that the sample is of the same temperature and that the container is filled with equal amount of cheese to able to compare different measurements. Try to avoid air pockets when filling the containers.

Test*:* The force increases until the probe has reached the pre-defined distance. The maximum force is the firmness of the cheese spread at this specific depth. The negative forces represent the stickiness and adhesiveness of the product and are the forces needed to separate the probe from the product. The maximum negative force is the stickiness and the negative forces area is the adhesion of the product.

Yoghurt

Back extrusion test to measure the consistency of yoghurt

Settings:

Test mode:	Single cycle
Probe:	P-CP (sized to fit the container)
Rig:	
Compression:	30 mm
Trigger force:	10 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	5.0 mm/s
Data Acquisition Rate:	333 pps
Adhesiveness	Activate, Height above trigger: Auto

Sample and test preparation*:* Fill the container to 75 % with yoghurt and put it centrally under the probe and start the test. The probe used should not be sized so it touches the container walls. The temperature of the yoghurt should be kept constant.

Test*:* When the probe has reached the trigger force the penetration is made until the pre-defined distance is attaint. The probe returns to its starting position and here it could be necessary to hold the container so it does not lift with the probe. The negative forces are indicating the cohesiveness of the yoghurt. The more negative, the more cohesive is the sample.

Yoghurt

Compression test to measure the consistency of yoghurt

This test does not destroy the structure of the yoghurt as much as the back extrusion test

Settings:

Test mode:	Single cycle
Probe:	P-Cy20
Rig:	
Compression:	30 mm
Trigger force:	10 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	5.0 mm/s
Data Acquisition Rate:	250 pps
Adhesiveness	Activate, Height above trigger: Auto

Sample and test preparation*:* Put yoghurt in a container or put the original container centrally under the probe and start the test. The temperature of the yoghurt should be kept constant.

Test*:* When the probe has reached the trigger force the penetration is made until the pre-defined distance is attaint. The probe returns to its starting position and here it could be necessary to hold the container or attach it so it does not lift with the probe. The negative forces are indicating the cohesiveness of the yoghurt. The more negative, the more cohesive is the sample.

Mousse

Puncture test of mousse to measure the consistency

Settings:

Test mode:	Single cycle
Probe:	P-Cy25
Rig:	
Compression:	10 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	333 pps
Adhesiveness	Activate, Height above trigger: Auto

Sample and test preparation*:* Put the sample centrally under the probe and start the test. The mousse should be put in containers of the same size and be filled to the same volume to make comparisons. The temperature of the mousse should be the same upon measurement. Try to avoid getting air pockets when filling the containers. Penetrate each mousse only once.

Test*:* When the probe has reached the trigger force the penetration is made until the pre-defined distance is attaint, Figure 15. Two types of mousse were tested; one made of milk and one made of water. The mousse of water is harder than the mousse of milk, but the adhesiveness of the two mousses are similar.

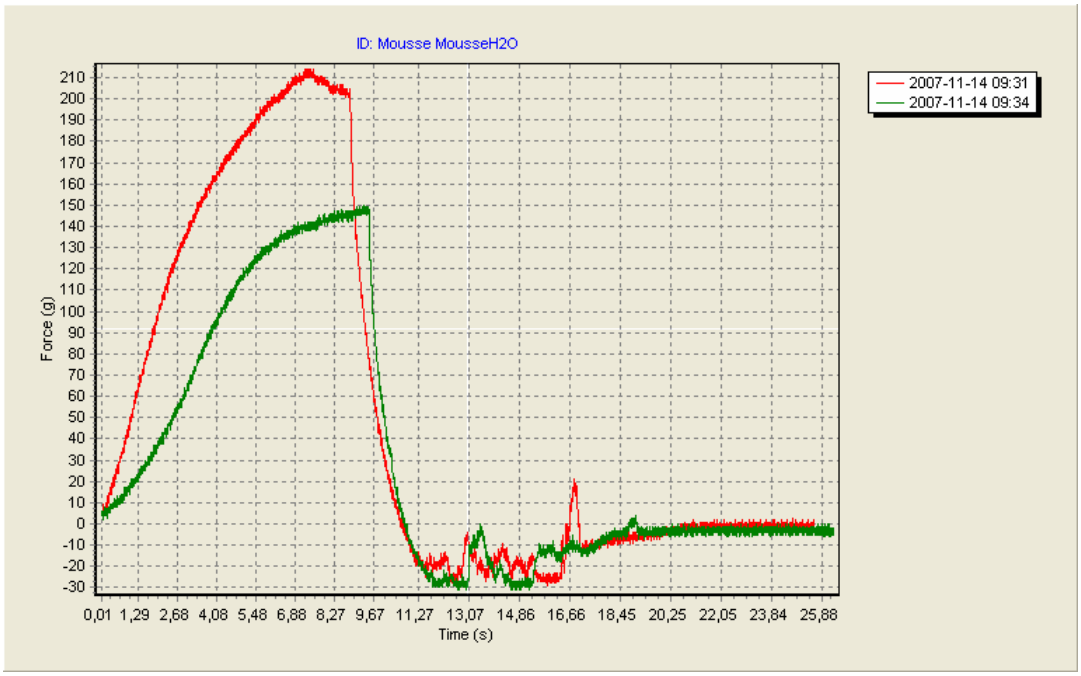

Figure 15 Comparison of two types of mousse made of water (red) and one made of milk (green)

Milk foam

Back extrusion test to measure the force of foam used for coffee

Settings:

Test mode:	Single cycle
Probe:	P-Cy45
Rig:	
Compression:	50 %
Trigger force:	5 g
Pre-test speed:	0.5 mm/s
Test speed:	0.5 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps
Adhesiveness	Activate, Height above

Sample preparation*:* Prepare the foam and put carefully in containers. Avoid getting empty space, because this can lead to a false force at the test. Prepare the foam in the same way every test, for best reproducibility. Put the container centrally under the probe and start the test.

Test*:* The force increases, before it decreases quickly. The negative forces represent the adhesiveness of the product and are the forces needed to separate the probe from the product.

Frutas y Vegetales

Frutos secos

Ensayo de corte para la medición de dureza exterior e interior en almendras

Patatas

Determinación de fuerza de corte en patata

Determinación de firmeza en patatas fritas

Firmeza y fuerza de extrusión en puré de patatas

Frutas

Ensayo de penetración para la medición de dureza en frutas

Ensayo de compresión para la medición de rapidez de estropeado en fruta

Vegetales

Ensayo de extrusión inversa para la medición de firmeza y fuerza de extrusión en judías en conserva

Almonds

Cutting test to measure the exterior and interior hardness of almonds

Settings:

Test mode:	Single cycle
Probe:	P-CBK
Rig:	R-HDS, RA-WBKSI
Compression:	4 mm
Trigger force:	15 g
Pre-test speed:	1.5 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Attach the heavy duty stand with the blade set insert to the instrument and calibrate the probe movement. Make sure that the temperature of the sample is the same to be able to compare different test results.

Test: The force increases rapidly when the knife has reached the trigger force and cuts through the exterior. When the knife reaches the interior the force drops rapidly and the force is stabilised. The maximum force and the area of work from the beginning of the test until the force is stabilised represent the “bite force” and exterior force of the almond. The stabilised force represents the interior force of the almond.

Potato

Determination of shearing force of potato

Settings:

Test mode:	Single cycle
Probe:	P-CBK
Rig:	
Compression:	More than the height of the sample
Trigger force:	5 g
Pre-test speed:	2.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Cut the potato uniformly (e.g. in small cubes). Boil/fry the potato under control conditions for best reproducibility. Put the sample below the knife and start the test. Be sure to put the sample quickly and centrally below the knife blade. The knife should cut through the whole sample, which means that the compression, in mm, should be of a higher value than the height of the sample.

Test: The maximum of the curve is the maximum force of the potato.

French Fries

Determination of firmness of French fries

Settings:

Test mode:	Single Cycle
Probe:	Kramer shear cell (Multiple blade knife)
Rig:	
Compression:	5 mm
Trigger force:	20 g
Pre-test speed:	2.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Attach the rig, calibrate the probe movement and tare the load cell. Fry the fries for a specific time and put them beside each other in the rig. Make sure that the preparation is made in the same way every time. Start the test.

Test: The highest peak of the curve represents the maximum force and firmness of the fries.

Mashed potatoes

Firmness and extrusion force of mashed potatoes

Settings:

Test mode:	Single cycle
Probe:	P-Cp45
Rig:	R-CBE, R-CBE-H
Compression:	
Trigger force:	
Pre-test speed:	
Test speed:	1.5 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Prepare the mashed potatoes and be sure to prepare it the same way every time. Put a specific amount into the back extrusion container and attach it to the platform of the instrument. The probe used in the test should fit into the container used and it should not touch the walls since this affects the result. Let the mashed potatoes always have the same temperature when tested, since temperature changes affect the results.

Test: The force increases rapidly when the plunger has reached the sample, until the sample has broken and starts to extrude. The area under the curve is the work needed for the extrusion.

Apple

Puncture of apples or other fruits to measure the hardness

Settings:

Test mode:	Single cycle
Probe:	P-Cy03
Rig:	
Compression:	5 mm
Trigger force:	25 g
Pre-test speed:	1.5 mm/s
Test speed:	1.5 mm/s
Post-test speed:	5.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Be sure that the probe will penetrate the apple (or other fruits) centrally. In this way the reproducibility of the test improves.

Test: The force increases, before it decreases quickly, Figure 16. This behavior is due to the skin of the product that first resists penetration and then gives in. After this the penetration of the fruit commences. Notice that different samples of fruit are differently ripened and this may cause differences in the values of the measurements. In this case 2 different types of apples were used: green and red delicious. In this case the green delicious was the firmer product.

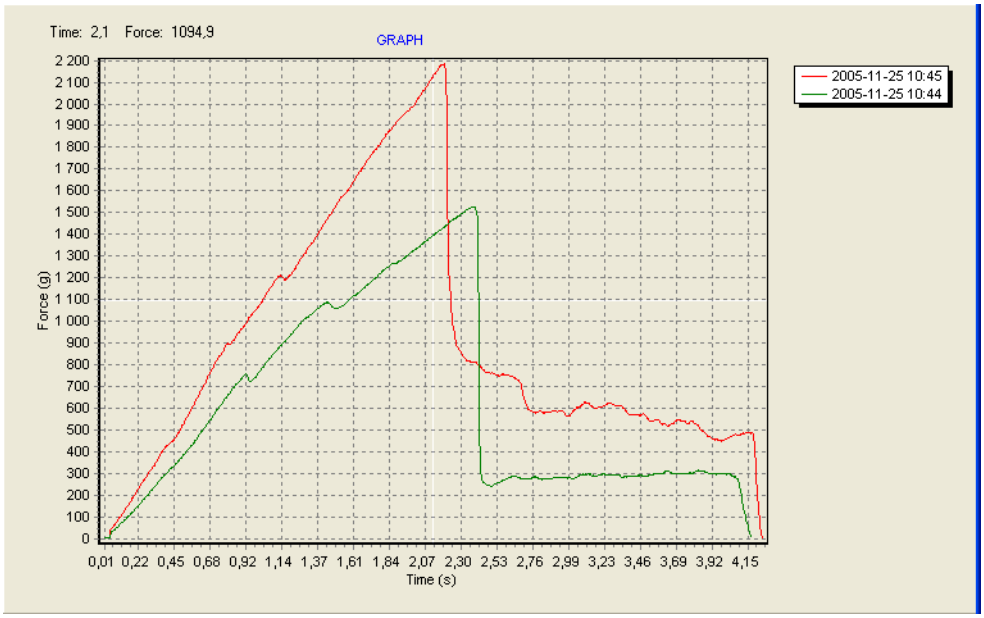

Figure 16 Penetration of two apples; Red delicious and green

Apple

Compression of apples or other fruits to measure how easily they bruise

Settings:

Test mode:	Single cycle
Probe:	P-Cp75S
Rig:	
Compression:	16 mm
Trigger force:	100 g
Pre-test speed:	0.5 mm/s
Test speed:	0.1 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	25 pps

Sample preparation: Be sure that the probe will compress the apple (or other fruits) centrally. In this way the reproducibility of the test improves.

Test: The force increases, before it decreases quickly. The further away the decrease in force occurs, the more force can the fruit stand without breaking. The small peaks that can be seen in the graph are breakage of the sample and give rise to bruises. There can be large variations of the firmness of the fruits due to the variation of ripening of individual fruits.

Beans

Back extrusion test to measure the firmness and extrusion force of canned beans

Settings:

Test mode:	Single cycle
Probe:	P-CP
Rig:	R-CBE-H, R-CBE
Compression:	68 mm
Trigger force:	
Pre-test speed:	
Test speed:	5.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Attach the back extrusion rig to the instrument and calibrate the probe movement and tare the load cell. Fill the back extrusion cell with beans. Fill up the same amount every time and be sure that the temperature of the sample is the same to be able to compare different test results.

Test: The force increases rapidly when the plunger has reached the sample, until the sample has broken and starts to extrude. The area under the curve is the work needed for the extrusion.

Confituras, Mermeladas y Geles

Marmalade

Ensayo de penetración para la determinación de fuerza de gel, fuerza de ruptura y elasticidad en mermelada

Gelatina

Ensayo de penetración para la medición de fuerza bloom según el estándar internacional ISO:9665

Gel

Ensayo de penetración para la medición de fuerza de gel y elasticidad

Marmalade

Penetration test to decide the gel strength, rupture force and elasticity of marmalade

Settings:

Test mode:	Single cycle
Probe:	P-Cy25
Rig:	
Compression:	20 mm
Trigger force:	10 g
Pre-test speed:	3.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	2.0 mm/s
Data Acquisition Rate:	200 pps

Sample and test preparation: Put the sample centrally under the probe and start the test. The marmalade should have been stored and prepared in the same conditions to be able to compare different tests and samples.

Test: When the probe has reached the trigger force the penetration is made until the specified distance. The maximum positive force represents the rupture strength of the gel. The distance before the break of the gel indicates the elasticity of the gel. If there are negative forces in the diagram, they represent the adhesiveness of the sample.

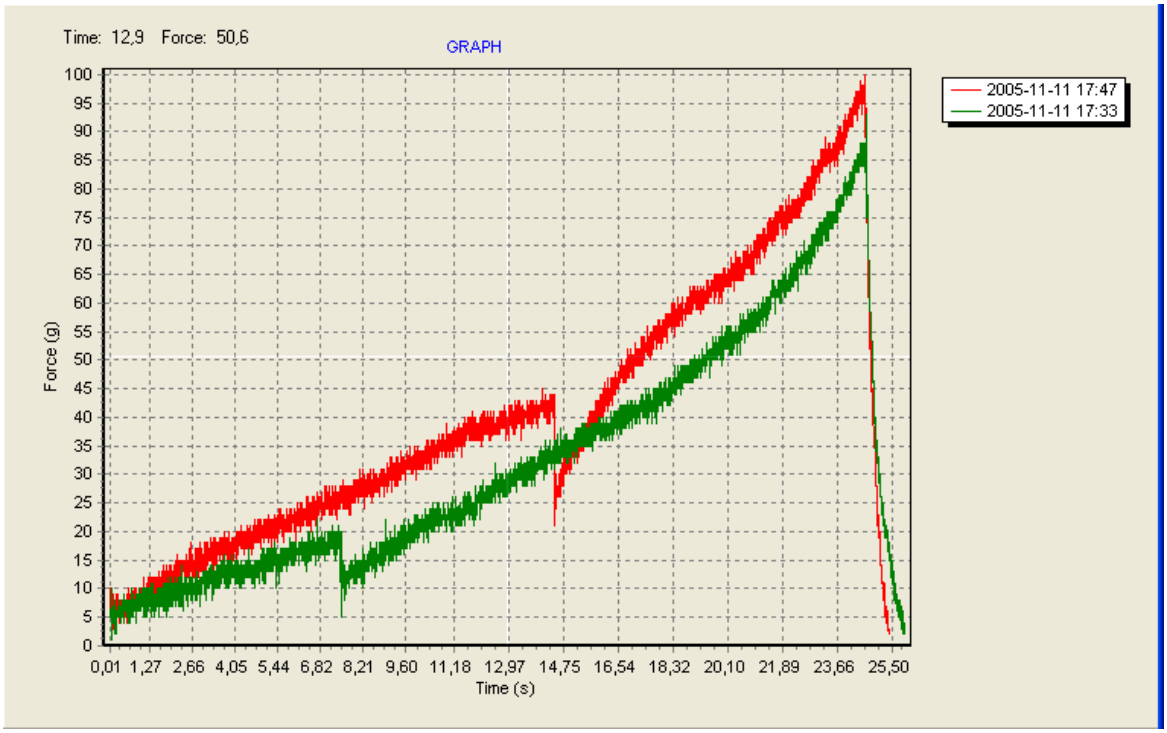

Figure 17 Comparison of two types of marmalades

Gelatin

Puncture test to measure the bloom strength, according to International standard ISO:9665

Settings:

Test mode:	Single cycle
Probe:	P-Cy12.5
Rig:	
Compression:	4 mm
Trigger force:	5 g
Pre-test speed:	0.5 mm/s
Test speed:	0.5 mm/s
Post-test speed:	0.5 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Prepare the gel (normally gelatin is added to water to form a standard solution of 12.5 % w/v). Stir with a glass rod or stainless steel and let soak covered for 3 h at a temperature lower than 22°C. After 3 h heat the container to 60°C (do not exceed) about 15 min on a magnetic stirrer. When the gelatin is dissolved pour into bloom containers. Cover the containers after 2 min and condition 17 h at 10°C.

Place the container centrally under the probe and attach it to the support, so it does not follow the probe at the end of the penetration.

Test: The force increases, until the rupture of the force. The negative forces represent the adhesiveness of the gel. The maximum force obtained is called the Bloom strength and is normally 150-250 Bloom (g) for gels in the food industry. If the force is above 400 g, change the concentration of the solution to 6.2/3 % (w/v).

This test can also be used to measure rupture force and brittleness if increasing the penetration depth. The bloom strength can still be seen after 4 mm of penetration.

Gel

Puncture test to measure the gel strength and elasticity

Settings:

Test mode:	Single cycle
Probe:	P-Cy25R
Rig:	
Compression:	9 mm
Trigger force:	10 g
Pre-test speed:	1.0 mm/s
Test speed:	0.5 mm/s
Post-test speed:	0.5 mm/s
Data Acquisition Rate:	200 pps
Adhesiveness	Activate, Height above

Sample preparation: Prepare the gels in the same way every time and put carefully in containers. Fill the containers with the same amount and use the same type of containers to be able to compare different tests. Avoid getting foam at the top, which could give a false trigger force. Put the container centrally under the probe and attach it to the support (or hold it carefully in the end of the test), so it does not follow the probe upwards at the end of the penetration. Start the test.

Test: The force increases until the gel breaks. This is the rupture and the maximum hardness of the gel, Figure 18. The distance of probe penetration gives an indication of the elasticity of the gel. The further distance the higher elasticity. The negative forces represent the adhesiveness of the product and are the forces needed to separate the probe from the product.

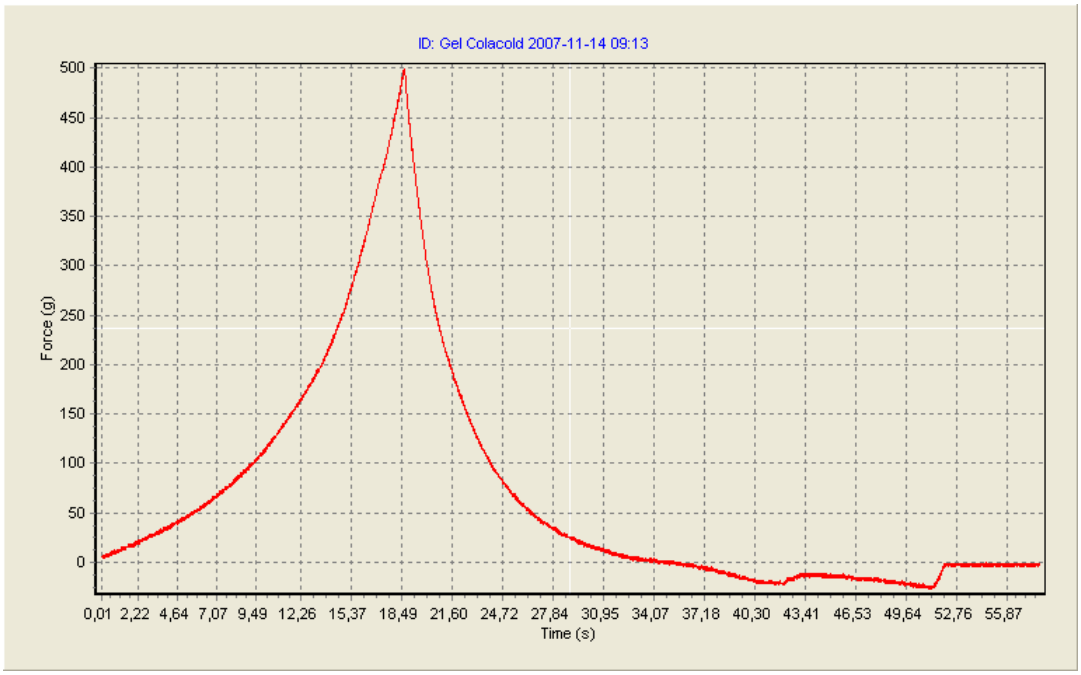

Figure 18 A typical curve of a gel

Producto Cárnico

Meat

The firmness, toughness and bite force are measured of circular meat products

Compression of meat to measure the firmness, cohesiveness, resilience, springiness and gumminess

Chicken

Cutting test to measure the firmness and cutting strength of cooked chicken breasts

Fish

Cutting test to measure the firmness and cutting strength of fish

Puncture test to measure the firmness of fish

Egg

The strength of egg shells to stimulate the strength during transportation

Circular meat products

The firmness, toughness and bite force are measured

Settings:

Test mode:	Single cycle
Probe:	P-WBB
Rig:	R-HDS, RA-WBKSI
Compression:	30 mm
Trigger force:	20 g
Pre-test speed:	2.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Put the sample centrally under the blade, so that the sample touches both sides of the blade at the same time. Be sure that the temperature and the size of the sample is the same for all replicates. The fibre direction should be the same for all replicates.

Test: When the trigger force is reached, the blade proceeds through the sample until the pre-defined distance is reached. The blade should cut through the whole sample. The maximum force is when the sample completely fills the triangular cavity of the blade and cuts through the sample surface.

Meat products

Compression of meat to measure the firmness, cohesiveness, resilience, springiness and gumminess

Settings:

Test mode:	Single cycle
Probe:	P-Cy20
Rig:	
Compression:	50 % (meat products) / 70 % (raw meat)
Trigger force:	20 g
Pre-test speed:	2.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample preparation: Cut with a special tool a cylinder of meat along the fibres (16 mm in diameter, 15 mm in height). Put the sample centrally under the probe. Be sure that the temperature and the size of the sample is the same for all replicates. The fibre direction should be the same for all replicates.

Test: The maximum peak of the curve represents the maximum force of the compression.

Chicken

Cutting test to measure the firmness and cutting strength of cooked chicken breasts

Settings:

Test mode:	Single cycle
Probe:	Kramer shear cell (Multiple knife blade)
Rig:	R-HDS RA-WBKSI
Compression:	60 mm
Trigger force:	50 g
Pre-test speed:	2.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Attach the heavy duty stand on the instrument and put the blade set insert into the stand. Calibrate the probe movement. Put the sample centrally under the probe. Be sure that the temperature and the size are the same for all replicates.

Test: The knife penetrates the sample until the pre-defined distance is reached. The maximum force is the rupture and firmness of the sample. The higher value of the force, the firmer is the sample. The distance of rupture is greater the more elastic and rubbery the sample is.

Fish

Cutting test to measure the firmness and cutting strength of fish

Settings:

Test mode:	Single cycle
Probe:	P-WBK
Rig:	R-HDS WBKSI
Compression:	10 mm
Trigger force:	50 g
Pre-test speed:	2.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Attach the heavy duty stand on the instrument and put the blade set insert on the stand. Calibrate the probe movement. Put the sample centrally under the probe. Be sure that the temperature and the size are the same for all replicates.

Test: The knife penetrates the sample until the pre-defined distance is reached. The maximum force is the rupture and firmness of the sample. The higher value of the force, the firmer is the sample. The distance of rupture is greater the more elastic and rubbery the sample is.

Fish

Puncture test to measure the firmness of fish

Settings:

Test mode:	Single cycle
Probe:	P-Sp05
Rig:	
Compression:	15 mm
Trigger force:	10 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample preparation: Put the sample centrally under the probe. Be sure that the temperature and the size are the same for all replicates. In this test a sample of 25 mm in height was used.

Test: The probe penetrates the sample until the pre-defined distance is reached. The maximum force is the rupture and firmness of the sample. The higher value of the force, the firmer is the sample. Gel strength is used when measuring fish gels and this is the maximum force multiplied with the distance.

Egg shells

The strength of egg shells to stimulate the strength during transportation

Settings:

Test mode:	Single cycle
Probe:	P-Cy02
Rig:	
Compression:	mm, sufficient to completely penetrate the shell
Trigger force:	20 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample preparation: Put the egg placed in a vertical position centrally under the probe. Be sure that the temperature is the same for all replicates.

Test: The probe penetrates the egg until the shell is completely penetrated. This could give several peaks on the graph, but the first peak indicates the hardness of the product.

Pasta y Arroz

Spaghetti and Noodles

Cutting and shearing of spaghetti and noodles. AACC method 16-50

Cutting test to measure the firmness of cooked noodles

Tension test to measure the elasticity and the break strength of cooked noodles

Compression test to measure the firmness and adhesiveness of cooked noodles

Fracture test to determine the hardness of dry lasagna

Rice

Compression test to measure the firmness and stickiness of cooked rice

Spaghetti and Noodles

Cutting and shearing of spaghetti and noodles. AACC method 16-50

Settings:

Test mode:	Single cycle
Probe:	P-CBK 1 mm
Rig:	
Compression:	4.5 mm
Trigger force:	
Pre-test speed:	
Test speed:	0.17 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	333 pps

Sample preparation: Calibrate the probe movement and tare the load cell. Cook the spaghetti until they are done and write down the time. It is important that the spaghetti is prepared in the same way every time and that the time in between cooking and testing is the same to be able to compare different tests. Check if there are any visible damages at the product that may affect the test result.

Put 5 strains of spaghetti on the scale and then let the blade go through them. This will show how firm the product is, which could give information of how long the product should be cooked and how old it is e.g.

Test: When the probe has reached the trigger force the cutting is made until the specified distance. The maximum positive force and the area under the curve (the work in gram – centimeter) represent the firmness of the noodles.

Spaghetti and Noodles

Cutting test to measure the firmness of cooked noodles

Settings:

Test mode:	Single cycle
Probe:	P-CBK
Rig:	
Compression:	5 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	1.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample and test preparation: Cook the noodles until they are done and write down the time. It is important that the noodles are prepared in the same way every time to be able to compare different tests. Check if there are any visible damages at the product that may affect the test result.

Put 5 noodles on the scale and then let the blade go through them. This will show how firm the product is, which could give information of how long the product should be cooked and how old it is e.g.

Test: When the probe has reached the trigger force the cutting is made until the specified distance. The maximum positive force represents the firmness of the noodles.

Spaghetti and Noodles

Tension test to measure the elasticity and the break strength of cooked noodles

Settings:

Test mode:	Single cycle
Probe:	P-STRG
Rig:	R-STRG
Compression:	100 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	3.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	200 pps

Sample and test preparation: Cook the noodles until they are done and write down the time. It is important that the noodles are prepared in the same way every time to be able to compare different tests. Check if there are any visible damages at the product that may affect the test result. Attach the rig to the instrument and calibrate the probe movement and tare the load cell. Put carefully a noodle in the rig. Do not tense the noodle too much, when this could affect the result. Start the test.

Test: When the probe has reached the trigger force the pulling of the product is done until it breaks. The distance to the maximum tension strength indicates the elasticity of the noodle.

Spaghetti and Noodles

Compression test to measure the firmness and adhesiveness of cooked noodles

Settings:

Test mode:	Single cycle
Probe:	P-Cy35S
Rig:	Attachment of the pasta
Compression:	75 %
Trigger force:	10 g
Pre-test speed:	2.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	2.0 mm/s
Data Acquisition Rate:	200 pps
Adhesiveness	Activate, Height above trigger: Auto

Sample and test preparation: Cook the products until they are done and write down the time. It is important that the noodles are prepared in the same way every time to be able to compare different tests. Check if there are any visible damages at the product that may affect the test result. Place the products (e.g. 2 samples) on the load cell and attach them. Make sure that the products are flat to the surface of the load cell. If any parts rise, it might affect the test result. Start the test.

Test: When the probe has reached the trigger force the compression is done until the pre-defined compression is reached. The maximum force is the firmness of the product. This can be used to evaluate the bite force needed for the product. The negative forces represent the adhesiveness of the product.

Dry Spaghetti and Noodles

Fracture test to determine the hardness of dry lasagna

Settings:

Test mode:	Fracturability
Probe:	P-BP70A
Rig:	R-TPBR
Compression:	5 mm
Trigger force:	15 g
Pre-test speed:	2.0 mm/s
Test speed:	3.0 mm/s
Post-test speed:	
Data Acquisition Rate:	500 pps

Sample and test preparation: Attach the probe and the rig to the instrument and calibrate the probe movement and tare the load cell. The product should have been stored in the same way and have the same temperature to be able to compare the test. Check if there are any visible damages at the product that may affect the test result. Put a lasagna sheet on the rig centrally under the knife blade and start the test. This test could also be performed with other dry pasta, but it may be necessary to change the trigger force.

Test: When the probe has reached the trigger force the cutting is made until the specified distance. The maximum positive force represents the firmness of the lasagna. The distance until the lasagna breaks represents the brittleness of the sample. The slope represents the stiffness of the product. The higher the gradient of the slope, the stiffer is the sample.

Rice

Compression test to measure the firmness and stickiness of cooked rice

Settings:

Test mode:	Single cycle
Probe:	P-Cy35S
Rig:	
Compression:	90 %
Trigger force:	5 g
Pre-test speed:	0.5 mm/s
Test speed:	0.5 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	333 pps
Adhesiveness	Activate

Sample and test preparation: Cook the product until they are done and write down the time. It is important that the rice is prepared in the same way every time and that the time from cooking to testing is the same to be able to compare different tests. Place the products (e.g. 3 grains of rice) centrally under the probe. Start the test.

Test: When the probe has reached the trigger force the compression is done until the pre-defined compression is reached. The maximum force is the firmness of the product. The negative forces represent the stickiness of the product and are the forces needed to separate the probe from the product.

CONSUMIBLES DE LABORATORIO
Apdo 97
28691 Villanueva de la Cañada (Madrid) –ESPAÑA
www.consumiblesdelaboratorio.com
info@consumiblesdelaboratorio.com

Tel.: +34 918 168 973
Fax: +34 918 168 594
www.texvol.com.mx
info@texvol.com.mx

Alimento para animales

Pet food

Compression test to measure the hardness of different dehydrated pellets

Pet food

Compression test to measure the hardness of different dehydrated pellets

Settings:

Test mode:	Single cycle
Probe:	P-Cy35
Rig:	
Compression:	2.5 mm
Trigger force:	100 g
Pre-test speed:	2.0 mm/s
Test speed:	2.0 mm/s
Post-test speed:	
Data Acquisition Rate:	200 pps

Sample preparation: Put two pellets centrally under the probe. Take them directly from storage, so they have not gotten moisture from the atmosphere. Start the test.

Test: When the trigger force is reached the probe compresses the pellets until the pre-defined distance. The pellets will break in fractions and therefore the graph consists of many small peaks.

Cosméticos

Moisturing cream

Back extrusion test to measure the firmness and stickiness of moisturing cream and lotion

Shampoo

Back extrusion test to measure the firmness and stickiness of shampoo

Eye shadow

Penetration test to measure the hardness and strength of eye shadow

Lipstick

Penetration test to measure the hardness of lipstick

Moisturing cream

Back extrusion test to measure the firmness and stickiness of moisturing cream and lotion

Settings:

Test mode:	Single cycle
Probe:	P-Cp35S
Rig:	R-BECH, (RA-C-40H50D)
Compression:	60 %
Trigger force:	30 g (or more to obtain full contact of probe and sample before the test commence)
Pre-test speed:	1.5 mm/s
Test speed:	2.0 mm/s
Post-test speed:	2.0 mm/s
Data Acquisition Rate:	250 pps
Adhesiveness	Activate, Height Above Trigger: 25 mm

Sample and test preparation: Attach the back extrusion rig holder and calibrate the load cell and the probe movement. Fill the container to approximately 75 % with cream and start the test. Store the cream in the same way every time and make sure they have the same temperature to be able to compare different tests.

Test: When the probe has reached the trigger force the compression is done until the pre-defined compression is reached. The maximum force is the firmness of the product. The area of the curve to the maximum force is a measurement of consistency of the cream. The higher the value the thicker is the consistency. The negative forces represent the stickiness and cohesiveness of the product and are the forces needed to separate the probe from the product. The area of the negative region of the curve is the work of cohesion. It is also an indication of the viscosity of the sample.

Shampoo

Back extrusion test to measure the firmness and stickiness of shampoo

Settings:

Test mode:	Single cycle
Probe:	P-Cp35S
Rig:	R-BECH, (RA-C-40H50D)
Compression:	60 %
Trigger force:	5 g (or more to obtain full contact of probe and sample before the test commence)
Pre-test speed:	1.5 mm/s
Test speed:	2.0 mm/s
Post-test speed:	2.0 mm/s
Data Acquisition Rate:	250 pps
Adhesiveness	Activate, Height Above Trigger: 25 mm

Sample and test preparation: Attach the back extrusion rig holder and calibrate the load cell and the probe movement. Fill the container to approximately 75 % with shampoo and start the test. Store the shampoo in the same way every time and make sure they have the same temperature to be able to compare different tests.

Test: When the probe has reached the trigger force the compression is done until the pre-defined compression is reached. The maximum force is the firmness of the product. The area of the curve to the maximum force is a measurement of consistency of the shampoo. The higher the value the thicker is the consistency. The negative forces represent the stickiness and cohesiveness of the product and are the forces needed to separate the probe from the product. The area of the negative region of the curve is the work of cohesion. It is also an indication of the viscosity of the sample.

Eye shadow

Penetration test to measure the hardness and strength of eye shadow

Settings:

Test mode:	Single cycle
Probe:	P-Cy02S or P-Co45S
Rig:	
Compression:	5 mm
Trigger force:	5 g
Pre-test speed:	1.0 mm/s
Test speed:	0.5 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	333 pps

Sample and test preparation: Place the sample centrally under the probe and start the test. A conical probe will, differently from the cylinder probe, penetrate the sample more than compressing it. Store the eye shadow in the same way every time and make sure they have the same temperature to be able to compare different tests. If the same container is used for several tests make sure that there is sufficient space between the different penetrations and that they are evenly spaced. Do not make a test too close to the sides of the container.

Test: When the probe has reached the trigger force the penetration is done until the pre-defined compression is reached. The maximum force is the hardness of the product and a measurement of the "cake strength" of the eye shadow. This is good to know for determine how sensitive the powder is for transport and when used by the consumer. If there are small peaks in the curve this could indicate air pockets or that the powder is having some more loosely packed areas.

Lipstick

Penetration test to measure the hardness of lipstick

Settings:

Test mode:	Hold Until Time, 5 s
Probe:	P-Cy02S
Rig:	
Compression:	100 g (or lower – adapt to the weakest sample)
Trigger force:	5 g
Pre-test speed:	0.5 mm/s
Test speed:	1.0 mm/s
Post-test speed:	10.0 mm/s
Data Acquisition Rate:	333 pps

Sample and test preparation: Place the sample centrally under the probe and start the test. Store the lipstick in the same way every time and make sure they have the same temperature to be able to compare different tests. If the original container is used for the test, cut the edge of the lipstick to get an even surface before starting the test. If the lipstick is put in a container several tests could be done within one container – just make sure that there is sufficient space between the different penetrations and that they are evenly spaced. Do not make a test too close to the sides of the container.

Test: When the probe has reached the trigger force the penetration is done until the pre-defined force is reached. The force of 100 g is hold for 5 s. The distance of penetration during the hold of the force will change and this indicates the resistance to the penetration. A large penetration distance means a soft product.