PRISTINE® 2000 DOUGH CONDITIONER

Clean Label Conference Technology Snapshot
FACT: Ingredient information influences consumer purchasing decisions

60% of bread consumers indicate that type of ingredient impacts their purchasing decisions.

47% of bread consumers indicate that the number of ingredients in the ingredient legend impacts their purchasing decisions.

Source: Proprietary Study, October 2014
Corbion Caravan’s clean label family of bases, mixes & dough conditioners that reduce or remove unfriendly conditioners and oxidation systems from bakery products.

Why choose Pristine?

• Satisfy consumer demands for shorter, simpler, and cleaner ingredient declarations.
• Appeal to health conscious consumers.
• Benefit from partnering with an experienced trusted solutions provider.

Focus today: dough conditioners
Dough Conditioners

*Ingredients added to dough to improve overall quality and baking performance.*

<table>
<thead>
<tr>
<th>Dough Conditioner Functions</th>
<th>Improve dough tolerance  (formula variations, mixing, dough processing, proofing,...)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increase dough absorption</td>
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<tr>
<td></td>
<td>Improve gas retention</td>
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<tr>
<td></td>
<td>Improve pan flow</td>
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<td></td>
<td>Improve loaf volume and symmetry</td>
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<td>Improve internal crumb  (finer crumb, thinner cell walls,...)</td>
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<td></td>
<td>Improve product texture – increase shelf life</td>
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</tbody>
</table>
### Building Blocks of Dough Conditioners

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidants:</td>
<td>ADA, bromate, iodate, peroxide, ascorbic acid, etc.</td>
</tr>
<tr>
<td>Reducing:</td>
<td>L-Cysteine, sulfite, glutathione, sorbate, etc.</td>
</tr>
<tr>
<td>Emulsifier:</td>
<td>SSL, DATEM, EMG, CSL, mono-glyceride, lecithin, etc.</td>
</tr>
<tr>
<td>Enzymes:</td>
<td>malt, F. amylase, lipase, oxidases, xylanases, Tgase, cellulases, lipoxygenase, proteases, etc.</td>
</tr>
<tr>
<td>Others:</td>
<td>salt, ammonium, MCP, carbonate, gluten (protein), yeast, gums, etc.</td>
</tr>
</tbody>
</table>
Building Blocks of Dough Conditioners

Oxidants: ADA, bromate, iodate, peroxide, ascorbic acid, etc.

Reducing: L-Cysteine, sulfite, glutathione, sorbate, etc.

Emulsifier: SSL, DATEM, EMG, CSL, mono-glyceride, lecithin, etc.

Enzymes: malt, F. amylase, lipase, oxidases, xylanases, Tgase, cellulases, lipoxygenase, proteases, etc.

Others: salt, ammonium, MCP, carbonate, gluten (protein), yeast, gums, etc.
Matching Dough Conditioning Needs with Enzyme Functionality

- Release water for better gluten development: Xylanases, Cellulases, Barley Malt, Amylases
- Strengthen gluten network: Oxidases, TGase, Xylanases
- Make dough strengthening emulsifiers: Lipases
- Relax dough or reduce mixing time: Proteases, Amylases, Xylanases, Cellulases
## Pristine Dough Conditioners

<table>
<thead>
<tr>
<th>Features</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pristine® 2000</strong></td>
<td>• <strong>TOP CHOICE</strong>&lt;br&gt;• Newest enzyme system&lt;br&gt;• Better rheology/pan flow&lt;br&gt;• Ability to adjust ascorbic acid</td>
</tr>
<tr>
<td><strong>Pristine® 2000 i</strong></td>
<td>• Approved for use in Canada&lt;br&gt;• Does not contain Cal. Sulfate&lt;br&gt;• Ability to adjust ascorbic acid</td>
</tr>
<tr>
<td><strong>Pristine® Concentrate</strong></td>
<td>• Original innovative enzyme system&lt;br&gt;• Ability to adjust ascorbic acid</td>
</tr>
<tr>
<td><strong>Pristine® 1</strong></td>
<td>• Specifically developed for frozen dough</td>
</tr>
</tbody>
</table>

*INTERNAL USE ONLY*
Pristine 2000® Product Overview

What is Pristine® 2000?
• Dough conditioner
• Reduces # of unfriendly chemicals in the ingredients declaration

Application Overview
Bakeries that are, or want, to produce clean label products, including:
• White Bread
• Whole Wheat Breads
• Specialty/Artisan Breads
• Buns & Rolls

Value to Customer
• Stable, more consistent processing
• Ability to adjust ascorbic acid
• Versatility, can be used in a variety of applications
• Ability to appeal to consumers looking for simplified labels
Chemical vs. Clean Label Dough Conditioner

**Im-Prove 200**
- Wheat Flour
- DATEM
- Soybean Oil
- Enzymes
- Ascorbic Acid
- L-Cysteine Hydrochloride
- ADA

**Dependox AXC**
- Wheat Starch
- Ascorbic Acid
- ADA
- DATEM
- Monoglycerides
- Enzymes
- Silicon Dioxide

**Pristine 2000/Pristine 2000 i**
- Wheat Flour
- Calcium Sulfate
- Enzymes
Chemical Conditioner vs. Pristine 2000 – 100% Whole Wheat

- Pristine 2000 run with 100ppm Ascorbic Acid
- SSL and DATEM remained constant
- **Conclusion:**
  - Pristine 2000 can replace chemical oxidants and reducing agents
Chemical Conditioner vs. Pristine 2000 – White

- Pristine 2000 run with 60ppm Ascorbic Acid
- SSL and DATEM remained constant
- Conclusion:
  - Pristine 2000 can replace chemical oxidants and reducing agents
## Clean Label Competitive Analysis

Below is a visual summary of lab-based testing*

<table>
<thead>
<tr>
<th>Company</th>
<th>Product Name</th>
<th>Usage</th>
<th>Dough Rheology</th>
<th>Tolerance/Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corbion</td>
<td>Pristine 2000</td>
<td>0.25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Market Product #1</td>
<td>0.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Market Product #2</td>
<td>0.375%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Market Product #3</td>
<td>0.625%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Market Product #4</td>
<td>0.15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Market Product #5</td>
<td>0.25%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*100% whole wheat; straight dough; 2% gluten to show tolerance
Key Takeaways

Value to Customer

• Achieve better dough rheology
• Can be used in a variety of applications
• Ability to adjust ascorbic acid
• Stable, more consistent processing
• Appeal to consumers with a simplified, cleaner ingredients declaration

Best Opportunities

• Wholesale and In Store Bakery manufacturers that are making clean label bakery products including: Pan Bread, Whole Wheat Bread, Buns, Rolls, Artisan Breads

Differentiation from current Pristine products

• New enzyme system
• Better dough rheology & tolerance
• Doesn’t contain ascorbic acid
Pristine 2000 – Product Information

Item Number
138083

Product Uses:
• Pan Bread
• Whole Wheat Bread
• Buns & Rolls
• Artisan/Specialty Breads

Usage Level
0.1% - 0.3% (based on flour). This product does not contain Ascorbic Acid, but should be used in conjunction with 30 ppm to 150 ppm of Ascorbic Acid.

Ingredient Statement
Wheat Flour, Calcium Sulfate, Enzymes (Contains Wheat)

Allergens
• Wheat

Countries approved for use:
• Mexico
• China
• Australia
• Brazil

Label Claims:
• Kosher Pareve
Questions?