Production: SPONGE CAKE

Objective: Measurement of the firmness and springiness of cakes held for three storage times

Type of action: Relaxation test

Test mode settings:

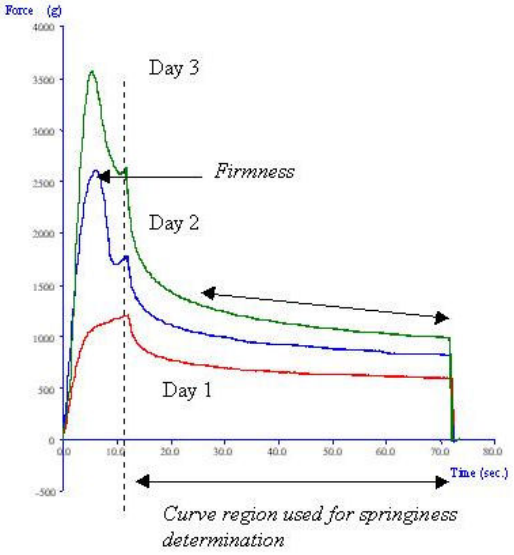
Speed	Test mode	Trigger	Target	Hold
1 mm/s	Strain (c)	5 gf	25 %	60 sec

Accessory:
ϕ 36 mm cylinder probe, Platform

Sample Preparation:
Remove samples from place of storage just prior to testing.

Test Set-Up:
Place the sample centrally under the cylinder probe, avoiding any irregular or non-representative areas of the crumb or crust. This test assumes that the surface of the sample is larger than the diameter of the probe being used.

Typical plots:



The above curves were produced from samples of sponge cake tested after storage for 1,2 and 3 days.

Observations:
The above plot illustrates a Force-Time curve which shows the characteristics of a cake firmness and springiness test. The probe compresses the sample until it has compressed 25% of the product height. It holds at this distance for 60 seconds and then withdraws from the sample and returns to its starting position.

Firmness is defined as the force (in grams, kilograms or Newtons) required to compress the product by a pre set distance e.g. 25%. A simple way of looking at the springiness property is to record the force after 60 seconds and divide this by the maximum force and then multiply by 100%

i.e. F60 / Fmax x 100 = % recovery

The closer the resulting value is to 100% the more like a 'spring' the product is.

Data Analysis:

☒Max Force

☒Force after hold

☒Springiness Ratio

Results

Sample	Mean Compressive Force 'Firmness' (+/- S.D.) (g)	Springiness (+/- S.D.) (%)
Day 1	1017.1 +/- 37.8	51.3 +/- 0.4
Day 2	2709.1 +/- 118.9	31.1 +/- 1.4
Day 3	3438.3 +/- 136.6	30.3 +/- 2.0

Notes:

- Before commencing each test, consideration must be taken to ensure that the sample is of the same height otherwise when the Texture Analyzer compresses by 25% of the sample height the distance travelled by the probe will vary.
- The blip observed in the curves of the cakes stored for 2 days and 3 days, is a result of the probe's perimeter 'cutting' through the sample as it becomes more stale.
- 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.