TEXTURE APPLICATION NOTE

JELLY CUP

APPLICATION

QC test to evaluate the gel strength of soft jelly (pectin set gel).

TEST OBJECTIVE

To quantify gel strength and breaking point in an accurate and reproducible manner.

TEST PRINCIPLE

Simple penetrometry, where the probe comes into contact with the sample creating both compressive and shear (cutting) forces as penetration increases.

The technique aims to imitate the subjective test technique of pressing the gel surface with a finger. A 12mm diameter hemispherical probe was used to replicate the geometry of a finger pressed into the sample. The travelling probe is directly connected to a load cell which measures sample response as a function of probe penetration.

BACKGROUND

Many simple tests have been developed in order to measure physical/textural attributes of food materials as part of the quality control process. The quantification of gel strength is particularly relevant to the sensory and functional properties of finished products and their ingredients.

METHOD

Three flavour variations of jelly were tested in small plastic conical containers. A specially designed holder was used to support the conical shaped gels in a reproducible manner. It is critical to be consistent in sample presentation within the QC environment to prevent variation in results.

An average of 3 readings was taken from each sample group where the jellies were centrally located beneath the test probe and penetrated to a distance of 20mm following the test settings in Table 1.

DEFINITIONS

Hardness—force necessary to break gel structure; peak force of the compression cycle.
Apparent modulus—initial slope of elastic region

Conical shaped mini cup jellies are supported during test by specially-designed holder.

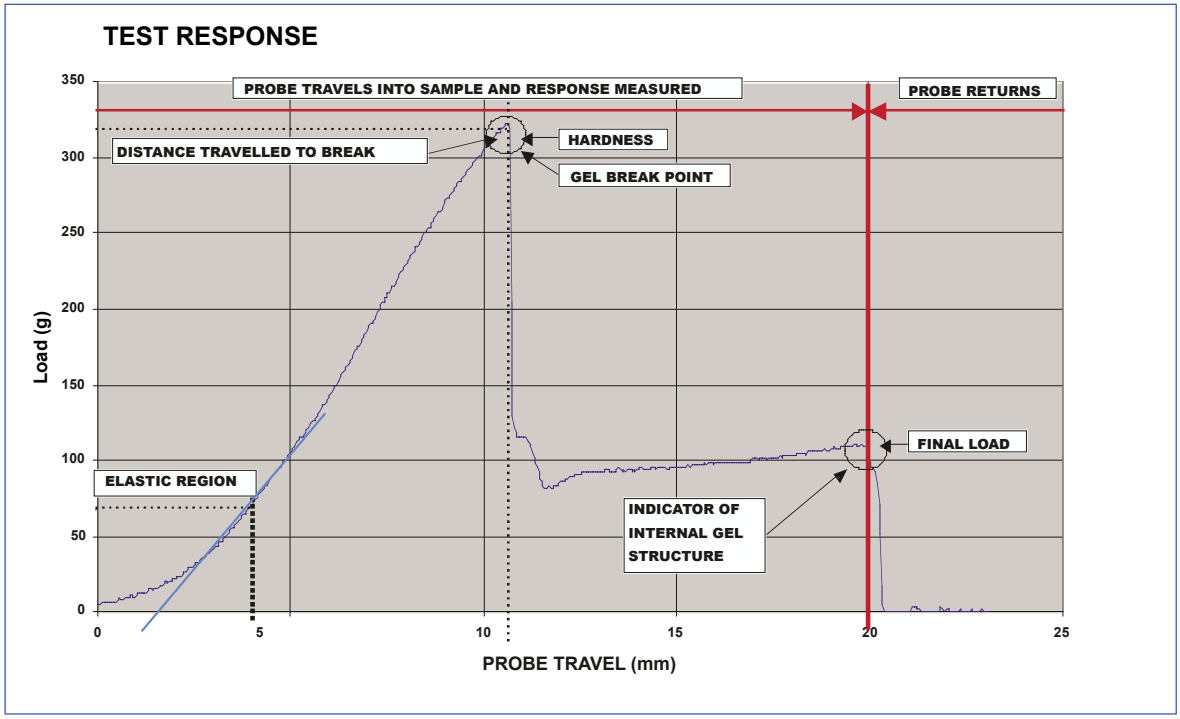
Probe travels into sample in controlled manner while the Texture Analyser continuously collects load response.

TABLE 1
Texture Analyser Test Settings

MODE:	Normal
TRIGGER:	4.5g
DISTANCE:	20mm
SPEED:	1mm/s

TEXTURE APPLICATION NOTE

JELLY CUP



DISCUSSION

The test method followed allows identification of a full range of textural properties from the pectin set jelly.

The rigidity of the sample maybe taken within the elastic region of deformation based upon theory from the gelatin Bloom test at around 4mm penetration to provide improved correlation of results.

The peak load is interpreted as gel hardness and in this application reflects the load required to break the gel e.g. the point of sample failure. The distance at which this break occurs relates to the brittleness of the gel, where pectin set products are generally more brittle and less elastic than traditional gelatin set alternatives.

The final load recorded provides an excellent indication of gel strength post failure and allows us to quantify the residual strength of the gel.

CONCLUSION

The pectin set gel evaluated in this exercise is relatively weak and there is considerable variation in characteristics of the different flavors. Results obtained reflect natural variation in gels which is influenced by manufacturing factors such as shear and cooling profile as well as formulation variables which include sugar and calcium ion concentration.

The simple method followed is ideal for application in the QC environment where the break load is of core importance to the gel quality. The additional sub-characteristics are of interest to the product developer who may require more detailed analysis. Texture analysis could then be used to measure the effect of different gelling agents (Carrageenan, Locust Bean Gum, etc) on the finished gel profile in relation to that obtained from traditional gelatin.

SELECTED CALCULATIONS	sample_01	sample_02	sample_03	sample_04	sample_05	sample_06	Arithmetic Mean	Standard Deviation	Lowest	Highest	Units
Peak Hardness	361.00	276.00	346.00	288.00	347.00	324.00	323.67	34.59	276.00	361.00	g
Apparent modulus	18.05	13.80	17.30	14.45	17.35	16.20	16.19	1.72	13.80	18.05	g/s
Hardness at 20mm	120.20	92.00	115.30	96.50	115.70	108.00	107.95	11.40	92.00	120.20	g

Brookfield Engineering Laboratories, Inc.
11 Commerce Boulevard, Middleboro, MA 02346-1031 USA
Tel: 800-628-8139 or 508-946-6200 · Fax: 508-946-6262
Email: sales@brookfieldengineering.com · Website: www.TextureAnalysis.com

ISO 9001:2000 CERTIFIED