

APPLICATION:

Establish a standard compression test method for evaluating the firmness of bakery products.

TEST OBJECTIVE:

Firmness is accepted as a measure of freshness and quality. This method is useful for measuring freshness and quality in product development and quality control.

TEST PRINCIPLE:

Quantitatively measure the force required to compress the bread sample.

BACKGROUND:

The American Association of Cereal Chemists (AACC) developed a standard method for the assessment of bread samples by deformation. The force to compress a bread sample a specific distance simulates gentle squeezing by the consumer when selecting their loaf at the supermarket.

METHOD:

One slice of bread 25mm thick or two slices, each 12.5mm thick can be used. The slices can be cut mechanically or by hand provided the end three slices are discarded and the crusts are not removed. A 38.1mm Ø probe (TA4/1000) at a test speed of 2mm/s. The location of testing is the centre of the bread slice(s) avoiding non-representative areas of crumb. Sample is subjected to 40% deformation and compression load at 25% deformation is recorded in either Newton's or g. Test a total of three samples per loaf.

DEFINITIONS:

Compression Force Value (CFV): The load in grams at the point of 25% compression.

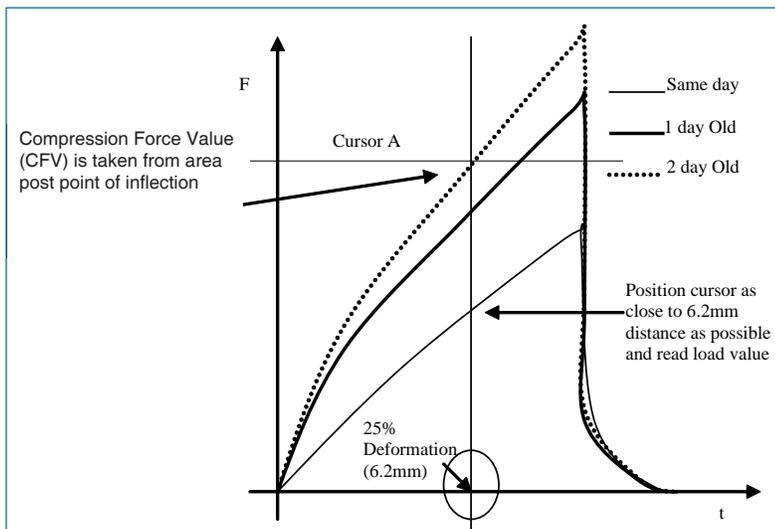


TABLE 1
LFRA Settings

MODE:	Normal compression
SPEED:	2mm/sec
DISTANCE:	10mm
TRIGGER:	5g

PROBE:	38.1mm Ø Perspex Cylinder (Ref: TA 4)
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READING



Same Day	85.5g
1 Day Old	151.3g
2 Day Old	174.1g

EMPIRICAL FACTORS:

Test conditions which will affect results generated:

1. Sample size
2. Sample age
3. Test probe employed
4. Position and centralisation of sample

Sample conditions which will effect results generated:

1. Formulation and composition
2. Bake or process treatments
3. Storage conditions imposed on loaf

DISCUSSION

The structure of bread can be defined a solid foam colloid with multiple pockets of carbon dioxide distributed uniformly through its bulk. Gluten forms the interconnected network that supports the carbon dioxide in small pockets. The end result when baked is the aerated honeycomb texture characteristic of bread. Texture analysis provides a valuable tool for insight into the quality of bread. The method applied within this study has clearly quantified the effect of staling on the strength of the gluten matrix.

RELATED TESTS

TPA Type assessment of bread sample
Measurement of Bread Strength and Extensibility
Stress relaxation as an indicator of bread staling

CONCLUSION

The texture measurement described has been shown to quantify physical characteristics of a range of loaves in the early stages of their life. The simple compression test is ideally suited for production or development environments where it can give an indication of product staling or formulation in relation to enhancers, flour quality or the use of additives such alpha amalyse.