



iff

**WHEAT TORTILLA: INTERDEPENDENCE
OF STRENGTH AND FRESHNESS
IN SHELF-LIFE PERFORMANCE**

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NEED TO IMPROVE STRENGTH vs FRESHNESS

Effects mostly related to gluten network development

- Bread volume
- Baked product overall shape
- Crumb structure and uniformity
- Crust quality and definition of crust cuts
- Dough stability and processability
- Compensation for ingredients diluting the gluten matrix (i.e. bran, fibres, inclusions)
- Need to upgrade of weak flours

Effects mostly related to starch retrogradation

- Bread crumb firming: hardness increase
- Development of crumbliness
- Decline in resiliency
- Crumb less foldable and pliable
- Development of a leathery crust
- Decrease of moistness perception



MOST COMMON ADDITIVES IN BREAD BAKING

Strength: direct or indirect effect on gluten



- Ascorbic acid (E300)
- Emulsifiers: i.e. DATEM (E472)
- Xylanases
- Lipases
- Oxydative enzymes

Freshness: effect on starch retrogradation

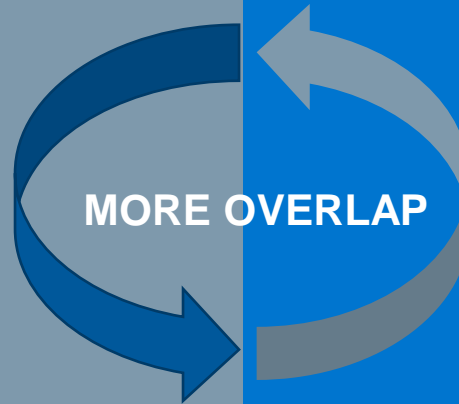


- Emulsifiers: Distilled monoglyceride (E471)
- Fresh-keeping amylases
- Some lipases

DOES THIS SIMPLIFICATION EXPLAIN WHEAT TORTILLA BEHAVIOUR ?

Product features related to strength

- Inherent strength of the tortilla matrix
- Robustness in meal preparation
- Resistance to punctures and breakings from filling
- Suitable to tight folding

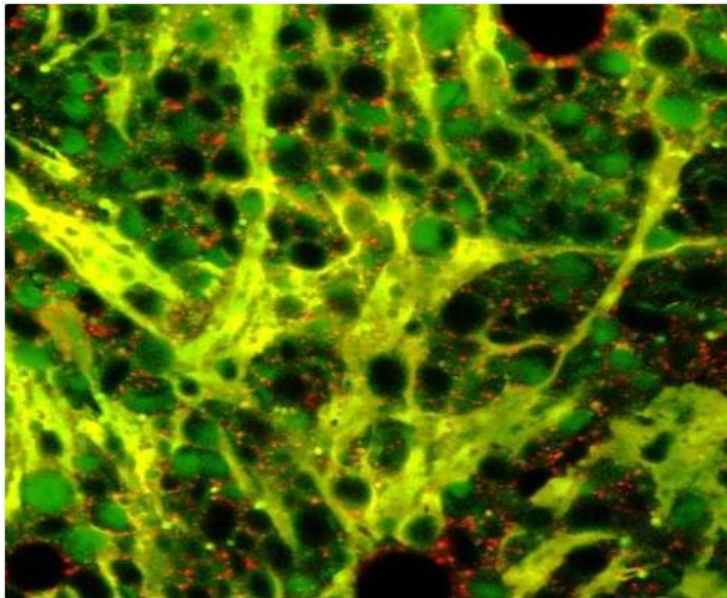


Product features related to freshness

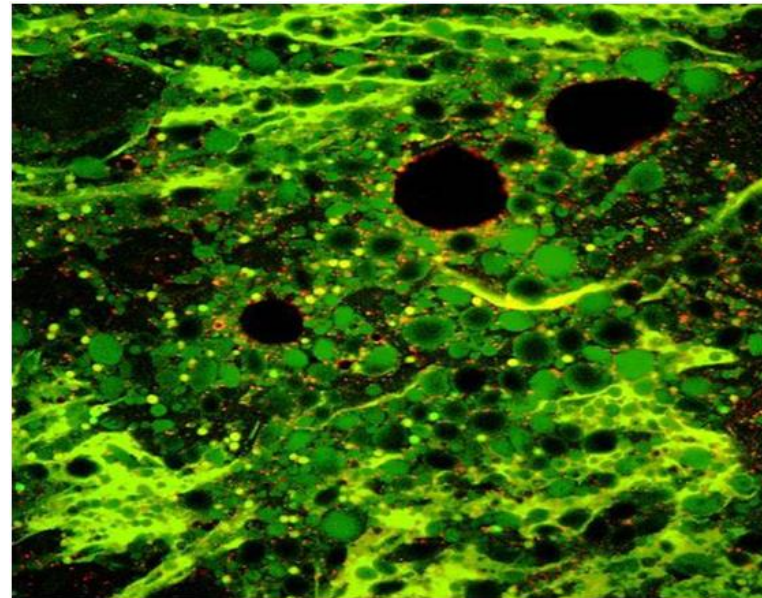
- Foldability, rollability, pliability in time
- Extensibility in time
- Freshness perception
- Moistness perception
- Softness

TORTILLA DOUGH QUALITY

Developed gluten network



Poor gluten network



Based on medium shelf-life solutions

ADDITIVES WITH A POTENTIAL WEAKENING EFFECT:

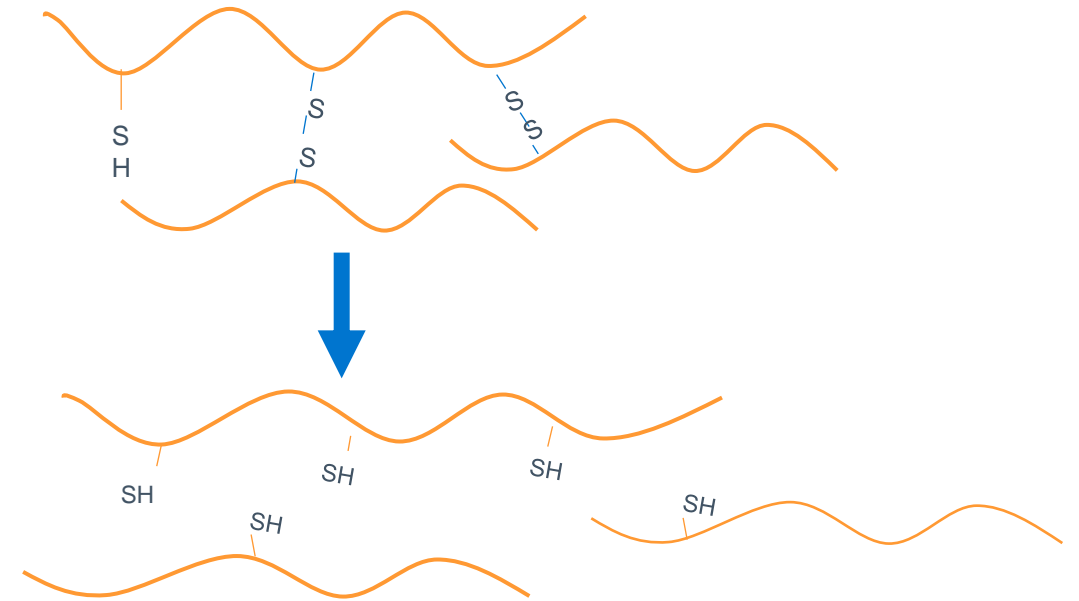
Relaxants and reducing agents

Pressed tortilla often require the use of relaxants that offer better dough pressability, particularly to reach large diameters.



Lawrence equip, courtesy

These make a more extensible, pressable dough



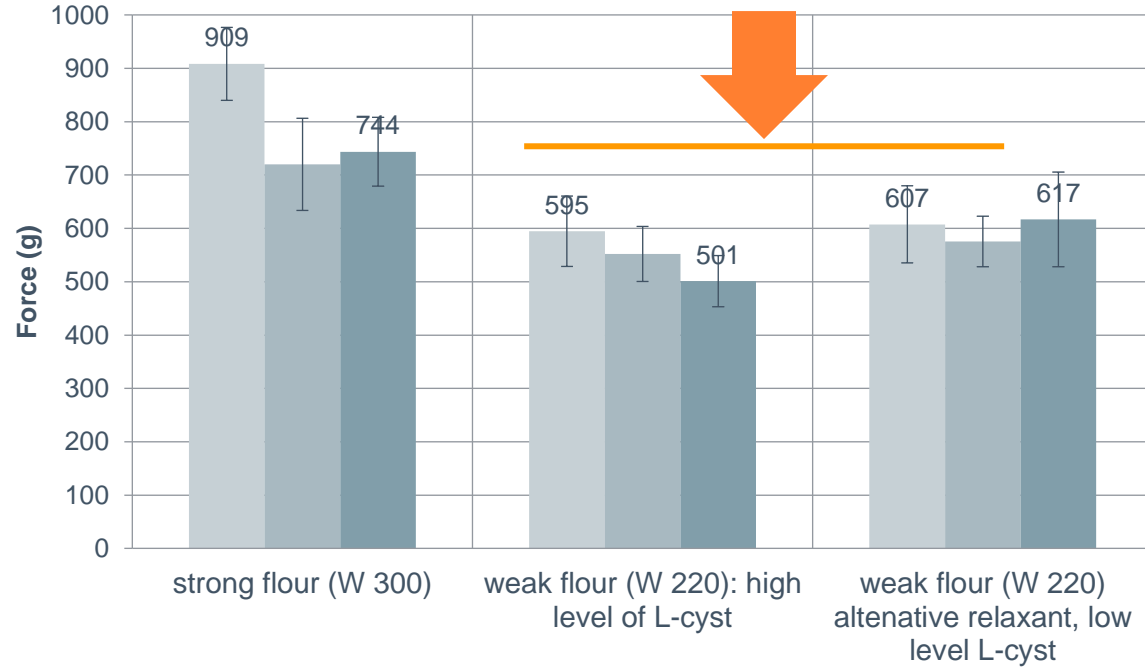
But, if abused, can weaken of the dough and the final tortilla: **Follow the next 3 examples**

EXAMPLE 1

Impact of L- cysteine (E920) in tortilla made with medium low quality flour

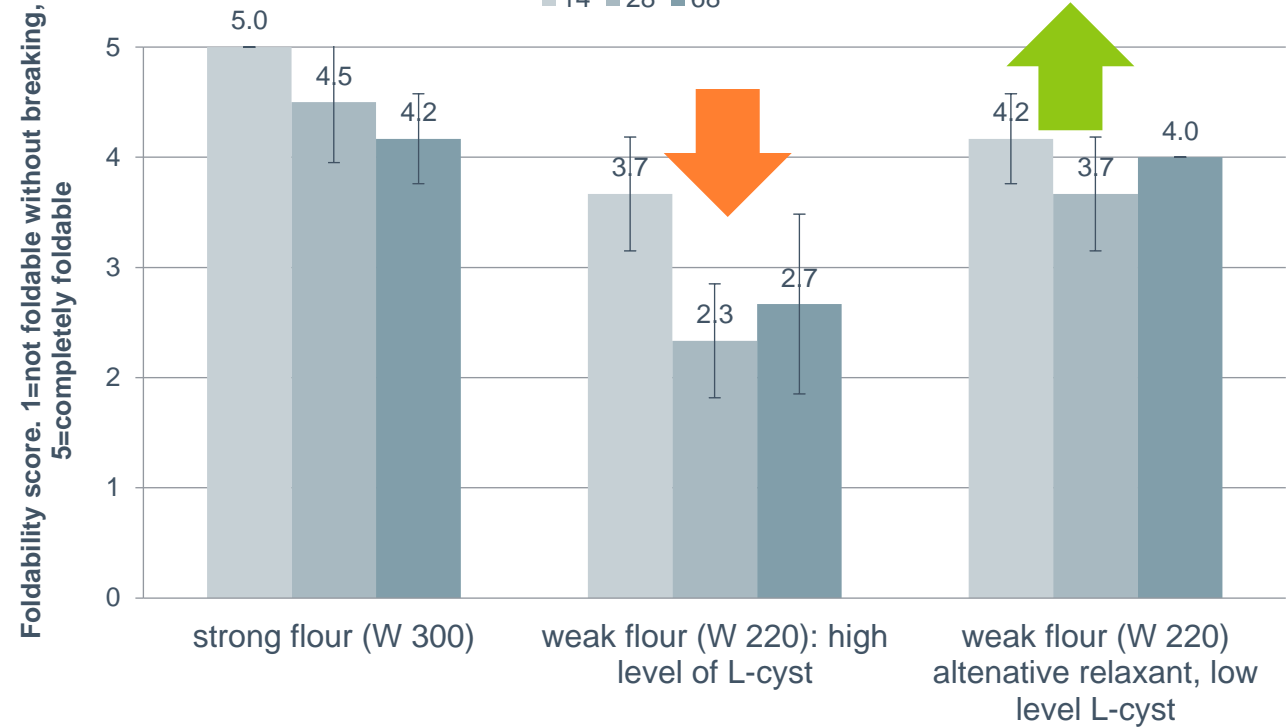
Break force tortilla

■ 14 ■ 28 ■ 68



Foldability during shelf life

■ 14 ■ 28 ■ 68



Same scaling weight and diameter

EXAMPLE 2

Impact of sodium meta-bisulphite in tortilla with low quality flour



SMB 15 ppm
Weak flour

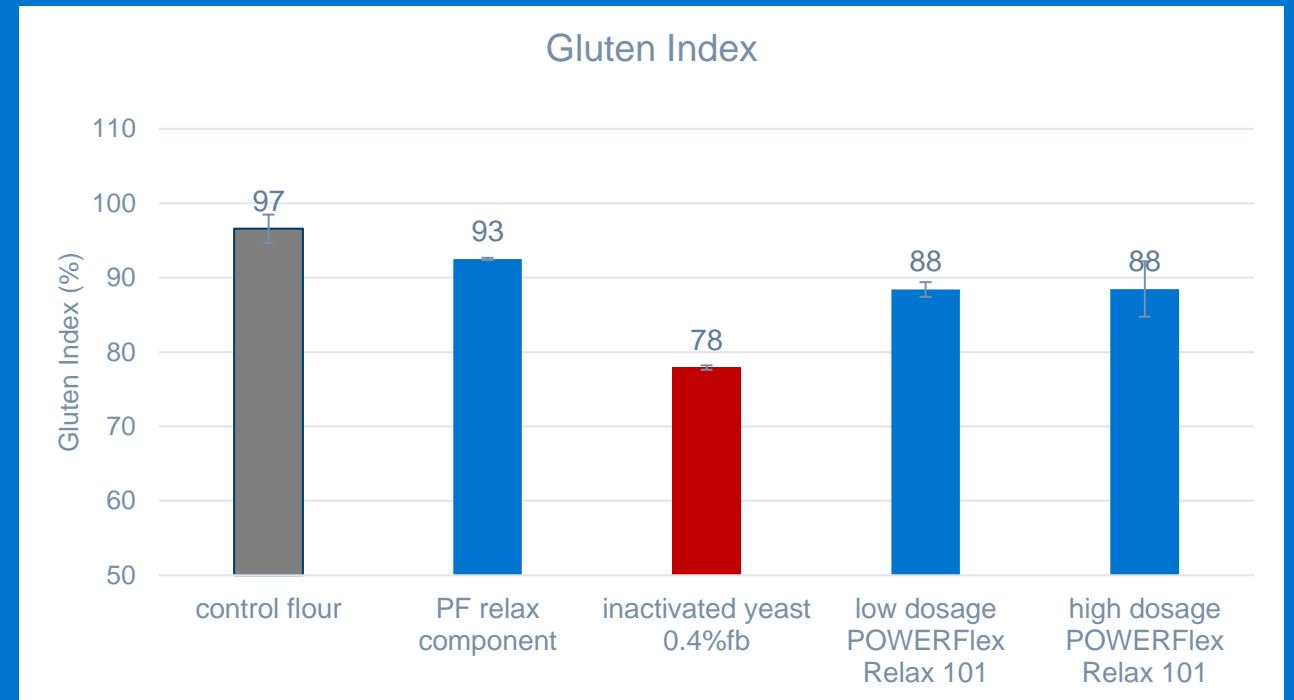
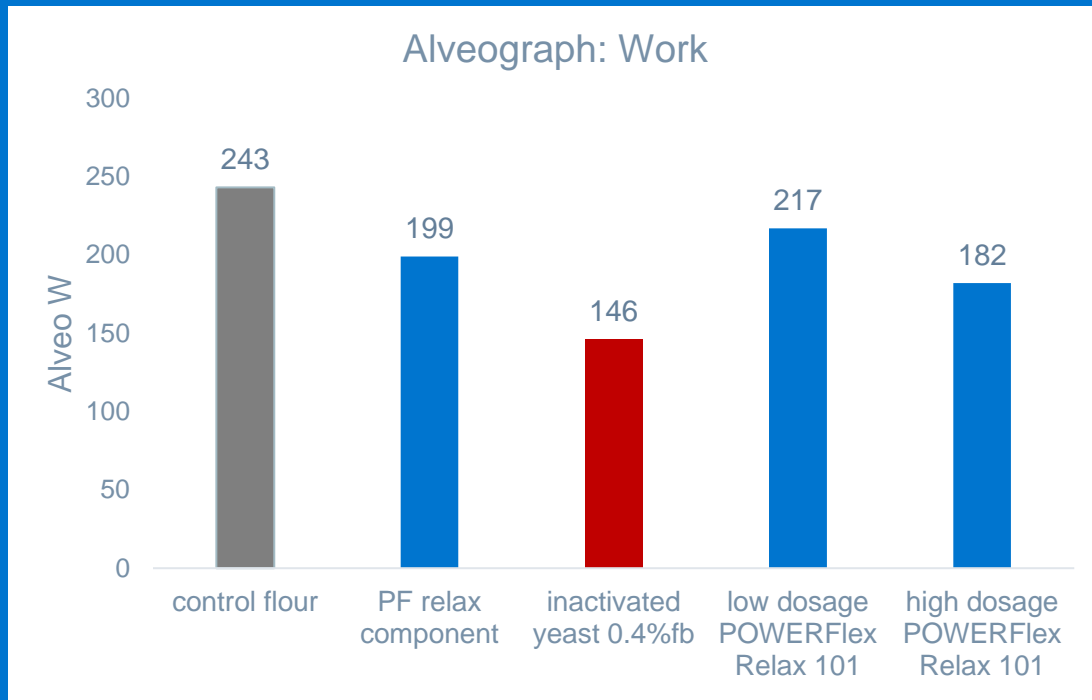


SMB 30 ppm
Weak flour



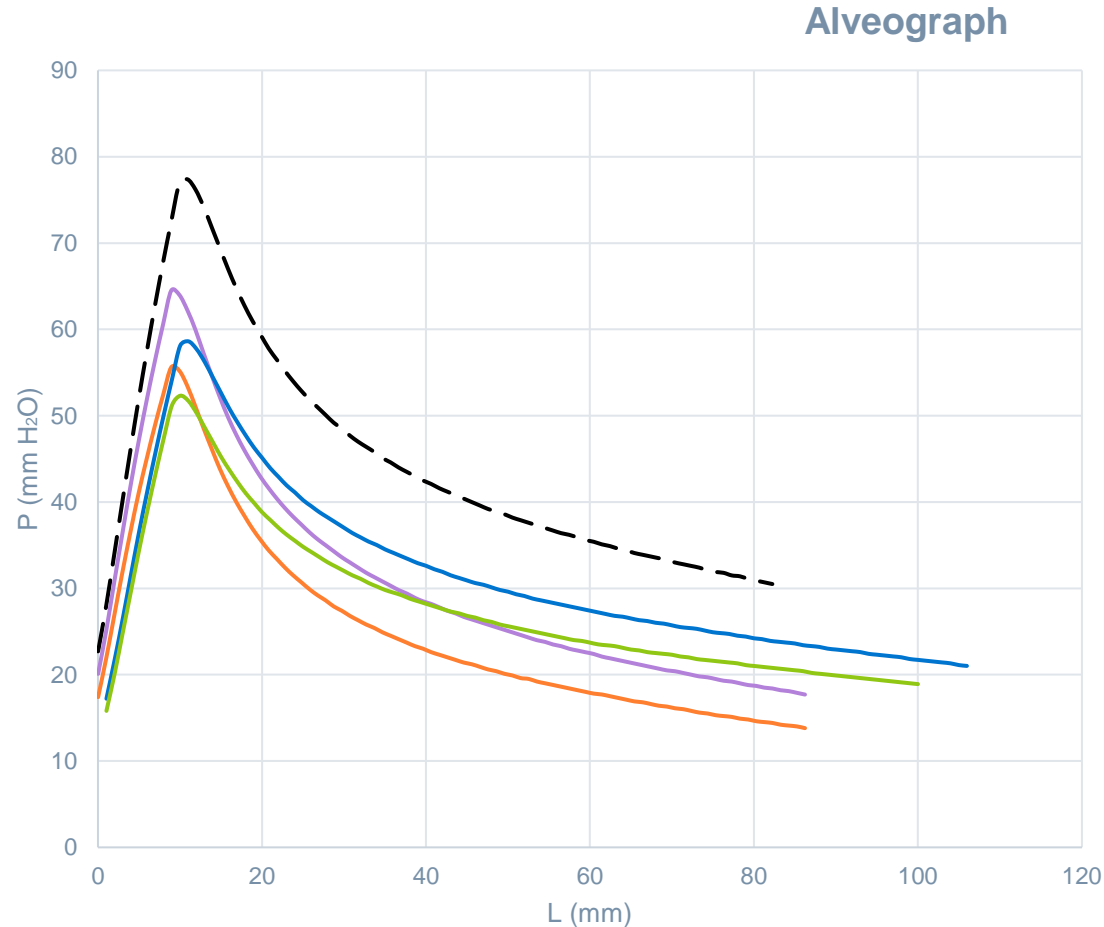
EXAMPLE 3: IMPACT OF INACTIVATED YEAST

Some dough rheology parameters



EXAMPLE 3: IMPACT OF INACTIVATED YEAST

Alveograph detail

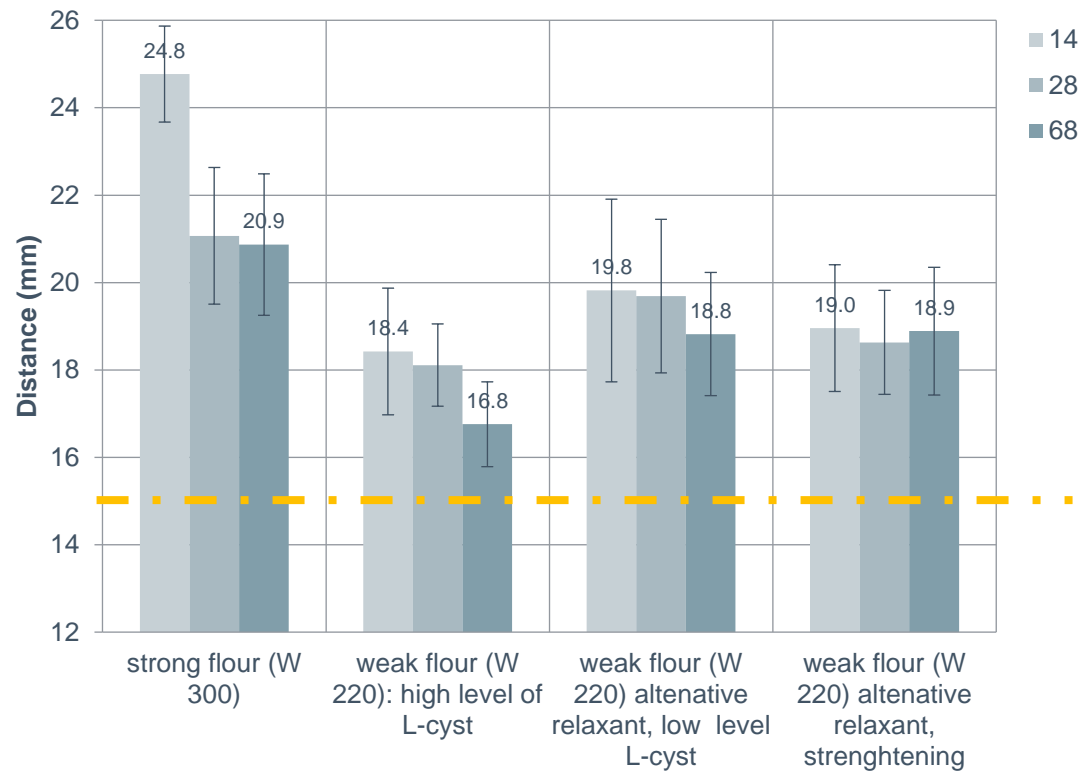


- Control flour
- 30 ppm L-cystein
- inactivated yeast 0.4%fb
- POWERFlex relax 101 low dosage
- POWERFlex relax 101 high dosage

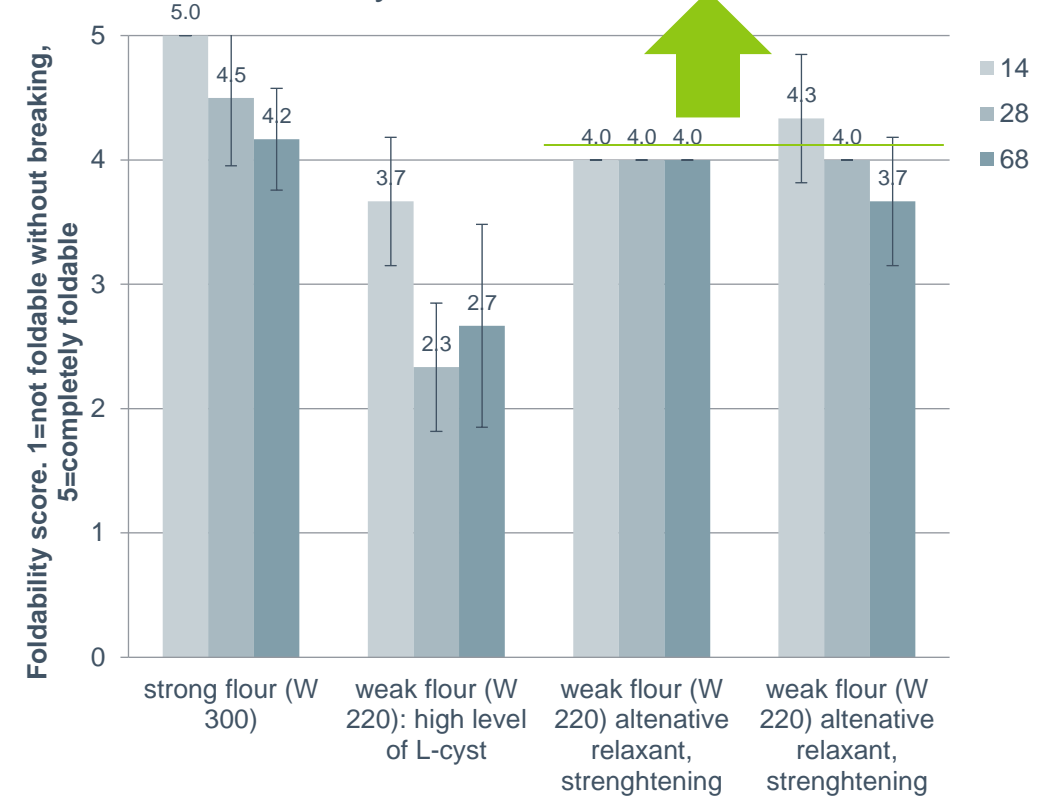
	W	P	L	P/L
control flour	243	85	82	1.04
inactivated yeast	146	61	86	0.71
L cysteine 30 ppm	178	71	86	0.83
POWERFlex® Relax 101 low dose	217	64	103	0.62
POWERFlex® Relax 101 high dose	182	57	98	0.58

CAN WE FIND ALTERNATIVE RELAXANT SOLUTIONS ?

Tortilla Extensibility during shelf-life



Foldability of tortillas over shelf life



Same scaling weight and diameter

Conclusions:

Consider the impact of relaxants on tortilla performance.

A system like POWERFLEX® RELAX 101 acts as replacement of chemical relaxants like l-cysteine or sulphite. It helps dough relaxation and pressability in speciality tortilla (high protein, large diameter, low fat).

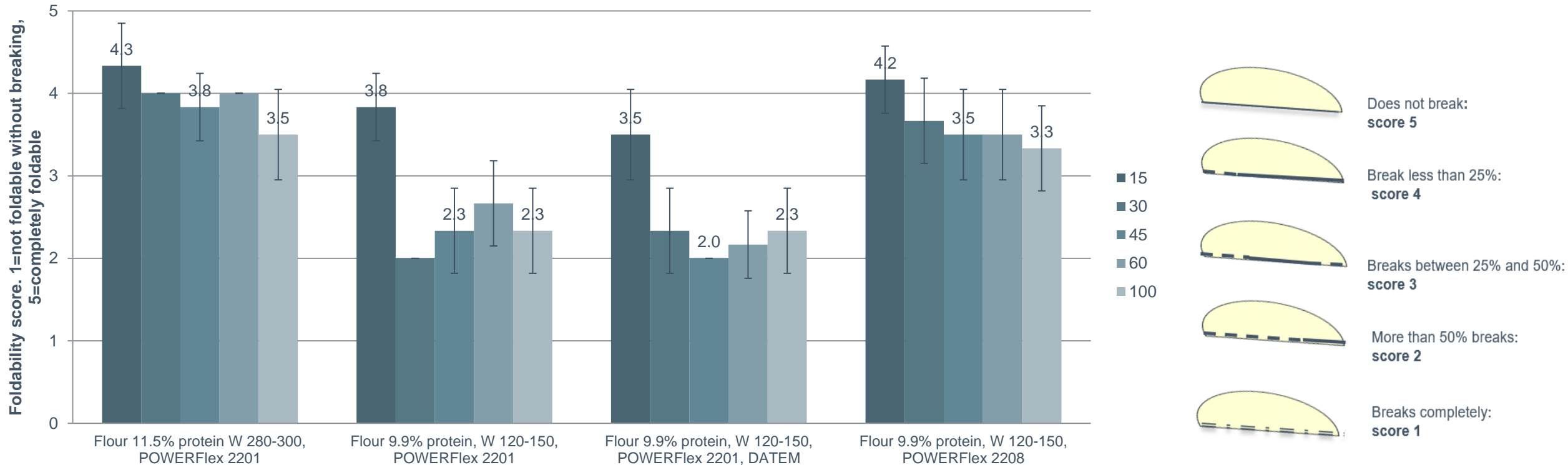


**IS THERE A WAY TO
STRENGTHEN
TORTILLA PRODUCED
WITH WEAKER FLOUR?**

PERFORMANCE IN SHELF-LIFE

Reference flour: 11.5% protein, Alveo W 280-300
Test flour: 9.9% protein, Alveo W 120-150

Changes in foldability during shelf life (days)



Reference
high quality flour



Drop in
performance



No
improvement



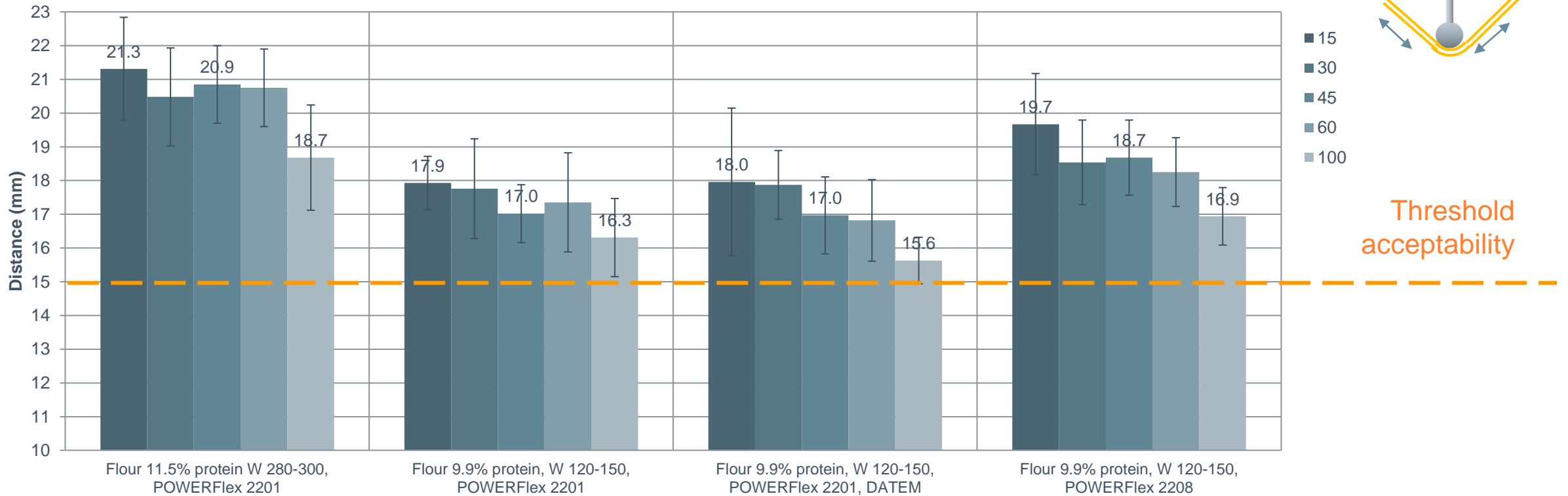
Recovery of
In performance

PERFORMANCE IN SHELF-LIFE

Texture Analyser data

Reference flour Alveo W 280-300
Test flour Alveo W 120-150

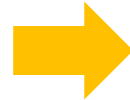
Tortilla extensibility during shelf life



Reference
high quality flour



Drop in
performance



No
improvement

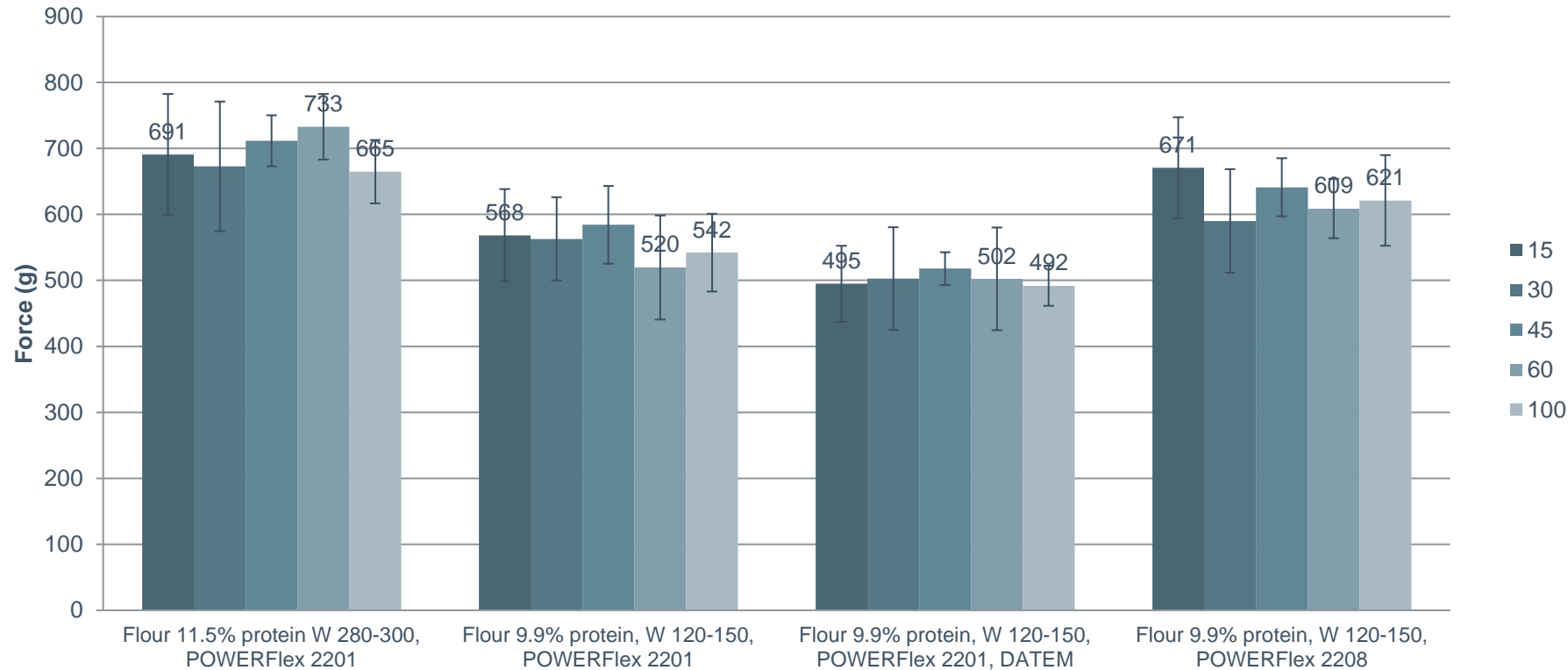


Recovery of
performance

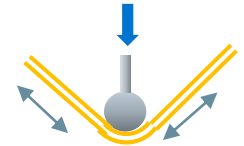
PERFORMANCE IN SHELF-LIFE

Texture Analyser data

Break force during shelf-life (days)



Ref flour Alveo W 280-300
Test flour Alveo W 120-150



Reference
high quality flour



Drop in
performance



No
improvement



Boost
In performance

CONCLUSION

An opportunely rebalanced system like the POWERFlex[®] 2208 (xanthan, dismo, enzymes) can be used compensate for moderately weak flour, where traditional strengthening offers little improvement





UPGRADING FRESHNESS OF TORTILLA, WHEN FLOUR QUALITY IS LESS OF AN ISSUE

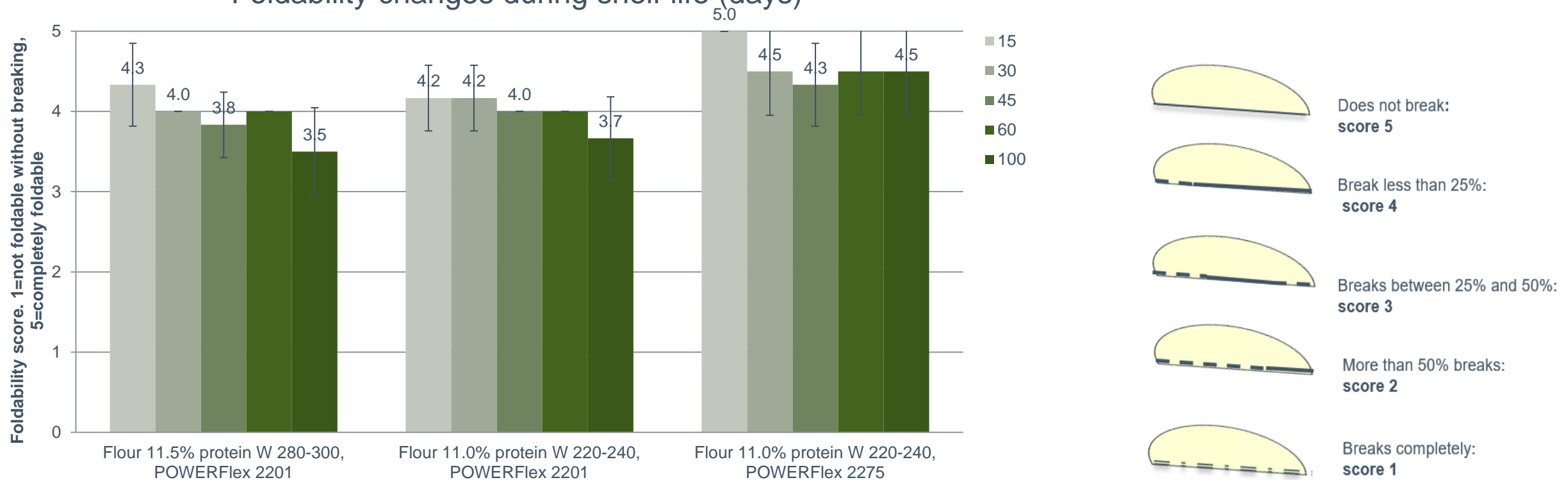
The benefits of

POWERFlex[®] 2275

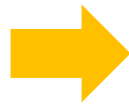
UPGRADING FRESHNESS OF TORTILLA WHEN FLOUR QUALITY IS LESS OF AN ISSUE

Ref premium flour, protein 11.5%, W 280-300
Test flour, protein 11.0%, W 220-240

Foldability changes during shelf life (days)



Reference
high quality flour



Similar
performance

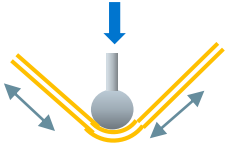
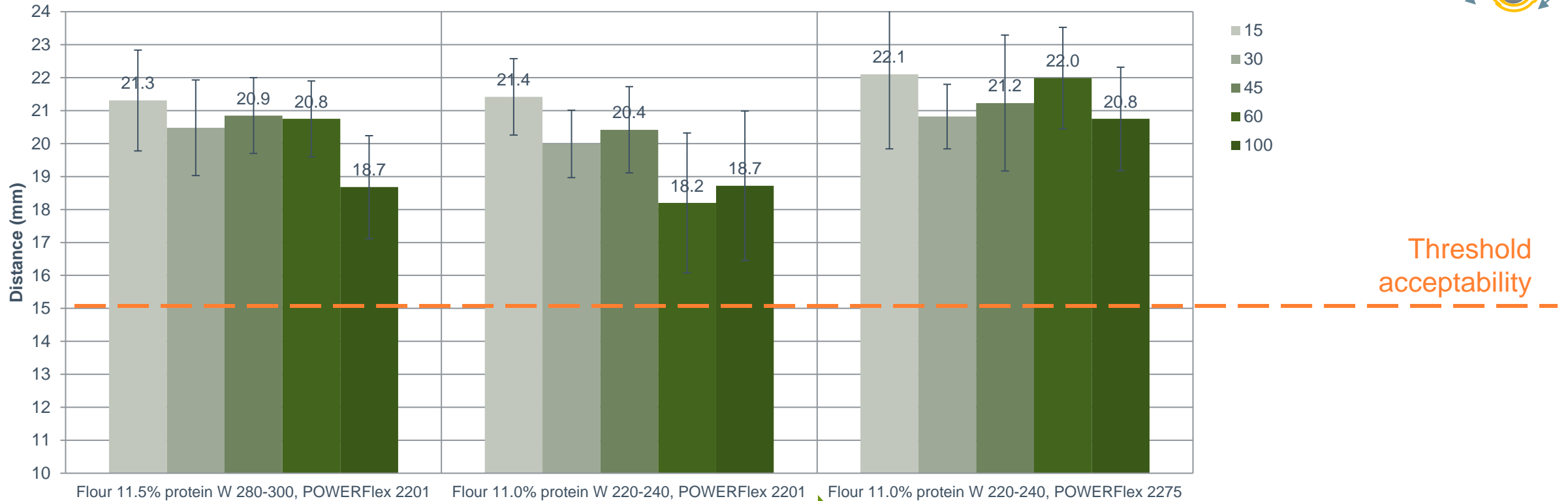


Foldability sustained
above score 4

POWERFlex® 2275 new high-performance solution

Shelf-life: Texture Analyser data

Tortilla extensibility during shelf life



Threshold
acceptability

Reference
high quality flour



Similar
performance

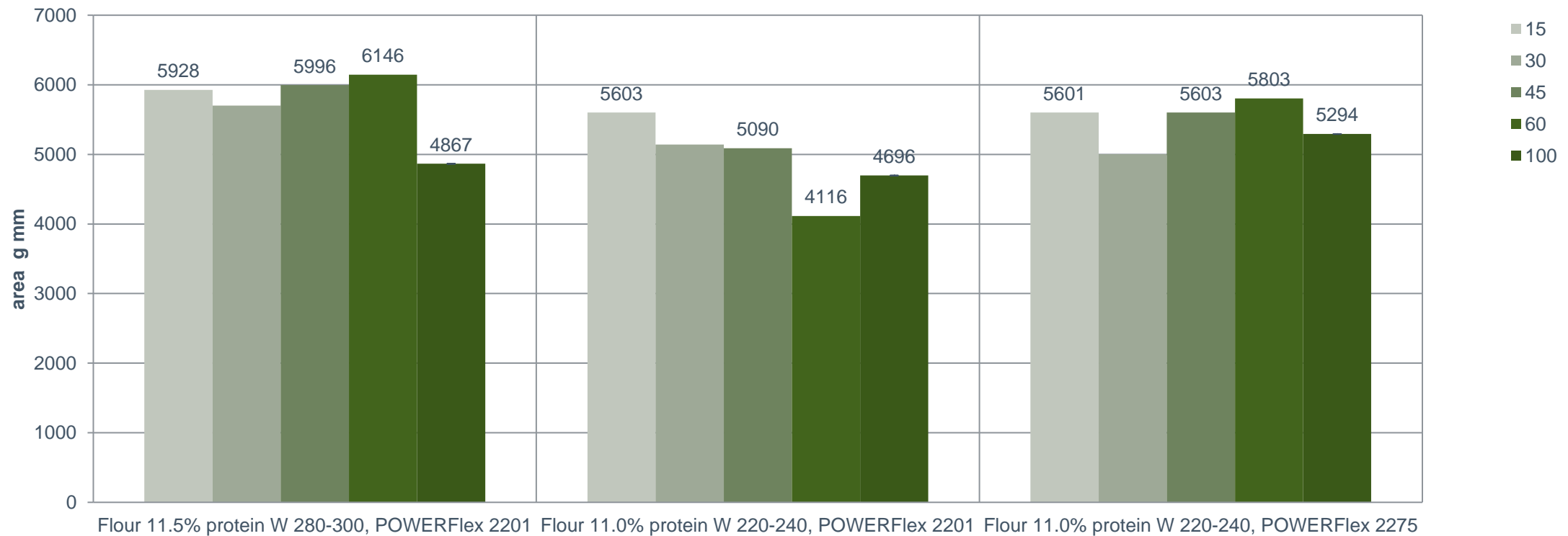


Sustained improvement in
extensibility through shelf-life

POWERFLEX® 2275 NEW HIGH-PERFORMANCE SOLUTION

Shelf-life: Texture Analyser data

Physical work to the break point of tortilla during shelf life



Reference high quality flour



Slight drop



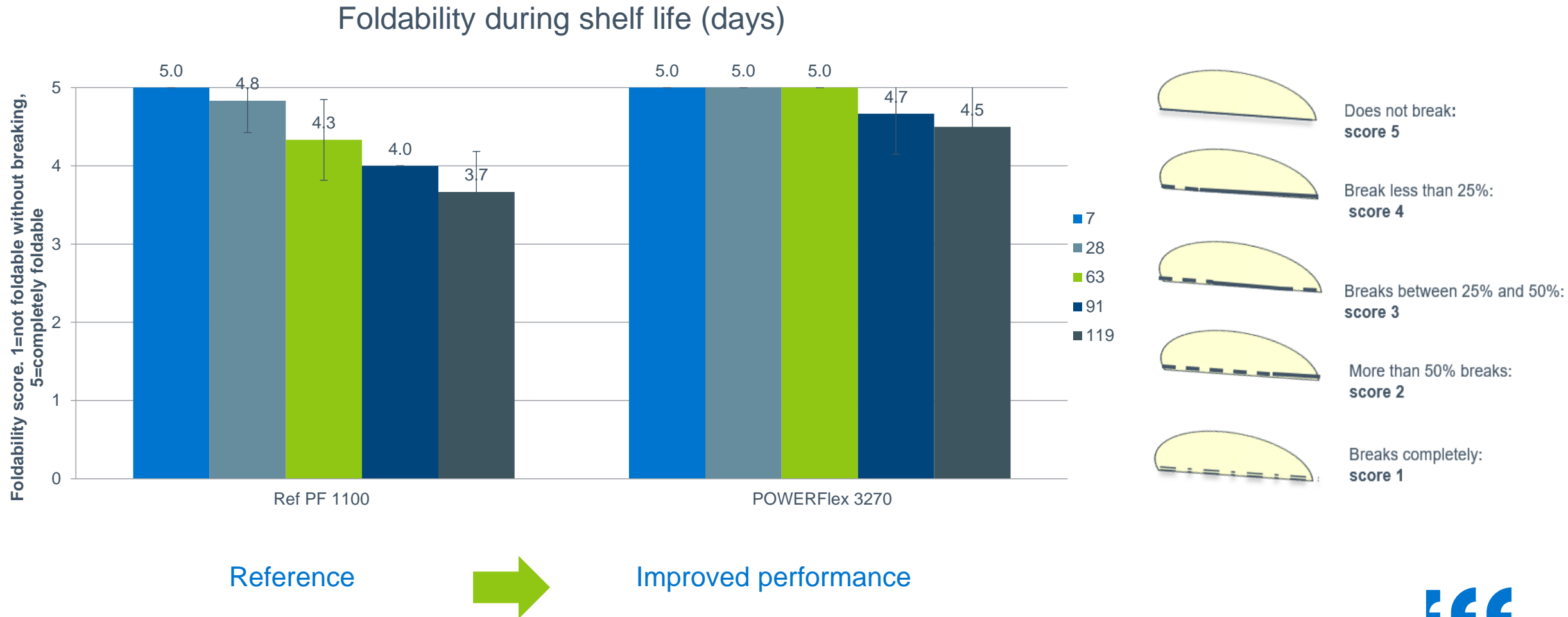
No particular changes as expected

VARIATION OF HYDROCOLLOID OPTIONS

POWERFlex® 3270

(distilled monoglyceride, citric acid, guar,
enzymes)

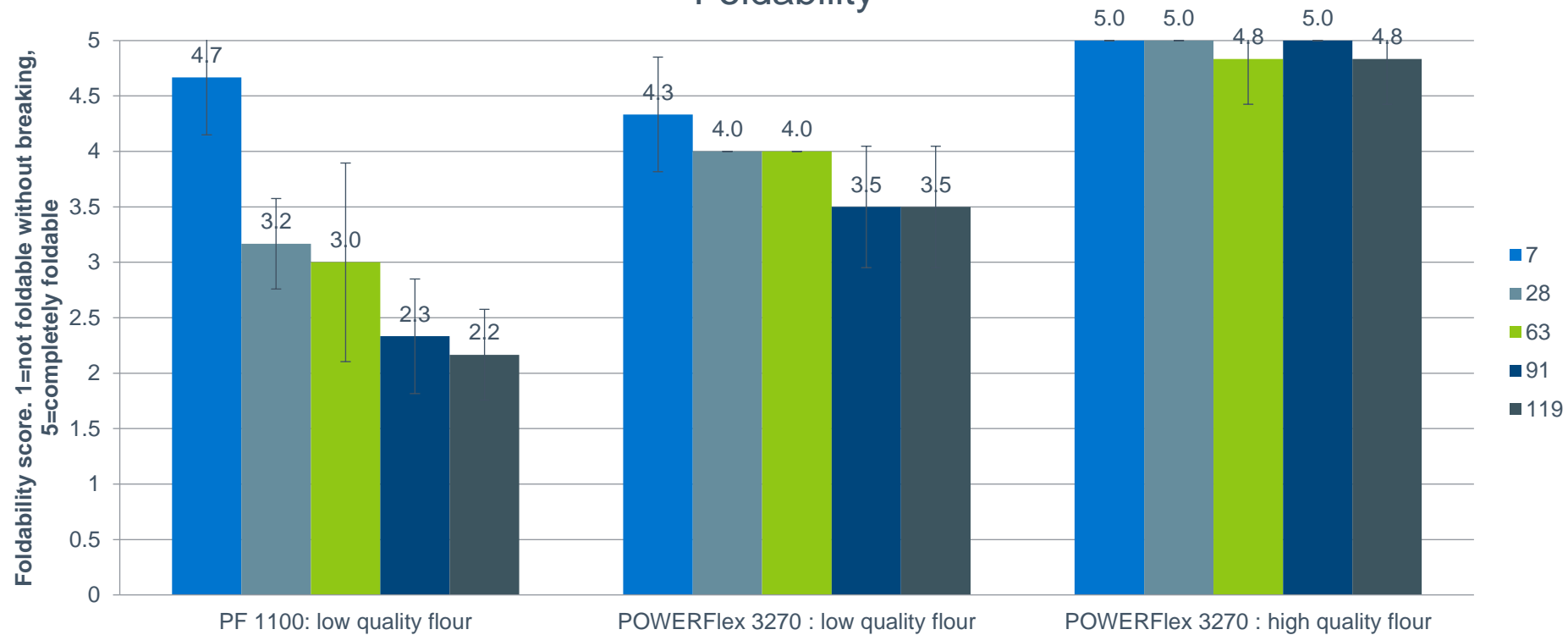
PERFORMANCE IN SHELF-LIFE IN STANDARD FLOUR



IMPROVED PERFORMANCE ALSO IN LOW QUALITY FLOUR

Low quality flour W 150
High quality flour W 280-300

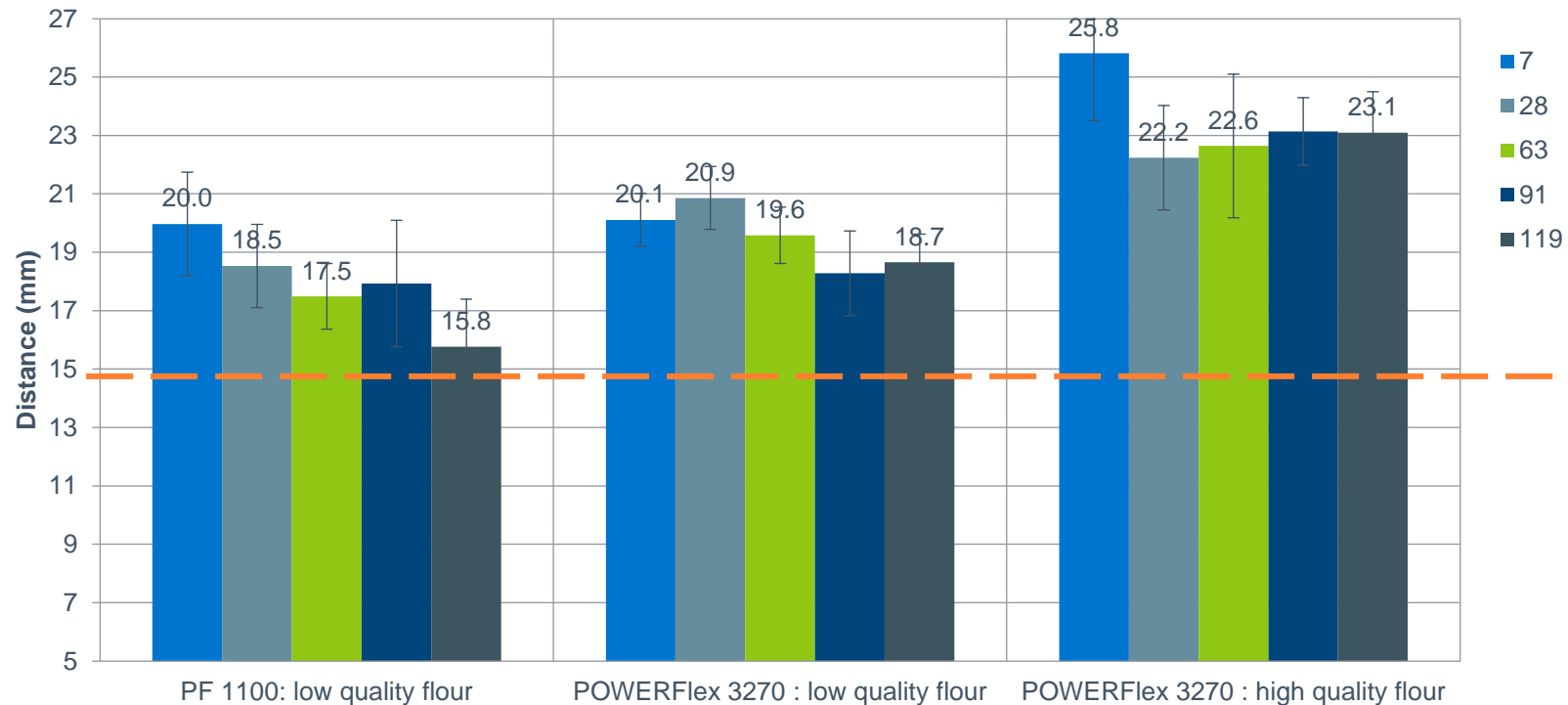
Foldability



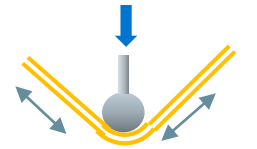
IMPROVED PERFORMANCE:

Texture Analyser data

Tortilla Extensibility over shelf life (days)



Low quality flour W 150
High quality flour W 280-300



Threshold
acceptability

Reference



Improved performance

SUMMARY

- **POWERFlex® 2201** standard softness module
- **POWERFlex® 2208** version with strength components
- **POWERFlex® 2275 NEW** sustained freshness during shelf-life

Declaration non-palm

- Distilled monoglyceride
- Citric acid
- Xanthan
- Enzyme preparation

POWERFlex® 3270


NEW prolonged softness with more bite and tenacity, sustained freshness during shelf life

Declaration non-palm

- Distilled monoglyceride
- Citric acid
- Guar Gum
- Enzyme preparation



OVERALL CONCLUSION



In hot pressed wheat tortilla the physical aspects of fresh-keeping are more directly affected by structural aspects (strength) than other fermented bakery products

Wheat tortilla require a dedicated approach to the design of improvers

IFF has expanded the tortilla toolbox for new development and supply chains challenges



Capability in tortilla and flatbreads

- **Leading supplier to the tortilla industry with POWERFlex[®] systems and enzyme complexes.**
- **Strong and differentiated functionality basis, single enzymes, emulsifiers, hydrocolloids, fibres, coated acids and specialised fats.**
- **Exceptional pilot plant facilities for tortilla and some other flatbreads**
- **Capacity to innovate and create new solutions for customers and the operations to implement new blends and systems.**
- **Good IP coverage that allowed to enter the tortilla market and defend the position for more than 10 years**



**GREAT SAMPLES FOR
TASTING AVAILABLE AT
THE TABLE TOP**

**EXAMPLE POWERFLEX® 2208
EXAMPLE POWERFLEX® 2275
EXAMPLE POWERFLEX® 3270**

A person wearing a white long-sleeved shirt and a blue apron is shown from the chest down, shaking a large amount of white powder from their hands. The powder is captured in mid-air, creating a dynamic, cloud-like effect. The background is dark and out of focus. On the left side of the image, there is a large, semi-transparent blue circle that partially overlaps the person's arm and the powder. The text 'THANK YOU FOR YOUR ATTENTION' is written in white, bold, sans-serif capital letters across this blue circle.

**THANK YOU FOR
YOUR
ATTENTION**

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