



CLEAN LABEL CONFERENCE

Sophisticated Solutions for Simplified Labels

October 29-30, 2013 • Hyatt Lodge, Oak Brook, Illinois, USA

2013 Technology Snapshot Presentation

**Sulfite-Free, Light Colored
Dried Apples**

By: TreeTop, Inc.



Sulfite-Free Light Colored Dried Apples

Kevin Holland, Ph.D.
Clean Label Conference
October 29, 2013





Agenda

- **A little chemistry**
- **Antibrowning history**
- **New treatment**
 - Ingredients
 - Nutritionals
 - Shelf life

Low Moisture Apples

- **Moisture level between 0-3%**
- **Crunchy texture**
- **Available in many cut sizes and treatments**
- **Typically used in hot cereals, cold cereals, trail mixes, and other low water activity applications.**

A Little Chemistry

- **Polyphenol oxidase reacts with phenolic compounds and oxygen to create brown pigments**
- **To control browning:**
 - Reduce oxygen
 - Reduce phenolic compounds
 - Interrupt reaction
 - Inhibit enzyme

Antibrowning Treatment History

- **Sulfites used extensively**
 - 1986: no longer allowed in fresh foods and required labeling
 - 1% of population is sensitive
 - Effective against enzymatic and non-enzymatic browning
- **Sulfite alternatives**
 - Calcium chloride
 - Sodium chloride
 - Erythorbic/ascorbic acid
- **Trends are leading us away from these treatments**
 - GMO-free
 - Clean label

Appearances



Sulfite

Sulfite Alternative

No Treatment

Ingredient Label

Apples, Potassium Metabisulfite, and Sodium Sulfite.

Apples, Erythorbic Acid, Salt, Citric Acid, and Calcium Chloride.

Apples, Sea Salt, Lemon Juice Concentrate, and Molasses.

Which label would you prefer?

How we got here?

- **Always looking for new solutions**
- **Used both internal and external resources**
 - Merlin Development, Inc.
- **Investigated numerous compounds, salts, and processing methods**
- **Salt, lemon juice concentrate, and molasses (SLM) performed the best (good color, flavor, label statement).**

Nutritional

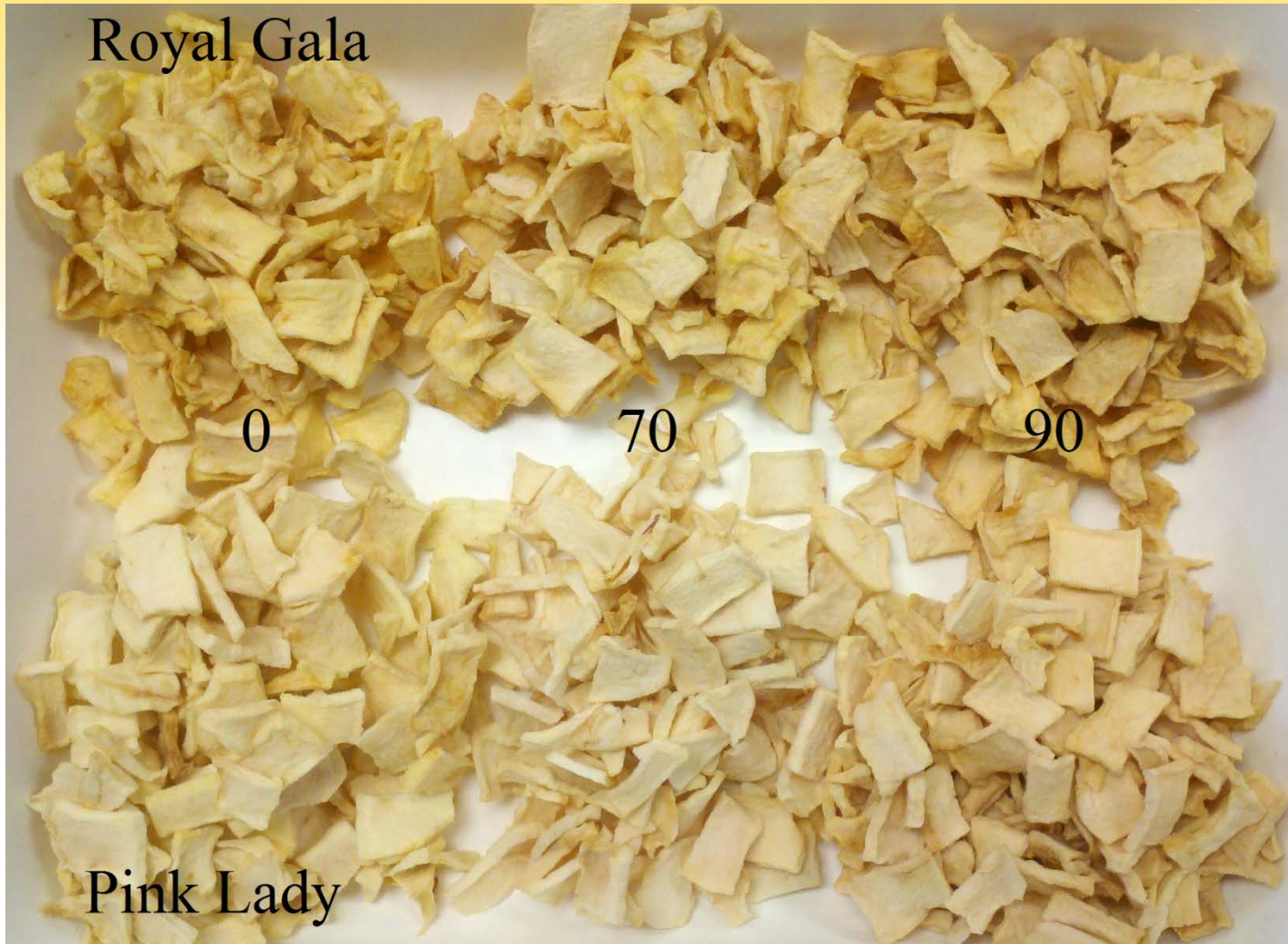
SLM Nutritional

NUTRIENT OR ITEM		NUTRIENT OR ITEM	
Moisture (g/100 g)	2.59	Vitamin A as b-carotene (IU/100 g)	130
Ash (g/100 g)	2.95	Vitamin C (mg/100 g)*	7.4
Protein (g/100 g)	1.73	Dietary Fiber (g/100g)	9.4
Fat (g/100 g)	0.5	Sodium (mg/100 g)	190
Trans Fat (g/100 g)	0.0	Potassium (mg/100 g)	774
Carbohydrates (g/100 g)	92.23	Calcium (mg/100 g)**	20.7
Calories (per/100 g)	380.0	Iron (mg/100 g)	0.46
Sugars (g/100 g)	51.2		

Sodium	(mg/ 100 g)	(mg/fruit serving)
Sulfite	368	52
Sulfite alternative	219	31
SLM	190	27



Shelf Life



The Future

- **Continue investigating SLM across product lines**
- **Continue to search for processes and treatments to improve our ingredients**



Contact us with any questions or product needs:

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Thank You!

