

Sponge Cake Properties by Double Cycle Compression

TVT Texture Analyzer

The TVT Texture Analyzer (Figure 1) offers rapid and objective analysis for bread products. The following parameters can be characterized for your product category:

- Firmness
- Springiness
- Cutting force

Both international standard methods as well as customer tailor-made profiles are available.



Figure 1: TVT Texture Analyzer

Scope

- Determination of sponge cake firmness and springiness by double-cycle compression.

Method Description

The recording of the measurement data commences once the probe reaches the pre-set trigger force. The probe will then compress the sample to a pre-defined percentage of the sample height. After the first compression, the probe returns to its starting position before the second compression begins. A pre-set wait time decides when the second compression starts. After the second compression, the probe returns to its starting position.

Calibration

Make sure the instrument is correct calibrated before the measurements. How to perform the calibration can be found in the User's Manual.

Load cell (recommended) 5 - 10kg

Probe

P-CY75A, Cylinder/compression probe 75 mm diameter, aluminum (Figure 2)
Part number: 67.30.75

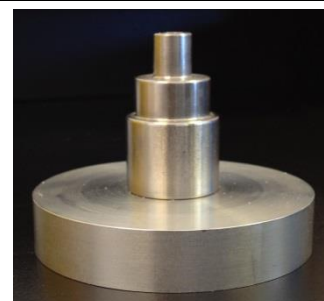


Figure 2: P-CY75A

Profile settings

Setting Parameter

Multiple cycle compression

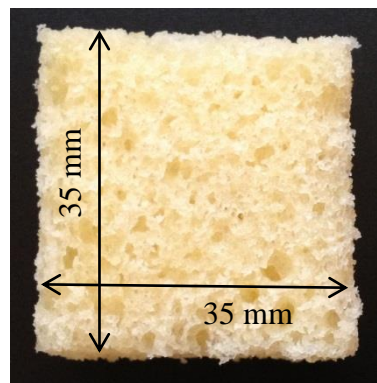
Sample height [mm]	25.0
Starting distance from sample [mm]	5.0
Number of cycles	2
Compression [%]	25.00
Paus [s]	15.0
Initial speed [mm/s]	1.0
Test speed [mm/s]	1.0
Retract speed [mm/s]	1.0
Trigger force [g]	5
Data rate [pps]	200

Sample preparation

Slice the sponge cake in 20 mm thick slices (Figure 3a). Cut the slices into a squared shape (35 x 35 mm) by cutting of the sides of the slices (Figure 3b). Place a sample on the measuring table centrally under the probe. Avoid larger sample irregularities in the measuring area. Work quickly, since contact with air dries out the sponge cake and makes it firmer. **NOTE** The sample size should be kept constant to be able to compare different samples.



Figure 3: a, 20mm thick slices;



b, squared shaped samples

Curve Description

In Figure 4 typical Force-Distance compression cycle curves are illustrated. The two peaks are representing the force required during the two compressions in the cycle. Peak Force A and B represents maximum firmness for first and second compression respectively. The sponge cake firmness is here the maximum peak force for the first compression. Springiness is a type of recovery measurement of the sample and gives a value to what extent the sample springs back after the deformation during the first compression. The springiness is here measured as the compression distance for the second peak (y) divided with the compression distance for the first peak (x) (Figure 4).

$$\frac{\text{Distance } y}{\text{Distance } x} \times 100 = \% \text{ Springiness}$$

The pre-set wait time between the two compressions is important for some products, where a too long wait time will allow the sample to spring back more than it would do under its normal conditions

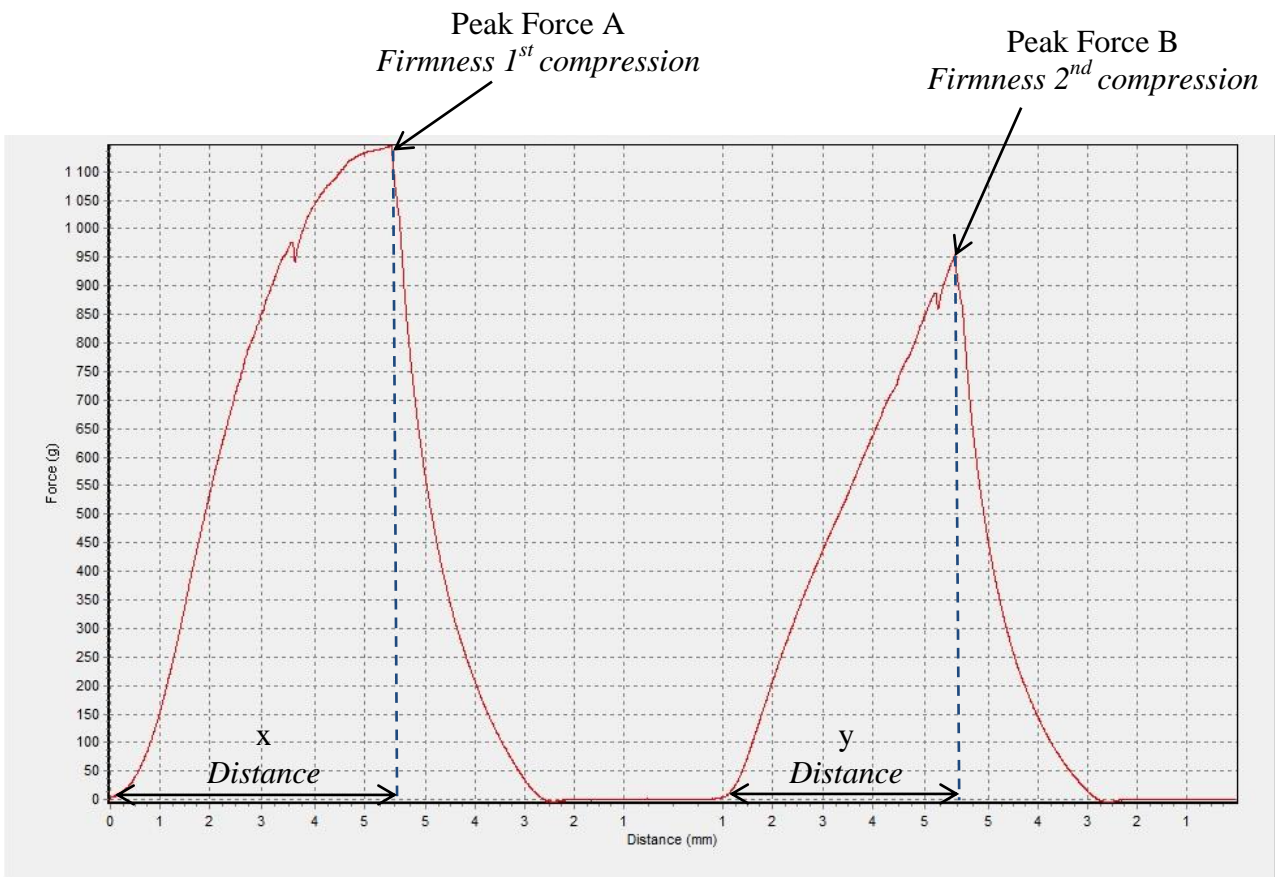


Figure 4: Double-cycle compression of sponge cake

Data Analysis

The force required to compress the sample to a certain strain is here defined as firmness and can be measured in the units [g] or [N]. Springiness is given as a percentage [%] value. Except raw data (force, time and distance) the program also directly provides calculated results such as *mean value* and *standard deviation*.