The Brabender® GlutoPeak
A new type of dough rheology

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Brabender® GmbH & Co.KG Duisburg – Germany

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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 r*aw 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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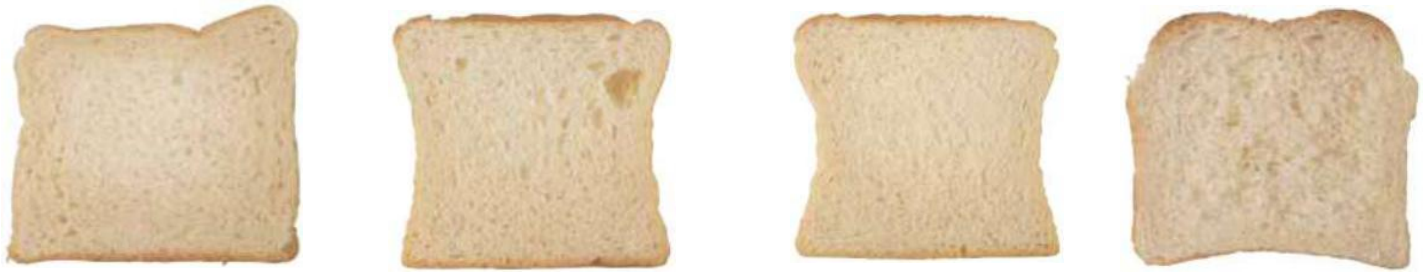
What happened if something went wrong?

- Less or bad quality of products



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

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What happened if something went wrong?

- Additional cost for disposal of rejected products

- Increasing time preasure 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)
- …

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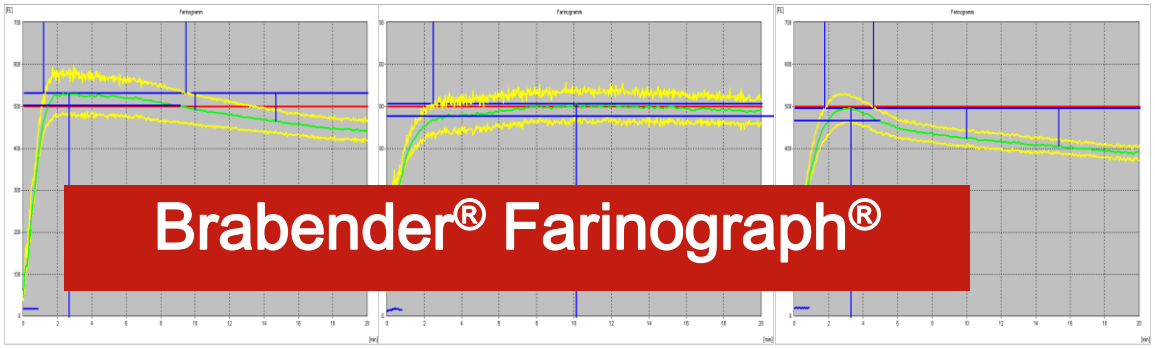
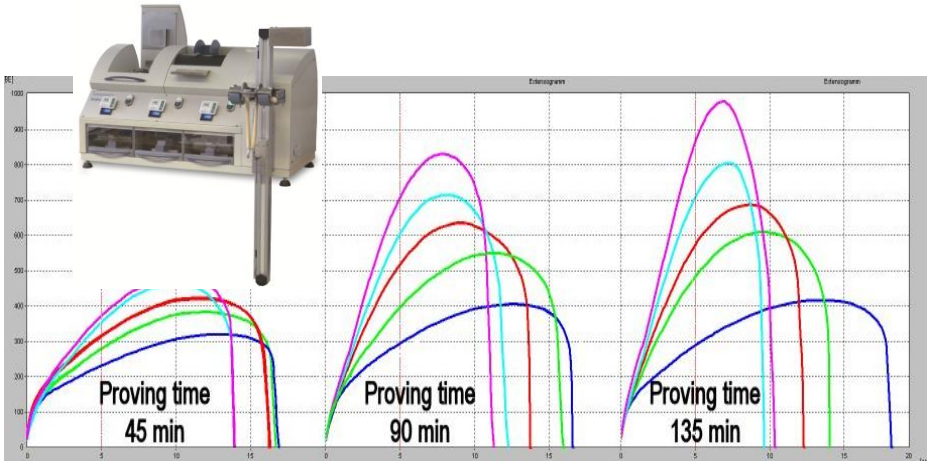
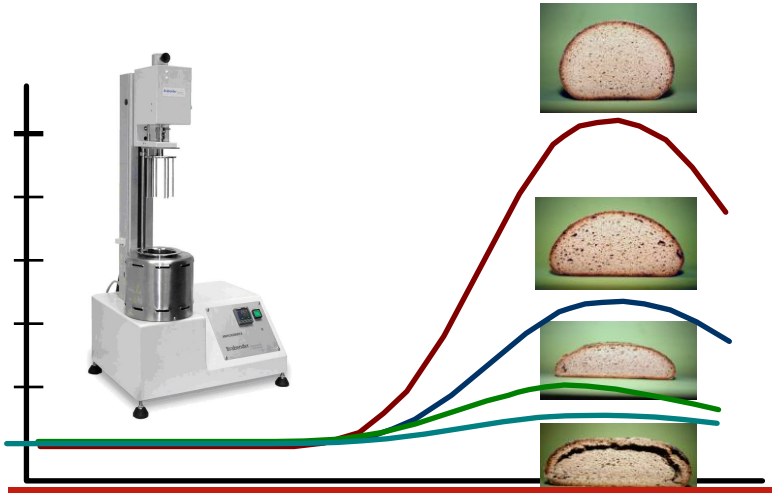
The Brabender® 3-Phase-System
Rheology from dough mixing to the oven



Brabender® Farinograph®



Brabender® Extensograph®



Brabender® Amylograph®

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The Brabender® 3-Phase-System
Rheology from dough mixing to the oven

Phase 1: Dough mixing

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

- Water absorbtion
- 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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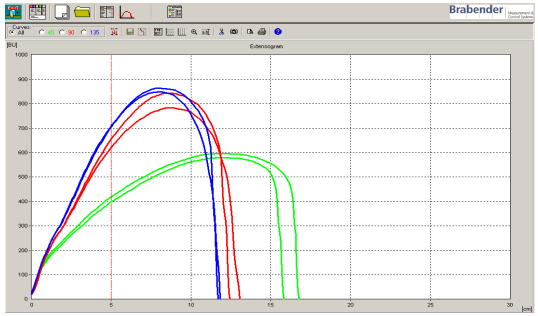
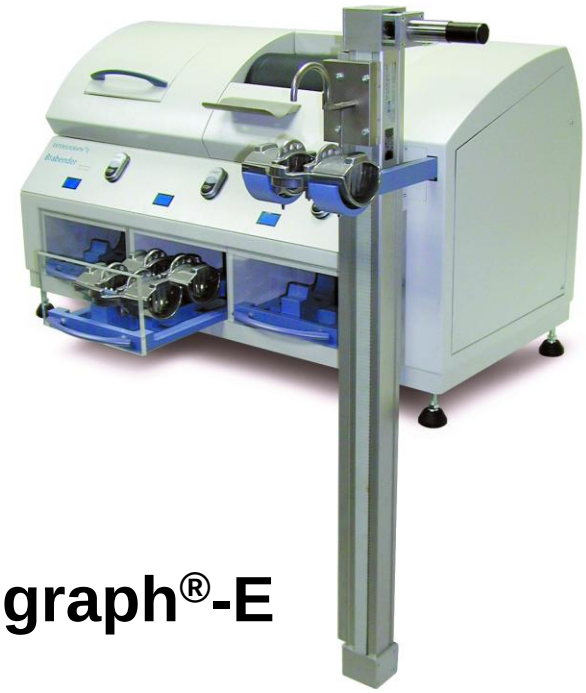
Phase 2: Dough resting and stretching

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, …

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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

Amylograph®-E

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

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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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The Brabender® GlutoPeak

New instrument – new method

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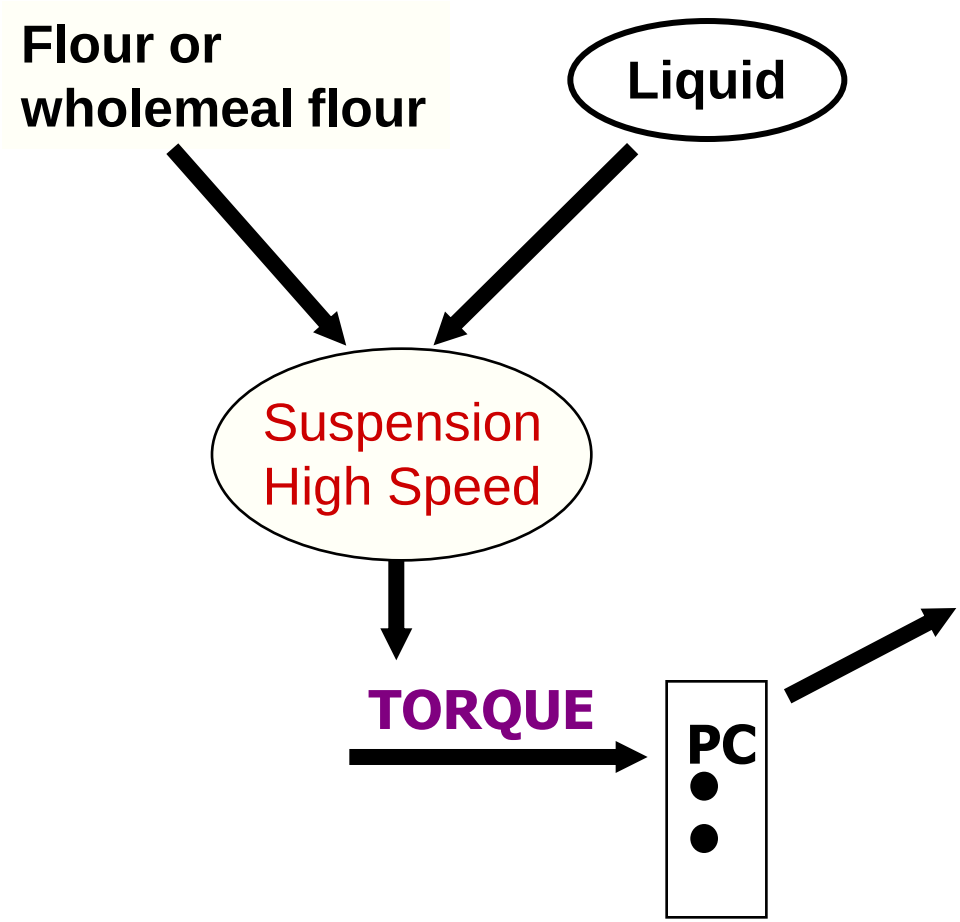

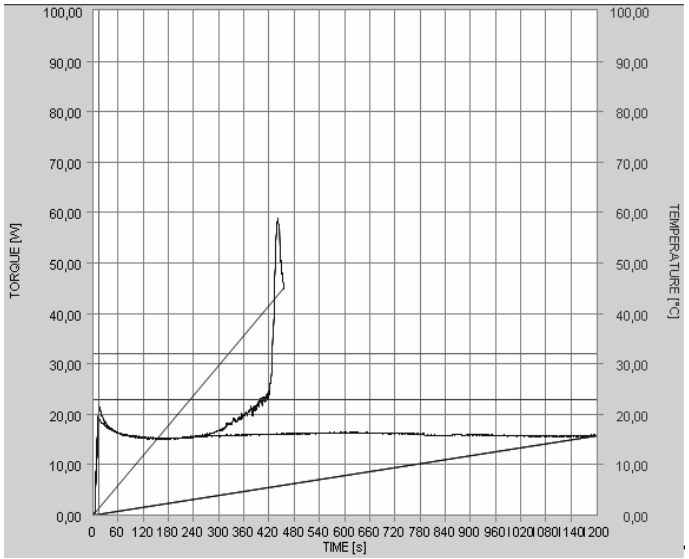

Results by

- Evaluation software
- Correlation software

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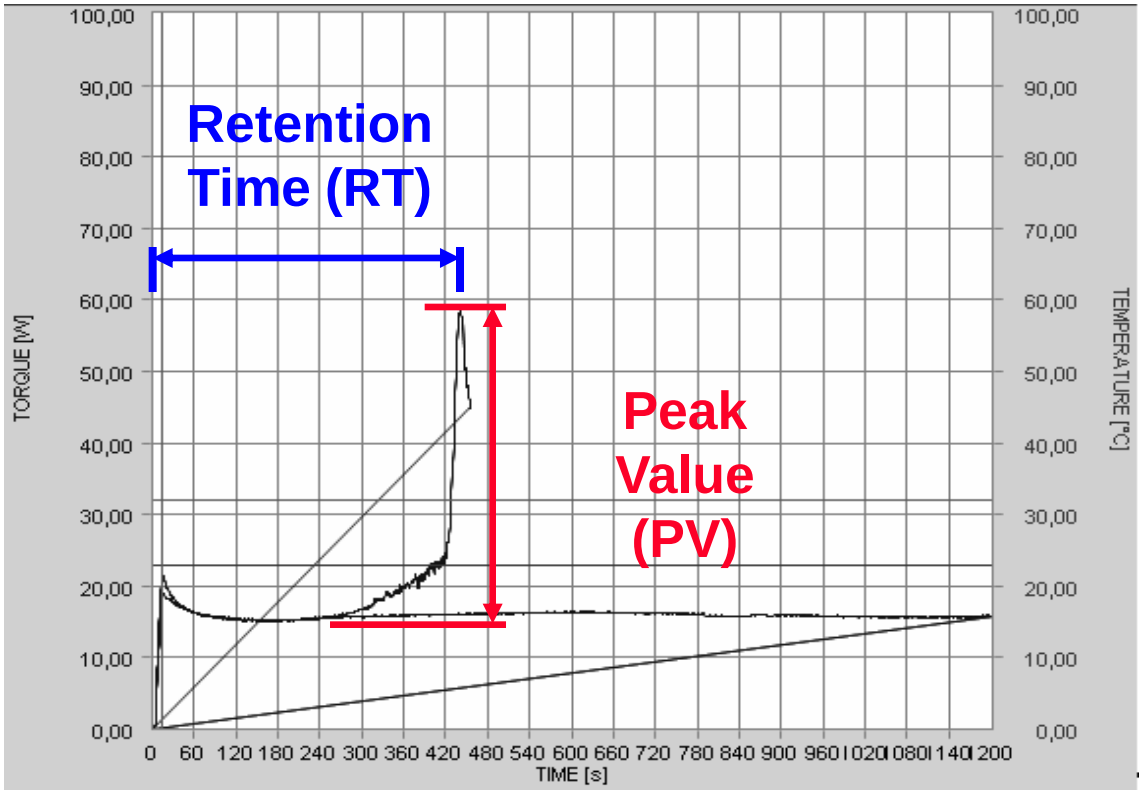
Description of the results



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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The Brabender® GlutoPeak

GlutoPeak – Wet Gluten Content

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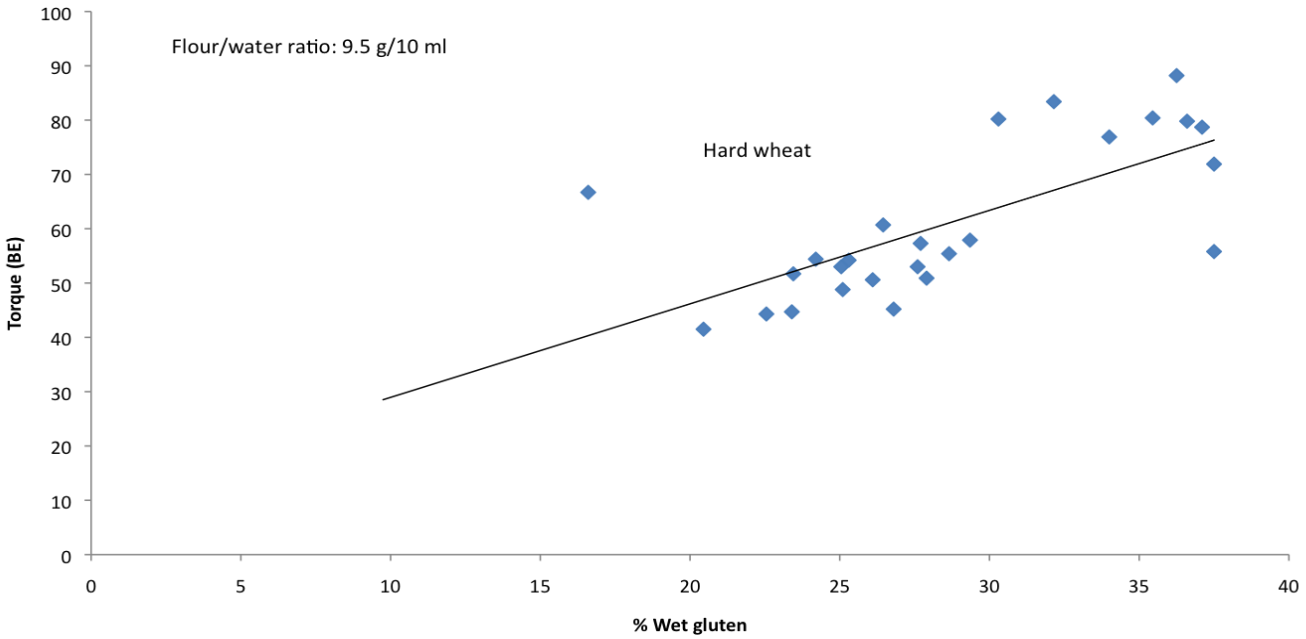
Hard wheat: Correlation between wet gluten [%] and torque generated with the GlutoPeak



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The Brabender® GlutoPeak

GlutoPeak – Farinograph® water absorption

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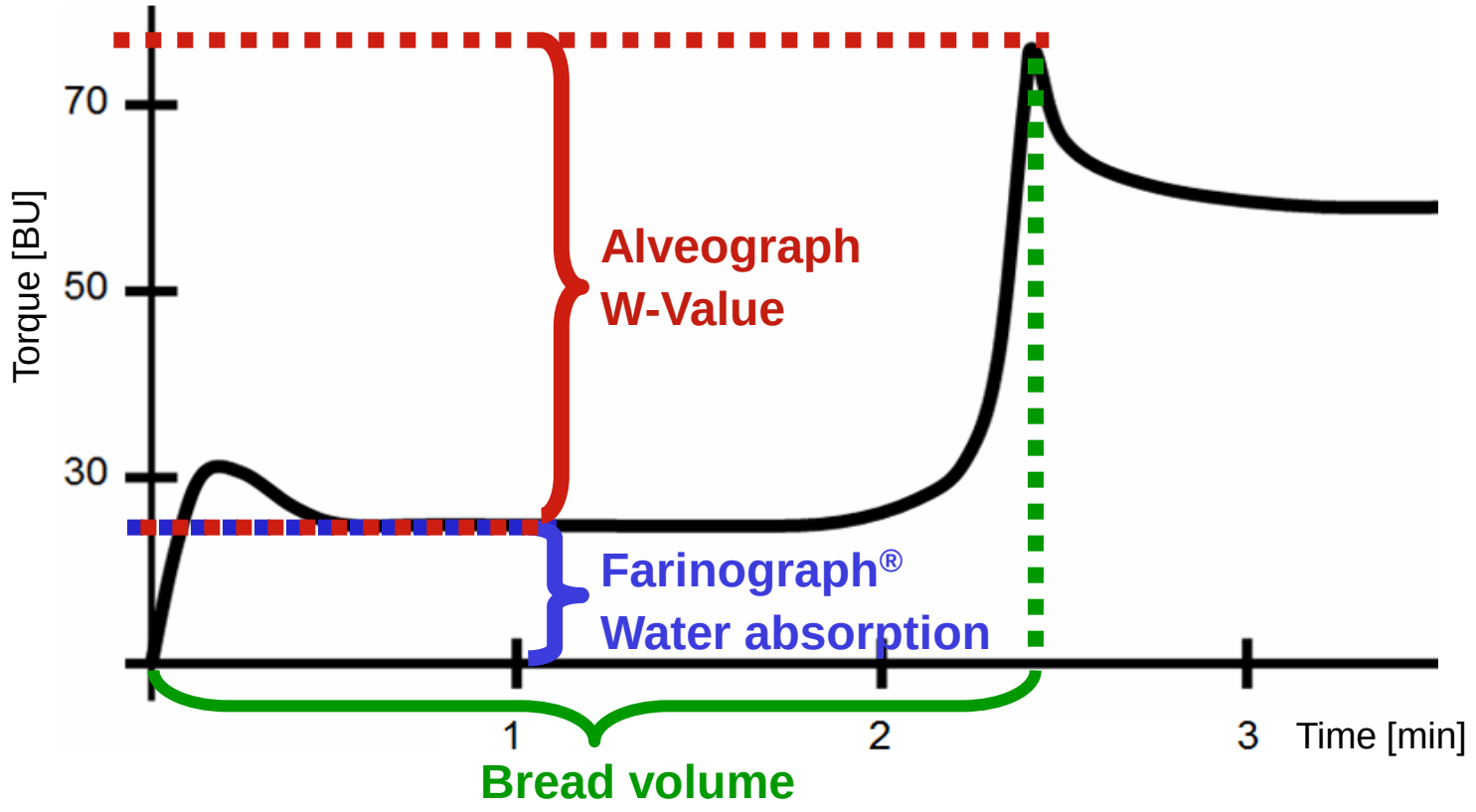

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The Brabender® GlutoPeak

GlutoPeak – Farinograph® water absorption

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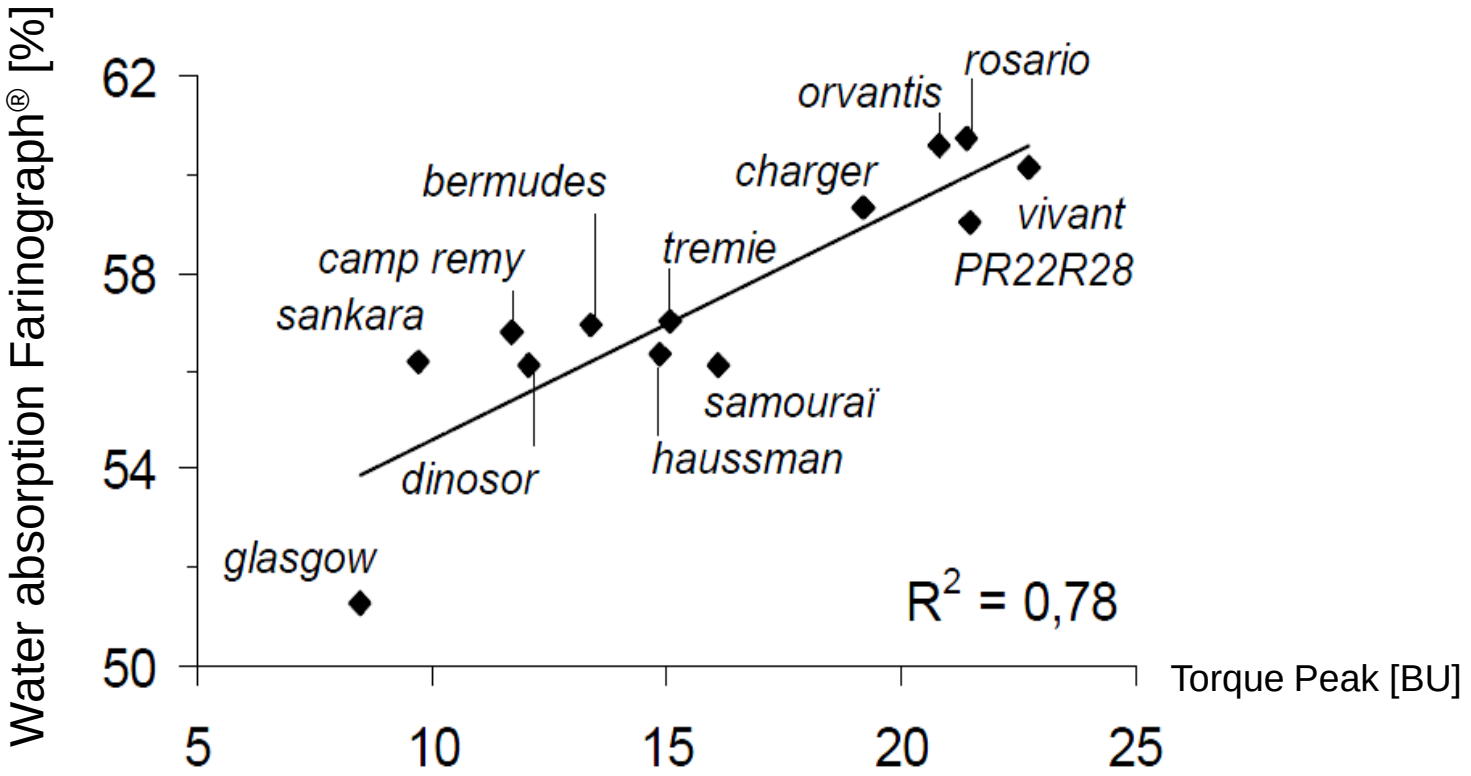

Caractérisation de la qualité technologique des farines

Frédéric Baudouin[a], Taileah Leite Nogueira[a], Sofie Frederix[b], Andreas Redl [b], Marie-Hélène Morel [a]

[a]UMR Ingénierie des Agropolymères et Technologies Emergentes, 2 place Viala, 34060 Montpellier, France

[b]Tereos Syral S.A.S., Z. I. et portuaire, B.P. 32, 67390 Marckolsheim, France

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The Brabender® GlutoPeak

GlutoPeak - Alveograph W-value

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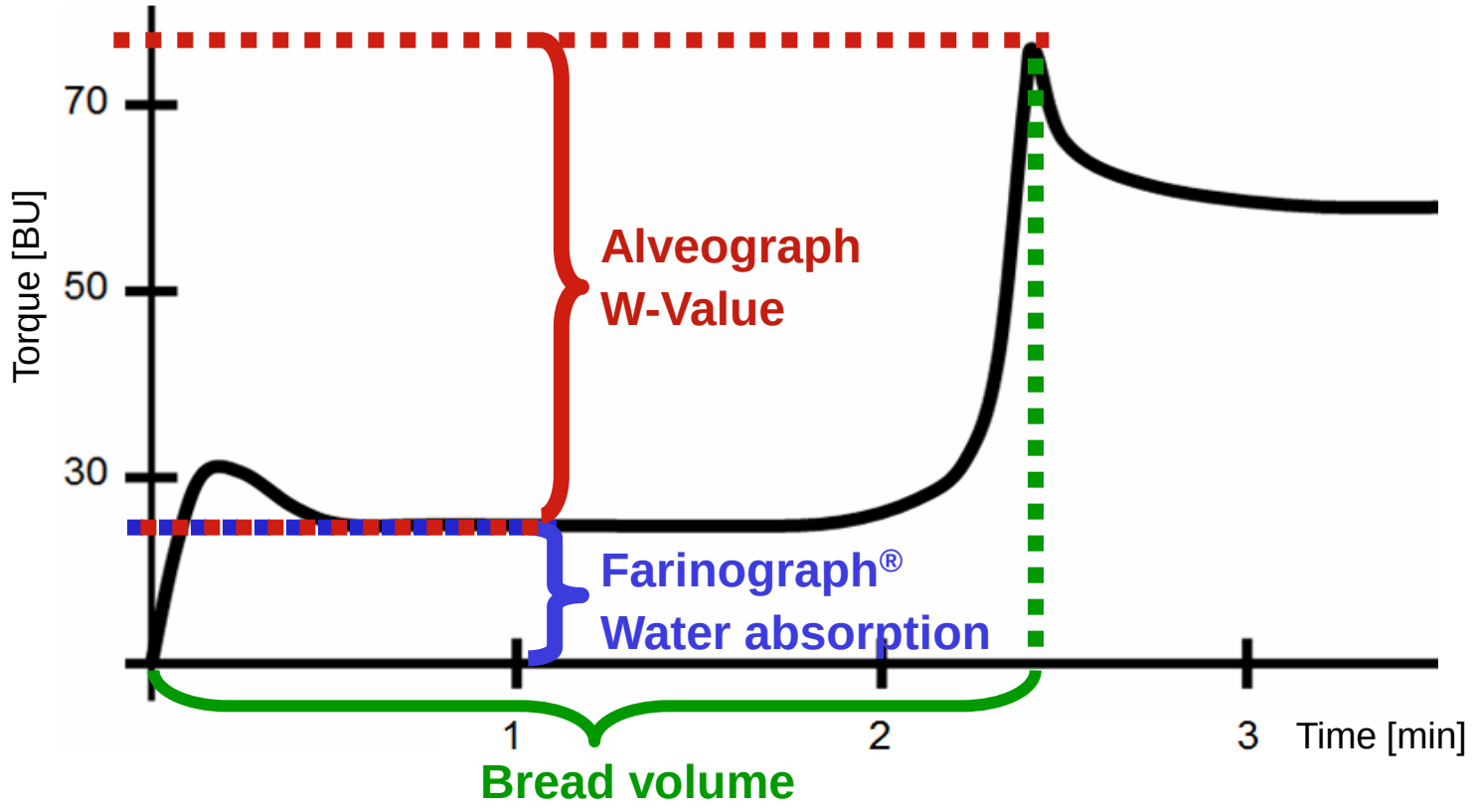

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The Brabender® GlutoPeak

GlutoPeak - Alveograph W-value

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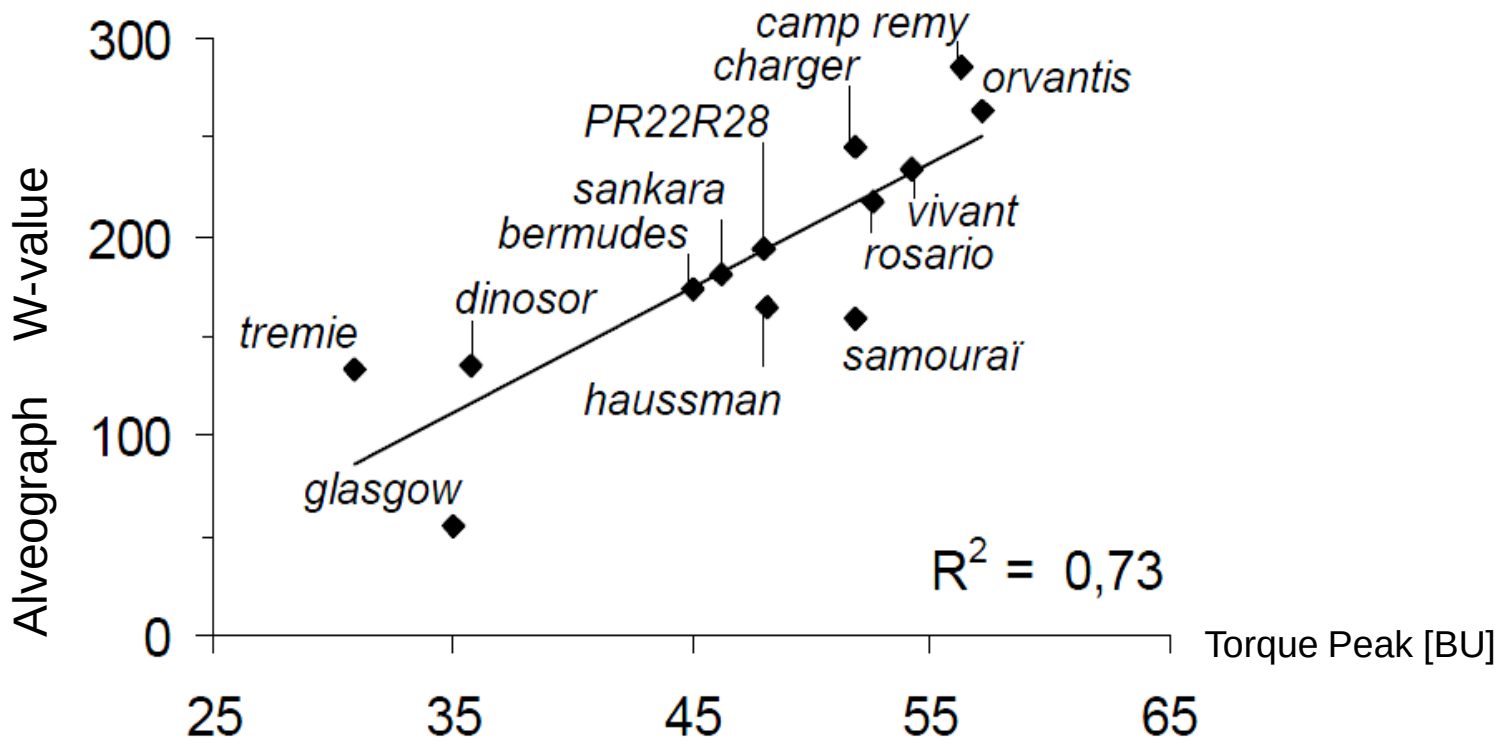

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The Brabender® GlutoPeak

GlutoPeak – Bread volume

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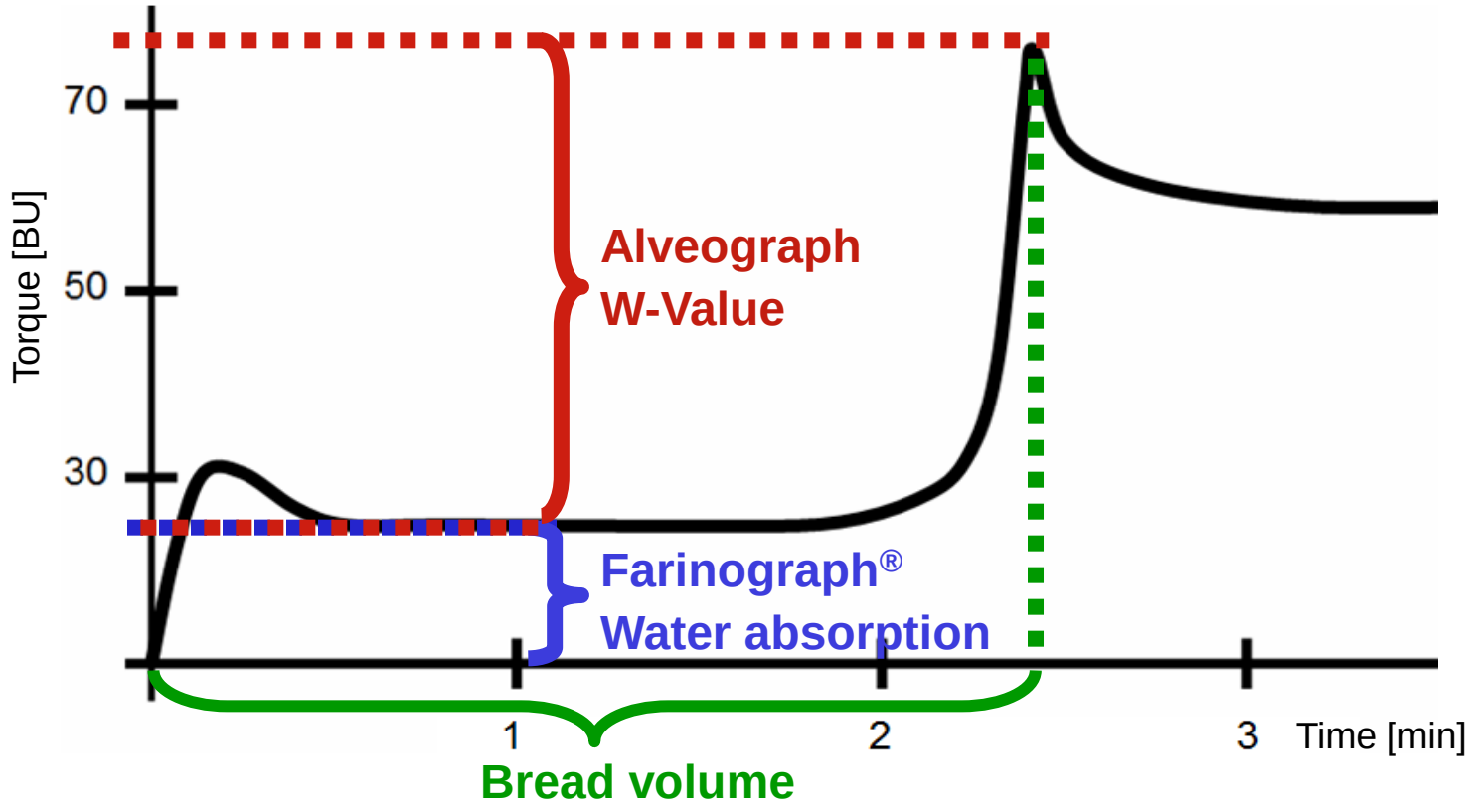

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The Brabender® GlutoPeak

GlutoPeak - Baking test (10g procedure)

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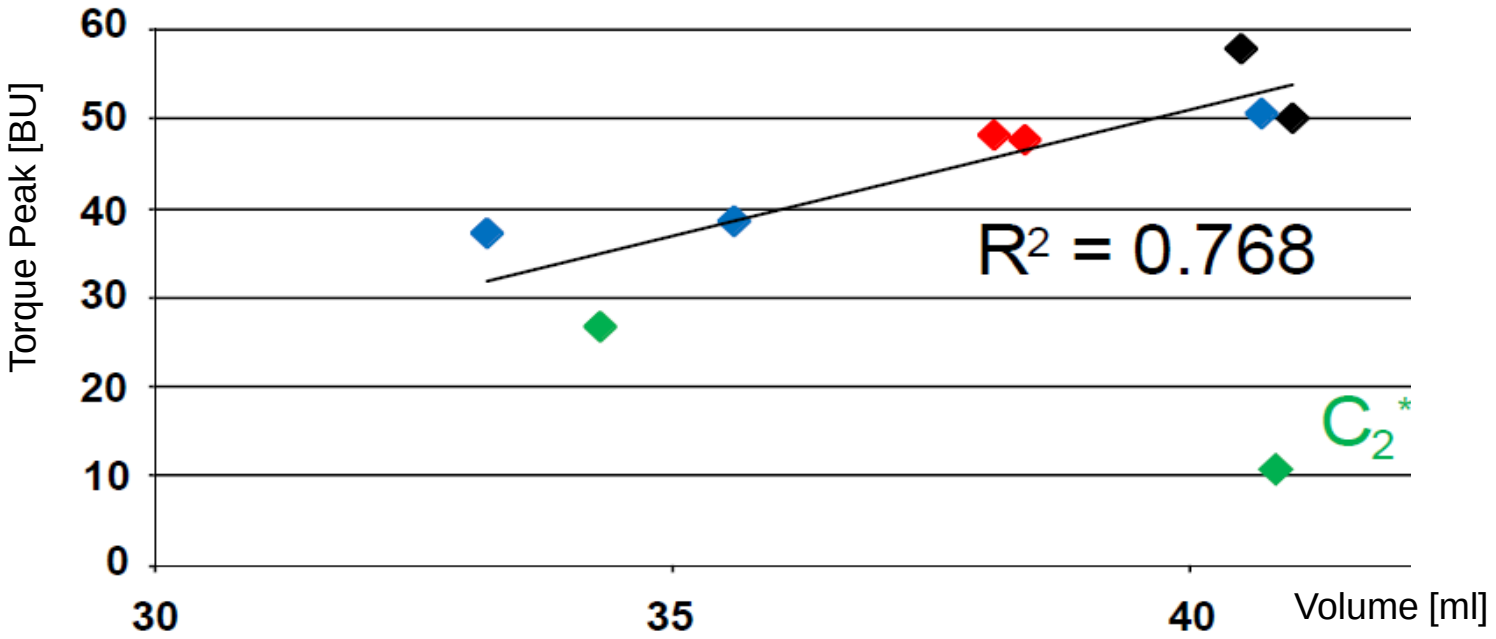

Determination of the gluten aggregation behaviour from different wheat cultivars and correlation with the rheological and the baking properties

Markus Brunnbauer[1], Patrick Selmair[1] and Peter Köhler[1,2]

[1] Deutsche Forschungsanstalt für Lebensmittelchemie, Lise-Meitner-Straße 34, D-85354 Freising, Germany
[2] Hans-Dieter-Belitz-Istitut für Mehl- und Eiweißforschung, Lise-Meitner-Straße 34, D-85354 Freising, Germany

hdbi

DFA
Leibniz Institut
Deutsche Forschungsanstalt für Lebensmittelchemie

Flour	8 g
Water	9 mL
NaCl	16 g/L
Speed	2750 rpm
Temperature	36 C

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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 loyality 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

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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.

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Thanks for your attention

For any further discussion please visit us at

booth J5

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