

# THE JOURNEY FOR A LABEL FRIENDLY TORTILLA



## THE USE OF FERMENTATE IN TORTILLA

NIC FRANCIOSI, IFF NOURISH

# OPENING PERSPECTIVE ON BAKERY TRENDS

While bakery market is dominated with flour quality and raw material supply challenges, consumers are still asking for more tasty and indulgent bakery goods while Health and Sustainability trends are considered through a broader perspective



AFFORDABILITY

HEALTH  
&  
SUSTAINABILITY

TASTE  
&  
INDULGENCE

**In the pursuit of conveying a healthier and accessible appeal, bread producers are therefore cleaning up their recipes**



**Interest in world cuisine as well as versatile and affordable cooking ingredients**



**+4.5% new tortilla & flatbread launches per year with label friendly claim**

**+18% ethical & environmental claims**

**+5% natural claims**



**Travel with senses**

**Specific cultural heritage**

**Endless opportunities for usage extensions unleashing consumers creativity**



# SUMMARY

Overview of tortilla  
additives and  
**POWERFLEX® Clean:**

**FERM TRITICUM**  
A new wheat flour  
fermentate

IFF range for tortilla

# JOURNEY FOR LABEL FRIENDLY TORTILLA

				Classic recipe Till early '00	POWERFLEX® 2201, 2206, 2208	POWERFLEX® 1100 NP	POWERFLEX® CLEAN
Raising Agent	Sodium Bicarbonate	E500	crumb structure, translucency	●	●	●	●
	Phosphates	E450 (i)	neutralisation, aeration, aspect	●			
pH Corrector	Citric Acid	E330	pH correction	●	●	●	●
	Malic Acid	E296	pH correction	●			
Aw Control	Glycerol	E422	Aw reduction, plasticizer	●	●	●	●
Preservatives	Potassium Sorbate	E202	microbial control	●			
	Calcium Propionate	E282	microbial control	●	●	●	●
Emulsifiers	Distilled Monoglycerides	E471	freshness, adhesion, processability	●	●	●	
	DATEM	E472e	dough strength, processability	●			
Hydrocolloids	CMC	E466	adhesion, strength, flexibility	●			
	Guar Gum	E412	bite tenacity, strength	●			
	Xanthan Gum	E415	bite, strength, processability		●		
Process aids	Enzyme	no	Freshness, processability	●	✓	✓	✓
<b>TOTAL E-numbers</b>				<b>8-12</b>	<b>6</b>	<b>5-4</b>	<b>4-3</b> ←



Optional, depending on clean room and packaging methods and facilities



Recipe rationalization				Classic EU recipe	Simplified recipe
Raising Agent	Sodium Bicarbonate	E500	crumb structure, translucency	●	●
	Phosphates	E450 (i)	neutralisation, aeration, aspect	●	
pH Corrector	Citric Acid	E330	pH correction	●	●
	Malic Acid	E296	pH correction	●	
Aw Control	Glycerol	E422	Aw reduction, plasticizer	●	●
Preservatives	Potassium Sorbate	E202	microbial control	●	●
	Calcium Propionate	E282	microbial control	●	
Emulsifiers	Distilled Monoglycerides	E471	freshness, adhesion, processability	●	●
	DATEM	E472e	dough strength, processability	●	
Stabilizers	CMC	E466	adhesion, strength, flexibility	●	●
	Guar Gum	E412	bite tenacity, strength	●	
	Xanthan Gum	E415	bite, strength, processability		
Relaxants	L cysteine or sulphites	E920	Pressability, diameter	●	
Process aids	Enzyme	no	Freshness, processability	●	✓
<b>TOTAL E-numbers</b>				<b>8-12</b>	<b>6</b>

● Optional

# MOVING ONE STEP FURTHER WITH FERM TRITICUM

Towards a cleaner label in long life ambient tortilla				Classic recipe Mid-'80s to '05	POWERFLEX® 2201/2206/2208 + FERM TRITICUM	POWERFLEX® 1100 NP + FERM TRITICUM	POWERFLEX® CLEAN + FERM TRITICUM
Raising Agent	Sodium Bicarbonate	E500	crumb structure, translucency	●	●	●	●
	Phosphates	E450 (i)	neutralisation, aeration, aspect	●			
pH Corrector	Citric Acid	E330	pH correction	●	●	●	●
	Malic Acid	E296	pH correction	●			
Aw Control	Glycerol	E422	Aw reduction, plasticizer	●	●	●	●
Preservatives	Potassium Sorbate	E202	microbial control	●			
	Calcium Propionate	E282	microbial control	●			
Emulsifiers	Distilled Monoglycerides	E471	freshness, adhesion, processability	●	●	●	
	DATEM	E472e	dough strength, processability	●			
Hydrocolloids	CMC	E466	adhesion, strength, flexibility	●			
	Guar Gum	E412	bite tenacity, strength	●			
	Xanthan Gum	E415	bite, strength, processability		●		
Process aids	Enzyme	no	Freshness, processability	●	✓	✓	✓
<b>TOTAL E-numbers</b>				<b>8-12</b>	<b>5</b>	<b>4</b>	<b>3</b>

● Optional

# REMOVING MONOGLYCERIDES FROM AMBIENT TORTILLA: POWERFLEX CLEAN

## Technical challenges

Background: Conversion to local vegetable oils, such as rapeseed or sunflower, and elimination of emulsifiers



Decrease in freshness and foldability during the shelf life



Increased tendency of adhesion among tortilla in the pack and damage when tortilla are pulled apart by consumers



Fail to release from prover baskets and increased risk to jam the lines during maintenance stops







# POWERFLEX® CLEAN 1001 NP

Leading the way to tortilla formulations without emulsifiers or stabilisers



## Solution

- A complete POWERFLEX® solution delivering foldability, flexibility and control of adhesion issues
- pH regulation: modularity with Protex



## Overcome shelf life challenges

- Proven over medium and long shelf life to provide freshness and flexibility and limit adhesion damage



## Overcome production challenges

- Same processability tolerance as the usual POWERFLEX® systems containing stabilizers and emulsifiers.



## Speed to market

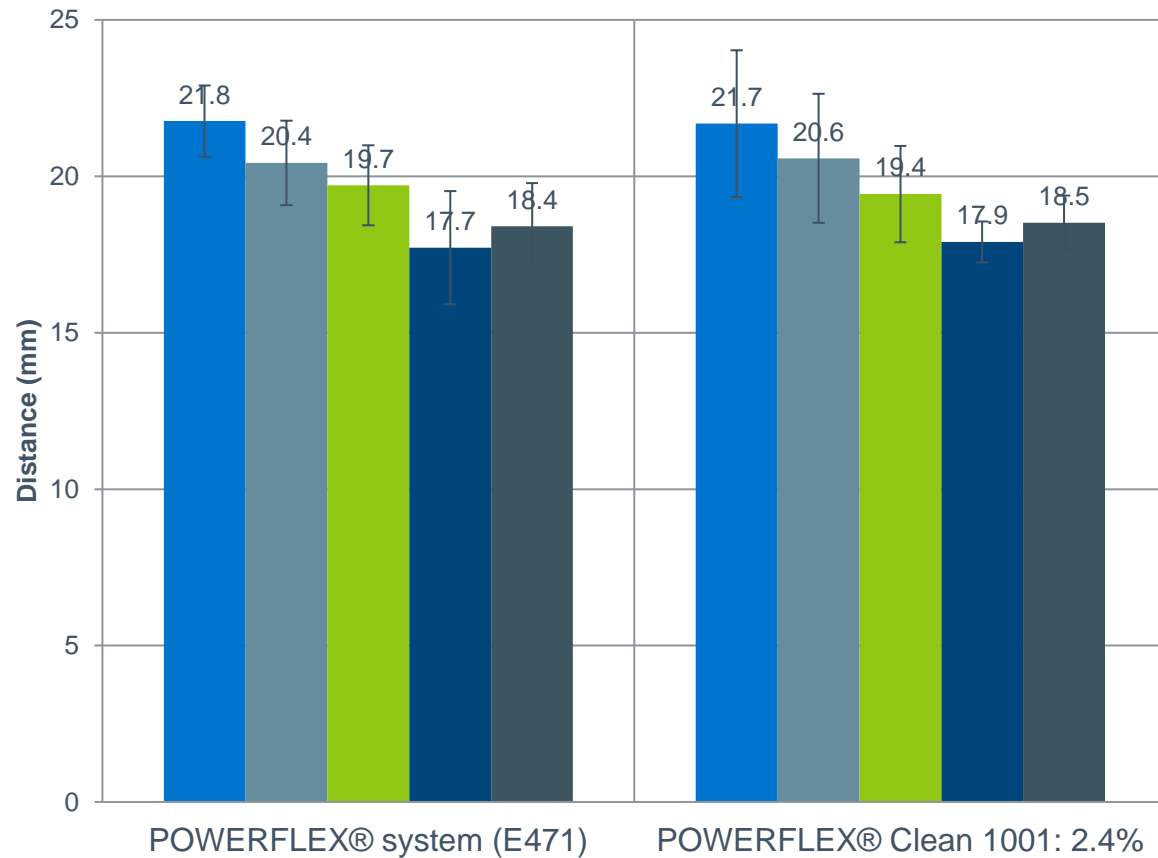
- Launch new products to secure or grow market share through portfolio expansion or range extension



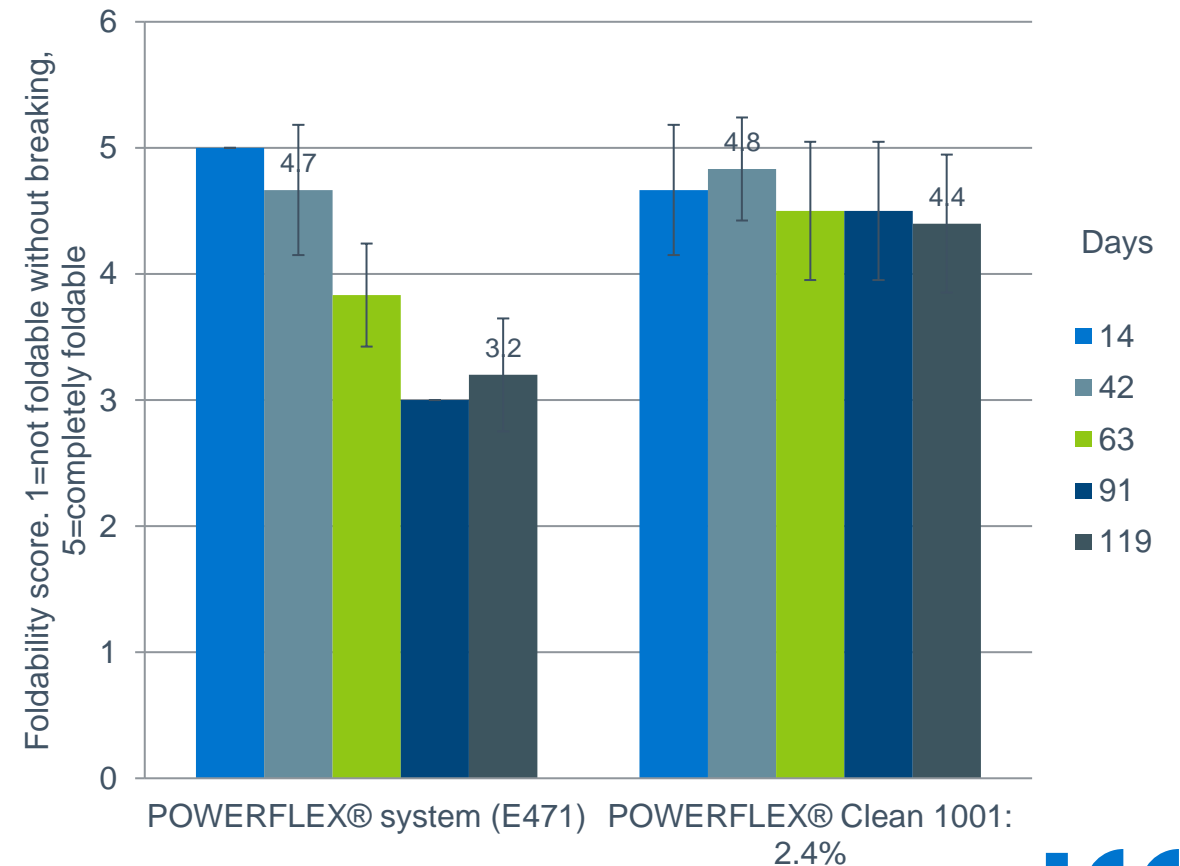
# POWERFLEX® CLEAN 1001 NP

Ensures Superior Fresh keeping and Foldability over a long shelf life

Tortilla Extensibility with TA

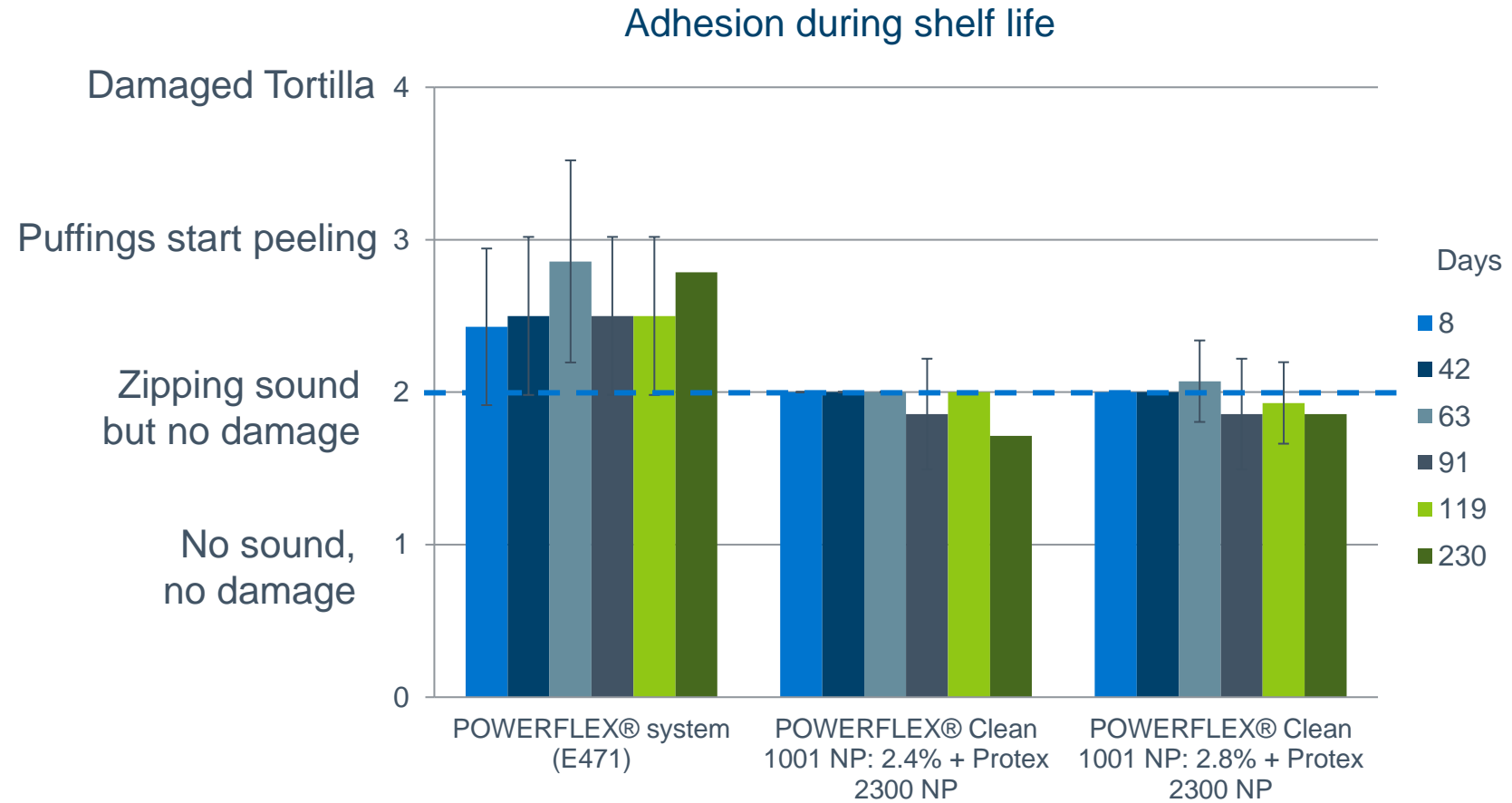


Foldability



# POWERFLEX® CLEAN 1001 NP

Allows a good adhesion damage control over a long life



# TORTILLA ADHESION VIDEOS

Adhesion damage at 15 days

**Positive reference  
with distilled monoglyceride**

**Negative reference  
monoglyceride simply removed**

**POWERFlex® Clean 1001 NP**



# POWERFLEX<sup>®</sup> CLEAN

For clean label tortilla without added hydrocolloids and monoglycerides

**POWERFlex<sup>®</sup> Clean 1001 NP for long life  
Dosage 2.2 -2.8%. Additional grades  
available on request**

**Contact IFF Specialist  
for application advice**



# FERM TRITICUM

Label friendly wheat flour fermentate



iff



## FERM range

Multifunctional label friendly ingredients which improve the flavor & maintain the freshness

40 years ago, IFF pioneered the development of new effective fermentates for the food industry.

By fermenting basic foods like milk, or ingredients like corn sugar or wheat with traditional starter cultures, FERM solutions provide improved sensory properties that have attracted food manufacturers looking for innovative consumer-friendly solutions.

FERM product range provides an easy-to-use, label-friendly way to improve the taste of a wide range of food and beverage applications and to maintain their freshness during shelf-life.

# FOR A NEW LEVEL OF YOUR TORTILLAS

## FERM TRITICUM

Label-friendly wheat flour fermentate that improves and maintains product sensory quality all along the shelf life, thus keeping customer loyalty, increasing market share, and reducing costly waste.



A top-down view of a stack of several round, light-colored tortillas with some golden-brown spots, resting in a dark, woven basket. A wooden rolling pin is visible on the left side, and a pile of white flour is scattered on the surface below it. A piece of reddish-brown fabric is draped over the top left corner of the basket.

# DESIGNED TO MEET THE NEEDS OF CONSUMERS & PRODUCERS

Great tortilla need great ingredients to deliver uncompromised quality that consumers reach out to – every day.

We closely monitor **consumer insights & market trends**, and carefully listen to the **voice of the tortilla producers**.

FERM TRITICUM is our answer to the following key identified needs:

- Improved flavor
- Maintained freshness throughout the shelf life
- Friendly label
- Quality, transparency & ease of use
- Security of supply
- Sustainability

# PRODUCT INFORMATION

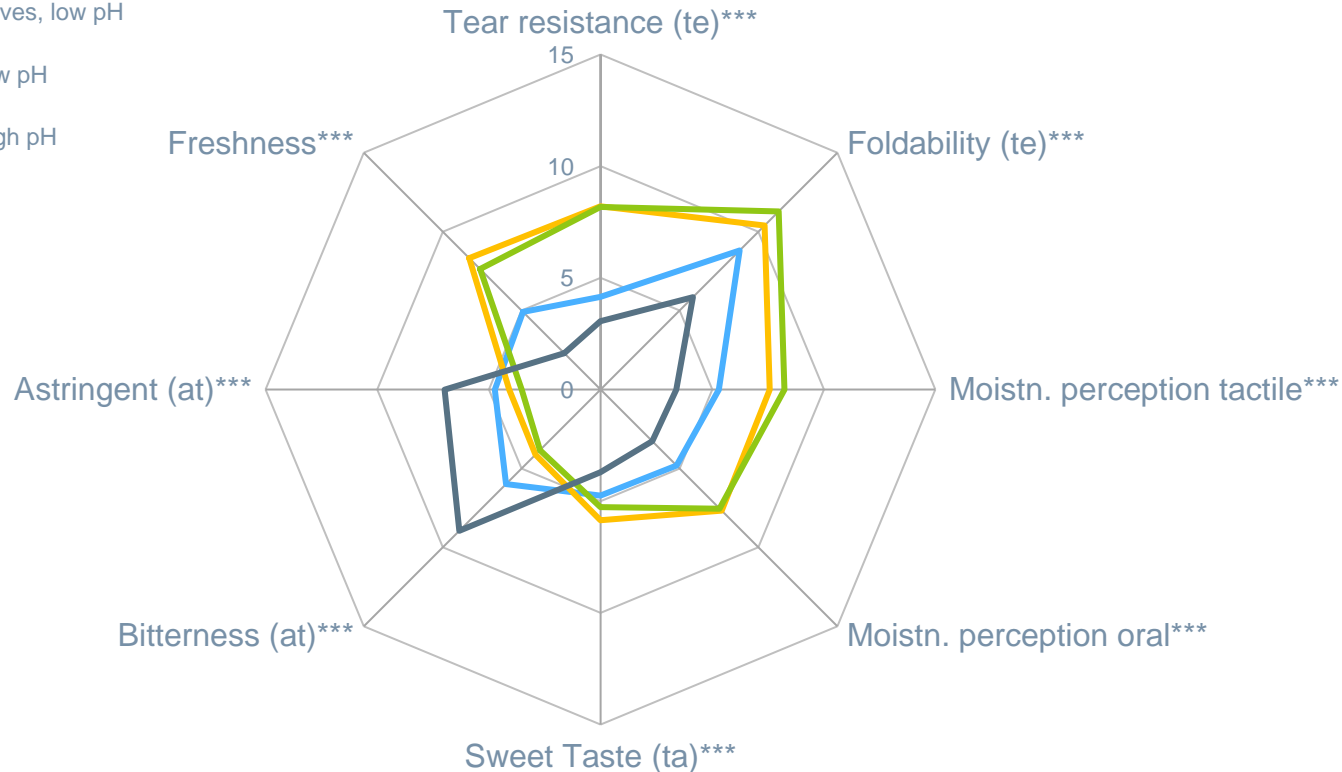
<b>Product name</b>	<b>FERM TRITICUM 20kg</b>
<b>Product composition</b>	Cultured Wheat Flour
<b>Product format</b>	Off-white to tan powder
<b>Certifications</b>	Kosher pareve, Halal
<b>Recommended dosage</b>	0.5 % - 1.0 % of flour weight.
<b>SAP code</b>	61040802 (20kg bag)
<b>SAP Code sampling</b>	61040803 from Grindsted (Plant 401)
<b>Storage location</b>	Rotterdam, Netherlands
<b>Production site</b>	Cedar Rapids, Origin USA



# OVERALL PERCEPTION OF TEXTURAL AND TASTE ATTRIBUTES

## FERM TRITICUM and POWERFLEX Clean

- POWERFLEX with E471, preservatives, low pH
- 1% FERM, POWERFLEX Clean, low pH
- 1% FERM, POWERFLEX Clean, high pH
- Ref, E471, preservatives, low pH



Significance level  
 (\*) = 10%  
 \* = 5%  
 \*\* = 1%  
 \*\*\* = 0,1%

External panel

✓ The combination of POWERFLEX and FERM TRITICUM offers overall a superior sensory profile.

✓ pH regulation with Protex 2300 NP

Low pH: 5.2-5.4

High pH: 5.6-5.8

# TASTE AND ASPECT

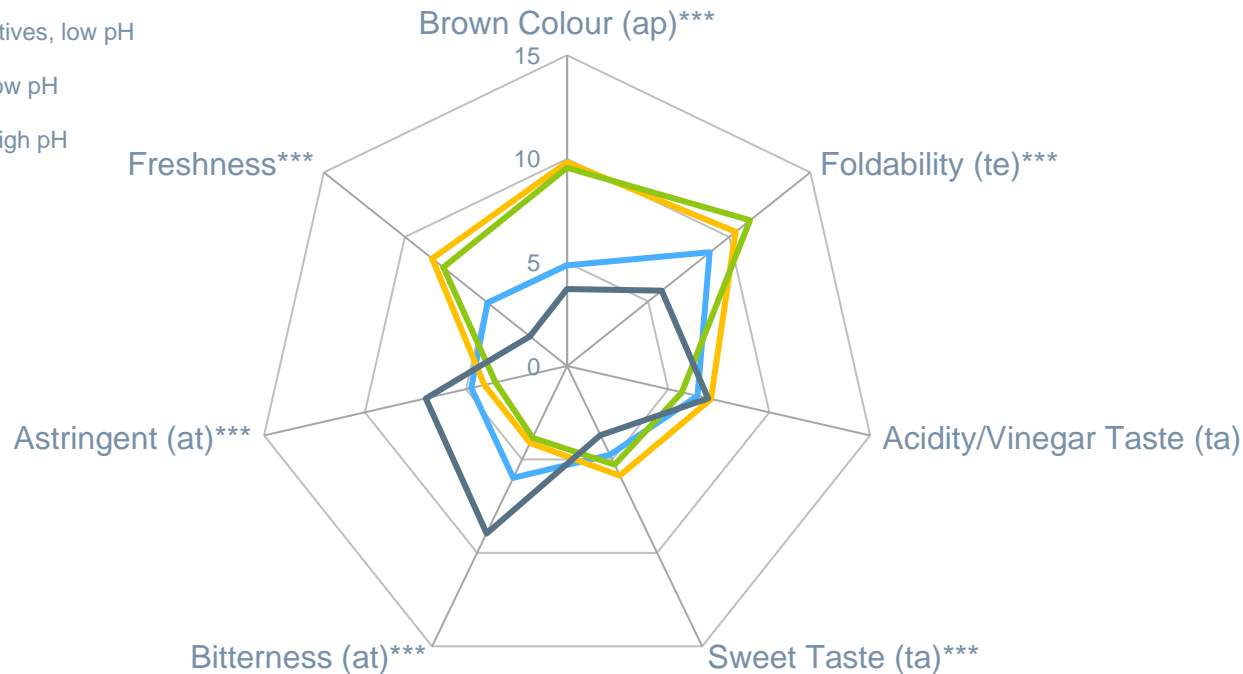
## FERM TRITICUM with Protex and POWERFLEX Clean

- ✓ FERM modifies the flavor profile of wheat tortilla
- ✓ Improved taste attributes compared to preservatives

- ✓ pH regulation with Protex 2300 NP

Low pH: 5.2-5.4

High pH: 5.6-5.8

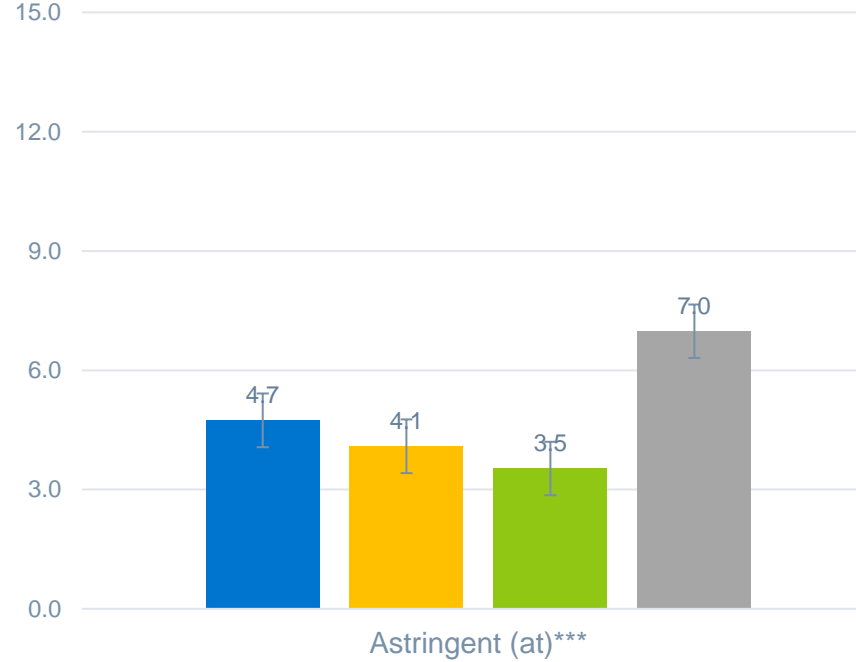
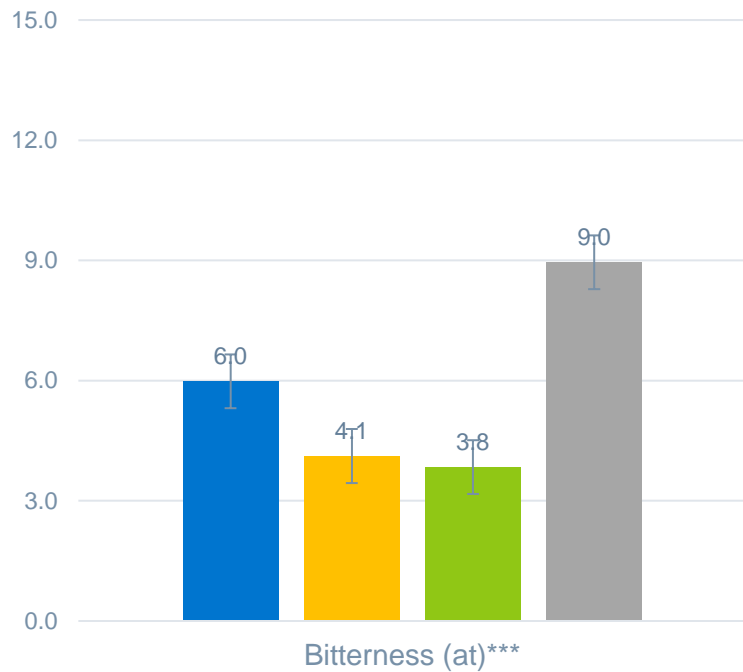


Significance level  
 (\*) = 10%  
 \* = 5%  
 \*\* = 1%  
 \*\*\* = 0,1%

External panel

# TASTE ATTRIBUTES DETAILS:

## Bitterness and astringency after taste



- POWERFLEX with E471, preservatives, low pH
- 1% FERM, POWERFLEX Clean, low pH
- 1% FERM, POWERFLEX Clean, high pH
- Ref, E471, preservatives, low pH

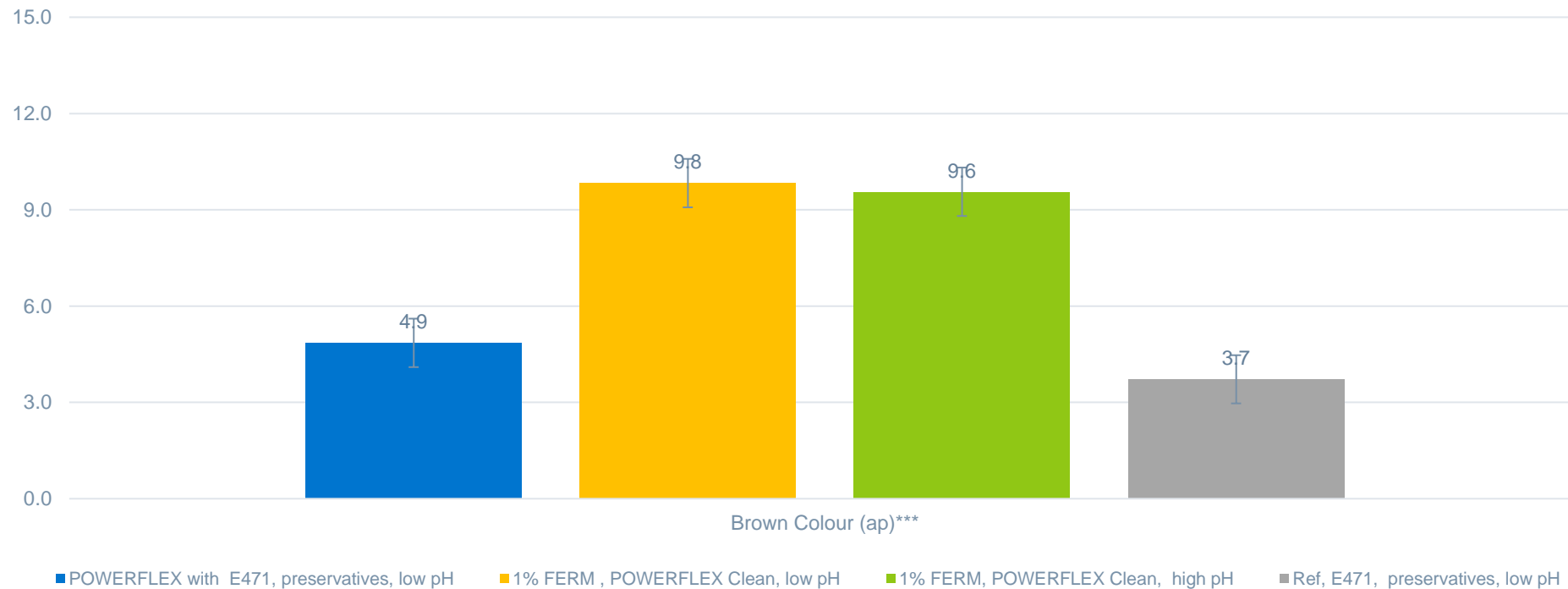
Low pH = 5.2-5.4  
High pH = 5.6-5.8

Significant 0.001%

# COLOUR EFFECT

## Brown colour detail

- ✓ FERM TRITICUM imparts a more brownish hue to the tortilla which was detectable to the panellists



# FERM TRITICUM

## SAFETY AND SPOILAGE CONTROL IN TORTILLA

- Mold-free shelf life in modified atmosphere packaging (MAP)
- Examples of challenge test (i.e. *A. Niger*)
  - With air exposure: ( $O_2$ )
  - in MAP:  $O_2 < 2\%$  (data pending)



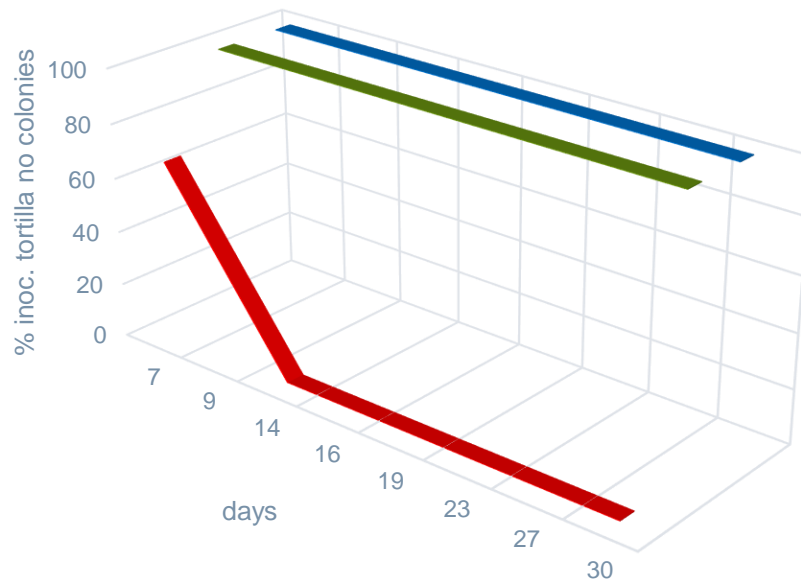
# Antimycotic effect of FERM TRITICUM

## CHALLENGE TEST WITH *A. Niger*

Example of challenge test with *A. niger*

- ✓ FERM TRITICUM shown to inhibit mould growth
- ✓ Inhibited mould development in challenge test in presence of O<sub>2</sub>
- ✓ pH controlled with Protex 2300 NP

Tortilla plates without colonies growth after inoculation with *A. Niger* (air exposure)



- reference no preservative
- T. FERM 1.0% ; POWERFlex Clean and Protex pH 5.4
- reference preservative 0.3% Ca Pro 0.3% K Sorb

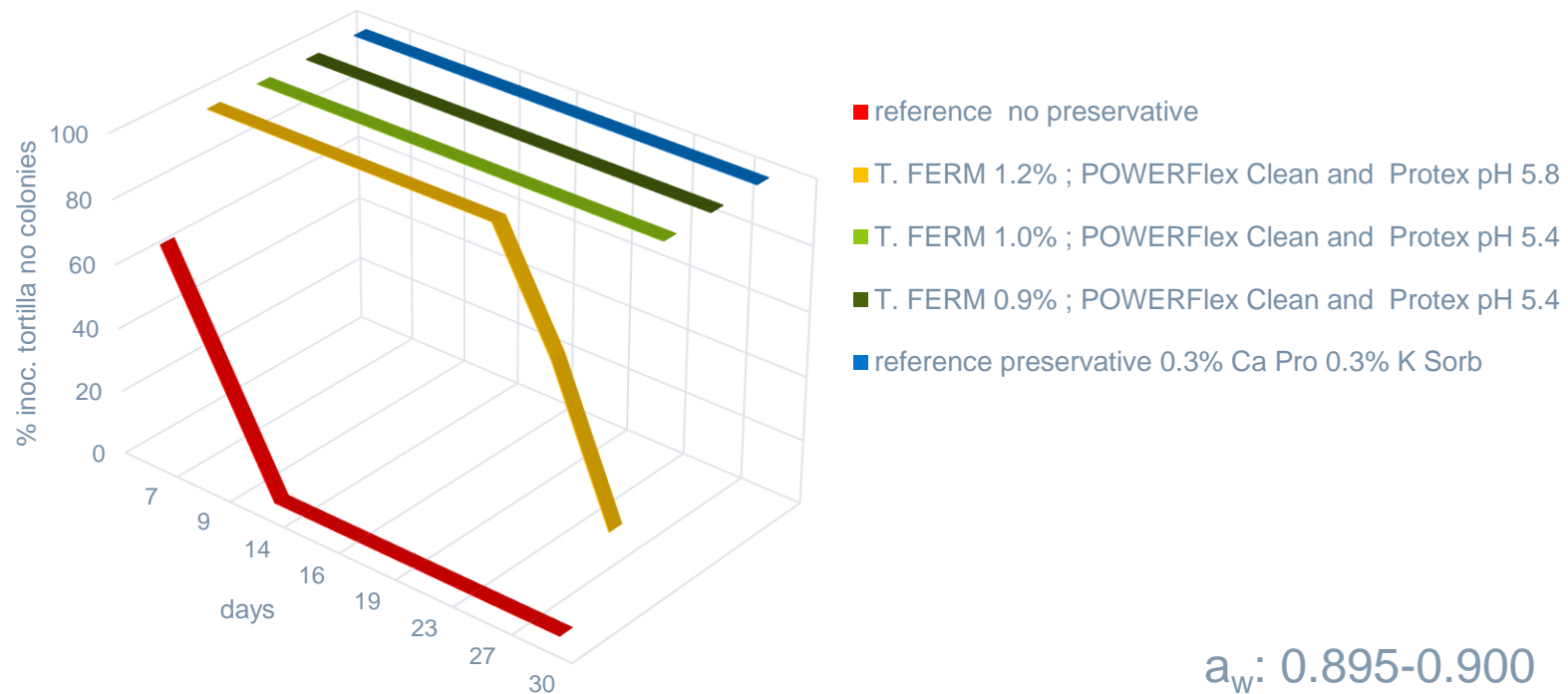
$a_w$ : 0.895-0.900



# CHALLENGE TESTS WITH *A. Niger*

## Tortilla pH versus FERM TRITICUM dosage

Tortilla plates without colonies growth after inoculation with *A. Niger* (air exposure)



$a_w$ : 0.895-0.900

9 plates included in the study

Example of challenge test with *A. niger*

- ✓ FERM TRITICUM shown to inhibit mould growth
- ✓ Inhibited mould development in challenge test in presence of O<sub>2</sub>
- ✓ pH controlled with Protex 2300 NP

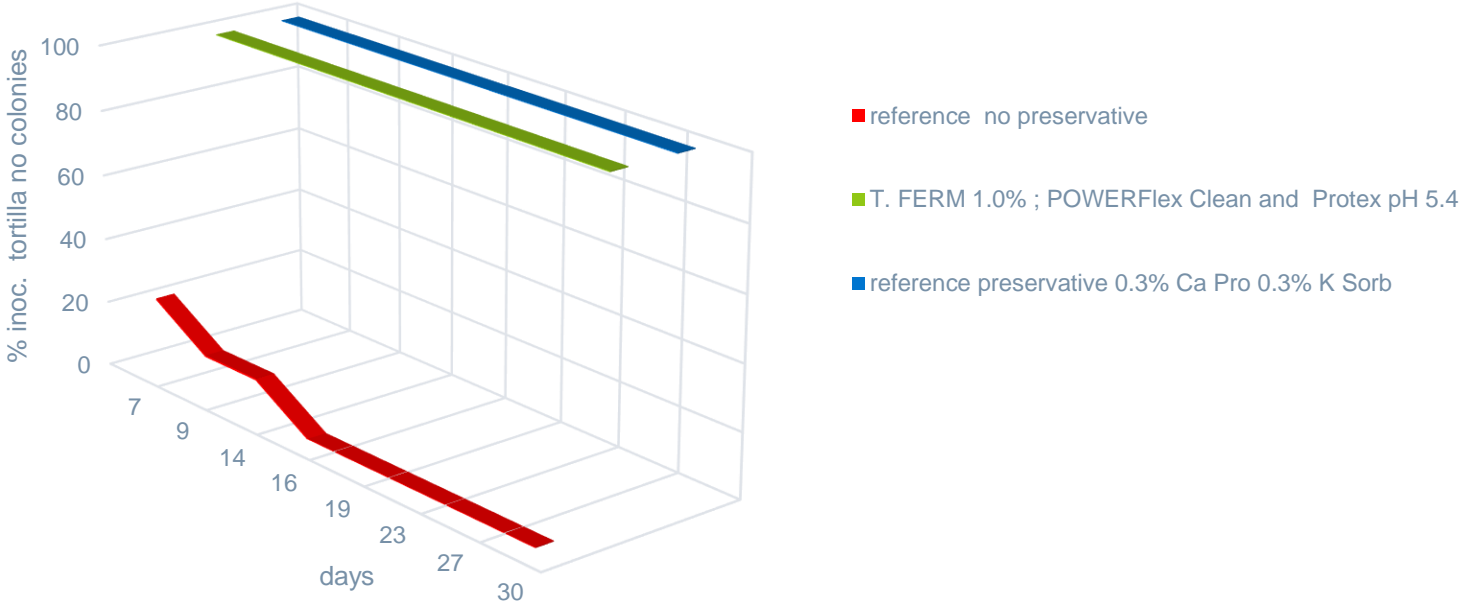
# Antimycotic effect of FERM TRITICUM

## CHALLENGE TESTS WITH *P. brevicompactum*

### Example of challenge test with

- P. brevicompactum**
- ✓ FERM TRITICUM shown to inhibit mould growth
- ✓ Inhibited mould development in challenge test in presence of O<sub>2</sub>
- ✓ pH controlled with Protex 2300

Tortilla plates without colonies growth after inoculation with *P. Brevicompactum* (air exposure)



$a_w$ : 0.895-0.900

9 plates included in the study

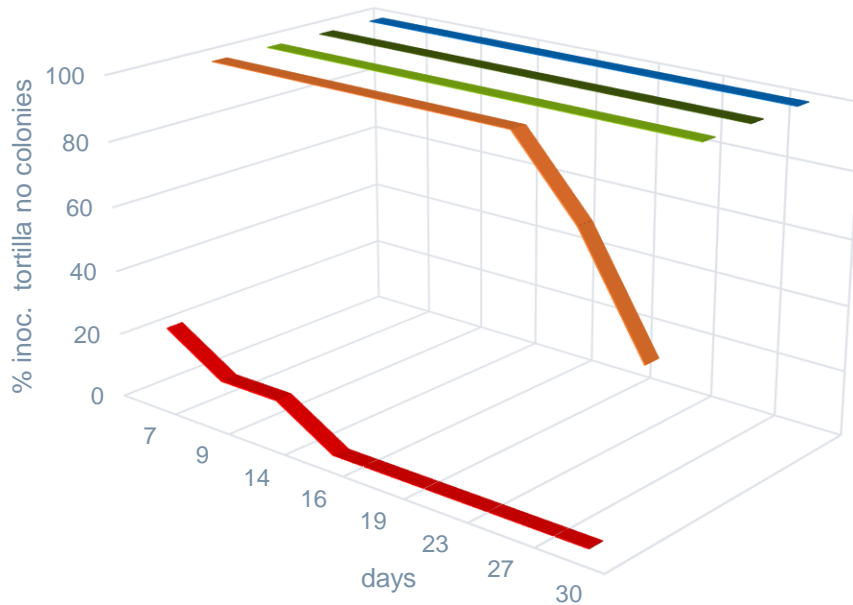


# CHALLENGE TESTS WITH *P. brevicompactum*

## Tortilla pH vs FERM TRITICUM dosage

- ✓ It appears more effective to reduce pH than to increase the fermentate dosage

Tortilla plates without colonies growth after inoculation with *P. brevicompactum* (air exposure)



- reference no preservative
- T. FERM 1.2% ; POWERFlex Clean and Protex pH 5.8
- T. FERM 1.0% ; POWERFlex Clean and Protex pH 5.4
- T. FERM 0.9% ; POWERFlex Clean and Protex pH 5.4
- reference preservative 0.3% Ca Pro 0.3% K Sorb

$a_w$ : 0.895-0.900

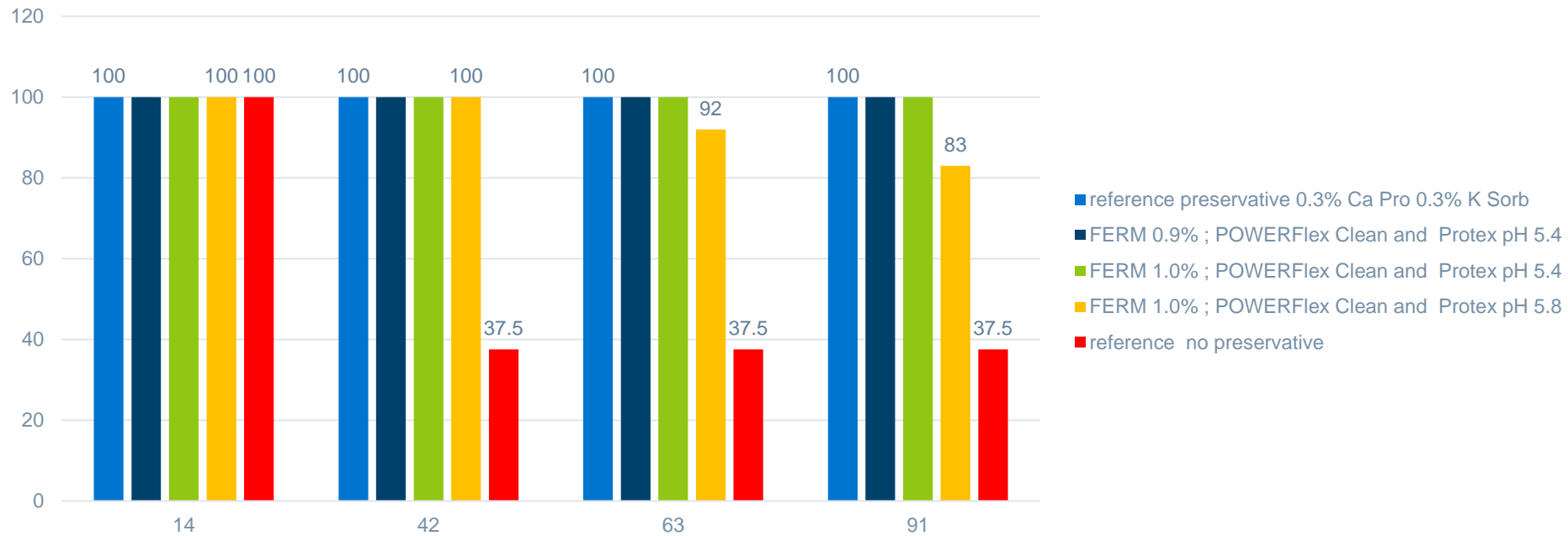
- ✓ pH controlled with Protex 2300

# VISUAL MOULDS DURING SHELF LIFE

Tortilla packed in Modified Atmosphere Packaging

✓ No mould observed in samples with FERM TRITICUM and preservative in 90 days

✓ Gas mixture 80:20 N<sub>2</sub> / O<sub>2</sub>



# PHYSICAL SHELF LIFE TEST

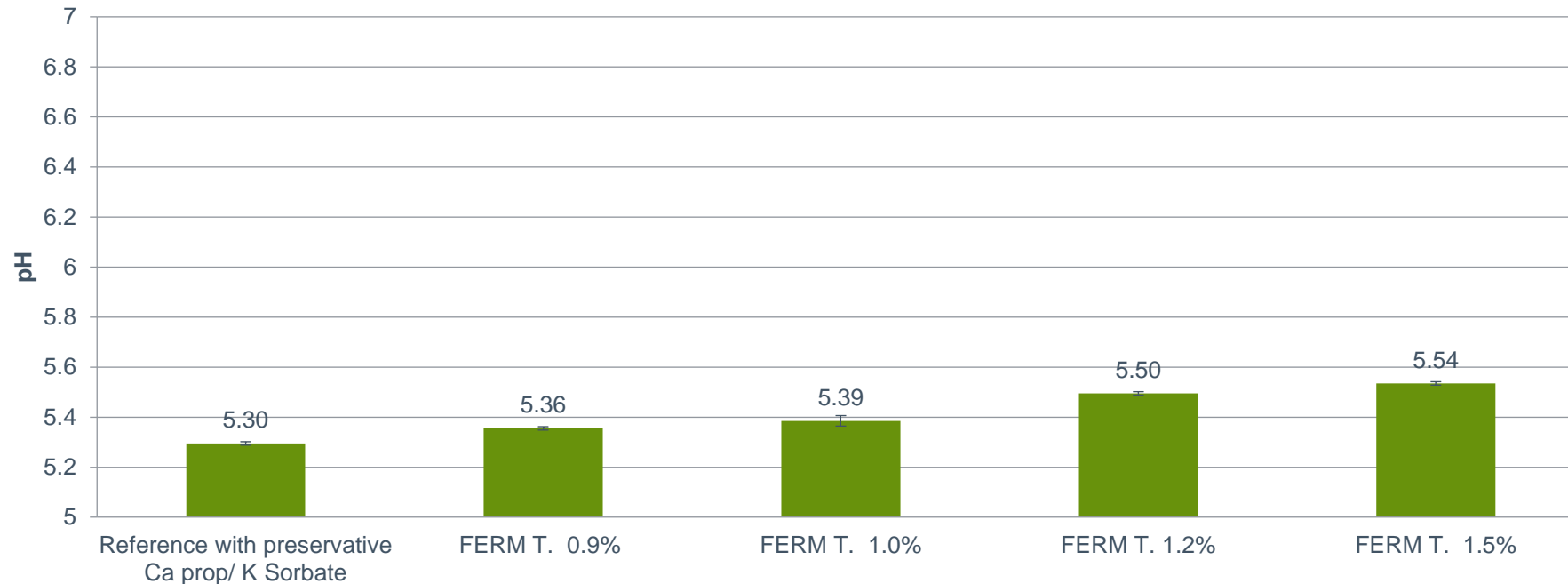


# FERM TRITICUM

## Effect on the final tortilla pH

- ✓ As the FERM TRITICUM dosage is increased tortilla pH shows a slight increase in pH
- ✓ Dose response conducted with the same level of acid in all trials

Tortilla pH: dose response



# TORTILLA SHELF LIFE TRIALS

## FERM in combination Protex 2300 and POWERFLEX Clean

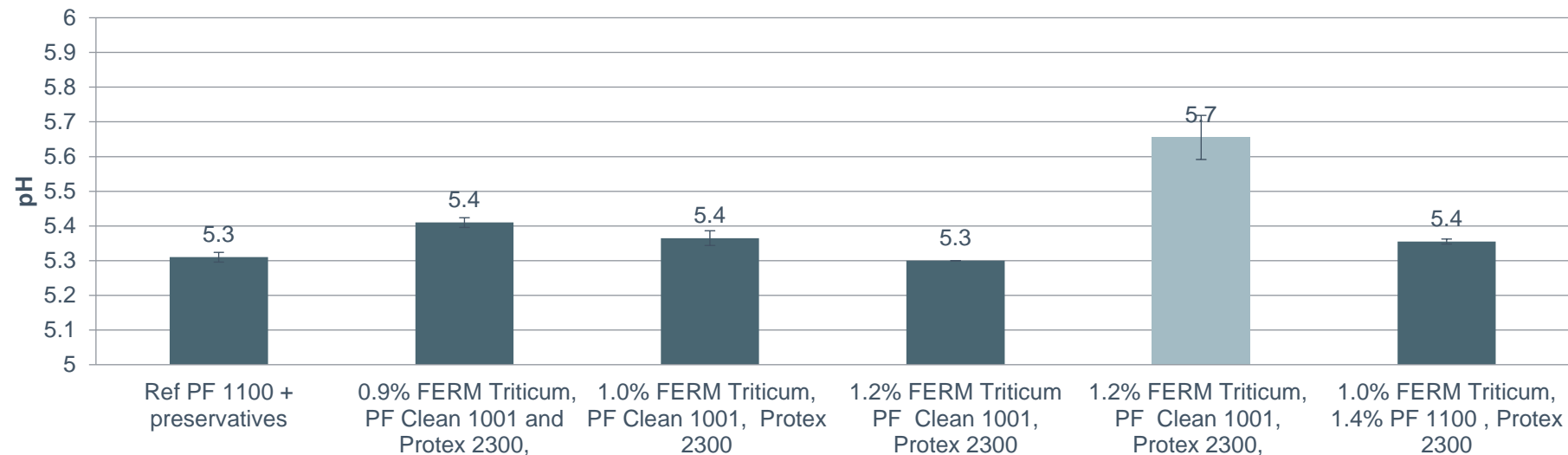
✓ pH effect compensated with Protex 2300 NP

✓ Targeting two pH levels:

Low 5.3-5.4

High 5.7-5.8

### Tortilla pH compensated with Protex

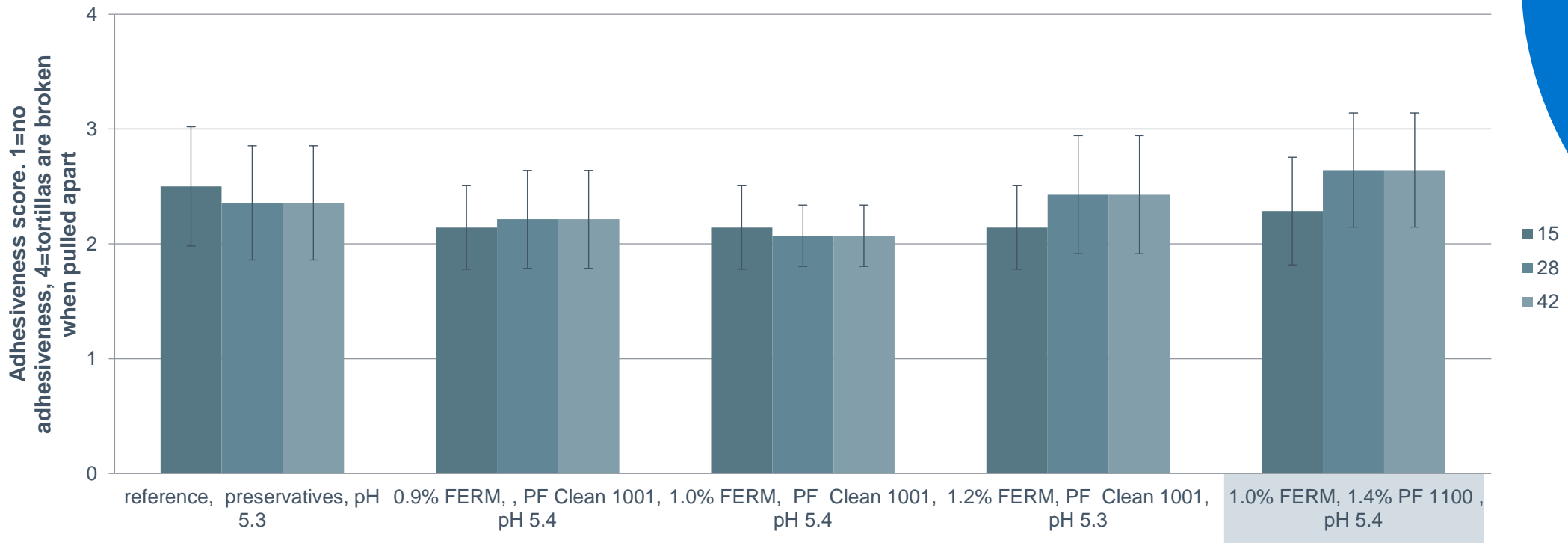


# SHELF LIFE TRIALS POWERFLEX CLEAN AND FERM TRITICUM

Effect on adhesion

best adhesion at  
1.0% fb of FERM  
TRITICUM

And  
POWERFLEX  
clean

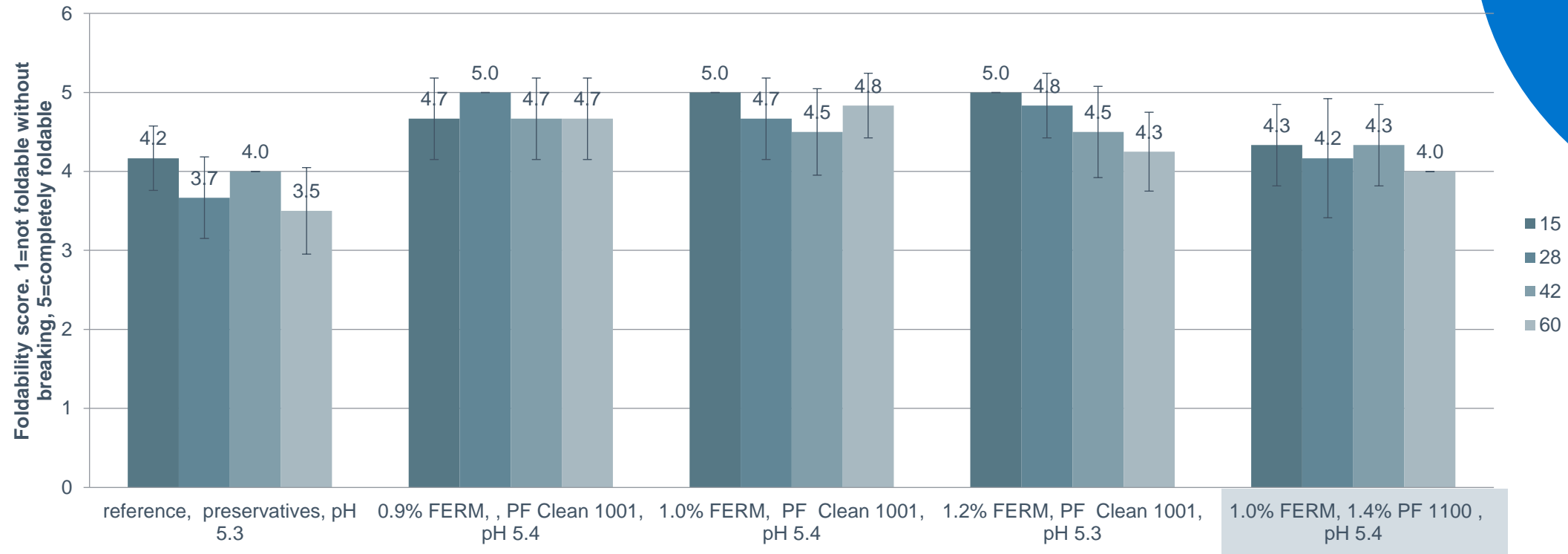




# SHELF LIFE TRIALS POWERFLEX CLEAN AND FERM TRITICUM

pH targets achieved with protex 2300 NP

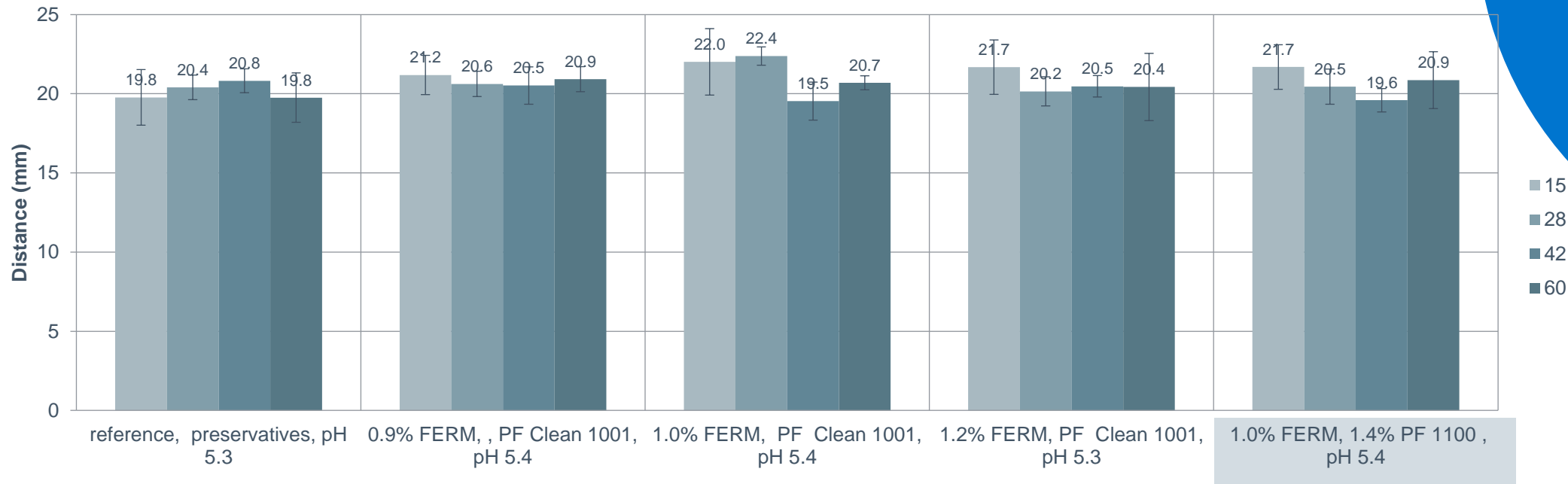
## Foldability during shelf life



# SHELF-LIFE TRIALS POWERFLEX CLEAN AND FERM TRITICUM

TA extensibility during shelf life

✓ No negative impact compared to reference with preservatives



# CONCLUSION

**The combination of FERM TRITICUM and POWERFLEX<sup>®</sup> Clean is a viable combination for a more natural and better tasting tortilla.**

**It is, for now, recommended to use Protex as top up to POWERFLEX<sup>®</sup> to achieve a pH ≤ 5.4, as part of a multi hurdle strategy for safety and spoilage control.**

# THE POWERFLEX® RANGE

A solution for each type of tortilla

**POWERFLEX® is a range of solutions providing improved process tolerance, improved product quality and longer shelf life.**

**The optimal combination of the active ingredients is a result of combining in depth understanding of each components functionality with long hands- on market experience.**



# THE RIGHT POWERFLEX® FOR DIFFERENT TORTILLA TYPES

## Ambient Wheat Tortilla

- **POWERFLEX® 2201**  
*Cost in Use, Versatility*
- **POWERFLEX® 3201**  
*Robustness, bite & texture*
- **POWERFLEX® 2208**  
*Wholemeal, tolerance, adhesion*
  
- **POWERFLEX® 6109**  
*Fresh keeping enzyme complex*

## Frozen Wheat Tortilla

- **POWERFLEX® 3202**  
*More gums, Neutral pH*

## Reduced E-number Tortilla

- **POWERFLEX® CLEAN 1001 NP**  
*No monoglycerides or stabilisers*
- **POWERFLEX® 1100 NP**  
*No gums, Neutral pH*

## Gluten-Free Tortilla

- **POWERFLEX® GF 4220 NP**

# OTHER TOOLS FOR TORTILLA

## PROTEX range

Various types of coated acid available for pH control as a top up of POWERFLEX systems

## POWERFLEX® enzyme complex

Range including different grade for different impact of dough properties

## POWERFLEX® Relax

Improved dough workability to reach larger diameter at a reduced press regime

Elimination of E numbers:

Sulfites E 221

L cysteine E 920



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