The Brabender® GlutoPeak®
Introduction and first results from the practice

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

...where quality is measured.
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 in general
- Technological processing properties
- ...

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Important

There is no good or no bad flour in the market.

It is our aim to find the right application and usage for it.

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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, ..)
- Quick methods (e.g. NIR)
- Practical methods (e.g. Brabender® 3-Phase-System)
- …
The Brabender® GlutoPeak
The Brabender® 3-Phasen-System

The Brabender 3-Phase-System
Since 1939: from practice for practice

Dough production  Fermentation  Gelatinization

Dough properties  Baking behaviours

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Phase 1: Dough preparation and mixing

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

- Water absorption
- Protein quality
- Enzyme activity (Proteinase)
- 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?

- Wheat flour: Time pending quality
- Dough properties/elasticity
- Enzymes, baking properties

AACC standard 54-10, ICC standard 114, ISO 5530-2, …

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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,…

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Brabender® GlutoPeak® (GP)

- A new rapid method
- In addition to the Brabender® 3-Phase-System
- Rheological „fingerprint“ of grain/flour, obtained within 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 Brabender® GlutoPeak®
New instrument – new method

Measuring system

- High speed performance
- Special paddle geometry
- Stainless steel paddle and bowl
- Temperature controlled bowl and sample

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The Brabender® GlutoPeak®
New instrument – new method

8 g of flour or wholemeal flour

Suspension
High Speed

Liquid

TORQUE

PC

Results by
- Evaluation software
- Correlation software

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Description of the results

Retention Time (RT)

Peak Value (PV)

Classification

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

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

- Wafer flour
  - very long RT
  - 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

- Wet gluten content
- Alveograph W-Value
- Work on extension

Farinograph® water absorption

Bread volume

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Correlation between **GlutoPeak®** and **gluten washer**

- Study carried out by Brabender®
- Flour from Switzerland (ash type 550)

**Test parameter**

- 9,0 g flour
- 9,0 g water
- 36 °C temperature
- 2.750 rpm

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Correlation between the the **GlutoPeak® area** curve and the **wet gluten content**

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Correlation between **GlutoPeak®** and **gluten washer**

Study carried out by Prof. Dr. Koushik Seetharaman†
Associate Professor and Cereals Industry Research Chair at the University of Guelph, Ontario, Canada

**Test parameter**
- 9,5 g flour
- 10,0 g water
- °C unknown
- Rpm unknown

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

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Study carried out by

Marie Helene Morel

INRA - Laboratory of Cereal Technology and Agropolymers, Montpellier, France

Test parameters

- unknown

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GlutoPeak® torque – water absorption

Water absorption Farinograph [%]

Torque Peak [BU]

$R^2 = 0.78$

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The Brabender® GlutoPeak® - Alveograph® W-value

GlutoPeak® torque and Alveograph® W-value

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Study carried out by

Dr. Peter Köhler/Dr. Markus Brunnbauer
1. Deutsche Forschungsanstalt für Lebensmittelchemie
2. Hans-Dieter-Belitz-Institut für Mehl- und Eiweißforschung
Freising, Germany

Test parameter

- 8,0 g flour
- 9,0 ml water
- 36 °C temperature
- 2.750 rpm

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Flour qualities

- **E** (n = 2) → E₁, E₂  excellent baking quality
- **A** (n = 2) → A₁, A₂  good baking quality
- **B** (n = 3) → B₁, B₂, B₃  moderate baking quality
- **C** (n = 2) → C₁, C₂  poor baking quality

Flour preparation:

- Milling with Quadrumat® Junior
- Sieving (0.2 mm)
The Brabender® GlutoPeak®
Brabender® GlutoPeak® - Baking test (10g procedure)

GlutoPeak® torque – baking volume

$R^2 = 0.768$

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Peak maximum time – dough development time

![Graph showing peak maximum time vs dough development time with an R² value of 0.735]

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Summary

- Optimization / standardization of flour quality requires standard procedures and high quality instruments
- Flour can be well defined by the Brabender® 3-Phase-System
- Additional rapid method for the first „quality finger print“
- Constant and good flour quality reduces additional cost and waste in bakeries
- Optimization 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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Thank you for your attention

For any further discussion please visit us at

booth D 10

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