Application manual No. 111

Production: PECTIN GEL

Objective: Comparison of rupture force and brittleness/elasticity of three gel formulations as a means of monitoring effects of quality, concentration and processing

Type of action: Penetration test

Test mode settings:

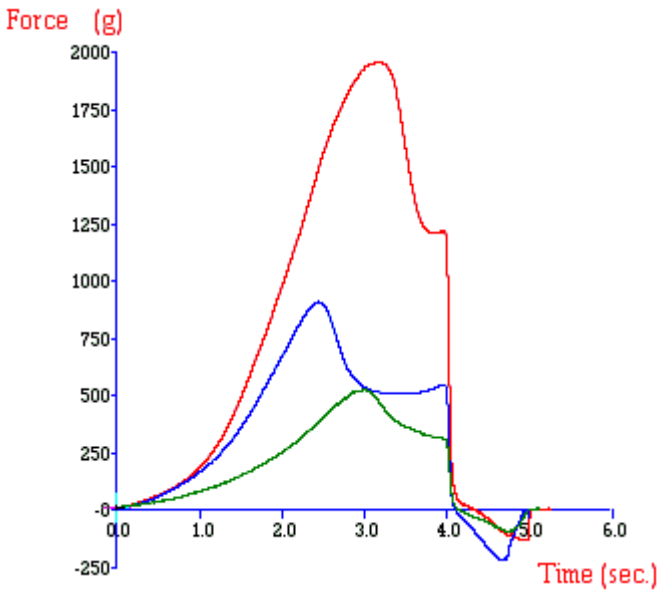
Speed	Test mode	Trigger	Target	Hold
0.5 mm/s	Distance (c)	10 gf	8 mm	0 sec

Accessory:
ϕ 1/2 inch cylinder probe PP, Platform

Sample Preparation:
Prepare the gels according to a standard or preferred procedure and condition for a specified time at a controlled temperature which should be adhered to for subsequent comparative gel testing.

Test Set-Up:
After conditioning, place the bloom jars (or alternative sample container) centrally under the standard probe and commence the penetration test.

Typical plots:



The above curves were produced from testing 3 different concentrations of pectin gels, tested at 20C.

Observations:
After a trigger force of 10g is attained the probe then proceeds to penetrate into the gel to a depth of 8mm. During this penetration the force is shown to drop at the point where the gel breaks. After this the resulting forces are due to continuing penetration up to the required depth. The maximum +ve force (i.e. the rupture point of the gel) is taken as an indication of gel firmness or 'rupture strength'. The distance that the gel penetrates before this break occurs gives an indication of the gel's elasticity, i.e. a short distance of penetration before break indicates a brittle gel whereas a large distance of penetration before rupture indicates a more elastic gel.

Data Analysis:

☒Max Force

☒Peak Distance

Results

Sample	Mean Max. Force 'Rupture Strength' (+/- S.D.) (g)	Mean Distance at Break 'Brittleness' (+/- S.D.) (mm)
A	1912.4 +/- 108.3	6.3 +/- 0.05
B	899.7 +/- 34.4	5.2 +/- 0.2
C	543.2 +/- 20.3	5.6 +/- 0.6

Notes:

- The results for this type of test normally show very good reproducibility. However this is only true when the sample is set in a position which allows the formation of a flat surface. Failure to test on a flat surface causes differing test contact areas and hence produces erroneous results. Also failure to position the sample centrally can produce a higher force reading which is due to a wall (i.e. of the container) strengthening effect.
- 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.