Formulating Clean Label Bakery Products

ACCENT Dough Conditioners
&
ENCORE Shelf Life Extenders

By DELAVAU FOOD PARTNERS

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Traditional Bakery Ingredients

Provide High Levels of Functionality

- Azodicarbonamide – cross-links gluten to strengthen dough
- K Iodate – cross-links gluten
- K Bromate – cross-links gluten
- L-Cysteine – dough relaxation
- Ascorbic Acid – dough strengthening/relaxation (when in excess)
- Sodium Steryl Lactylate – emulsification
- Mono-Glycerides – emulsification, retard retrogradation
- Propionate – mold inhibition
- Sorbate – mold inhibition
- Diacetyl tartaric acid ester of mono-glyceride – emulsification, retard retrogradation
Traditional Bakery Ingredients

3 primary areas of functionality

1) Gluten structure modification

2) Starch Structure modification

3) Air and Oil Droplet Stabilization (emulsification)
Traditional Bakery Ingredients

Segments of Functionality

Gluten structure modification

• Oxidizers – strengthen network
  • ADA
  • K Iodate
  • K Bromate
  • Ascorbic acid

• Reducers – weaken network
  • L-Cysteine
  • Ascorbic Acid (In excess)
Micro-Structure of Gluten-based Baked Goods

- Oil Droplets
- Air Cells
- Gluten
- Starch
- Arabino-Xylans
Structure / Function
Modification of Gluten Network

Gluten

Hemi-cellulose
(Arabino Xylans)
Structure / Function
Modification of Gluten Network
Structure / Function
Clean label modification of Gluten Network

GLUCOSE OXIDASES create these connections

PROTEINASES chop up gluten

XYLANASES chop up Arabino xylans
Case Study: Improving consistency with Accent 5450 (1) (2)

Clean Label Sub Roll

BEFORE

AFTER
Traditional Bakery Ingredients

Segments of Functionality

Starch structure modification

• SSL – retards retrogradation

• Mono-Glycerides – retards retrogradation

• DATEM – retards retrogradation
Starches composed of amylose and amylo-pectin; contribute to structure
Structure / Function
Starch retrogradation contributes to staling
Structure / Function

Emulsifiers interfere with retrogradation
Structure / Function

Clean label Amylase enzymes create starch fragments that interfere with retrogradation
CASE STUDY: Improving Shelf Life with Encore 6200

Clean Label Pan Bread

- ESL Dose 2
- ESL Dose 1
- Control - No ESL
Case Study: Improving shelf-life with Encore DY1000

Clean Label Donut

~36% softer after 24 hour at ambient conditions.
Traditional Bakery Ingredients

Segments of Functionality

• In each area of functionality – gluten structure, starch structure, and droplet stabilization,

• Enzymes generate the same functional effect, although by different structural mechanisms

• And thus, can replace traditional (non-clean label) ingredients

• ACCENT and ENCORE products are built around this technology
Clean Label Formulation Process

1. Define Basic Formula Requirements & Key Product Attributes
2. Characterize Process – time, temperature, shear, wait
3. Design Prototype System – enzyme, starch, sugars, etc.
4. Perform Initial Lab Evaluation in Application
5. Optimize Ingredient System – enzyme type & level, starch type & level, etc.
6. Validate Application in Lab
7. Scale-Up Validation
8. Optimize Final System
• New, state-of-art, 15,000 sq. ft. **Food Innovation Center** fully equipped to provide applications, technical service, product development and analytical testing.

Delavau Bakery R&D Center, Piscataway, NJ
Delavaux Food Partners
What we do & How we work

• Off-the shelf products – ACCENT & ENCORE clean label dough conditioners

• Problem solving
  - Clean label formulating - ACCENT
  - ESL formulating - ENCORE
  - Cost optimization - HARMONY
  - Nutrition / fortification - ACCENT
    • Calcium fortification
    • Sodium reduction

• Customized products that are optimized for your process