Clean Label Preservation Techniques

October 3, 2017
Agenda

• A Case for Clean Label
• Clean Label Preservation Solutions for Tortillas
  – Upgrade™
  – Biobake™ Enzymes
A Case for Clean Label
What is Clean Label?

Clean Label is an industry term to describe consumer desire to know what is in our food, where it is grown and how it is processed. Consumers may not understand Clean Label, but they understand product claims and attributes.

Source: Kerry Primary Research; scaled to index
“Clean Label” Perceptions by Age

Younger consumers have a different view of clean label than older consumers, and tend to see “clean label” as intrinsic to a product. Older consumers view “clean label” more in the context of the removal of “bad” ingredients.

Consumers aged 18–44 tend to see “clean label” as aligned with organic and natural product concepts.

Consumers aged 45 and older have a fuzzier view of clean label and tend to equate it with the removal of “bad” ingredients.

US: "What does the term 'clean label' mean to you?”, top responses by age group, 2015

- 18–24 year olds: 55% natural/organic claims
- 25–34 year olds: 49% natural/organic claims
- 35–44 year olds: 34% (tie) natural/organic claims; minimally processed
- 45–54 year olds: 28% Free from artificial ingredients
- 55–64 year olds: 23% Free from artificial ingredients
- 65-plus year-olds: 22% Free from artificial ingredients

Source: Canadean's global survey, Q4 2015
Clean Label Growth

Clean Label products are growing 5x faster than the rest of the market.

- **2009**: $37,636MM
- **2015**: $69,376MM
- **2020**: $115,532MM

Evolution of Healthy Eating

The definition of “healthy eating” is changing, as consumers want cleaner foods and more information and transparency on what they eat and drink...

The Nutritional Information Labeling Act of 1985 represented our desire to identify things we wanted removed from our meals: fat, sodium, and cholesterol.

The 2000s were about adding beneficial things like whole grains, Omega-3s, and antioxidants.

The “Free Movement” – GMO-free or antibiotic-free – focusing on the purity of the ingredients.

Transparency and information. Empowering the consumer with information and choice.

Wholesome ingredients and shorter labels. A lack of artificial ingredients.
Trust is a Factor with Food Manufacturers

Consumers Worry About Potentially Harmful Ingredients in Their Food

- 71% Consumers think there are more harmful ingredients than manufacturers tell them
- 53% Consumers prefer foods & beverages with a short list of ingredients
- 75% Consumers are buying free-from foods because they think they are more natural

I WORRY QUITE A BIT ABOUT POTENTIALLY HARMFUL INGREDIENTS IN THE FOOD I BUY

- Millennials 60%
- Gen X 55%
- Baby Boomers 46%
- Swing Generation 35%

Meeting Customer Clean Label Expectations

Replace
To replace ingredient(s) with clean label alternatives while retain key functionality, taste and/or nutrition profiles in their products

- Natural Flavors
- No Flavors added
- Natural Colors
- Natural Preservatives
- Natural Sweeteners

Reduce
To leverage clean label technologies to reduce specific ingredients and simplify their ingredient statements

- Short, simpler ingredient statements
- Natural ingredients that are multi-functional
- Regulatory, dietary recommendation compliance
- Sugar and Sodium reduction

Remove
To eliminate specific ingredient(s)

- “No-No” lists
- BHT Free
- BPA Free

Re-position
Customers asking for creative ways to reposition product in the marketplace

- Product positioning and format
- Packaging, culinary processing
- Small Batch/Home cooked/Authentic

Re-invent
Natural Brand customers looking to scale their business, while maintaining their identity

- Certified Organic
- nonGMO
- Sustainable practices from local to global
- Waste not want not
- Long Term Investment in Health

Underpinned by understanding of the science and regulation of clean label ingredients
Global/Regional/National Regulation Consumer Insight Applications Expertise Culinary Expertise
Kerry’s Clean Label Solutions
Tortillas

Natural Preservation & Fresh Keeping

Biobake™ Enzymes
Upgrade™
Kerry’s Clean Label
Tortilla Solutions
Biobake™ Enzymes
Enzyme Use in Food

• Enzymes are clean label
  – Natural products of fermentation
  – GRAS
  – Processing aids

• Enzyme benefits in the food industry
  – Ease of processing
  – Higher throughput
  – Standardisation of raw materials
  – Improved texture
  – Longer shelf life
  – Improved nutrition

Enzyme use is increasing & on-trend
Biobake™ Enzymes

Protease Enzymes

Biobake™ protease enzymes are a range of products used to manage dough rheology, process operations, and product texture

- Less shrinkage
- Provide consistent texture

Products:

- Biobake™ BPN

Applications:

Sheeting & hot press operations, high fiber & wholegrain products
Biobake™ Enzymes
Amylase Enzymes

Biobake™ amylase enzymes are a range of enzymes to improve the processing & quality of baked goods.

• Enhanced freshness and softness
• Maintains flexible texture throughout shelf-life
• Can help prevent stickiness when used in combination with emulsifiers

Products:
• Biobake™ Fresh 2500 – extended shelf life
• Biobake™ Fresh 310 extended shelflife, high resilience & other high temperature applications

Applications:
Bread, Buns, Donuts, Croissants, Cake, Frozen Dough, Flatbread, Crackers, Tortillas
Biobake™ Enzymes
Lipase Enzymes

Biobake™ lipase enzymes are a range of enzymes to improve the processing & quality of baked goods.

- Increased pliability
- Reduced cracking
- Reduced stickiness

Product:
- Biobake™ STL1000 suitable for flour tortillas & flatbreads

Applications:
Bread, Buns, Donuts, Croissants, Cake, Frozen Dough, Flatbread, Crackers, Tortillas
Kerry’s Clean Label
Tortilla Solutions
Upgrade ™
Upgrade™

Upgrade™ is a naturally derived fermented ingredient consisting of a unique blend of organic acids.

- Inhibits mold growth in bakery applications
- Clean label, natural alternative to calcium propionate.
- Suitable for use in products claiming “natural” and “no artificial preservatives”
- Standardized to a high level of organic acids
- Available in gluten-free formats

**Application:**
Tortillas, Gluten Free, Bread, Buns, Rolls, Pizza Crust
Authenticity of Upgrade™

- Upgrade™ proactively validated for authenticity through Eurofins
- Eurofins – world leader in food & feed authenticity testing, analyses are “tailor-made” for each product
- Eurofins’ world class method and reports are available upon demand

100%
The real deal
Upgrade™ Case Study

Objectives:

- Replace calcium propionate and potassium sorbate with a clean label alternative in flour tortillas
- Validate sensory, pH and functionality conformance of Upgrade™

Study Design:

- Flour tortillas were hot-pressed in Kerry’s Commercialization Center.
- Upgrade performance was benchmarked against chemical control.
- Tortillas were stored at ambient temperature in zip lock bags (no MAP packaging).
- Visual inspection daily
- Sensory evaluation by trained panelists.
# Upgrade™ Case Study

## Tortilla Recipe

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Bakers %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flour</td>
<td>100.0</td>
</tr>
<tr>
<td>Water</td>
<td>61.0</td>
</tr>
<tr>
<td>Shortening</td>
<td>10.0</td>
</tr>
<tr>
<td>Salt</td>
<td>2.0</td>
</tr>
<tr>
<td>Baking Powder</td>
<td>1.2</td>
</tr>
<tr>
<td>*Fumaric acid</td>
<td>0.15 - 0.25</td>
</tr>
<tr>
<td>Admul MG 60-50</td>
<td>1.0</td>
</tr>
<tr>
<td>L-Cysteine</td>
<td>0.004 (40ppm)</td>
</tr>
</tbody>
</table>

*Can be used when making ‘No Artificial Preservative’ claim but cannot be used in ‘All Natural’ tortillas*
# Upgrade™ Case Study

## Results

<table>
<thead>
<tr>
<th>Tortilla Variable</th>
<th>pH</th>
<th>% Moisture</th>
<th>Mold-free Days</th>
<th>Sensory Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2% Potassium sorbate,</td>
<td>5.96</td>
<td>30.89</td>
<td>*36</td>
<td>Reference</td>
</tr>
<tr>
<td>0.5% Calcium propionate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15% fumaric acid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2% Upgrade™</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Label: Cultured wheat starch, wheat flour</td>
<td>5.79</td>
<td>30.60</td>
<td>*36</td>
<td>Comparable to Reference. Acceptable.</td>
</tr>
<tr>
<td>0.25% fumaric acid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The study concluded after 36 days.
Kerry’s Clean Label Solutions
Tortilla Label

• Traditional Label:
  – Enriched Flour (Wheat flour, Niacin, Reduced Iron, Thiamin Mononitrate, Riboflavin and Folic Acid), Water, Vegetable Shortening, Salt, Leavening (Sodium Bicarbonate, Sodium Acid Pyrophosphate, Monocalcium Phosphate), Calcium Propionate, Potassium Sorbate, Fumaric Acid, Mono and Diglycerides, L-cysteine

• Cleaner Label
  – Enriched Flour (Wheat flour, Niacin, Reduced Iron, Thiamin Mononitrate, Riboflavin and Folic Acid), Water, Vegetable Shortening, Salt, Leavening (Sodium Bicarbonate, Sodium Acid Pyrophosphate, Monocalcium Phosphate), Cultured wheat, Fumaric Acid, Mono and Diglycerides, Enzymes
Thank you.

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