Marzipan Consistency, by Penetration

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
- Consistency
- Stickiness

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

Figure 1: TVT Texture Analyzer

Scope
- Determination of marzipan consistency by single cycle penetration test.

Method Description
The recording of the measurement data commences once the probe reaches the pre-set trigger force. The probe will then penetrate the sample to a pre-defined distance. After penetration, 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 – 10 kg |

**Probe**
P-CO45S, Conical Probe, 45°, Stainless Steel (Figure 2)
Part number: 67.15.45

Figure 2: P-CO45S
Profile settings

<table>
<thead>
<tr>
<th>Setting Parameter</th>
<th>Parameter Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Cycle Compression</td>
<td></td>
</tr>
<tr>
<td>Sample height [mm]</td>
<td>35.0</td>
</tr>
<tr>
<td>Starting distance from sample [mm]</td>
<td>5.0</td>
</tr>
<tr>
<td>Compression [mm]</td>
<td>12.00</td>
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<tr>
<td>Initial speed [mm/s]</td>
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<tr>
<td>Test speed [mm/s]</td>
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</tr>
<tr>
<td>Retract speed [mm/s]</td>
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<tr>
<td>Trigger force [g]</td>
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</tr>
<tr>
<td>Data rate [pps]</td>
<td>200</td>
</tr>
<tr>
<td>Adhesiveness</td>
<td>Marked</td>
</tr>
</tbody>
</table>

Sample preparation
Take the samples from their packaging just before testing and place under the probe, Figure 3. Work quickly, since contact with air dries out the product and increases the surface firmness. Storage and handling of the samples might influence the result and should thereby be kept constant.

Figure 3: Sample set-up

Curve Description
In Figure 4 a typical Force-Time curve is illustrated. Maximum peak force is here defined as the hardness of the sample. The area is the work of penetration and defined as consistency, while the maximum peak force is here defined as stickiness and the area is the work of adhesion.
Figure 4: Penetration test of marzipan

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

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**Maximum Peak Force**
- **Hardness**
- **Consistency**
- **Work of Adhesion**

**Area**
- **Stickiness**