TORTILLA QUALITY ATTRIBUTES AND THEIR MEASUREMENT

NIC FRANCIOSI, IFF NOURISH

AGENDA

- Tortilla properties and measurable parameters
- Foldability and extensibility methods
- Case studies and new product examples
- Lab tour

MAIN QUALITY PARAMETERS

For long life, ambient, wheat tortilla

- Microbiological safety and spoilage
  - Water activity, moisture content and pH
  - Level of preservatives levels
  - Oxygen level in the pack: modified atmosphere (gas flushing : O_2 : 2-5% ; thermoforming O_2 < 2%)
- Product format and appearance
  - Tortilla size, shape
  - Aspect: translucency, structure
- Shelf-life performance
  - **Foldability: folding methods**
  - **Extensibility (instrumental)**
  - Adhesiveness
  - Robustness

FOLDING TORTILLA

Subjective assessments and instrumental methods

ROLLABILITY

Score explanation

Rollability scores : pin diameter

Score 1: Breaks on 19 mm ∅

Score 2: Breaks on 13 mm ∅

Score 3: Breaks on 10 mm ∅

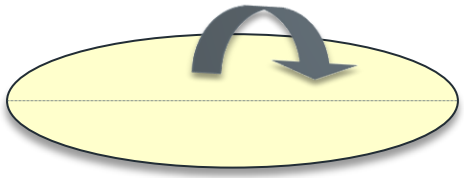
Score 4: Breaks on 8 mm ∅

Score 5: Breaks on 5 mm ∅

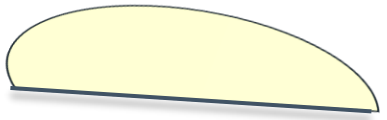
5

FOLDABILITY METHODS FOR PRODUCT ASSESSMENT

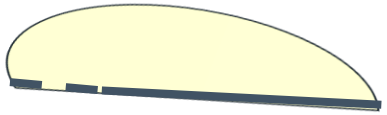
scores explanation



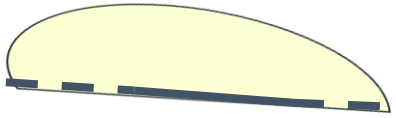
Fold



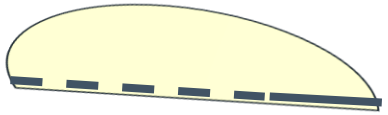
Does not break**:**
score 5



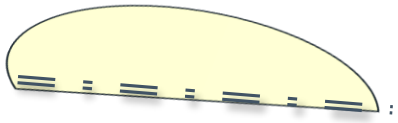
Break less than 25%:
score 4



Breaks between 25% and 50%:
score 3



More than 50% breaks:
score 2



Breaks completely:
score 1

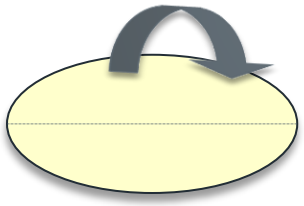
TORTILLA FOLDING METHODS

Double folding, burrito style

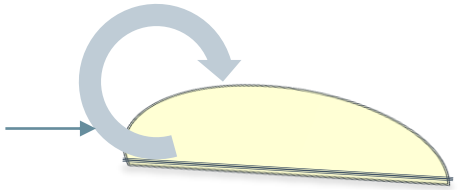
GRINDSTED® POWERFLEX® at 120 days

OTHER FOLDING METHODS

Burrito style folding



Tigh fold



Folding
on the folding line

Using a reference pin to **standardise the curvature** and reduce operator bias

Less folding damage

More folding damage

OTHER FOLDING METHODS

Bias: curvature defined by the spacing of the first folding

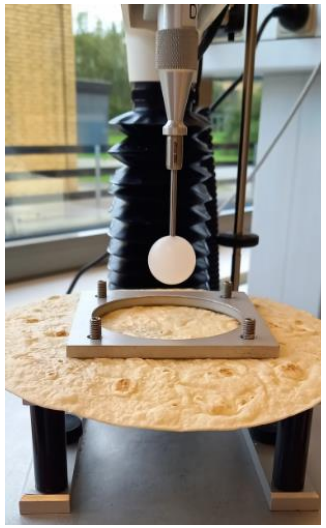
INSTRUMENTAL METHODS

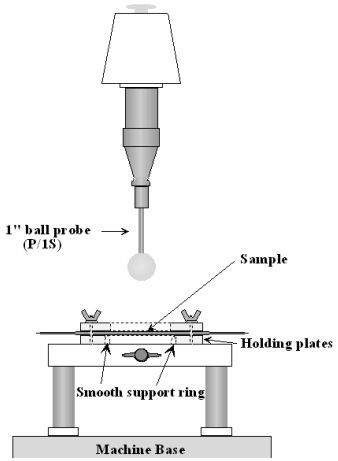
Texture Analyser Tortilla Rig vs Tensile grips rig

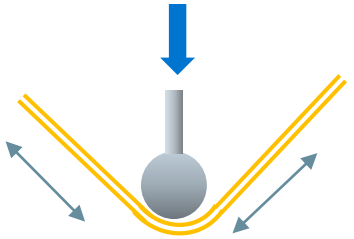
Courtesy of Stable Micro Systems®

INSTRUMENTAL METHODS

Texture Analyser Tortilla Rig from Stable Micro Systems®





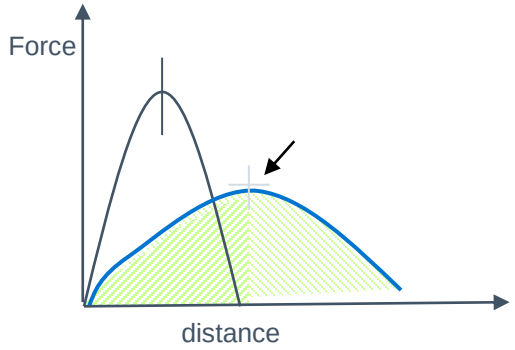


Combination of:

Folding (sphere probe curvature),

Puncturing (depending on probe size

and **tensile stress (stretching)**



Derivable measurements

- Breaking distance (mm) = extensibility
- Breaking force (g force or N)
- Partial work: g ·mm *(yielding point)*
- Total work: ´total area under peak' (g ·mm)

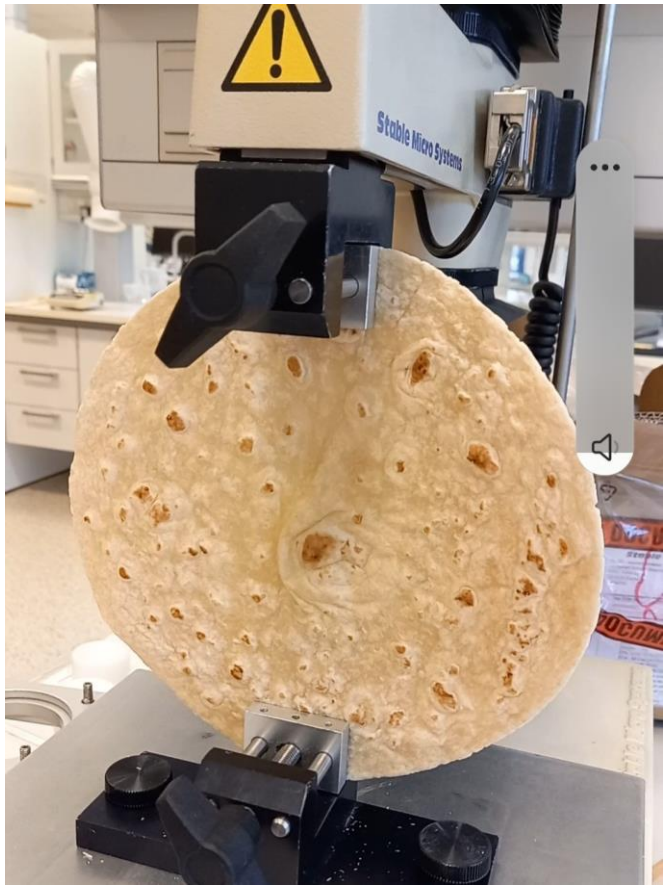
TENSILE STRESS

Tensile Grips rig

Tensile Grips

Courtesy of Stable Micro Systems®

Tortilla strip



Whole tortilla

TENSILE STRESS

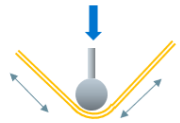
Video clip

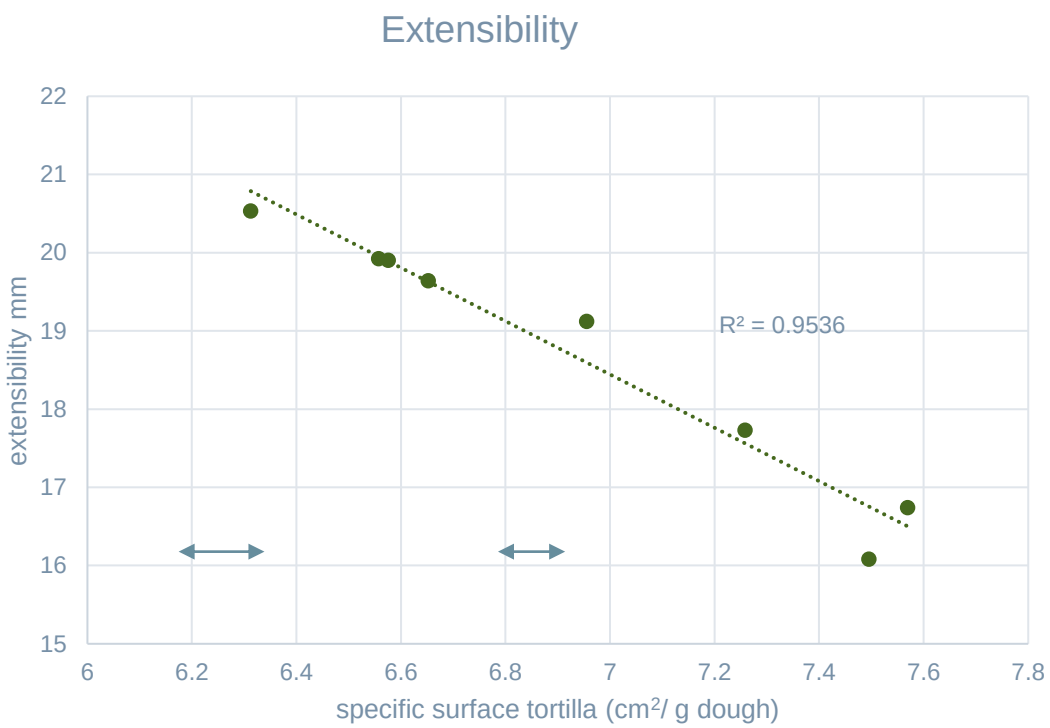
With a tortilla strip the break point is mostly situated in the central area of the tortilla strip.

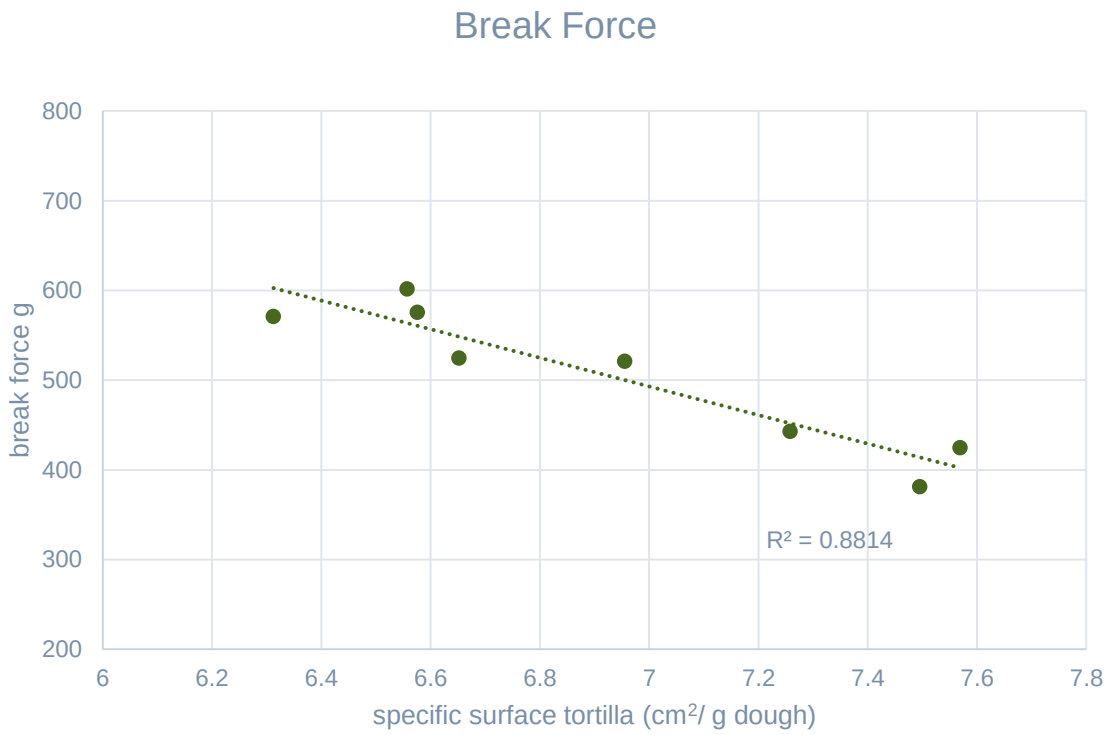
In whole tortilla more often is on the clamp area

Relationship between **Extensibility** and **Specific Surface** of tortilla

Tortilla rig on TA







20 cm ∅:
50 g

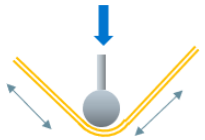
30cm ∅
105 g

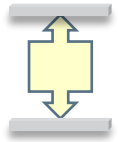
30cm ∅
115 g

Specific Surface range achieved using press parameters and relaxants

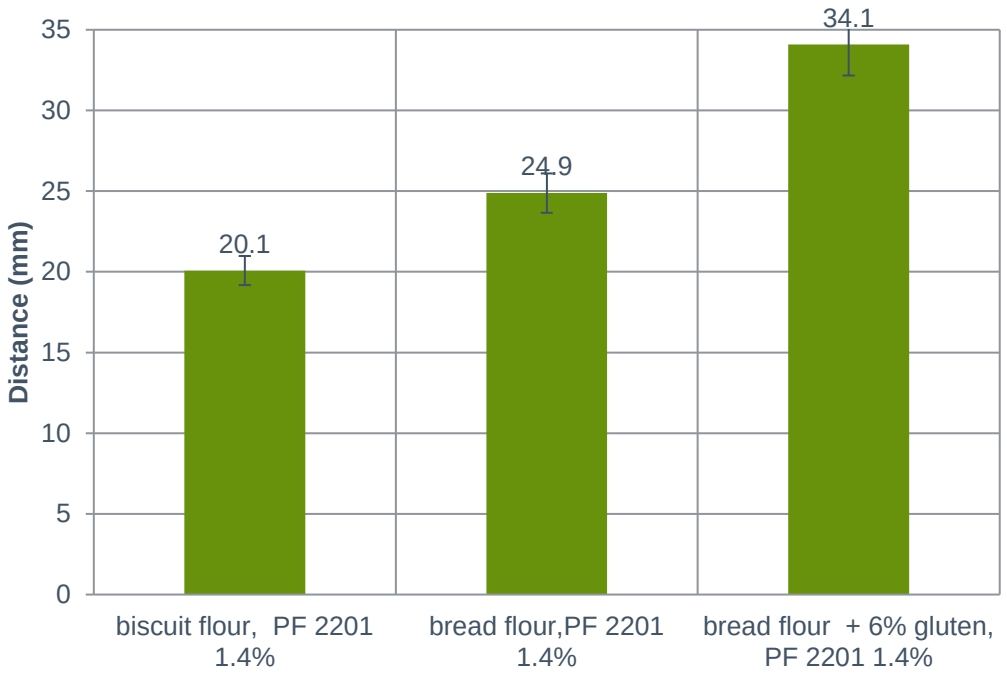
EFFECT OF FLOUR AND GLUTEN

Bread flour 12.5% protein ; Biscuit flour 10% protein, adapted tortilla recipe

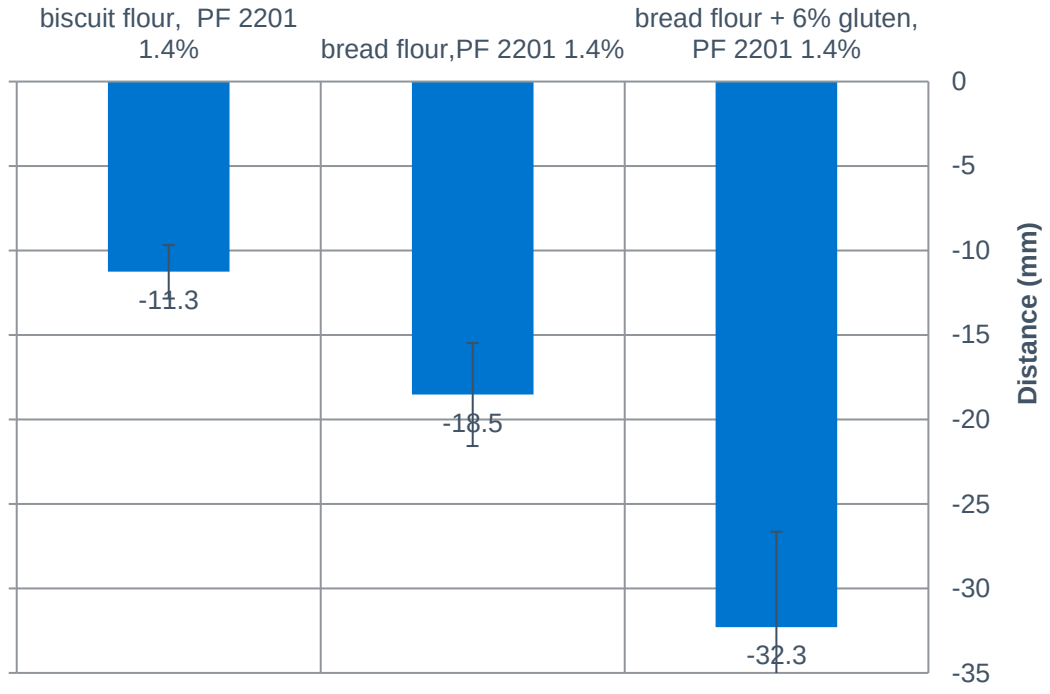




Extensibility, tortilla rig

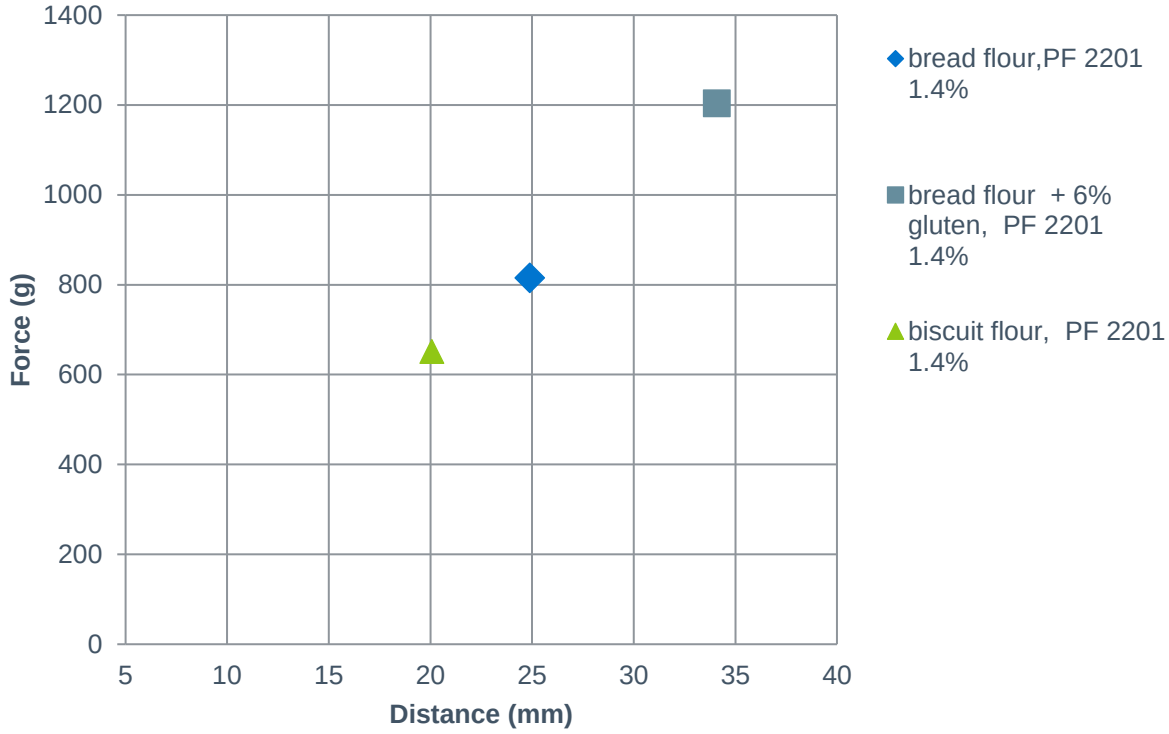


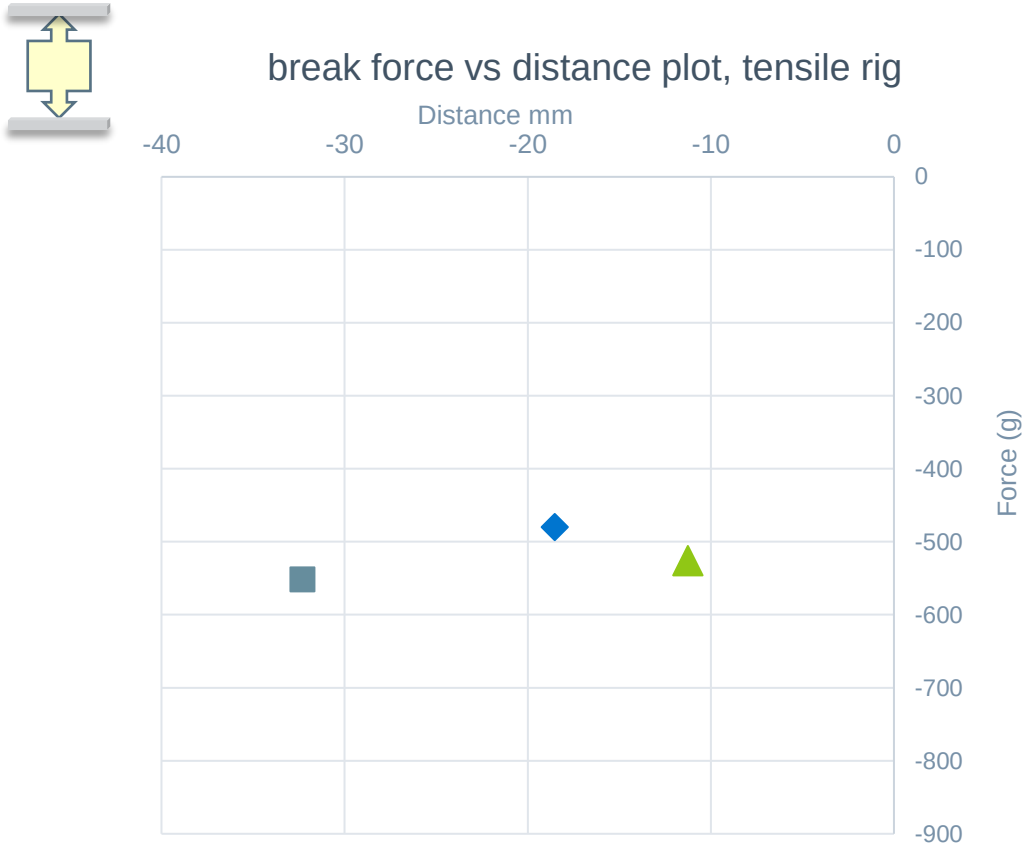
Extensibility, tensile rig



EFFECT OF FLOUR AND GLUTEN

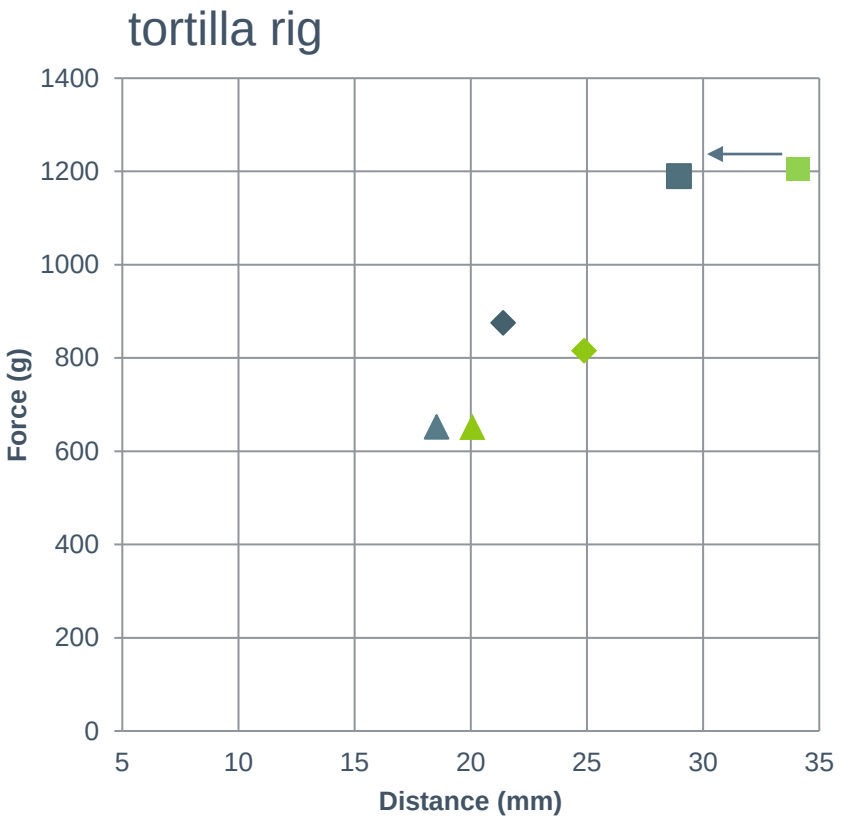
Bread flour 12.5% protein vs biscuit flour 10% protein





BREAK FORCE-DISTANCE

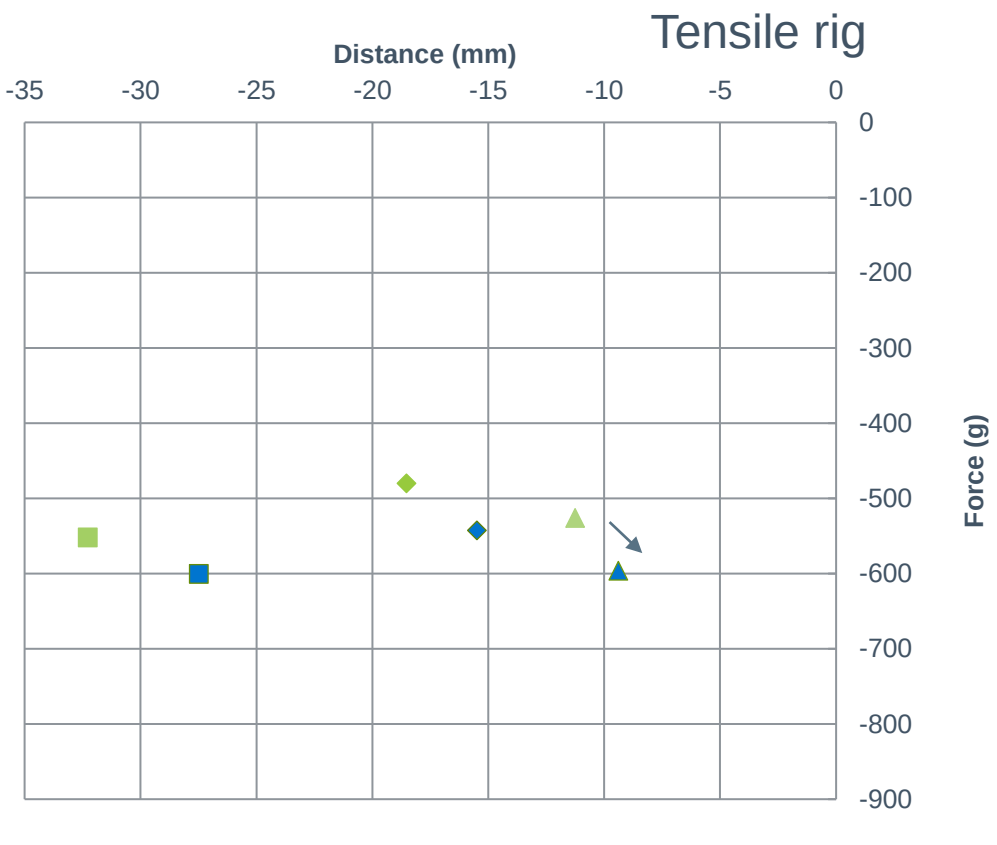
Evolution from 1 week to 1 month



bread flour,PF 2201 1.4%

bread flour +6% VW gluten, PF 2201 1.4%

biscuit flour, PF 2201 1.4%

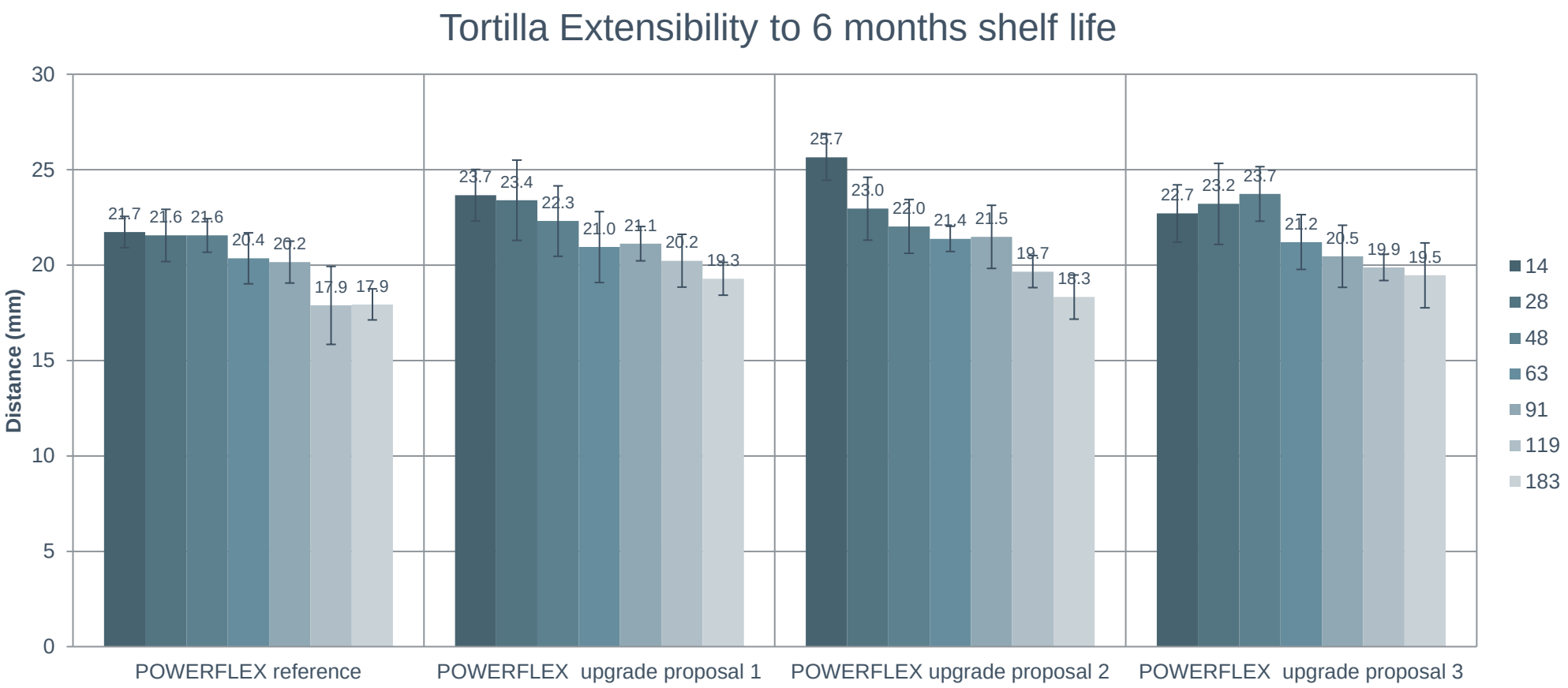


POWERFLEX® SYSTEMS EXTENSIBILITY IMPROVEMENT

Example of work to upgrade the performance of *PF 2201*

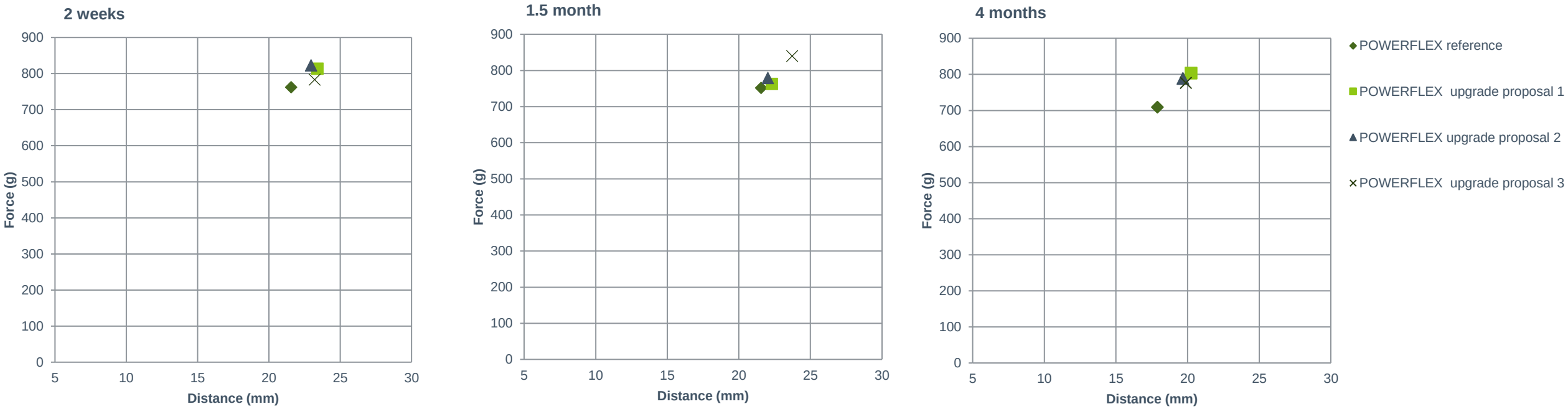
IMPROVING EXTENSIBILITY

Example of POWERFLEX 2201 upgrade work on fresh-keeping side



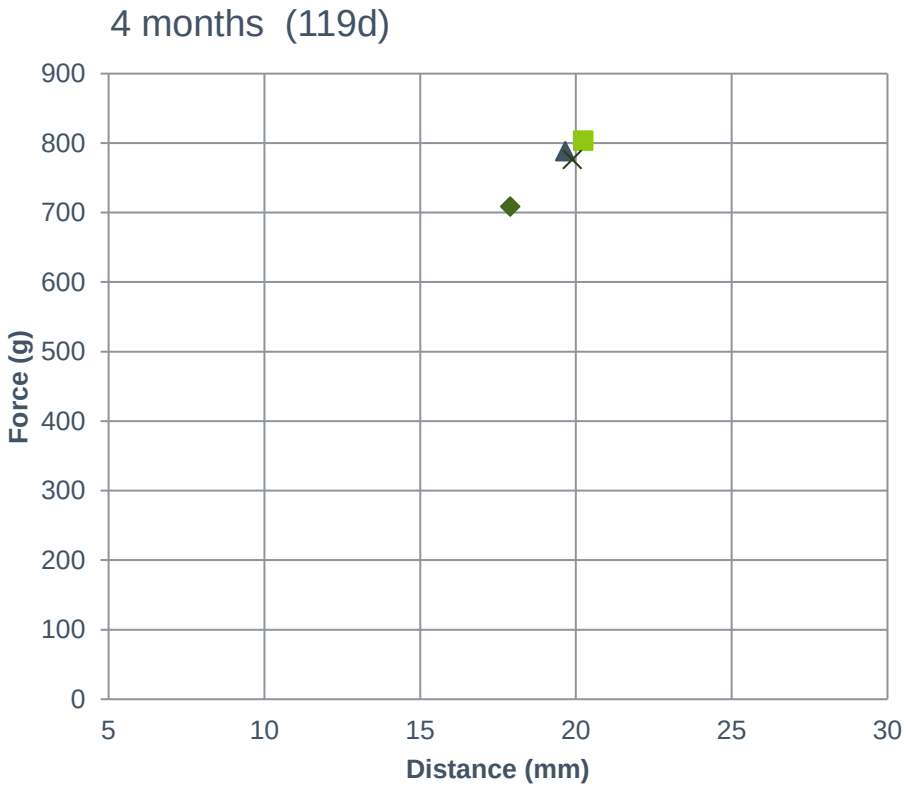
POWERFLEX® 2201 UPGRADE

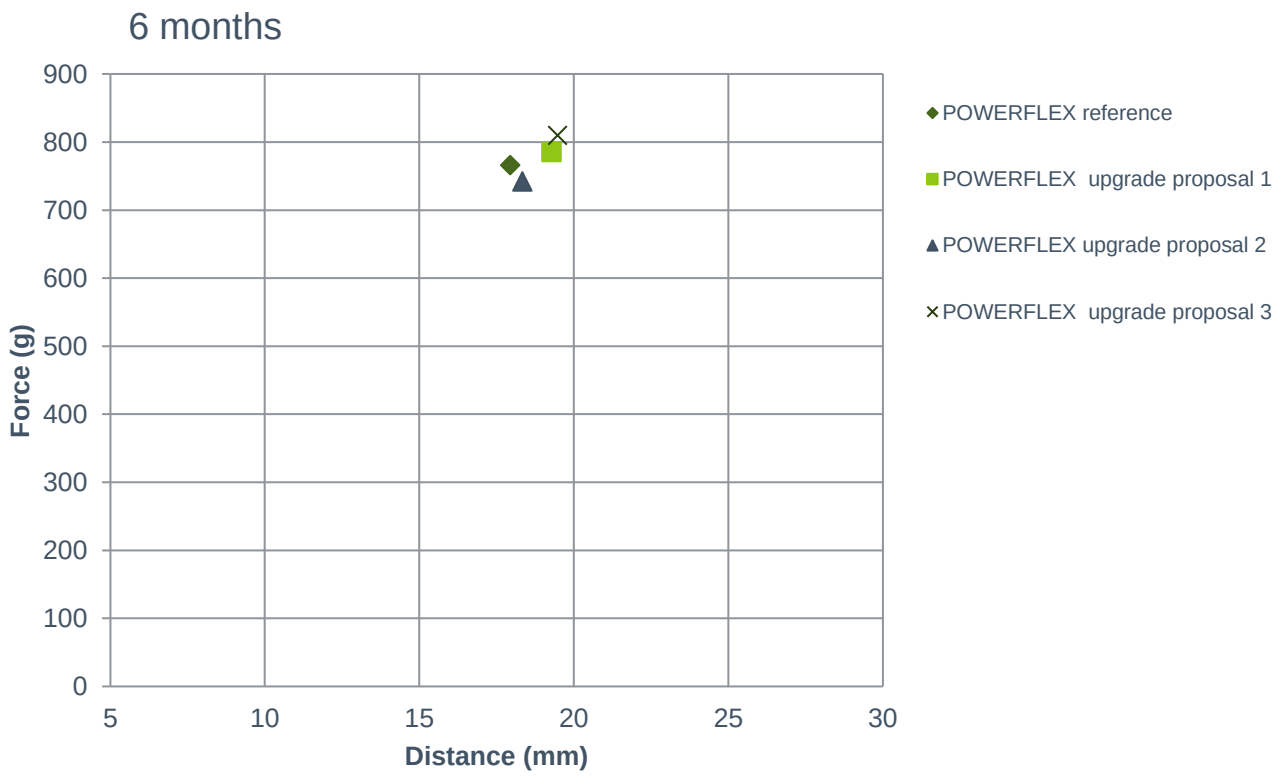
Mapping force vs distance evolution



POWERFLEX

Mapping break force vs break distance shelf life evolution





NEW PRODUCT PROPOSALS

Pre commercial samples

POWERFLEX PL 78592

improved overall extensibility

neutral pH

Dosage 1.5%

Citric, xanthan, distilled monoglyceride

SG palm

CONCLUSIVE REMARKS

- Specific needs that require a modification of the methods or creation of new methods ?

- Continues with the lab and pilot plant tour