

**25<sup>nd</sup> IAOM Mideast & Africa  
Conference & Expo**

**3-6 December 2014**

**Cape Town, South Africa**

**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**

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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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## Criteria of raw materials

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

## 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)
- ...

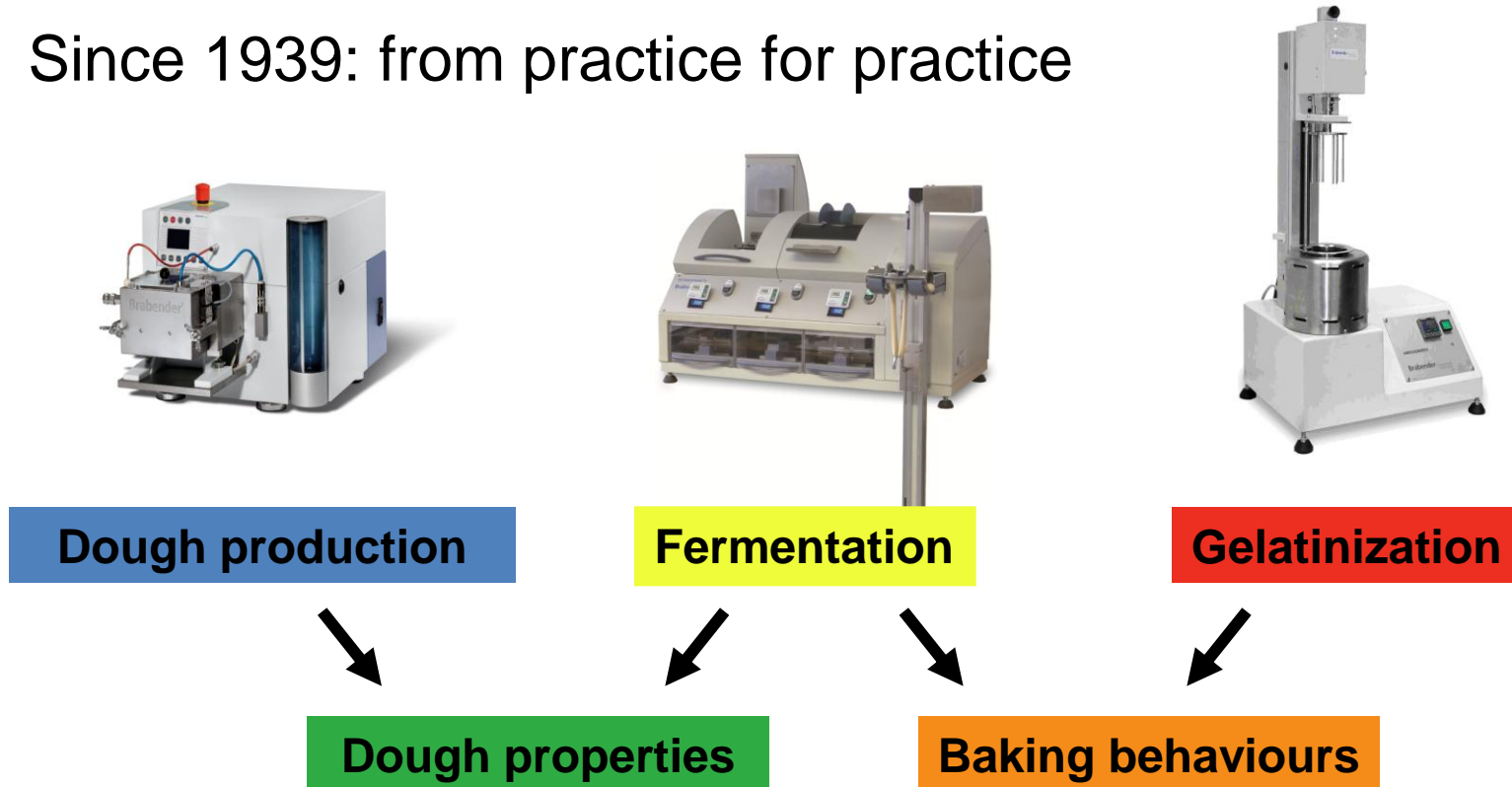
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## The Brabender 3-Phase-System

Since 1939: from practice for practice



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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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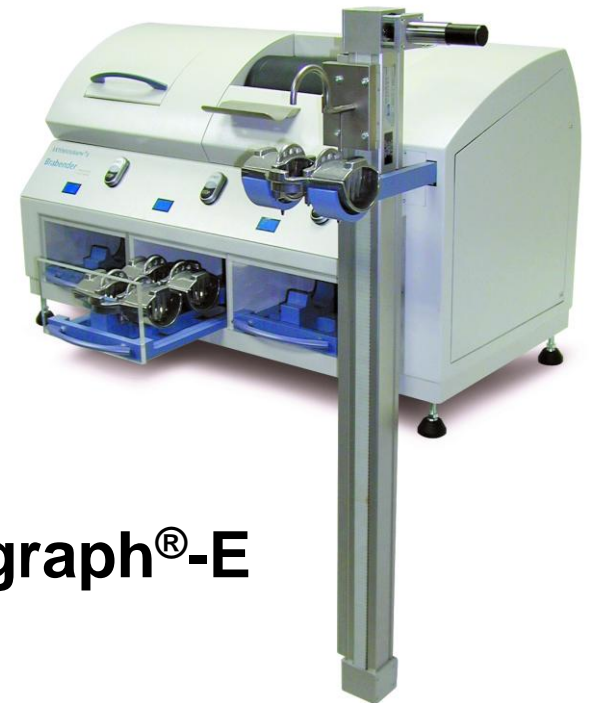
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## Phase 2: Dough resting and stretching

### Key question: Can the dough hold gas?

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



## 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,...

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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

## 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

## Measuring system



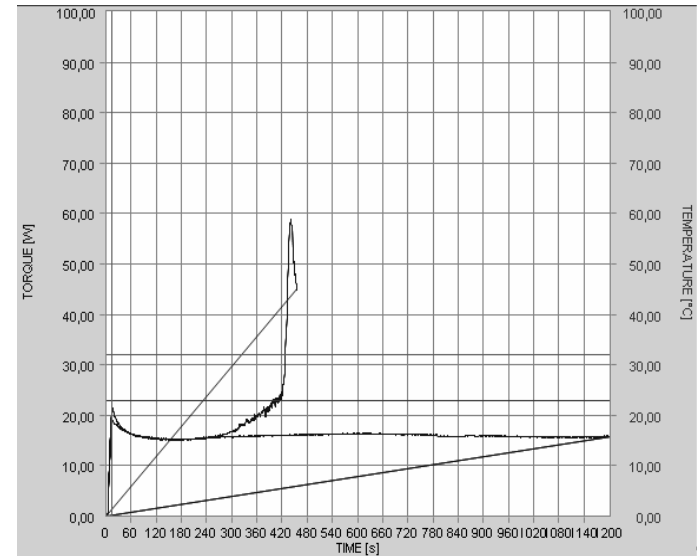
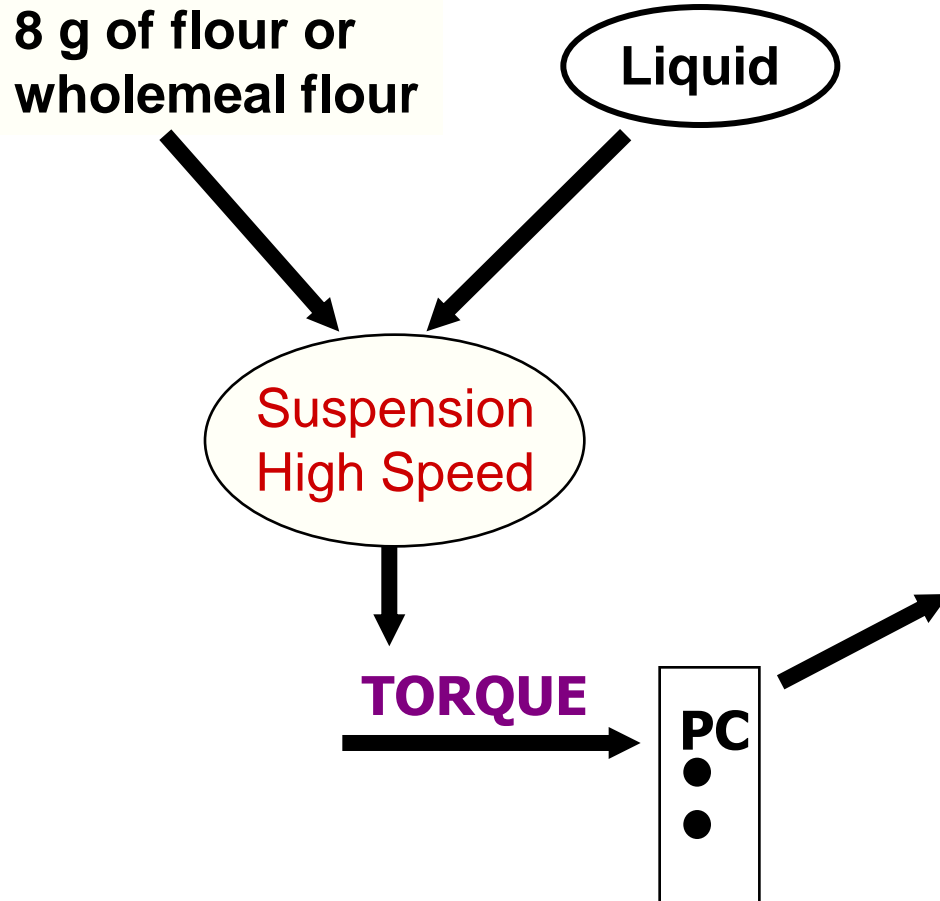
- High speed performance
- Special paddle geometry
- Stainless steel paddle and bowl
- Temperature controlled bowl and sample

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# The Brabender® GlutoPeak®

## New instrument – new method

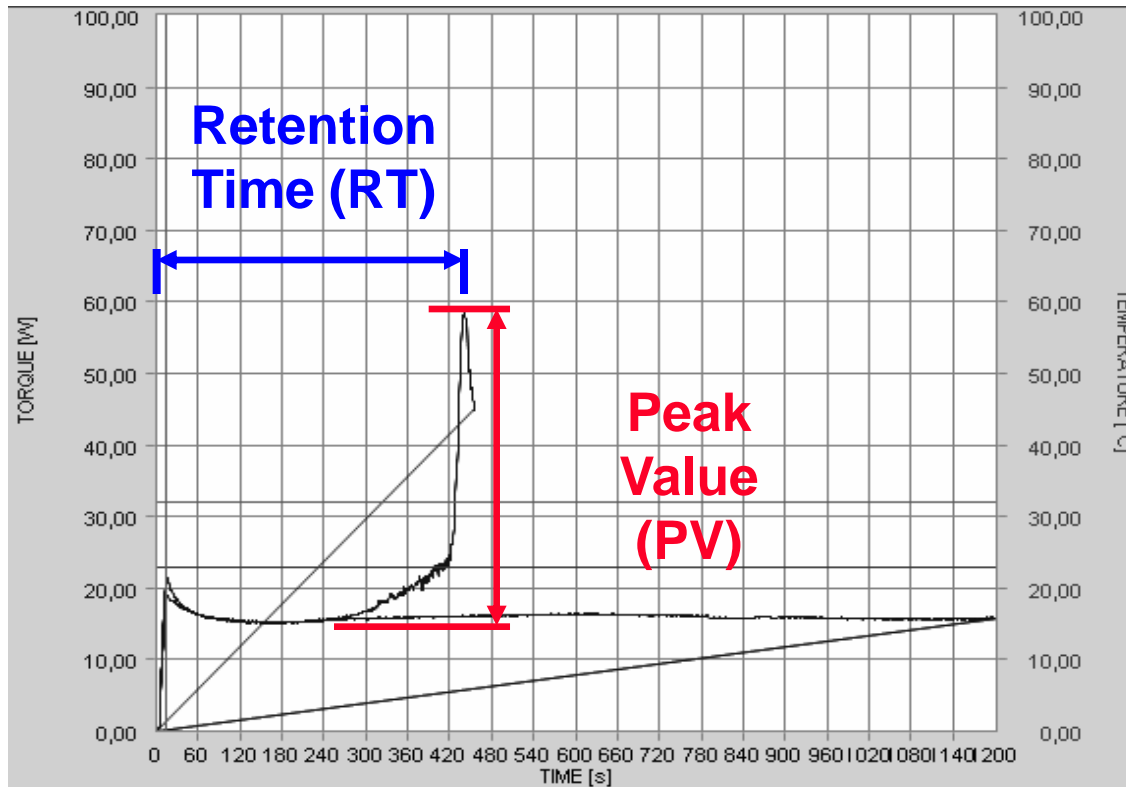


Results by

- 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
  - ✓ 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)

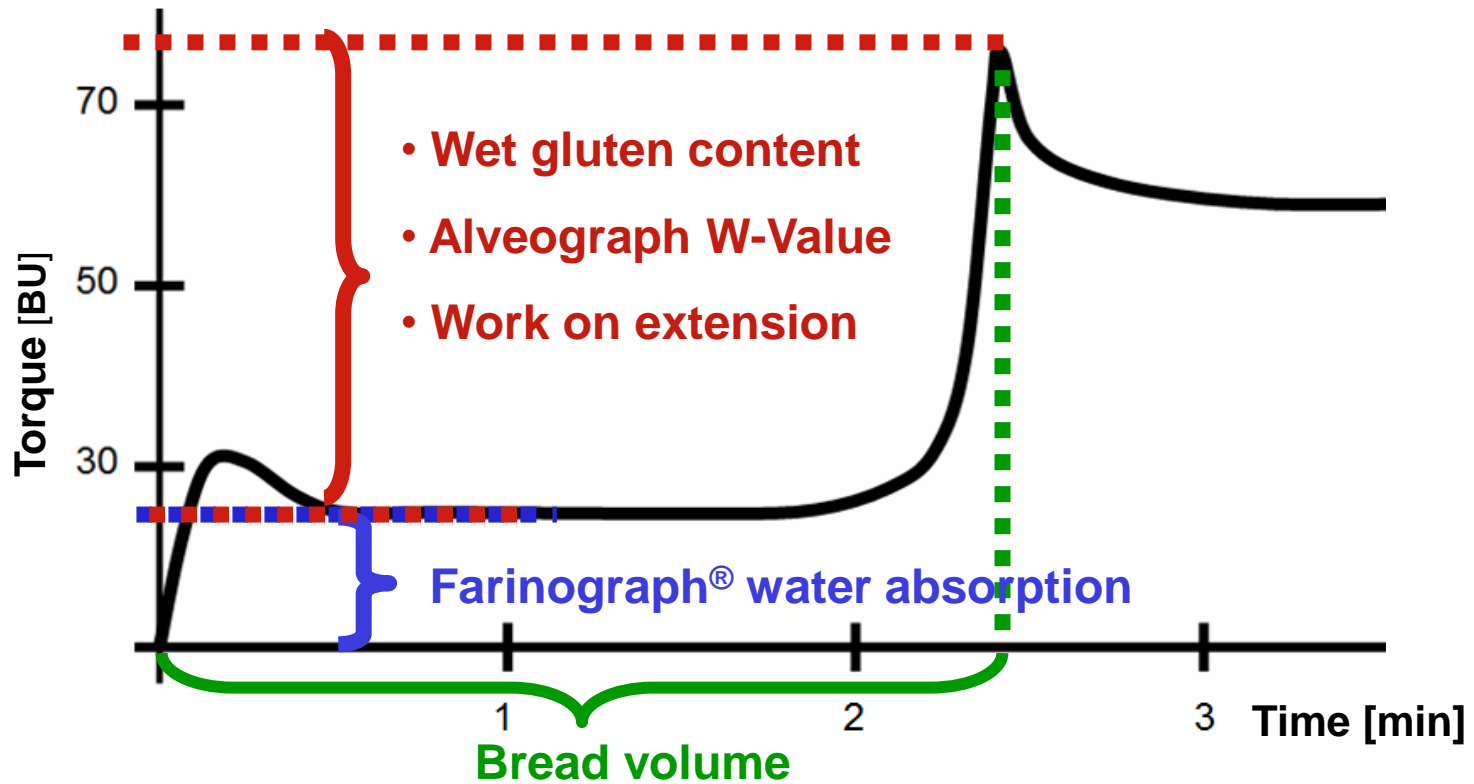
- Maximum torque in BU (Brabender® Units)

**High peak:** High content of strong gluten

**Low or no peak:** Low content of gluten



## Some results from scientific research



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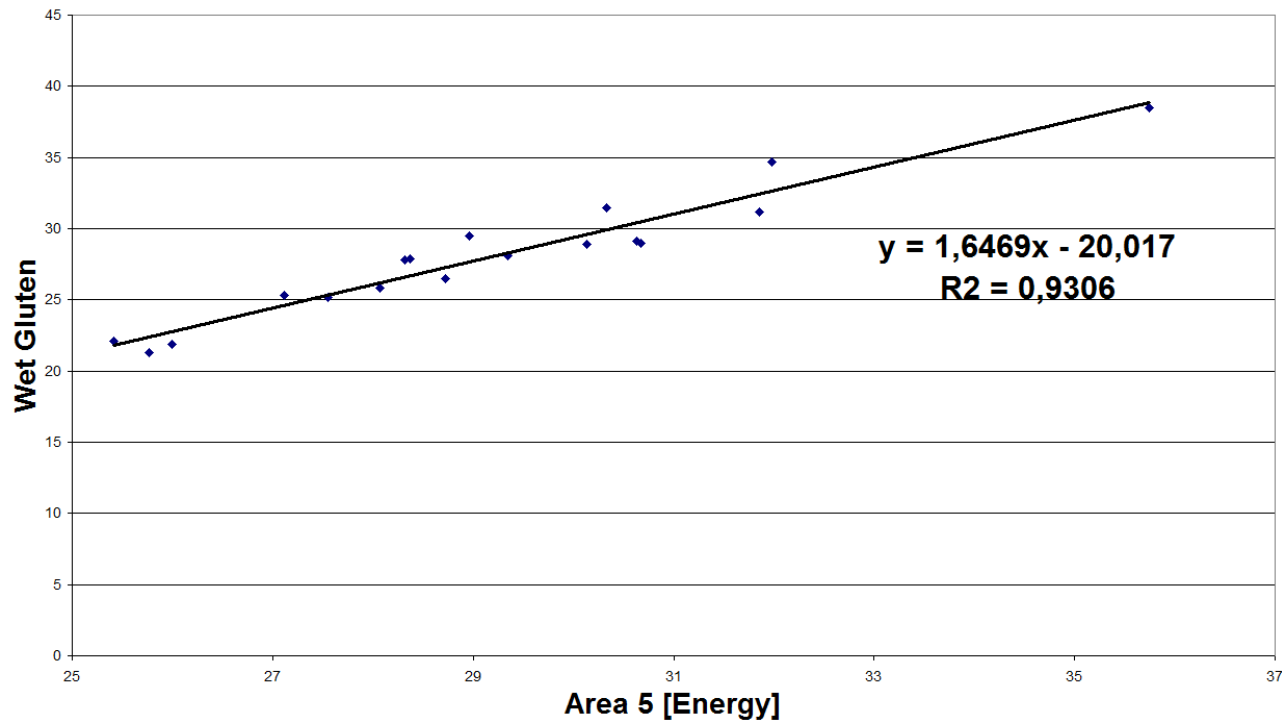
### Correlation between **GlutoPeak®** and **gluten washer**

- 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

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



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

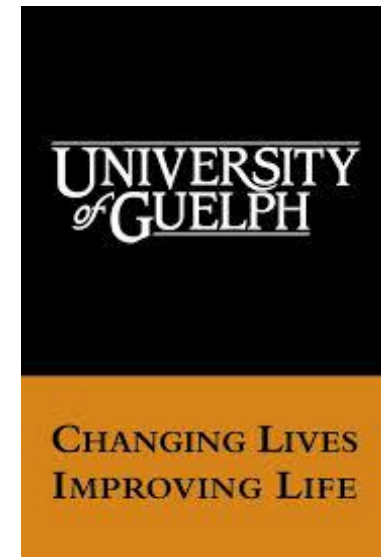
Study carried out by Prof. Dr. Koushik Seetharaman†

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

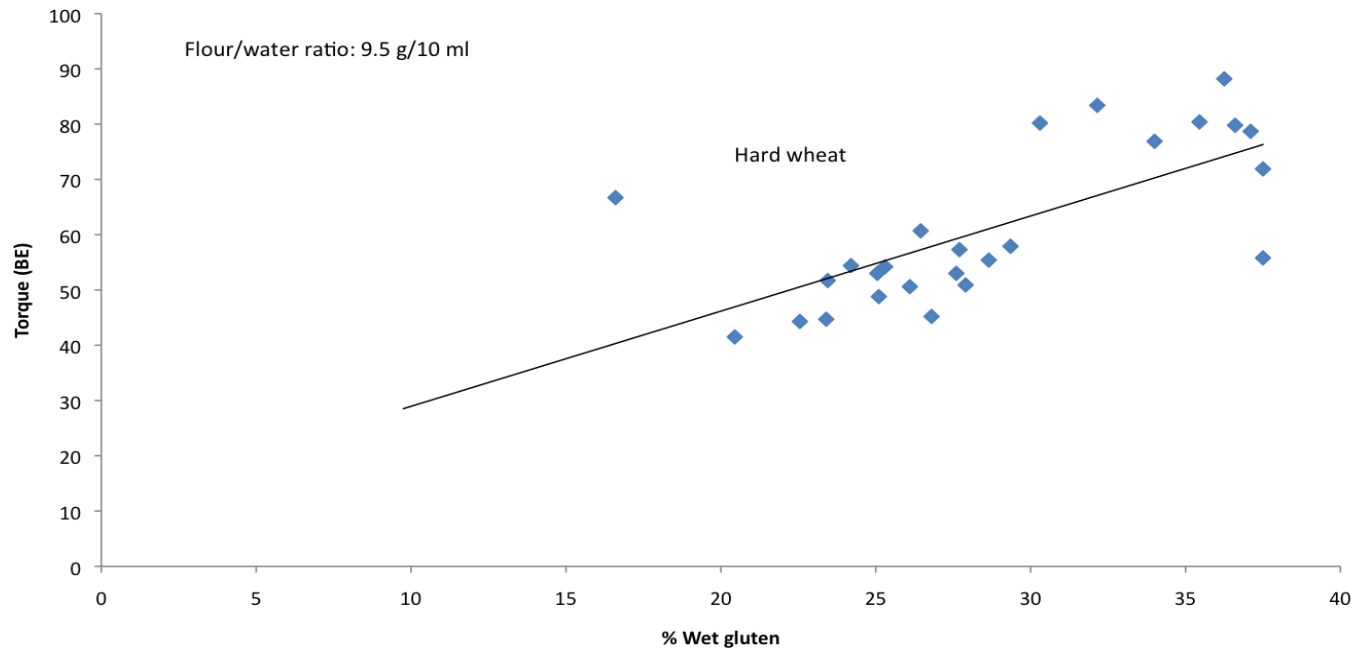


# The Brabender® GlutoPeak®

## Correlation between GlutoPeak® and Gluten Washer



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



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Study carried out by

**Marie Helene Morel**

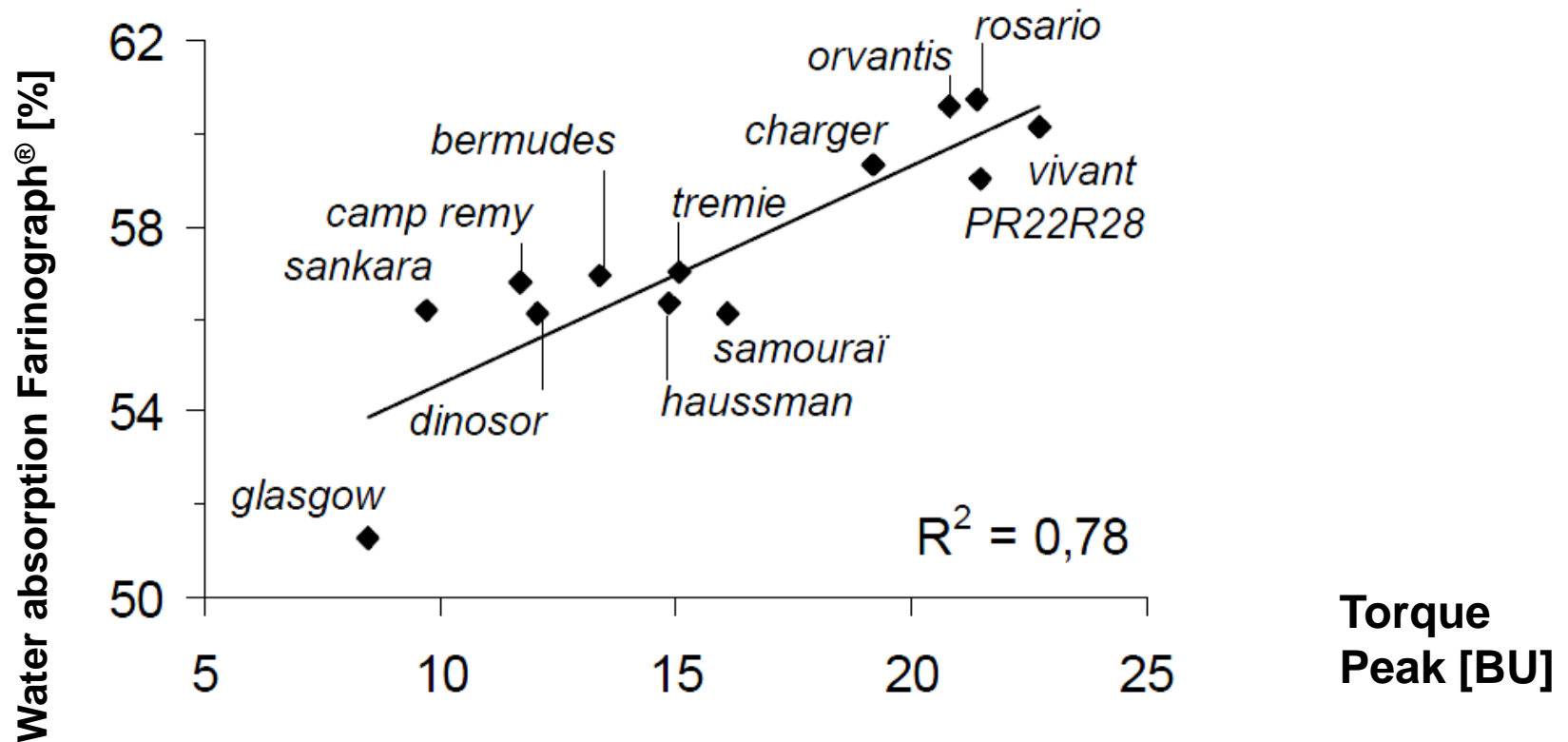
INRA - Laboratory of Cereal Technology and Agropolymers,  
Montpellier, France

### Test parameters

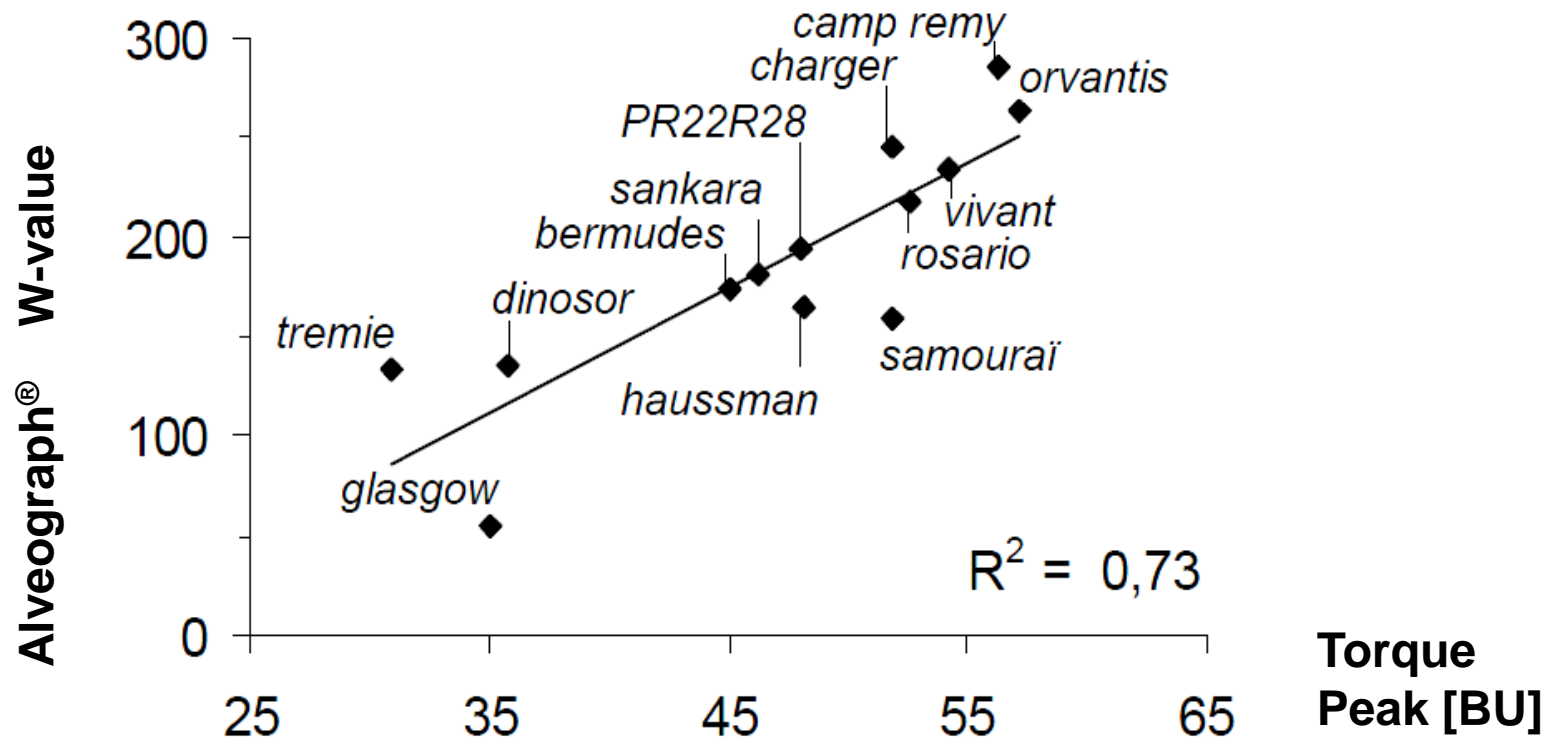
➤ unknown



### GlutoPeak® torque – water absorption



### 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



DFA



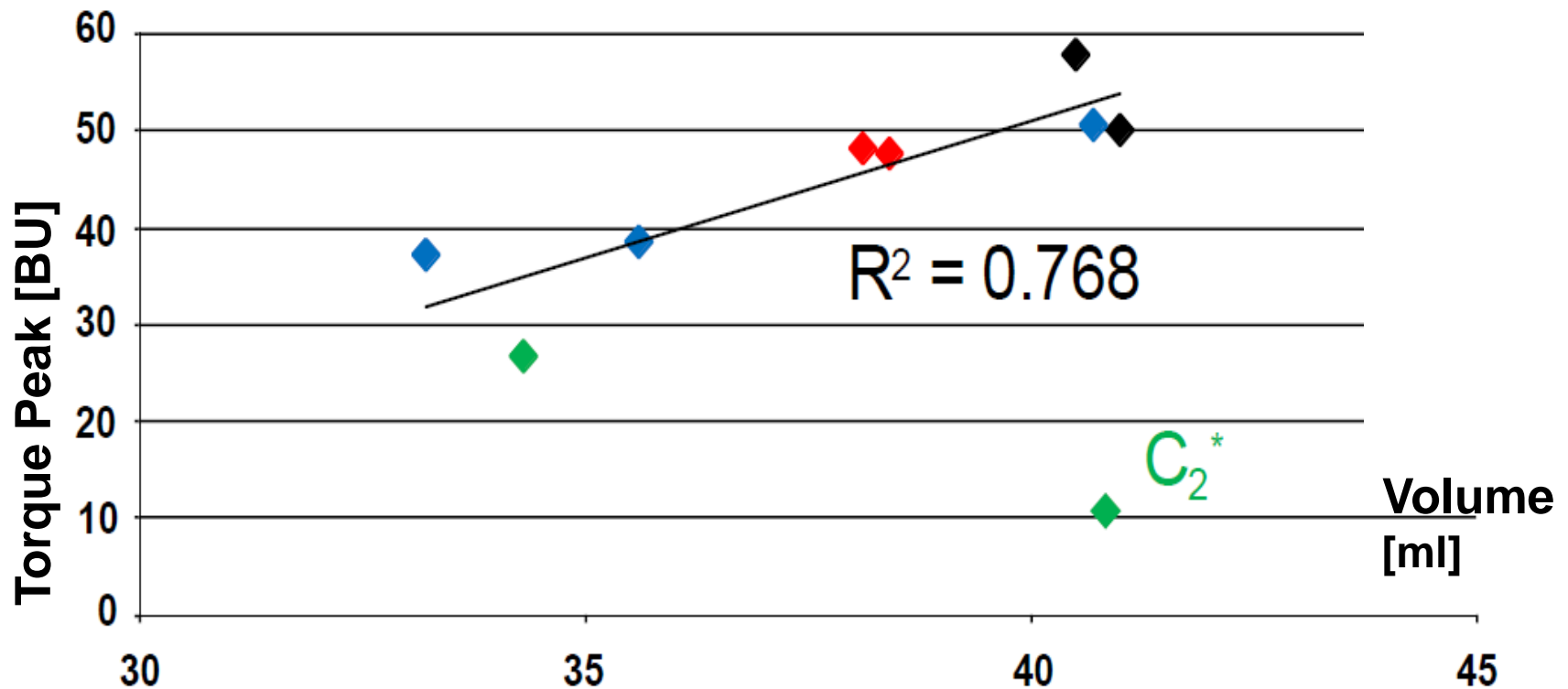
### Flour qualities

- E (n = 2) → E<sub>1</sub>, E<sub>2</sub>      excellent baking quality
- A (n = 2) → A<sub>1</sub>, A<sub>2</sub>      good baking quality
- B (n = 3) → B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>      moderate baking quality
- C (n = 2) → C<sub>1</sub>, C<sub>2</sub>      poor baking quality

### Flour preparation:

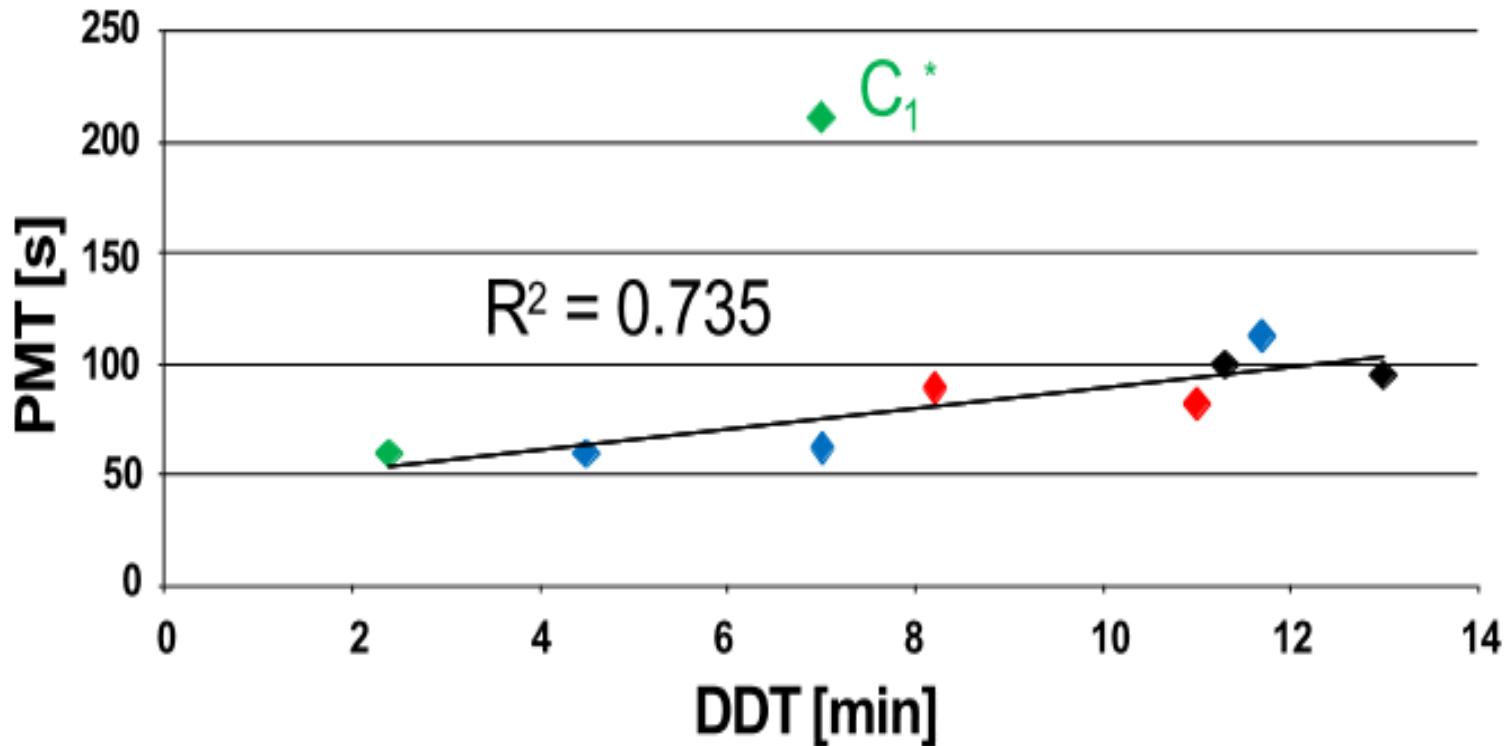
- Milling with Quadrumat® Junior
- Sieving (0.2 mm)

### GlutoPeak® torque – baking volume



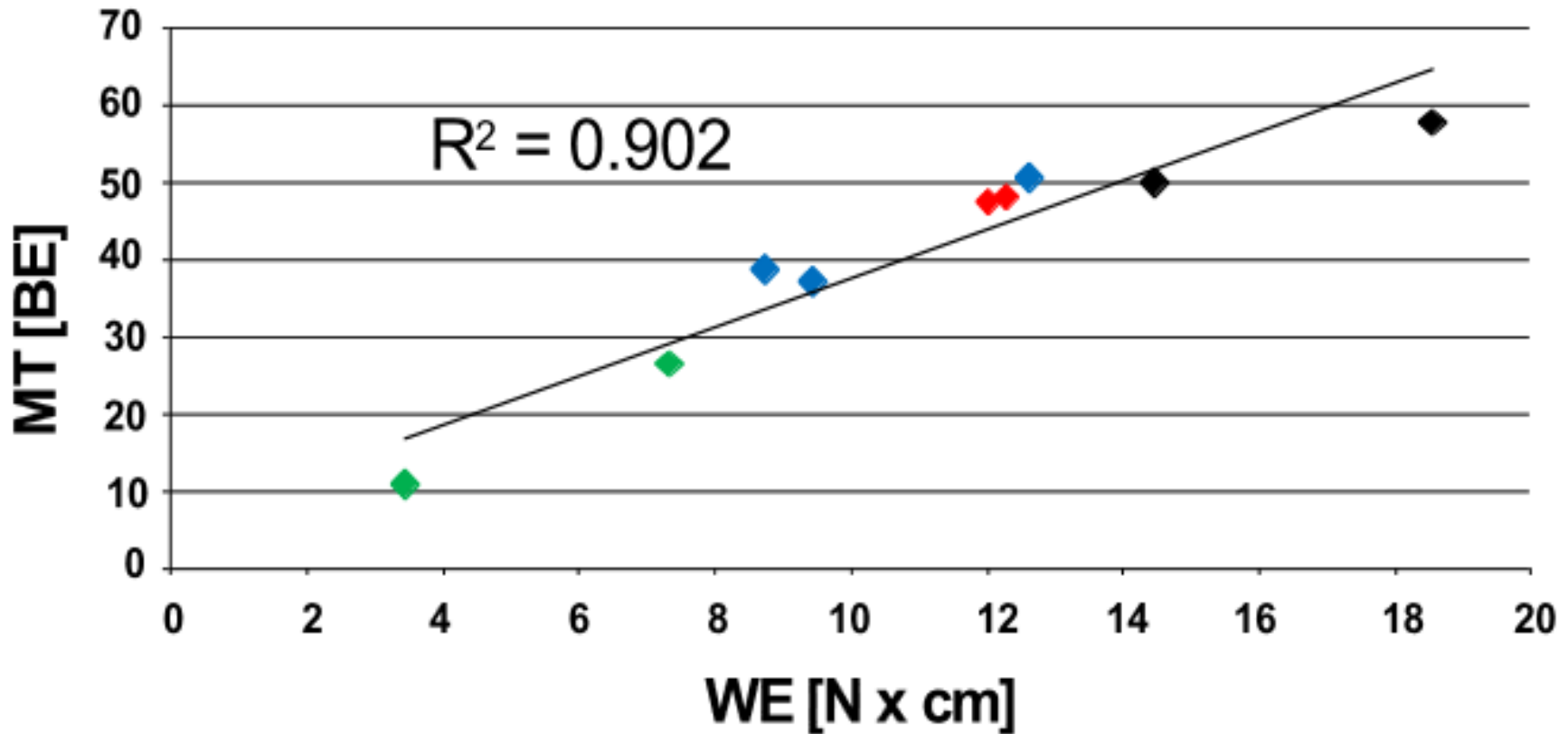
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### Peak maximum time – dough development time



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### GlutoPeak® torque – Work on extension after 45 min



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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

## 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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