USA Dry Pea & Lentil Council

How to use Pulses

in Gluten-Free, Allergen-Averse Product Development

June 20, 2013

BEST VANTAGE Inc. webinar presentation

USA Dry Pea & Lentil Council

STATE OF IDAHO

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IDAHO DEPARTMENT OF AGRICULTURE


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Presentation Objectives

- Overview: Pulses and pulse-based ingredients
- Overview: The gluten-free and allergen-averse market opportunity
- Principles in gluten-free formulation
- How to use pulses in gluten-free and allergen-averse formulations
- Conclusions

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Section 1

Overview: Pulse and Pulse-Based Ingredients

- Pulses – definitions and nomenclature
- Nutritional advantages of pulses
- Pulse production in the United States

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What are Pulses?

1. Pulses are legumes classified separately from oilseeds, such as peanuts and soybeans.
2. There are **10 categories of pulses,** as defined by the U.N. Food & Agriculture Organization (FAO). Of these, seven are of commercial importance as foods and only five are significant in international food trade. The remainder serve primarily as animal feeds.
3. Because they return or “fix” nitrogen in the soil, pulses are **highly sustainable** and often used as rotational crops to restore the quality of farmland.
4. Rich in **protein, protein quality, soluble fiber, insoluble fiber, antioxidants, vitamins, minerals,** and **low in oil content,** pulses are gaining attention as nutritionally superior foods and food ingredients.
5. Pulses are used in many different ways in foods today.
6. Pulses are also **free of gluten and other allergens** that must be declared in FDA allergen declaration labels.

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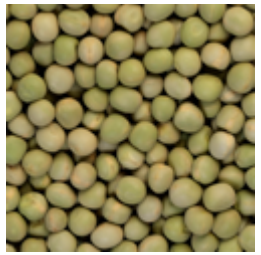
What are Pulses?

Pulses important to human food consumption:

1. Chickpeas (garbanzo beans)
2. Dry beans (*Phaseolus* spp.)
3. Lentils
4. Dry peas (field peas)
5. Broad (Fava) beans
6. Pigeon peas
7. Cowpeas




Of these seven categories, only the first five are important to international trade. Cowpeas and pigeon peas are important food crops primarily in Africa and Asia, but are rarely traded across national borders.

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What are Pulses?

Pulses that are important to food formulation

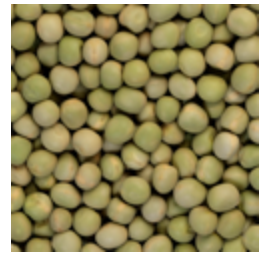
We will focus upon three categories produced in the United States:

- Chickpeas (garbanzo beans)
- Dry peas (field peas)
- Lentils

Chickpeas (Garbanzo)

Split Yellow Peas

Whole Green Peas



There are multiple varieties of peas and lentils. The varieties presented in this slide are the primary varieties used in industrial food manufacture.

Regular Lentils

Pardina Lentils

Red Lentils

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Pulses offer Exceptional Nutritional Value

PULSE COMPOSITION

[g/100g]

Food Reference	Protein	Fat	Starch & Sugars	Fiber
Beef[1]	77.5	8.6	0.0	0.0
Whole Soy Flour - Raw	35.0	20.0	25.6	9.6
Dry Peas	**23.7**	**1.3**	**45.5**	**16.6**
Regular Lentils	**26.3**	**1.1**	**45.0**	**13.6**
Chickpeas	**24.4**	**5.9**	**41.1**	**8.7**
Whole Wheat	13.2	2.5	61.3	10.0
Whole Rice Flour	5.6	1.4	77.7	2.4
Tapioca Flour	0.2	0.0	87.8	0.9

[1] *Whole Chuck, 10% moisture basis*

Sources: Canadian Grain Commission; U.S. Dept. of Agriculture-ARS; Cho, S., Prosky, L. and Dreher, M. Complex Carbohydrates in Foods, 1999, Marcel Dekker, Inc., New York, NY.

Plus…

- Superior amino acid profile
- Vitamins
- Minerals
- Low-Glycemic Index
- Non-GMO

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What about Protein and Fiber?

2012 Food & Health Survey
Consumer Attitudes Toward Food Safety, Nutrition & Health

Survey conducted by the International Food Information Council (IFIC)

The percentage of consumers surveyed that have considered whether or not a food contains the following nutrients when making purchase decisions about packed food and beverages is:

- **Fiber 62%**
- **Protein 56%**

Protein and fiber are sought-after nutrients!

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Where are Pulses Grown?

The United States is one of the premier pulse-producing regions in the world.

U.S. Pulse Production

	Metric Tons 2011	Global Rank
Dry Peas	255,150	9th
Lentils	214,640	5th
Chickpeas	97,205	16th

Source: United Nations FAOSTAT

The United States also provides…

- A superior production, manufacturing and distribution infrastructure.
- Multiple university and technical centers to provide technical support and innovation.

Because of the U.S.'s highly developed quality grading, handling and production control systems, U.S. pulse producers receive top dollar for their pulses in world export markets.

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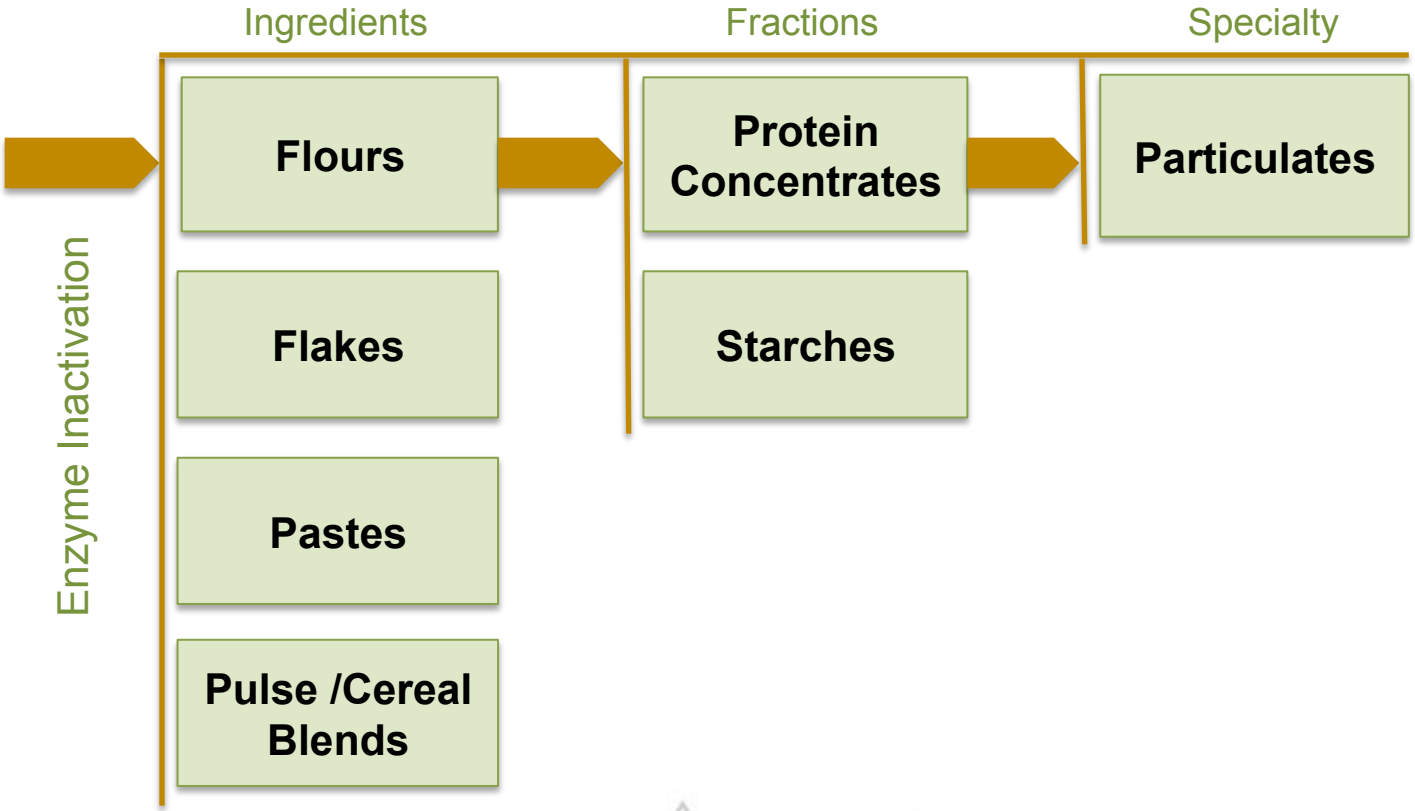
Pulses as Food Ingredients

Pulses can be processed into a variety of food ingredients.

- Dry peas
- Chickpeas
- Lentils



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Section 2

Gluten-Free and Allergen-Averse Market Opportunities

- Size and dynamics of the gluten-free / allergen-averse market
- Why this market will continue to grow
- The importance of nutritional parity.

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Why Gluten-Free and Allergen-Averse Products?

1. **CELIAC DISEASE:** The primary driver for gluten-free products is celiac disease, which is estimated to affect 0.8% to 1.2% of the U.S. population.
2. **GLUTEN SENSITIVITY**: However, this category also addresses the needs of people with gluten sensitivity and wheat allergies. Medical and nutritional literature estimates for the incidence of gluten sensitivity range from 0.5% to 7.0% of the population.
3. **OTHER FOOD ALLERGIES:** In addition, many other consumers are concerned about consuming gluten-containing products or other potential allergens for a variety of other health-related reasons.
4. **OTHER (athletes, etc.)**

GLUTEN- and/or ALLERGEN-FREE is often a family decision. Households with members that suffer from celiac disease or other food allergies are more likely to remove all offending foods from their household.

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Why Gluten-Free and Allergen-Averse Products?

U.S. Food Allergen Labeling and Consumer Protection Act of 2004

FALCPA passage was based on estimates that eight major food allergens account for 90% of all food allergies:

- Milk
- Eggs
- Fish
- Crustacean shellfish
- Tree nuts
- Peanuts
- Wheat
- Soybeans

- FALCPA required all foods to clearly identity all ingredients that contained one or more of the identified allergens.
- Pulses can play important roles as ingredient alternatives for those food allergens highlighted in **red**.

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Why Gluten-Free and Allergen-Averse Products?

U.S. Food Allergen Labeling and Consumer Protection Act of 2004

The U.S. Food & Drug Administration is behind schedule in formulating final rules to govern “gluten-free” claims on foods.

SEC. 206. GLUTEN LABELING. Deadlines. Regulations. 21 USC 343

Not later than 2 years after the date of enactment of this Act, the Secretary of Health and Human Services, in consultation with appropriate experts and stakeholders, shall issue a proposed rule to define, and permit use of, the term ”gluten-free" on the labeling of foods.

Not later than 4 years after the date of enactment of this Act, the Secretary shall issue a final rule to define, and permit use of, the term “gluten-free" on the labeling of foods

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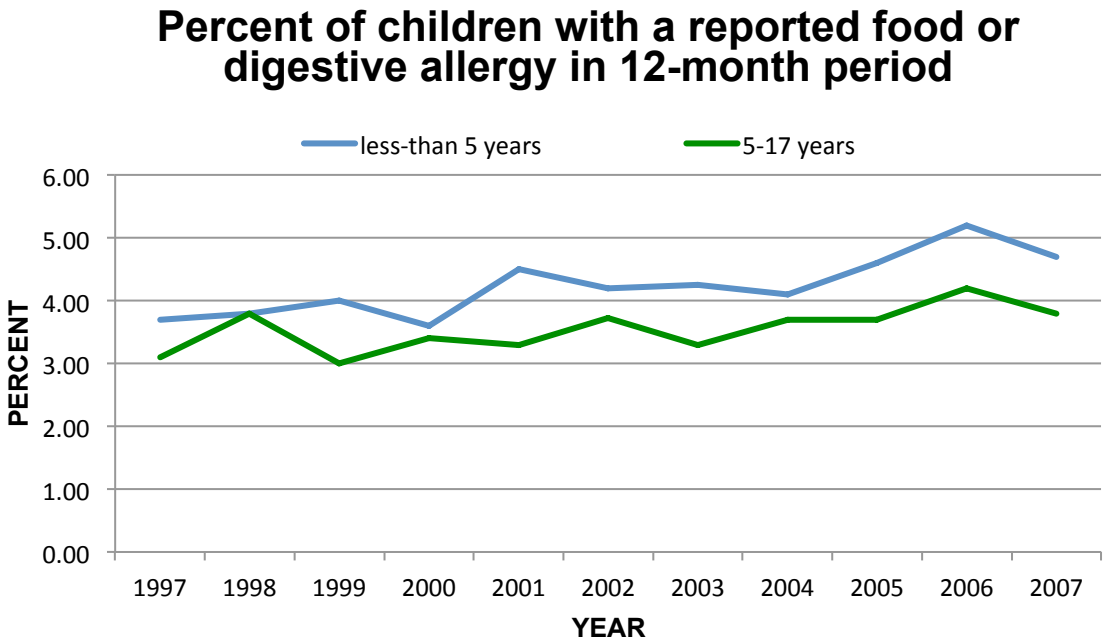
Why Gluten-Free and Allergen-Averse Products?



The incidence of food allergies in children has been trending upwards.

Adapted from : Branum A, Lukacs S. Food allergy among U.S. children: Trends in prevalence and hospitalizations. National Center for Health Statistics Data Brief. 2008. Retrieved from http://www.cdc.gov/nchs/data/databriefs/db10.htm

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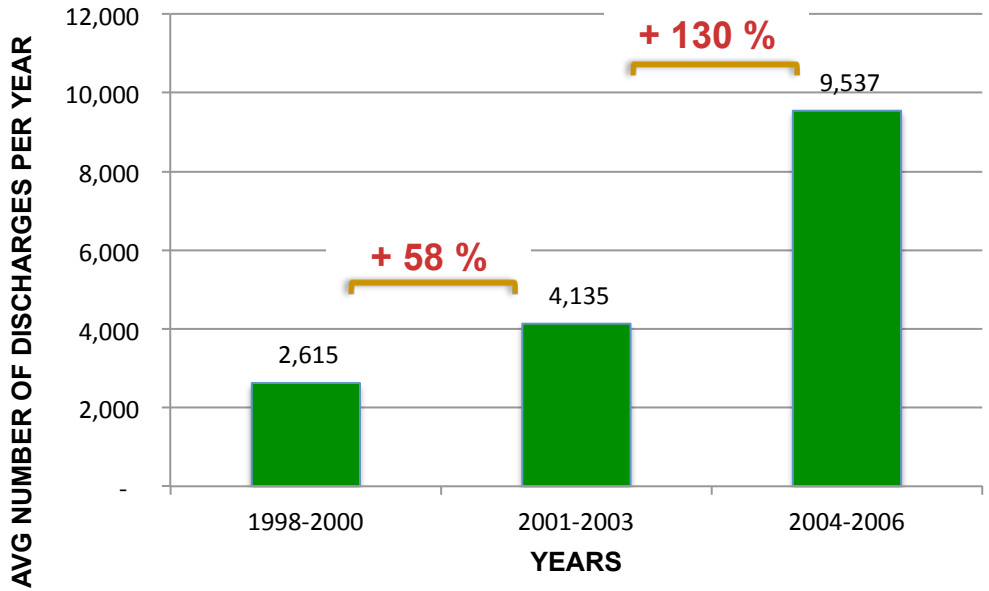
Why Gluten-Free and Allergen-Averse Products?

Average Number of Hospital Discharges per Year
children under 19 with food allergy-related diagnoses



Hospitalizations of children for food allergy-related problems have increased dramatically.

The U.S. Food & Drug Administration has variously indicated that…

…"millions of Americans" suffer food allergy reactions every year,

…leading to 30,000 hospitalizations

…and 150 deaths per year.

Adapted from : Branum A, Lukacs S. Food allergy among U.S. children: Trends in prevalence and hospitalizations. National Center for Health Statistics Data Brief. 2008. Retrieved from http://www.cdc.gov/nchs/data/databriefs/db10.htm

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How Big is the Gluten-Free Market Opportunity?

Packaged Facts Report

(October 2012)

"The market for gluten-free foods and beverages has continued to grow even faster than anticipated, reaching **$4.2 billion in 2012**, for a compound annual growth rate of 28% over the 2008-2012 period."

"**18% of adults** are buying or consuming foods products tagged as gluten-free"

"Packaged Facts projects that U.S. sales of gluten-free foods and beverages will **exceed $6.6 billion by 2017**."

Packaged Facts Report projections are based on Food, Drug and Mass Merchandise (FDMx) product scan data.

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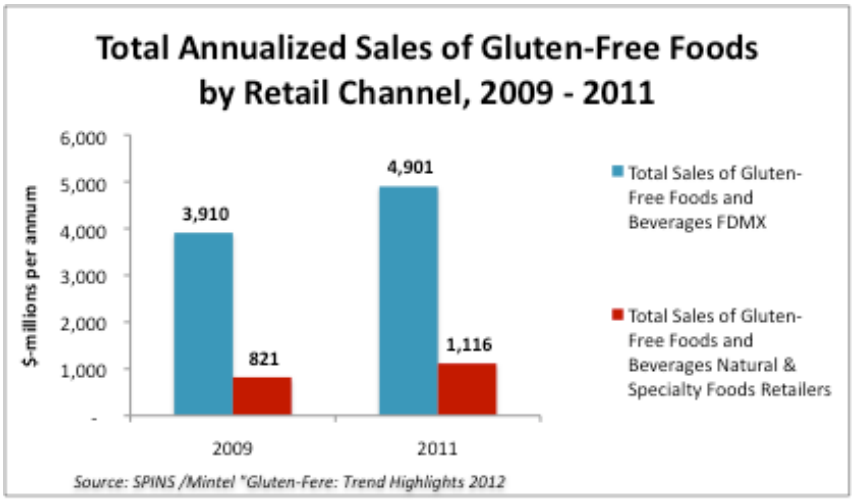
How Big is the Gluten-Free Market Opportunity?

SPINS /Mintel Gluten-Free Report

(Sept, 2011)



The “best case” projection was $10 billion in sales by 2013.

August, 2012 update - $12.4 billion, "including Walmart”)

SPINS / Mintel gluten-free market projections are based on Food, Drug and Mass Merchandise (FDMx) product scan data **PLUS** natural food and specialty retailers.

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How Big is the Gluten-Free Market Opportunity?

However, the following categories were not included in either the Packaged Facts or SPINS /Mintel gluten-free market surveys:

- Whole Foods (about 15% of all retail food and foodservice sales)
- Trade Joe's
- Restaurant /food service
- Store brands
- PLU (coded-entry sales)
- Multilevel marketers
- Internet Sales.

BEST VANTAGE Inc. estimates the current gluten- and allergen-free market size at $10 - 15 billion with a potential to reach **$70** billion by 2020.

For comparison, total estimated 2012 wholesale food retail and foodservice sales in the U.S. were about $1.3 trillion in 2012.

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The Importance of Nutritional Parity

1. Wheat flour is one of the most important venues of nutritional enrichment in the U.S. diet.
2. By substituting for wheat flour, gluten-free /allergen-averse products risk making themselves vulnerable to claims of being nutritionally inferior to wheat flour-containing products.
3. Pulses add important nutritional value to gluten-free/allergen-averse products.
4. We also recommend additional fortification and enrichment, as needed.

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Section 3

Principles of Gluten-Free and Allergen-Averse Formulation

- Formulation of gluten-free foods
- Achieving or exceeding nutritional parity
- Gluten-free starting formulations

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Formulation of Gluten-Free and Allergen-Averse Foods

Major Food Allergens

- Milk
- Eggs
- Fish
- Crustacean shellfish
- Tree nuts
- Peanuts
- Wheat
- Soybeans

Food product developers have many ingredient alternatives available to them for use as substitutes for identified food allergens.

Major Food Ingredient *Alternatives*

- **Pulse flours**
- Rice flour
- Tapioca flour
- Quinoa
- Sorghum
- Potato flour
- Teff
- Sweet potato flour
- Corn
- Oat flour
- Pulse starches
- Pulse proteins
- Other proteins and starches

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Formulation of Gluten-Free and Allergen-Averse Foods

Proteins and carbohydrates provide the two core building blocks in most food formulations:

Protein Functionality

- Structure
- Strength
- Texture /mouthfeel
- Coloration
- Emulsification
- Gelation
- Film-forming
- Foaming
- Water control
- Viscosity
- Flavor
- Opacity / turbidity
- Particle suspension
- Adhesion
- Agglomeration

Both food protein and carbohydrate components contribute a wide selection of functional properties to foods.

Carbohydrate* Functionality

- Structure
- Strength
- Texture /mouthfeel
- Emulsification
- Gelation
- Film-forming
- Foaming
- Water control
- Viscosity
- Opacity / turbidity
- Particle suspension
- Adhesion
- Agglomeration

** Starches, hydrocolloid gums, dietary fibers.*

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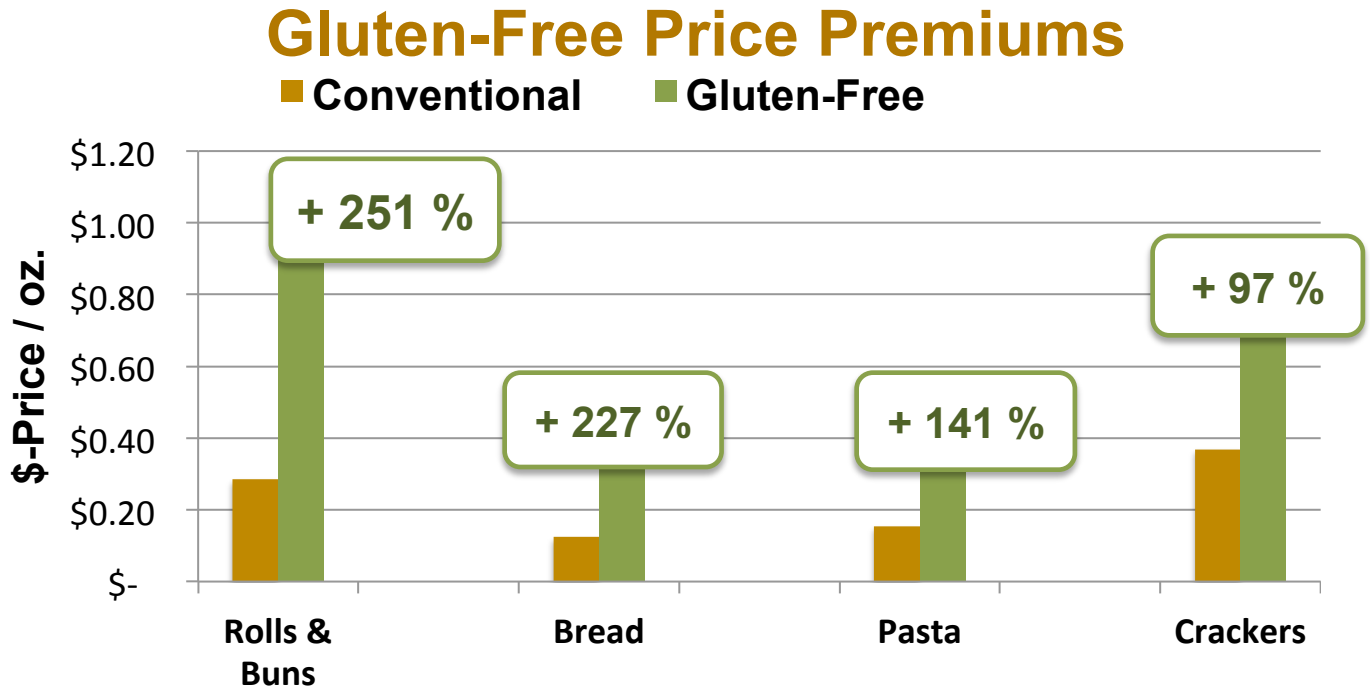
The good news is that, for now, people are willing to pay stiff premiums for gluten-free foods, which gives food product developers considerable flexibility in their choice of ingredients.

People Pay Premium Prices for Gluten-Free!



Based on random retail store checks conducted by BEST VANTAGE Inc. in the Chicago metropolitan area during May 2013.

Pea, chickpea and lentil ingredients tend to be very cost-competitive with other gluten-free ingredient alternatives.

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Formulation of Gluten-Free and Allergen-Averse Foods

Pulses contain high-levels of proteins, soluble and insoluble dietary fibers and starches (including resistant starches) that combine together in many unique ways that define their functional properties in food products.

PULSE COMPOSITION
[g/100g]

Food Reference	Protein	Fat	Starch & Sugars	Fiber
Dry Peas	23.7	1.3	45.5	16.6
Regular Lentils	26.3	1.1	45.0	13.6
Chickpeas	24.4	5.9	41.1	8.7
Whole Rice Flour	5.6	1.4	77.7	2.4
Tapioca Flour	0.2	0.0	87.8	0.9

Sources: Canadian Grain Commission; U.S. Dept. of Agriculture-ARS; Cho, S., Prosky, L. and Dreher, M. Complex Carbohydrates in Foods, 1999, Marcel Dekker, Inc., New York, NY.

Plus…

- Superior amino acid profile
- Vitamins
- Minerals
- Low Glycemic Index
- Non-GMO

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Formulation of Gluten-Free and Allergen-Averse Foods

Suppliers of pea, chickpea and lentil-based ingredients offer a wide range of highly specific protein and starch ingredients for use in food formulations.

Available Pulse Ingredients

- Whole pulses
- Roasted pulses
- Flakes, grits
- Raw flour
- Air-classified flours
- Pre-cooked flour
- Pre-gelled flour
- Protein concentrates
- Protein isolates
- Starches
- Bran meal
- Fiber

List of Pulse Ingredient Suppliers

Dakota Dry Bean, Inc.
Grand Forks, ND

Fiberich Technologies, Inc.
St. Louis Park, MN

George F. Brocke & Sons
Kendrick, ID

Harvest Innovations
Indianola, IA

Hinrichs Trading Co.
Pullman, WA

Inland Empire Foods, Inc.
Riverside, CA

SK Food International
Fargo, ND

United Pulse Trading
Bismarck, ND

Woodland Foods, Inc.
Gurnee, IL

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Formulation of Gluten-Free and Allergen-Averse Foods

OBJECTIVE: To duplicate the functional properties of wheat flour in a food system

Baked Goods Ingredients

- Proteins
- Starches
- Shortenings
- Leavening agents
- Emulsifiers
- Water
- Flavoring
- Salt

Proteins

Pulse flours and other **gluten-free flours** offer a range of functional protein combinations.

Protein functionality can be enhanced using **pulse flour fractions** (e.g., **pea protein concentrates** and **isolates**) and/or film-forming hydrocolloids, such as **xanthan gum**.

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Formulation of Gluten-Free and Allergen-Averse Foods

OBJECTIVE: To duplicate the functional properties of wheat flour in a food system

Baked Goods Ingredients

- Proteins
- Starches
- Shortenings
- Leavening agents
- Emulsifiers
- Water
- Flavoring
- Salt

Texturizers

Dough and finished product textures can be further optimized using combinations of gums, shortenings, enzymes and emulsifiers.

Minerals (e.g. calcium) can affect product functionality and texture.

Water: the most important texturizing ingredient is water.

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Formulation of Gluten-Free and Allergen-Averse Foods

OBJECTIVE: To duplicate the functional properties of wheat flour in a food system

Baked Goods Ingredients

- Proteins
- Starches
- Shortenings
- Leavening agents
- Emulsifiers
- Water
- Flavoring
- Salt

Flavor Systems

Salt, acidulants and **flavors** can remain largely unchanged, but ensure that they do not contain allergens as carriers.

A choice between **chemical** and **yeast leavenings** will significantly affect flavor.

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The Importance of Nutritional Parity

1. Wheat flour is an important dietary source of **micronutrient enrichment.**

2. In the interest of nutritional parity, we submit that it is important to **equal or exceed the micronutrient content** contributed by enriched wheat flour.

3. We recommend adding a **vitamin-mineral premix** to achieve or exceed nutritional parity.

   - Optimize your vitamin-mineral blend dilution to a practical working level using carriers.

   - Confirm that your vitamin-mineral carrier is gluten-free.

Vitamin-Mineral Premix

- Niacin
- Iron
- Thiamine
- Riboflavin
- Folic Acid

Courtesy of The Wright Group, Inc.

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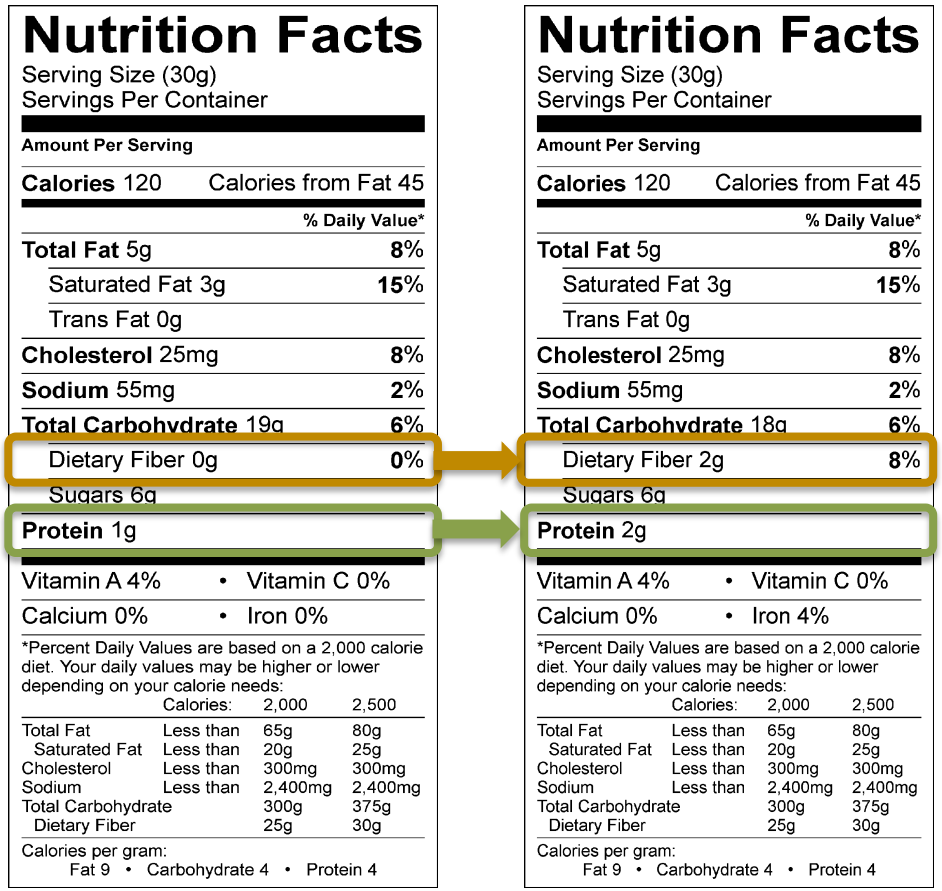
The Importance of Nutritional Equivalence

Gluten-Free Shortbread

INGREDIENTS: **Gluten-Free Flour (tapioca flour, rice flour)**, Sugar, Butter, **Lentils**, Eggs, Salt, Baking Soda, Flavor, Xanthan Gum.

Replacement of 30% of a gluten-free blend of tapioca and rice flours with lentil flour resulted in:

- Increased **protein** from 1g to 2g per 30g serving.
- Increased **Total Dietary Fiber** from 0g to 2g per 30g serving.



Nutrition Facts

Serving Size (30g)
Servings Per Container

Amount Per Serving

Calories 120	Calories from Fat 45
	% Daily Value*
Total Fat 5g	**8%**
Saturated Fat 3g	**15%**
Trans Fat 0g	
Cholesterol 25mg	**8%**
Sodium 55mg	**2%**
Total Carbohydrate 19g	**6%**
Dietary Fiber 0g	**0%**
Sugars 6g	
Protein 1g	

Vitamin A 4%	• Vitamin C 0%
Calcium 0%	• Iron 0%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Nutrition Facts

Serving Size (30g)
Servings Per Container

Amount Per Serving

Calories 120	Calories from Fat 45
	% Daily Value*
Total Fat 5g	**8%**
Saturated Fat 3g	**15%**
Trans Fat 0g	
Cholesterol 25mg	**8%**
Sodium 55mg	**2%**
Total Carbohydrate 18g	**6%**
Dietary Fiber 2g	**8%**
Sugars 6g	
Protein 2g	

Vitamin A 4%	• Vitamin C 0%
Calcium 0%	• Iron 4%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

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The Importance of Nutritional Equivalence

Gluten-Free Organic Lentil Pasta

Serving size: 85g

	%-Formula
• 21g Protein per serving	**24.7%**
• 13g Total Dietary Fiber per serving	**15.3%**

Percent Daily Value

- Riboflavin 15%
- Calcium 20%
- Vitamin B6 10%
- Iron 40%
- Thiamin 20%
- Niacin 8%
- Folate 30%
- Zinc 25%

The nutritional enhancement contributed by pulses is evident in this pasta formulation, both in terms of macro- and micronutrients.

Nutrition Facts

Serving Size 3 oz (85g)
Servings Per Container 4

Amount Per Serving	
Calories 310	Calories from Fat 10
	% Daily Value*
Total Fat 1g	**1%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 10mg	**0%**
Total Carbohydrate 56g	**19%**
Dietary Fiber 13g	**54%**
Sugar 6g	
Protein 21g	

Vitamin A 0%	•	Vitamin C 2%
Calcium 20%	•	Iron 40%
Vitamin D 0%	•	Thiamine 20%
Riboflavin 15%	•	Niacin 8%
Vitamin B_6 10%	•	Folate 30%
Vitamin B_{12} 0%	•	Zinc 25%

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Gluten-Free and Allergen-Averse Formulations

Gluten-Free Pasta

- Pasta is one of the easiest products to render gluten-free.
- The challenge is to obtain a consistent and appealing *al dente* texture that is robust to variations in cooking and preparation conditions.
- Pulses can comprise from 0% to 100% of a gluten-free pasta formula.

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Gluten-Free and Allergen-Averse Formulations

Gluten-Free Pasta

Examples of gluten-free pasta ingredient statements:

[**INGREDIENTS:** Corn Flour; Rice Flour, Mono & Diglycerides]

[**INGREDIENTS:** Organic Rice Flour; Organic Rice Starch; Organic Potato Starch; Organic Soy Flour]

[**INGREDIENTS:** Rice Flour; Rice Bran Extract]

[**INGREDIENTS:** Lentils; Water]

Pasta textures can be further enhanced by using purified pulse starches and proteins, as well as hydrocolloids, such as xanthan or guar.

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Gluten-Free Pasta

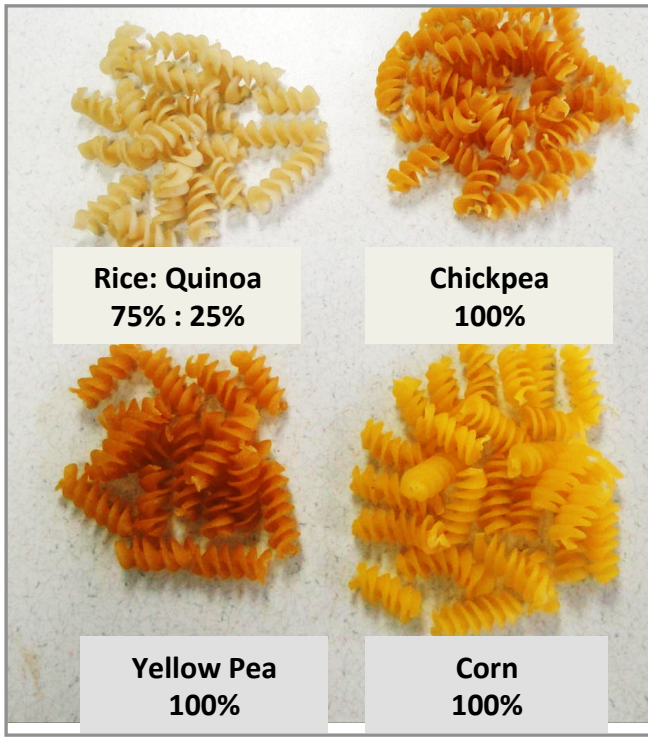
Effect of pea flour on pasta quality

Level of pea flour incorporation

	0%	5%	10%	15%	20%
Cooking Quality (al dente)					
Cooked Wt (g)	75.8	75.3	77.7	77.2	76.3
Cooking Loss (%)	5.9	5.6	5.9	6.1	6.3
Cooked Firmness (g cm)	12.9	12.4	12.5	13.4	14.4
Cooking Quality (overcook 6 min)					
Cooked Wt (g)	87.4	86.7	87.9	88.0	88.0
Cooking Loss (%)	7.2	6.6	7.3	7.2	7.3
Cooked Firmness (g cm)	9.3	9.0	9.1	9.6	10.2

Pasta al dente quality and robustness increased with increased levels of pea flour incorporation.

Source: Northern Crops institute



100% Legume Pasta

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Gluten-Free and Allergen-Averse Formulations

Chocolate-Chip Cookies

Laboratory-scale formulation

	Weight (g)	Formula-%
Butter, soft	170.0	15.3%
Brown sugar	112.0	10.1%
Sugar	112.0	10.1%
Egg	114.0	10.3%
Vanilla Flavoring	8.0	0.7%
Pregelled pea flour	**64.0**	**5.8%**
Pregelled chickpea flour	**64.0**	**5.8%**
Rice flour	52.0	4.7%
Potato starch	87.0	7.8%
Tapioca flour	29.0	2.6%
Xanthan gum	3.8	0.3%
Baking powder	5.0	0.5%
Baking soda	6.0	0.5%
Salt	3.0	0.3%
Semi-Sweet Chocolate Chips	280.0	25.2%

Note: although this formula contains eggs, suitable egg replacers are available as alternatives.

- Cream butter and sugar, add eggs and vanilla.
- Gradually add dry ingredients to creamed mix.
- Mix 1-minute at medium speed.
- Stir in chocolate chips
- Spoon and bake 8 – 10 min. @ 375°F

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Gluten-Free and Allergen-Averse Formulations

Gluten-Free Pizza-Crust

Laboratory-scale formulation

	Weight (g)	Formula-%
Chickpea flour	**300**	**29.9%**
Sugar	20	2.0%
Tapioca flour	150	14.9%
xanthan gum	20	2.0%
Salt	4	0.4%
Italian Seasoning	10	1.0%
Instant Yeast	30	3.0%
Water (100°F / 38°C)	460	45.8%
Canola oil	10	1.0%

- Mix instant yeast into warm water.
- Combine dry ingredients in mixer.
- Slowly add yeast/water blend and oil into mixer under medium-to-low shear until thoroughly blended.
- Roll dough into desired shape, use tapioca flour to prevent sticking.
- Bake 10-min. @ 400°F (204°C).
- Add toppings and finish bake.

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Gluten-Free and Allergen-Averse Formulations

Other Gluten-Free, Allergen-Averse Applications

Pea, chickpea and lentil flours and fractions can enhance a wide range of gluten-free, allergen-averse food applications, such as:

- Soups and sauces (thickeners, emulsifiers)
- Dips and spreads (thickeners, emulsifiers)
- Liquid meals (thickeners, protein source)
- Fried foods (batters, breadings)
- Meatloaf and meatballs (binders, moisturizers)
- Trail mixes
- Nutrition bars
- Extruded snacks

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Section 4

Summary and Conclusions

- Summary & Conclusions
- Additional Resources
- Questions and Answers

REMINDER Please email WEBINAR questions to amcdaniel@pea-lentil.com

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Summary and Conclusions

- Gluten-free, allergen-averse foods represent a fast-growing market based on legitimate consumer concerns. It is here to stay.
- Peas, chickpeas and lentils are highly sustainable agricultural crops produced in the United States to the highest global quality standards.
- Pulses contain no allergens that must be declared on food package labels.
- Nutritional parity with wheat flour is important to the long-term success of gluten-free, allergen-averse foods.
- Dry peas, lentils and chickpeas provide cost-effective functional ingredients for gluten-free and allergen-averse food product development that are:
    a. High in protein
    b. High in Total Dietary Fiber
    c. Low in fat
    d. Rich in essential vitamins and minerals
    e. Low Glycemic Index
    f. Non-GMO

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Additional Resources

- **The USA Dry Pea and Lentil Council**

  Contact: Ali McDaniel
  Email: amcdaniel@pea-lentil.com
  Tel. 1-208-596-5026
  Website: www.pea-lentil.com

- **Northern Crops Institute (North Dakota State University)**

  Contact: Thunyaporn “Naggie” Jeradechachai
  Email: T.jeradechachai@ndsu.edu
  Tel. 1-701-231-7736
  Website: www.northern-crops.com

- **BEST VANTAGE Inc.**

  Contact: Daniel Best
  Email: info@bestvantageinc.com
  Tel. 1-847-714-9527
  Website: www.bestvantageinc.com

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Industry Resources

Dakota Dry Bean, Inc.
Grand Forks, ND

Fiberich Technologies, Inc.
St. Louis Park, MN

George F. Brocke & Sons
Kendrick, ID

Harvest Innovations
Indianola, IA

Hinrichs Trading Co.
Pullman, WA

Inland Empire Foods, Inc.
Riverside, CA

SK Food International
Fargo, ND

United Pulse Trading
Bismarck, ND

Woodland Foods, Inc.
Gurnee, IL

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Additional Resources

A downloadable copy of this Webinar presentation will be posted on the USA Dry Pea & Lentil Council website in the near future @ www.pea-lentil.com. We will send webinar registrants an email notification when it becomes available.

Upcoming Webinars: Please stay tuned for future 2013 webinar presentations on more specific uses of pulse ingredients in food product development.

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QUESTIONS?

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STATE OF IDAHO

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Thank You

for you participation