The Brabender® GlutoPeak
A new type of dough rheology

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...where quality is measured.
The Brabender® GlutoPeak
A new type of dough rheology

Farmer – Miller – Baker
Everyone is looking for an optimal grain, flour and bread quality

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Influence to obtain an optimal baking product (e.g.)

- Quality of raw materials
- Recipe
- Technological process parameters
- Baking process
- Customer demands
- ...

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Criterias of raw materials

- Composition (protein, moisture, ash, fat, …)
- Properties of the ingredients
- Final: Quality of flour
- Technological processing properties
- …

⇒ International standards have been developed, are well defined and used worldwide over decades.

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What happened if something went wrong?

- Less or bad quality of products

- Inefficient production: means
  - low rate of output
  - demotivation of employees
  - unnecessary production cost

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What happened if something went wrong?

- Additional cost for disposal of rejected products
- Increasing time pressure at agreed product delivery
- Most important: your customers get unhappy

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How to check the quality of grain and flour?

- Absolute values (e.g. moisture, protein, ...)
- Rheological values (water absorption, dough stability, extensibility, ...)
- Quick methods (e.g. NIR, Falling Number, ...)
- Practical methods (e.g. Brabender® 3-Phase-System)
- ...
The Brabender® 3-Phase-System
Rheology from dough mixing to the oven

Brabender® Farinograph®

Brabender® Extensograph®

Brabender® Amylograph®

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Phase 1: Dough mixing

Key question: Water absorption and how stable is the dough during mixing?

- Water absorption
- Protein quality
- Enzyme activity (Proteases)
- Mixing stability

Farinograph®-AT

AACC standard 54.-21, ICC standard 115/1, ISO 5530-1, 5530-2, ...

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Phase 2: Dough resting and stretching

Key question: Can the dough hold gas?
- Stretching behavior of the dough
- Effect of enzymes, micro organismen, … during the fermentation
- Baking characteristics

Extensograph®-E

AACC standard 54-10, ICC standard 114, ISO 5530-2, …
Phase 3: Gelling of starch

Key question: Can the starch absorb the water during baking?

- Enzyme activity (Amylases)
- Gelling behaviour of starch
- „Video“ of starch gelling, not just picture

AACC standard 22-10, ICC standard 126/1, ISO...

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The Brabender® GlutoPeak
New instrument – new method

Brabender® GlutoPeak (GP)

- A new rapid method
- In addition to the Brabender® 3-Phase-System
- Rheological „fingerprint“ of flour after minutes
- Additional info for additional benefit

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The Brabender® GlutoPeak

- Measures flour, wholemeal flour, vital gluten and baking mixes
- Special application for wafer flour
- High correlation to protein content and baking volume
- Small sample size (3-10 g)
- Results within some minutes (1-10 min.)
- Easy handling

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The principle

- Preparing of a slurry with test material and water
- Gluten will be separated by the mixing and aggregates
- The temperature and speed are kept constant
- After a time (dependent upon the property of the sample), the gluten aggregates
- Further mixing destroys the network, the torque decrease

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The principle

- Most important are
  - the peak time and
  - the maximum height of the curve
- Strong gluten: short peak times with high peaks
- Weak gluten: long peak times with low or even no peaks
- The peak time range is between 60 and 600 s (1-10 min).
- The flours can be rated due to their different peak maximum times and peak heights.

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Flour or wholemeal flour

Liquid

Suspension High Speed

TORQUE

Results by
- Evaluation software
- Correlation software

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Description of the results

Classification

- **Strong flour (bread)**
  - short RT
  - high PV

- **Weak flour (biscuit)**
  - long RT
  - low PV

- **Wafer flour**
  - very long RT
  - very low or no PV

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Description of the evaluation

Retention time (RT) (Peak maximum time)
- Time required for gluten to aggregate and exhibit maximum torque on the paddle before breaking down

Peak value (PV)
- Maximum torque in BU (Brabender® Units)

High peak: High content of strong gluten
Low or no peak: Low content of gluten

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Some results from scientific research

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Hard wheat: Correlation between wet gluten [%] and torque generated with the GlutoPeak

Flour/water ratio: 9.5 g/10 ml

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The Brabender® GlutoPeak
GlutoPeak – Farinograph® water absorption

Torque [BU]

Time [min]

Bread volume

Alveograph W-Value

Farinograph® Water absorption

NEW

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The Brabender® GlutoPeak
GlutoPeak – Farinograph® water absorption

NEW

Caractérisation de la qualité technologique des farines

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The Brabender® GlutoPeak
GlutoPeak - Alveograph W-value

[Graph showing Farinograph® Water absorption and Alveograph W-Value over time (1-3 minutes)].

Bread volume

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The Brabender® GlutoPeak
GlutoPeak - Alveograph W-value

Caractérisation de la qualité technologique des farines

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The Brabender® GlutoPeak
GlutoPeak – Bread volume

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The Brabender® GlutoPeak
GlutoPeak - Baking test (10g procedure)

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Determination of the gluten aggregation behaviour from different wheat cultivars and correlation with the rheological and the baking properties

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<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Flour</td>
<td>8 g</td>
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<tr>
<td>Water</td>
<td>9 mL</td>
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<tr>
<td>NaCl</td>
<td>16 g/L</td>
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<tr>
<td>Speed</td>
<td>2750 rpm</td>
</tr>
<tr>
<td>Temperature</td>
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</tbody>
</table>
The Brabender® GlutoPeak
New instrument – new method

Summary

- Flour can be well defined by the Brabender® 3-Phase-System
- Additional rapid method GlutoPeak for the first „quality finger print“
- Constant and good flour quality reduces additional cost and waste in bakeries
- Optimizations of technological processes are possible
- Optimum and constant baking quality can be achieved

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Benefit for

Milling industry

- Constant and better flour quality
- Higher flour price possible
- Customer loyalty through quality

Baking industry

- Preventing adverse production batches
- Higher market share
- More baked goods by choosing better flours
- Customer loyalty through consistent product quality

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Conclusions (by Dr. Peter Köhler*1/2)
The GPT is a new, relative fast method for the characterization of the technological quality of wheat flours. The results are highly correlated to the protein content and the bread volume. Concerning the rheological properties the maximum torque is more correlated to the data obtained for dough than obtained for gluten. Nevertheless it has to be considered that some wheat cultivars with poor baking qualities do not fit to these correlations.

1. Deutsche Forschungsanstalt für Lebensmittelchemie, Lise-Meitner-Straße 34, D-85354 Freising, Germany
2. Hans-Dieter-Belitz-Institut für Mehl- und Eiweißforschung, Lise-Meitner-Straße 34, D-85354 Freising, Germany
There is no good and no bad flour in the market.

It is the aim of Brabender® as your partner to find the right application and usage for it.

...where quality is measured.
Thanks for your attention

For any further discussion please visit us at

booth J5

...where quality is measured.