Production: CHIPS/FRENCH FRIES

Objective: Firmness measurement of Chips/French Fries with multiple chip rig

Type of action: Penetration test

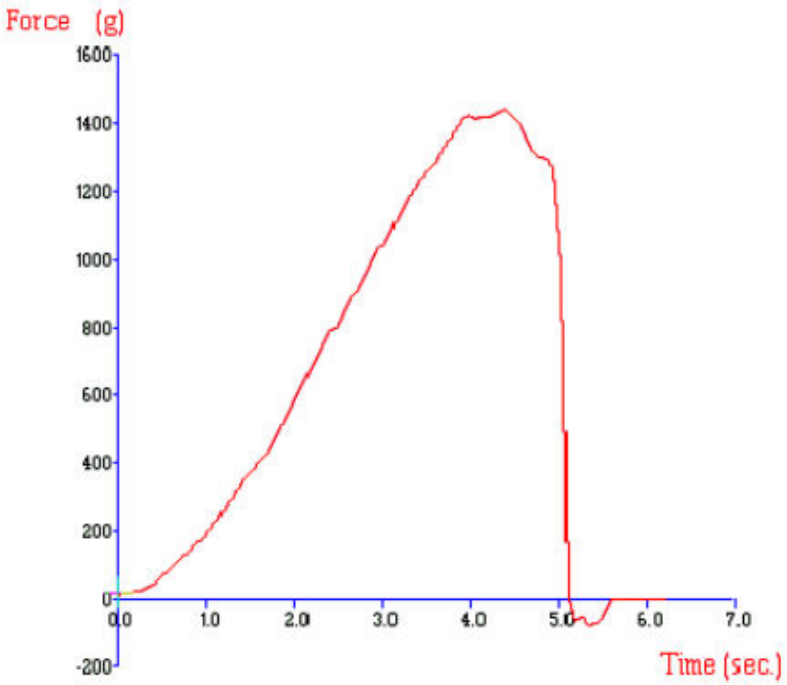
Test mode settings:

Speed	Test mode	Trigger	Target	Hold
1 mm/s	Distance (c)	20 gf	5 mm	0 sec

Accessory:
Fires Multi-puncture rig

Test Set-Up:
Attach the upper fixture (incorporating all of the 2mm cylinder probes) to the load cell carrier. Screw the lower fixture into the machine base. Before tightening the base screws, move the upper fixture down and position the 2mm penetration cylinders centrally through the lower fixture holes, ensuring that there is no contact between the cylinders and hole sides. Raise the upper fixture. Insert 10 chips into the rig and commence the test.

Typical plots:



The above curve was produced from oven baked chips, cooked at 180C for 3 minutes

Observations:
The maximum force reading (i.e. highest peak) is taken as the force to penetrate into the chips. This is an indication of firmness.

Data Analysis:
☒Max Force

Results

Sample	Mean Maximum Force 'Firmness' (+/- S.D.) (g)
A	1439.2 +/- 128.1

Notes:

- Chip manufacturers are often interested in studying the effect of 'plate life' on firmness of the chips. This involves testing the samples immediately after removal from the oil, pulling the samples along further on the lower fixture and then testing again after 1 min, 2 mins etc. Obviously this requires samples of greater length than 90mm as the test holes should not be in close proximity to one another e.g. not less than 5mm apart.
- 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.