Clean Label Conference
March 28-29, 2017
Today’s consumers have expectations for freshness

90% of consumers rate expiration date as extremely/very important

92% of consumers expect commercial bread to last between 5 – 14 days

90% of consumers would like commercial bread to stay fresh up to 14 days longer

If baked products could last longer, 57% of consumers would purchase more varieties/types in addition to what they purchase normally.
Ultra Fresh® a Clean Label Solution for Freshness

Complex blend of enzymes to extend products shelf life
• Formulated to achieve various goals
  • Texture, Process Tolerance, Shelf Life Requirements, Application
• Provides friendly ingredient declaration
Principle of Bread Staling

• **Main driving force for bread staling**
  - Tightly packed starch granules gelatinize during baking
  - Amylopectin re-crystalizes as bread ages
    - More firm, less resilient, less flavorful bread

• **Main driving force for anti-staling**
  - Modify starch to slow the re-crystallization of amylopectin
Why Choose Ultra Fresh®?

✓ Satisfy Consumer Demand for Cleaner Ingredient Declaration
✓ Appeal to Health Conscious Consumers
✓ Boost profitability
✓ Improve your sustainable footprint

Focus Today: Applying Ultra Fresh Technology to Formulate Clean Label Solutions
Which Ultra Fresh® Solution Should I Use?

- Application?
- Desired shelf life?
- Scaling Weight?
- Textural Attributes?
- Finish Product Use?
Ultra Fresh®
A family of options for sustaining freshness

ULTRA FRESH SUPREME
• Extend shelf life to 28 days
• Provides in-process tolerance to less than desirable baking condition
• Provide post bake tolerance to varied storage and distribution methods
• Provides post bake tolerance under extreme staling condition

ULTRA FRESH PREMIUM
• Extend shelf life to 21 days
• Cost effective way to deliver excellent shelf-life
• Provide production tolerance
• End Products have excellent eating qualities and are soft & fresh

ULTRA FRESH CLASSIC
• Provides shelf life of 14 days in bread, buns and rolls
• Deliver good freshness across the shelf life of the end products
Texture Attributes

Fracturability is the force at the 1st peak (Force 3 in the TPAFRAC.RES results file).

Hardness is the maximum force of the 1st penetration (Force 2 in the software’s TPAFRAC.RES results file).

Force 1 in the software’s TPAFRAC.RES results file.

Note that the probe withdraws to and waits at the point where it first encountered the trigger force on the 1st Compression.

Springiness = Length 2/Length 1

Gumminess = Area 2/Area 1 + Hardness (Force 2)

Resilience = Area 5/Area 4

Chewiness = Gumminess + Length 2/Length 1
Effect of Product Size on Enzyme Activity

**Baking profile**

- Smaller Items Bake Faster
- There is a limited activity window for enzymes to work
- The activity window for small items is shorter than for larger items
## Ultra Fresh® Classic

<table>
<thead>
<tr>
<th>Item#</th>
<th>Form</th>
<th>Usage Rate</th>
<th>Application</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra Fresh Classic 155</td>
<td>139834</td>
<td>Powder</td>
<td>0.25% - 0.5%</td>
<td>Designed for food service, enhance freshness on Day 1</td>
</tr>
<tr>
<td>Ultra Fresh Classic 150</td>
<td>136205</td>
<td>Powder</td>
<td>0.25% - 0.5%</td>
<td>Provides a soft and resilient crumb structure without creating gumminess</td>
</tr>
<tr>
<td>Ultra Fresh Classic 125</td>
<td>136209</td>
<td>Powder</td>
<td>0.25% - 0.5%</td>
<td>Contains enzyme active soy flour for crumb whitening</td>
</tr>
<tr>
<td>Ultra Fresh Classic 110 with Organic Flour</td>
<td>139895</td>
<td>Powder</td>
<td>0.25% - 0.5%</td>
<td>Certified organic product that provides a soft and resilient crumb without creating gumminess</td>
</tr>
<tr>
<td>Ultra Fresh Classic 100</td>
<td>136201</td>
<td>Powder</td>
<td>0.25% - 0.5%</td>
<td>Provides a soft moist texture and works well in continuous mix plant</td>
</tr>
</tbody>
</table>

MAINTAINS FRESHNESS FOR 14 DAYS
Ultra Fresh Portfolio Comparison

**Firmness**

- NoAdd
- Classic 150
- Premium 250
- UFPA

**Resilience**

- NoAdd
- Classic 150
- Premium 250
- UFPA

**Adhesiveness**

- NoAdd
- Classic 150
- Premium 250
- UFPA
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<tr>
<td>Ultra Fresh Premium 1650</td>
<td>Powder</td>
<td>0.03% - 0.125%</td>
<td>Breads, buns and rolls</td>
<td>Provides in-production and post-bake tolerance</td>
</tr>
<tr>
<td>Ultra Fresh Premium 300</td>
<td>Powder</td>
<td>0.5%</td>
<td>Buns, rolls and bagels</td>
<td>This product allows bakers to optimize formulas and reduce formula sugar and yeast, as well shortening baking time and increasing temperature</td>
</tr>
<tr>
<td>Ultra Fresh Premium 250</td>
<td>Powder</td>
<td>0.25% - 1.0%</td>
<td>Breads, buns and rolls</td>
<td>Provides a soft and resilient crumb structure without creating gumminess</td>
</tr>
<tr>
<td>Ultra Fresh Premium 209</td>
<td>Tablet</td>
<td>1-2 tablets/cwt flour</td>
<td>Breads, buns and rolls</td>
<td>Convenient, easy-to-use tablet that dissolves in water</td>
</tr>
<tr>
<td>Ultra Fresh Premium 225</td>
<td>Powder</td>
<td>0.25% - 0.5%</td>
<td>Tortilla</td>
<td>Improves the resiliency of tortillas to maximize rolling and folding performance</td>
</tr>
</tbody>
</table>

MAINTAINS FRESHNESS FOR 21 DAYS
Ultra Fresh® Premium Advantage significantly outperformed the current market ESL in terms of firmness, resilience, and adhesion of Honey Wheat Bread.

### Firmness of Honey Wheat Bread
- **Current Market ESL**
- **Ultra Fresh Premium Advantage**
  - Day 7: Too Firm
  - Day 14: Too Firm
  - Day 21: Not Resilient Enough

### Resilience of Honey Wheat Bread
- **Current Market ESL**
- **Ultra Fresh Premium Advantage**
  - Day 7: Not Resilient Enough
  - Day 14: Not Resilient Enough
  - Day 21: Not Resilient Enough

### Adhesion of Honey Wheat Bread
- **Current Market ESL**
- **Ultra Fresh Premium Advantage**
  - Day 7: Too Dry
  - Day 14: Too Gummy
  - Day 21: Too Gummy
## Ultra Fresh® Supreme

<table>
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<tbody>
<tr>
<td>136614</td>
<td>Powder</td>
<td>0.5%</td>
<td>Breads</td>
<td>Improve eating quality 7 additional days and allow the baker to reduce formula sugar and yeast levels</td>
</tr>
<tr>
<td>139927</td>
<td>Powder</td>
<td>1.0%</td>
<td>Buns, rolls and bagels</td>
<td>Improve freshness and eating quality 35 days, contains mold inhibition</td>
</tr>
<tr>
<td>139744</td>
<td>Powder</td>
<td>1.0%</td>
<td>Breads</td>
<td>Improve freshness and eating quality 35 days, contains mold inhibition</td>
</tr>
<tr>
<td>136219</td>
<td>Powder</td>
<td>1.0% - 2.0%</td>
<td>Breads, buns and rolls</td>
<td>Maintains freshness of products in extreme staling conditions</td>
</tr>
</tbody>
</table>

MAINTAIN FRESHNESS FOR 21+ DAYS
Ultra Fresh Supreme 400

- Supreme 400 provides superior bread quality even in extreme storage environments.

Bread staling is accelerated at refrigeration temperatures

![Graph showing firmness over shelf-life](image-url)
Ultra Fresh® Sweet

Use all-natural Ultra Fresh Sweet for optimal freshness in large and small cakes, muffins, donuts and more. Add it at the bowl or optimize the formula to reduce undesirable ingredients and save money. The technology has proven freeze-thaw performance that maintains high quality. You’ll also benefit from:

• Saving from reduced waste and stales
• Fully stocked shelves all day long
• Improvement in the quality of baked goods
• Flexibility to meet varying consumer preference.

CONTACT CORBION FOR MORE INFORMATION
QUESTIONS?