

Improve Rollability and Softness of Corn & Flour Tortillas

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Why is My Tortilla Breaking?

What is Staling?

- Retrogradation of starch, primarily amylopectin
- Begins after baking
- Increases at + 7°C and 7°C

What Causes Staling ?

- Starch retrogradation
- Moisture migration

Characteristics of Staling

- Crumbling
- Breaking and cracking
- Firmer or leathery texture





Starch Retrogradation



Starch starts as a crystalline structure, goes through the baking process, and gelatinizes. During cooling, starch branch chains reassociate.

Moisture Migration



Movement of moisture (vapor or liquid) from one area to another

Staling Prevention

Optimal Processing & Storage

Tools

- Emulsifiers (Mono & diglycerides, SSL)
- Gums (CMC, guar gum, xanthan gum)
- Moisture
- Shortening
- Enzymes



Optimal Processing & Storage

Baking

Packaging

Proper cooling
 Proper packaging

Storage

- Temperature stability
 Refrigeration speeds
 - up staling





- Have hydrophobic tail & hydrophilic head
- Interact with linear starch chains
- Make initial softness softer



- Heteropolysaccharides
 - Sources include seaweed, plant exudates, endosperm of certain plants
- Absorb & bind water
- Prevent water loss, extending shelf life

Enzymes



- Proteins that speed up chemical reactions
- Certain enzymes maintain softness
 - Amylases delay starch retrogradation
 - Phospholipases improve emulsifying properties
 - Xylanases act on arabinoxylans

Our Enzyme Solutions

Ingredient	Benefits	Products
Maltogenic Amylase	Improves texture, extends shelf life	SEBake Fresh Ultra ™
Phospholipase	Emulsifying properties mimic chemical emulsifiers	SEBake PF™
Proprietary Enzyme Blend	Emulsifying & moisture-binding properties	SEBake LO™
Xylanase	Modify gluten network, extend shelf life	SEBake AX™, SEBake FX™
Cellulase	Improve machinability for high-fiber tortillas	SEBake CLX™

High-Performing Maltogenic Amylase

Benefits

- Increases water binding
- Prolongs softness
- Maintains elasticity & resilience
- Extends shelf life by delaying staling
- Helps produce softer, superior-quality baked goods

Function

Weight And Annual Annua

High-Performing Maltogenic Amylase | SEBake Fresh Ultra™

SEBake Fresh Ultra[™]

Room Temperature Storage



Wheat Flour Tortillas

- 50%-66% improvement in rollability & foldability
- 71% improvement in softness on day 28

SEBake Fresh Ultra[™]

Frozen Storage





Control Corn Tortillas (No Enzymes)



Corn Tortillas with 100ppm SEBake Fresh Ultra™

35% improvement in softness Improved rollability in corn tortillas frozen for 15 months

Whole Wheat High-Fiber Tortillas



Day 28 <a> 28% improvement in softness
 ♦ 22% improvement in rollability

Phospholipase





- Whiter & finer crumb structure
- Increased volume
- Prolongs softness in tortillas
- Replaces emulsifiers like DATEM, SSL

Function

Hydrolyzes natural phospholipids to lyso-phospholipids

Phospholipase | SEBake PF™



SEBake PF[™]



Control	50ppm SEBake Fresh Ultra™	50ppm SEBake Fresh Ultra™ + 10ppm SEBake PF	50ppm SEBake Fresh Ultra™ + 20ppm SEBake PF
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SEBake PF[™]



21

35

4x softer tortillas

- Retained diameter size
- Improved rollability up to 35 days
- **Emulsifier replacement**

SEBake LO[™]



- Improved rollability & foldability up to 20 days
- Improved softness
- Reduced shortening while
 - Maintaining diameter
 - Improving softness, rollability & foldability

SEBake LO[™] Improved Rollability, Day 20



Control	33% Shortening Reduction	33% Shortening Reduction + SEBake LO™
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Cellulase





High-fiber whole wheat tortillas

Benefits

- 16% improvement in softness
- Improves dough machinability & quality
- Helps increase volume

Function

Modifies fibers in flour

Cellulase | SEBake CLX™

Prevent Tortillas from Breaking & Improve Softness

- Optimize formula moisture content & shortening
- Maintain proper storage conditions & good packaging
- Otilize ingredients to bind moisture & improve texture
 - Emulsifiers Mono & Diglycerides, SSL
 - Gums CMC, Guar gum, Xanthan gum
 - Enzymes

SEBake Fresh Ultra™ | SEBake PF™ | SEBake LO™ | SEBake CLX™



Global Source for Enzymes & Probiotics



- Top 10 Global Producer of Enzymes & Probiotics
- 60+ Years of Manufacturing Experience
- 70+ Individual Enzymes
- 25+ Probiotics (including Shelf & Heat-Stable)
- 400+ Solutions to Improve Processes, Save Time & Reduce Costs
- Non-GMO, Organic & Gluten-Free Products Available



Baking & Milling Solutions

Ingredient	Products	Benefits
High-Performing Maltogenic Amylase	SEBake Fresh Ultra™	Prolong Softness, Extend Shelf Life
Maltogenic Amylase	SEBake Fresh 1.5P™ SEBake Fresh 10P™	Prolong Softness, Extend Shelf Life
Multienzyme Blend	SEBake Fresh™	Prolong Softness, Extend Shelf Life
Hemicellulase / Xylanase	SEBake AX™, SEBake BX 5™, SEBake FX Ultra™	Smooth Dough Handling, Increase Volume, Flour Correction
Phospholipase	SEBake PF™	Emulsifier Replacement, Improve Whiteness
Fungal Amylase	SEBAmyl X100P™ SEBAmyl X5P™	Increase Volume, Softness
Lipase	SEBake L80™	Dough Strengthening, Improve Machinability, Increase Volume

Baking & Milling Solutions

Ingredient	Products	Benefits
Glucose Oxidase	SEBake GO™ / GO Eco™	Increase Dough Strength & Flour Stability Replace Potassium Bromate
Proprietary Enzyme Blend	SEBake LO™	Maintain Softness, Rollability & Diameter in Shortening-Reduced Tortillas
Glucoamylase	SEBake GA 400™	Replace Sugars, Increase Volume
Cellulase	SEBake CLX™	Improve Machinability for High-Fiber Tortillas
Protease	SEBake NP™	Increase Dough Extensibility, Gluten Correction in Sweet Biscuits
Protease & Xylanase	SEBake Crisp Plus™	Gluten Correction, Batter Viscosity Reduction
Papain	SEBake PP™	Gluten Correction in Fermented Biscuits, Cookies
Proprietary Enzyme Blend	SEBake EG6™	Egg Reduction in Cakes

References

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