

Marketing Ancient Grains as Modern Ingredients; Increasing Opportunity through Effective Application

Ancient Grains: From Field to Mainstream Market

November 8th, 2016

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Today's Goals

- Which are “Ancient Grains”?
- Proliferation of Ancient Grains in the News
- Market Benefits
 - *Marketing Ancient Grains as modern ingredients*
- What are the Nutritional and Functional Advantages of Ancient Grains?
 - *Increasing opportunity through effective application*
- Sustainability and Procurement
 - *Sustain growth and managing the supply chain*



What are Ancient Grains?

An Introduction

Whole Grains Council Definition:

Grains that are largely unchanged over the last hundreds of years.

*Those which have been utilized since antiquity or lost and *found* for myriad functional attributes

For our purposes these include:

Amaranth

Millet

Kamut

Quinoa

Kaniwa

Spelt

Sorghum

Brown Rice

Chia

Teff

Flax

Buckwheat

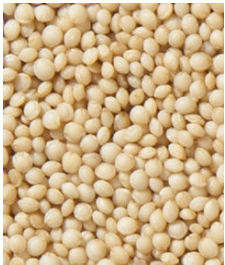
Farro

Freekah



Ancient Grains

Varieties



Amaranth

A source of complete protein, amaranth contains all of the essential amino acids including lysine. Amaranth is also an excellent source of fiber, magnesium, iron and phosphorus; and a good source of polyunsaturated fatty acids and calcium. It is also the only grain documented to contain Vitamin C.



Quinoa

An excellent source of dietary fiber as well as a good source of phosphorus and iron, quinoa is attractive to vegans and vegetarians because it contains all of the essential amino acids, making it a complete protein. Quinoa is easy to digest, ranks lower on the Glycemic Index and contains valuable amounts of heart-healthy monounsaturated fats.



Ancient Grains

Varieties



Sorghum

Compared to other grains, sorghum flavor is less distinguishable than corn and provides better texture than rice. Sorghum is high in fiber, iron, and protein, making it a staple starch in much of the developing world.



Teff

The world's tiniest grain (1/100th the size of a kernel of wheat) teff is a fast-cooking, nutritional powerhouse. An annual grass native to Ethiopia, teff is rich in dietary fiber and iron. The grain has a mildly sweet flavor despite its slightly sour taste when fermented for use in injera bread.

Ancient Grains

Varieties



Millet

More than 10,000 years ago, millet was actually Asia's staple grain. High in antioxidants and magnesium, research suggests it may help prevent and manage high blood pressure, heart disease and diabetes. Millet is quick cooking, and can be fluffed like rice, made creamy like mashed potatoes, and is ideal for gluten-free flatbreads.

Ancient Grains

From Introduction to Adoption and Demand

In light of surging health trends and allergen demands many manufacturers are swiftly shifting from traditional to ancient grains as an ingredient in baked goods.

Amaranth, quinoa, spelt and teff among others are increasingly featuring in products and the body of science behind them is growing too.

- Bakery & Snacks Trends; Ancient Grains



Ancient Grains

Making Headlines – In the news



Defining the Future of Food®

June, 2016

Ingredient Trends: Adventures in Ancient Grains

FOOD BUSINESS NEWS

May 17, 2016

Ancient Grains rising in product development



May 2, 2016

Food Facts: Great Grains

Detroit Free Press

April 14, 2016

Ancient Grains with new bite



October 6, 2015

**10 Ancient Grains to Switch Up
Your Healthy Carbs**



April 4, 2016

How to Shop for Ancient Grains



Ancient Grains

Making Headlines – a representative sample of awareness

- [Kellogg taps protein and ancient grains trends with breakfast and snacks NPD](#)
- [PepsiCo adds ancient grains quinoa and amaranth to Quaker line-up](#)
- [Monsanto and Remington in joint venture to develop sorghum seeds](#)
- [Researchers unlock secrets of making high-quality breads with teff](#)
- [Black amaranth muesli from Bolivia to showcase FAO's 'mountain food' logo](#)
- [Eating bread made with ancient grains could benefit heart health, study shows](#)
- [Manufacturers use quinoa for added nutrition, texture, color and function](#)



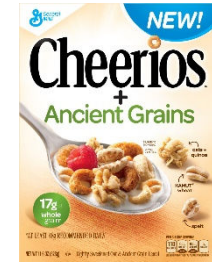
Marketing Claims

from Nu-World Foods Ancient Grains

- Gluten Free, Top 8 Allergy Friendly
- Ancient Grains, Whole Grain, Multi-Grain
- Plant-based proteins
- Non-GMO sourced ingredients
- Ingredient selectivity on the rise
- Simple ingredients for a clean label
- Natural nutrition
- Non-GMO, Organic, GFCO, Kosher & Halal certifications

And ...

- Nutrition, Taste, Functional performance benefits



Ancient Grains and Nutrition

Highlights of Ancient Grains Compared to Conventional Ingredients

| | Amaranth | Quinoa | Teff | Sorghum | Millet | Rice | Corn | Soy | Wheat |
|-------------------------------|-----------------------------|---------|---------|-----------------|--------|--------|--------|--------|---------|
| Key Nutrients | | | | | | | | | |
| Protein: | 14.4 g | 14.6 g | 12.6 g | 11.3 g | 11 g | 7.1 g | 9.4 g | 13 g | 12.6 g |
| Fiber: | 9.2 g | 7 g | 7.4 g | 6.3 g | 8.5 g | .66 g | 4.74 g | 6.8 g | 1.54 g |
| Calcium: | 184 mg | 56 mg | 176 mg | NA | 8 mg | 80 mg | 74 mg | 11 mg | 71 mg |
| Iron: | 10 mg | 7.76 mg | 6.27 mg | 4.4 mg | 3 mg | 1.3 mg | 7.3 mg | 4.2 mg | 12.2 mg |
| Unique Seed Attributes | | | | | | | | | |
| 9 Amino Acids | Yes | Yes | Yes | Yes | Yes | No | No | No | No |
| Top 8 Allergy Friendly | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| Non-GMO | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No |
| Nutritional Enhancement | Yes | Yes | Yes | Yes | Yes | | | Yes | Yes |
| | Enhancers & Differentiators | | | Price Balancers | | | | | |



Ancient Grain Ingredient Benefits

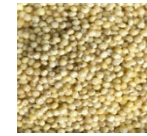
Formulating with Ancient Grains can improve flavor and increase utilization

Puffed and Popped Ingredients

- Texture
- Visual eye appeal
- Good dispersibility
- Pleasing flavor



Amaranth



Millet

Toasted Flours

- Limits enzymatic activity
- Pleasing flavor
- Enables “fat replacement” mouth feel
- Add to color



Quinoa



Sorghum

Pre-Gel Powders

- Pleasing or neutral flavor
- Assists in binding
- Increased water absorption/freshness
- Assists in viscosity control
- Enables suspension and dispersibility



Teff



Ancient Grains and Functionality

Scale: - ★ / ★ ★ ★ ★ ★ +

| Functionality | Attributes | Amaranth | Quinoa | Teff | Sorghum | Millet |
|-----------------|---|--------------------------------|--------------------------------|------------------------|---------------------------------|------------------------|
| Flavor Enhancer | Taste preferred for snacks, baked goods, beverages, cereals, etc. | raw flour ★★★★ | raw flour ★★★★ | raw flour ★★★★★ | raw flour ★★★★★ | raw flour ★★★★ |
| | | roasted/toasted flours ★★★★ | roasted/toasted flours ★★★★ | toasted flour ★★★★★ | roasted/toasted flours ★★★★★ | toasted flour ★★★★★ |
| | | puffed pieces ★★★★ | puffed pieces ★★★★ | | puffed/popped pieces ★★★★★ | |
| Texturizer | Further enhanced through popping and puffing | seeds ★★★★ | seeds ★★★★ | seeds ★★★ | flours ★★★★★ | seeds ★★★ |
| | | all flours ★★★★ | all flours ★★★★ | all flours ★★ | puffed/popped pieces ★★★★★ | all flours ★★★★ |
| | | puffed pieces ★★★★ | puffed pieces ★★★★ | | | |
| Mouth Feel | Creamy smooth mouthfeel for wet applications | all flours ★★★★ | raw flour ★★★ | raw flour ★ | raw flour ★ | raw flour ★ |
| | | pre-gel ★★★★ | roasted/toasted flours ★★★★ | toasted flours ★★★ | fine mesh flour ★★★ | |
| | | | pre-gel ★★★★ | | pre-gel ★★★★ | |

Ancient Grains and Functionality

| Functionality | Attributes | Amaranth | Quinoa | Teff | Sorghum | Millet |
|--------------------|--|--------------------------------|--------------------------------|-----------------------|------------------------------|-----------------------|
| Shelf-life | Further extended through heat treatment | raw flour ★★★ | raw flour ★★★ | raw flour ★★★ | raw flour ★★★ | raw flour ★★★ |
| | | roasted/toasted flours ★★★★ | roasted/toasted flours ★★★★ | toasted flour ★★★★ | toasted flour ★★★★ | toasted flour ★★★★ |
| Emulsification | Breads, other baked goods sauces, beverages and puddings | raw flour ★★★ | raw flour ★★ | raw flour ★ | raw flour ★ | raw flour ★ |
| | | roasted/toasted flours ★★★★ | roasted/toasted flours ★★★★ | toasted flour ★★ | roasted/toasted flours ★★ | toasted flour ★★ |
| | | pre-gel ★★★★ | pre-gel ★★★★ | | pre-gel ★★★ | |
| Moisture retention | Improve texture and mouthfeel, improves shelf life of baked goods and adds weight with lesser expensive ingredient | raw flour ★★★ | raw flour ★★ | raw flour ★ | raw flour ★ | raw flour ★ |
| | | roasted/toasted flours ★★★★ | roasted/toasted flours ★★★★ | toasted flour ★★ | roasted/toasted flours ★★ | toasted flour ★★ |
| | | pre-gel ★★★★ | pre-gel ★★★★ | | | |
| | | puffed ★★★★ | puffed ★★★★ | | | |

Ingredient Applications

Puffed Amaranth, Quinoa, Sorghum, Millet, Kaniwa, and Popped Sorghum

Nutritional: increases nutrition as it retains all of original seed

Textural: enhances texture and mouth-feel

Visual: unique visuals make ideal for inclusion or garnish

Flavorful: pleasing flavor profile

Flexible: accepts flavors well; virtually hull-less

Versatile: can be used as inclusion in multitude of applications

Applications:

- Batters: Cakes, Pastry
- Bars
- Breads
- Cereals: Hot and Cold
- Cookies, Crackers
- Confections: Chocolates, Coatings
- Granolas, Muesli
- Salad Toppers
- Snacks
- Yogurts, Parfaits



Ingredient Applications

Toasted Flours : Amaranth, Quinoa, Sorghum, Teff, Millet, etc.

Nutritional: Protein, fiber, iron, etc

Functional Additive : Blend with other flours for breads, cookies and other baked products

Shelf Life: Toasting process halts enzymatic activity without degrading nutritional profile

Clean Label: Simplify your ingredient list and enhance nutritional content

Flavor Enhancer: From neutral to distinctively toasted, sweet, and nutty flavors

Retain Moisture: High water-holding capacity

Applications:

- Breads
- Cakes
- Cookies
- Crackers
- Cake bars
- Pizza Crusts
- Tortillas



Ingredient Applications

Pre-Gel Powders : Amaranth, Sorghum, Quinoa, and Kaniwa

Nutritional: An all-natural solution for protein and other essential nutrients

Functional: Developed for sauces, puddings, and beverage applications. Also useful in baked goods to increase nutrition, enhance texture, mouth feel, and moisture retention

Sensory Value: Recreates glossy sheen and viscosity of puddings, sauces, and beverages without the need to heat; facilitates the appearance and texture of having retained “moist” characteristics in bakery products without increasing water activity, potentially enhancing shelf-life

Quick Hydrator: A powder in which the starch granules have been pre-swollen

Flavor Enhancer: Options from neutral to naturally sweet and nutty

Applications:

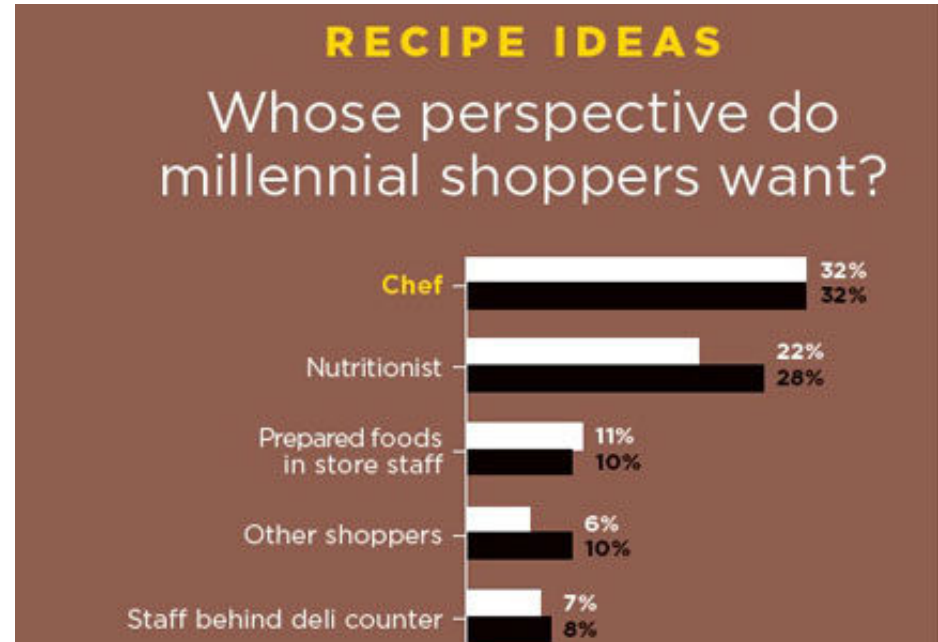
- Puddings
- Beverages
- Sauces
- Yogurts



Supply Chain

Growth in on-trend utilization

- 2016 Growth on Restaurant Menus
 - Kamut 67%
 - Sorghum 64%
 - Millet 46%
 - Quinoa 33%
 - Amaranth 29%
 - Datasential Trending Grains 2016
- 1 in 5 Consumers bought “ancient grains” in the past month
 - Packaged Facts 2015
- Ancient Grains Enjoy Rapid Sales Growth
 - Spins infographic
- Nat’l Restaurant Association ranks Ancient Grains #13 What’s Hot
 - *Natural Ingredients/Clean #4



Supply Chain

Growth in availability

- Ancient Grains Are Sourced Globally –
 - Every continent except Antarctica produces ancient grain ingredients
- The Most Commonly Acquired by Region:
 - North Americas – Sorghum, wheat varieties, rice, flax, some quinoa
 - South America and Mexico – Quinoa, chia, amaranth, etc.
 - Africa – Teff, amaranth
 - Europe – Teff, millet, wheat
 - India, etc. - Amaranth, teff, etc.



Supply Chain

Growth in narratives

- Rise of Transparency
 - Finished product branders, certifying bodies, and the consumers they serve require seed origin validation; story
- Issues in Narrative – Ethical
 - Is local health diminished in lieu of commercial success?
 - Does the personal narrative of growers sell?
 - Should that narrative be sold?
- Can Growth be sustained and will new ingredients supplant the current with the advent of future trends?
- Downward and Leveling Price Adjustments Suggest Resources Continue to Grow Commensurate with Demand



Don't Forget ...

- Incorporating Ancient Grains such add natural, plant-based nutrition to almost any formulation.
- Ancient Grains, especially in the case of amaranth, offer advantages in moisture retention, texture, viscosity control, and flavor.
- These Ancient Grains are non-GMO, Gluten Free, Top 8 Allergy Friendly (*not spelt; kamut)
- Ancient Grains can be used in a variety of applications from breads to crackers to granolas to beverages.
- The Supply chain infrastructure, while broadly established, must continue to grow



Who is Nu-World Foods?

Founded in 1983 as Nu-World Amaranth, Inc. Nu-World Foods now offers:

- Ancient Grain, Gluten-Free, and Allergy-Friendly Ingredients
- Contract Blending & Packaging of Flours and Dry Mixes
- Over 35 years experience with ancient grains, including gluten-free and mainstream products

Closely held family business with:

- Corporate Headquarters in Naperville, Illinois
- Three Processing and Warehouse Facilities in Dyersville, Iowa



**Organic, Vegan, and Non-GMO Certifications available upon request*





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