

Cracker Hardness & Fracturability by 3-Point Bend

TVT Texture Analyzer

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

- Hardness
- Fracturability
- Crispness

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



Figure 1: TVT Texture Analyzer

Scope

- Determination of hardness and fracturability of crackers by single cycle breaking test.

Method Description

The recording of the measurement data commences once the probe reaches the pre-set trigger force. The force will then increase until the sample fractures. After fracturing the sample, the probe returns to its starting position. This breaking test is comparable to the first bite force of a product.

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 - 10 kg

Breaking Rig Set

Part number set: 67.50.45

Consisting of:

P-BP70A, Break probe 70 mm, aluminum (Figure 2a), Part Number: 67.11.70

R-TPBR, Three point bend rig (Figure 2b)

Part Number: 67.50.40

Figure 2a: P-BP70A



Figure 2b: R-TPBR



Profile settings

Setting Parameter

Fracturability Compression

Sample height [mm]	6.0
Starting distance from sample [mm]	5.0
Initial speed [mm/s]	1.0
Test speed [mm/s]	3.0
Trigger force [g]	50
Data rate [pps]	333

Sample preparation

Choose the gap carefully between the support plates so that they support the sample. A too long gap might cause the sample to fall down and too short causes a penetration of the sample instead of a bending. Both sample diameter and support rig distance should be kept as constant as possible for comparability of the samples. Take the sample from the package just before testing and place it on the support plates. Samples with surface pattern should always be placed in the same direction/orientation, Figure 3. Storage and handling of the samples might influence the result and should thereby be kept constant. **NOTE.** A larger sample diameter (thus a larger contact area) or a shorter distance between the support plates both requires larger fracture forces. The gap distance of the base can be adjusted to accommodate cookies of various sizes. Adjusting the gap to be half the diameter of the cookie is a common procedure. The trigger force may need to be increased if the surface of the sample is uneven or variable in order to avoid early triggering.

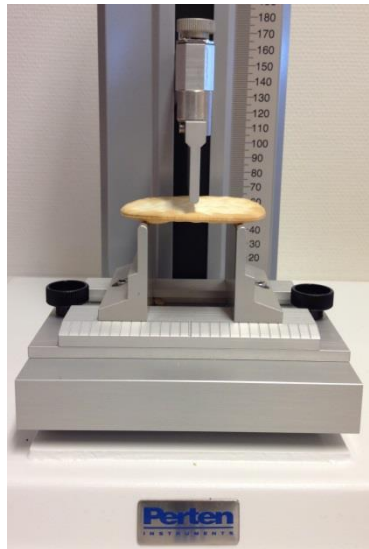


Figure 3: Sample set-up

Curve Description

In Figure 4 a typical Force-Distance curve is illustrated. The hardness of the sample is given by the maximum peak⁺ force while the fracturability is the distance between the trigger force and the maximum force. A short distance is equal to a high fracturability. Large variations might occur, due to structure variations and inclusions (fruit or chocolate) as well as various numbers of cracking.

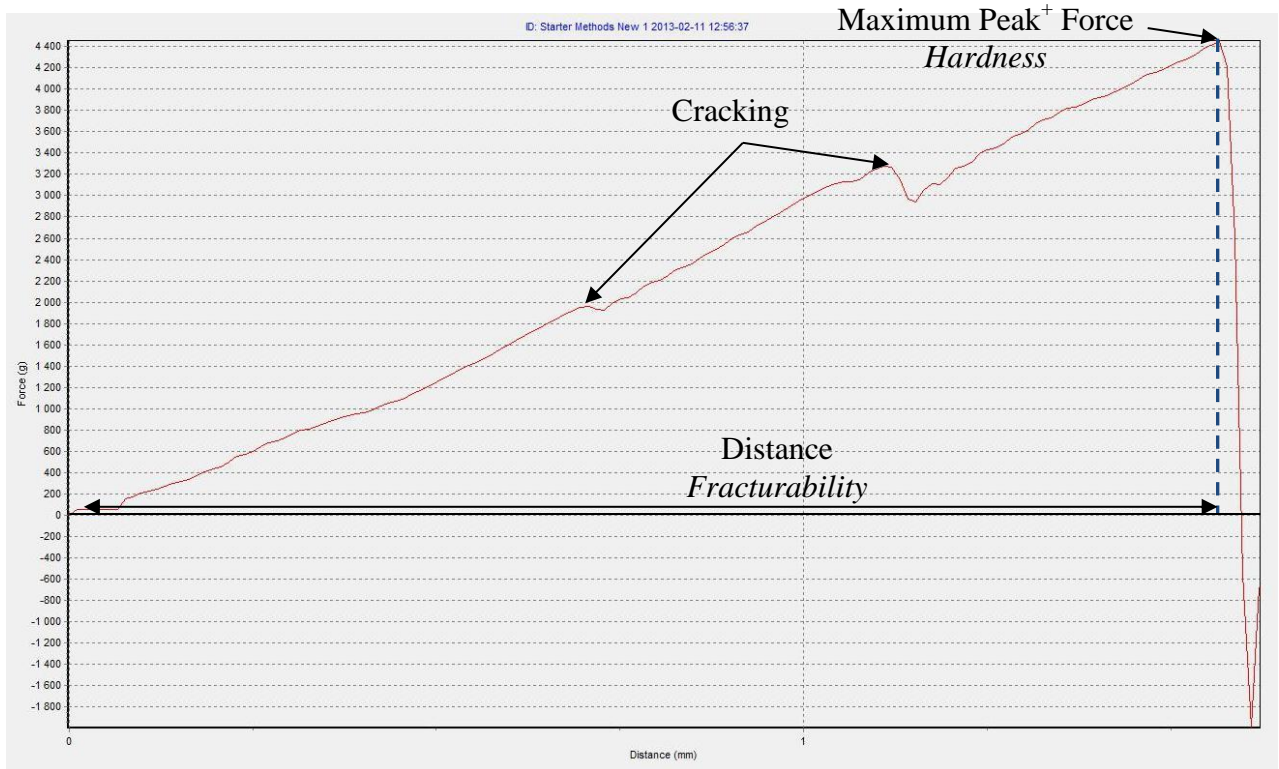


Figure 4: Fracture test of biscuit.

Data Analysis

The force required to break the sample is here defined as hardness and can be measured in the units [g] or [N]. The fracturability is given in [mm]. Except raw data (force, time and distance) the program also directly provides calculated results such as *mean value* and *standard deviation*.