## APPLICATION

Detailed analysis of 3 principle characteristics of Port Salut type cheese

## TEST OBJECTIVE

Develop quality control test method for detection of critical physical characteristics between production batches.

## TEST PRINCIPLE

Texture Profile Analysis principles were applied to carefully prepared samples taken from each block of cheese supplied. Each sample was compressed twice enabling determination of key properties by comparing the load profiles of both peaks.

## BACKGROUND

In semi-solid materials such as cheese hardness, springiness and cohesiveness (as defined below) are important to sensory perception by the consumer.

## METHOD

Uniform samples were removed from the cheese block with a cork borer 25mm in diameter and trimmed flat at both ends to form 30mm high cylinders. Samples with visible fractures or anomalies were discarded. Each sample was centrally located beneath the test probe at ambient temperature of 22°C. Both the sample table and the face of the probe were lightly coated with vegetable oil to minimize lateral stresses on the sample during compression. The sample was compressed following the conditions given in Table 1 while sample response was recorded.
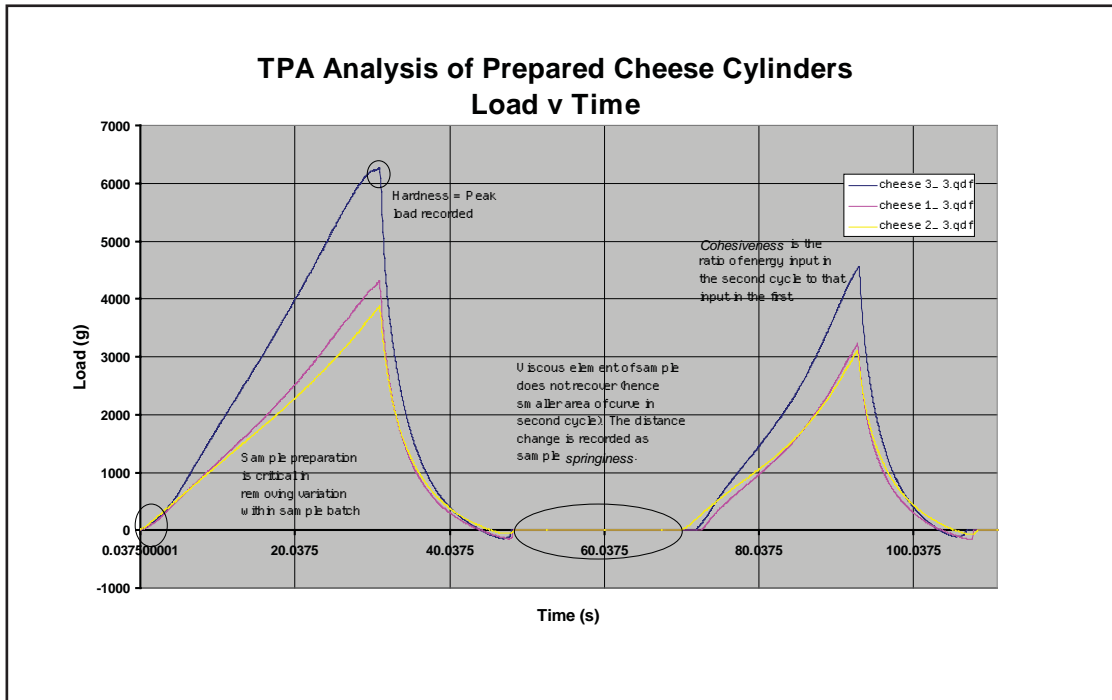
## DEFINITIONS

HARDNESS: Peak load recorded during The first compression cycle e.g. the force necessary to attain a given deformation.

COHESIVENESS: The ratio of positive force during the second to that of the first compression cycle (downward strokes only)

SPRINGINESS: Height that the food recovers between the end of the first compression cycle and the start of the second

### TABLE 1

| MODE: | TPA |
|---|---|
| TOTAL CYCLES: | 2 |
| HOLD TIME: | 0 |
| RECOVERY: | 0 |
| TRIGGER: | 5g |
| TEST SPEED: | 30mm min-1 |
| TARGET UNIT: | Distance |
| TARGET VALUE: | 15mm (50%) |
| PROBE: | 50mm dia cylinder (TA25/1000) |
| WEIGH CELL: | 25Kg |

**BROOKFIELD**

**RESULTS**



**TPA Analysis of Prepared Cheese Cylinders
Load v Time**

Hardness = Peak load recorded

Cohesiveness is the ratio of energy input in the second cycle to that input in the first

Viscous element of sample does not recover (hence smaller area of curve in second cycle) The distance change is recorded as sample *springiness*.

Sample preparation is critical in removing variation within sample batch

cheese 3_ 3.qdf
cheese 1_ 3.qdf
cheese 2_ 3.qdf

Load (g) — Time (s)

## DISCUSSION

This test method can produce reliable indications of the physical properties of the cheese samples. The method itself requires careful sample preparation, and placement, on the texture analyser. It is most important that each cylindrical sample have flat, square ends. This is critical to avoid surface effects at the beginning of the force-deformation curve which cause excessive variations in hardness results.

## EMPIRICAL FACTORS:

Test conditions which will affect results generated:

1. Temperature of sample
2. Diameter of probe
3. Diameter of sample
4. Regularity of sample surface
   (irregularities in surface characteristics will result in false triggering of apparatus)
5. Age of sample
6. Trigger force

## CONCLUSION

The technique successfully discriminated between the samples supplied and demonstrated that *Hardness* as a parameter is key to this differentiation. The parameters of *Springiness* and *Cohesiveness* will provide an invaluable indication of cheese elasticity and overall internal strength respectively

**BROOKFIELD**
ISO 9001:2000 CERTIFIED

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