



Gluten-free tortillas: Challenges & Solutions



Agenda

- Market Snapshot
- Gluten-free tortilla formulation challenges
- Gluten-free tortilla formulation solutions
 - Gluten-free flour and starch systems
 - Pulse flours and proteins
 - Fibers
 - Hydrocolloids

Key takeaways



Gluten-free by choice – the majority of products purchased is for reasons other than intolerance/sensitivity¹



Gluten is an essential component of taste and texture of tortillas through its unique functional properties



Removing gluten results in formulation challenges when developing gluten-free tortillas, e.g. building back the texture to maintain the original eating experience and texture



Using the right combination of key functional ingredients can replace gluten without compromising the eating quality of gluten-free tortillas



MARKET SNAPSHOT

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Tortilla market snapshot

Sales of tortillas in the U.S. surpassed \$12 billion in 2015 and are expected to steadily rise about 9-10% per year[1]:

- 20% of sales are chips, taco shells, and similar items
- 80% of sales are soft tortilla divided evenly between flour and corn varieties with each just over 40% of the market

Sales of flour tortillas accounted for about \$5 billion in 2014

Gluten-free tortillas, corn ones not included → small fraction of that market share

Gluten-free market expecting to reach \$2.3billion end of the decade [2] → the gluten-free tortilla segment should not be underestimated

[1] Presentation: Industry Overview, by Jim Kabbani, Tortilla Industry Assn. Executive Director; Tortilla Industry Assn. Technical Conference 2015

[2] “Gluten-Free Foods in the U.S.”, 5th Edition; Packaged Facts/ Market Research Group, LLC (January, 2015)

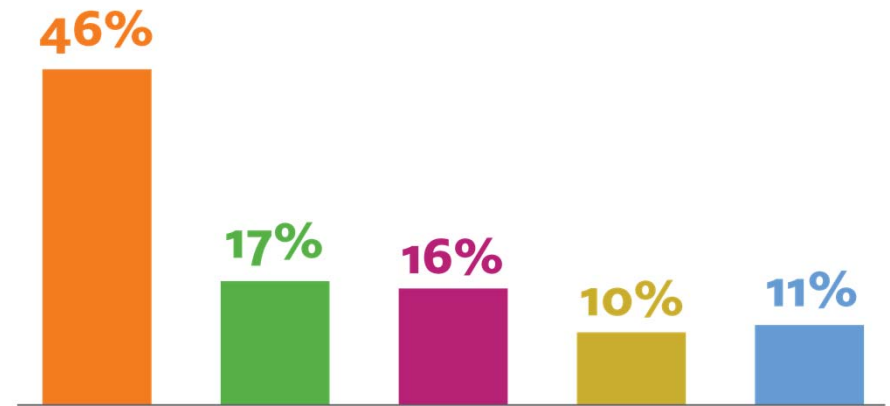
Gluten-free consumption trends

Total gluten-free **U.S. consumers:**



ONLY 3MM
DIAGNOSED AS CELIAC

The majority buys gluten-free products **by choice:**



- For reasons other than intolerance/sensitivity
- I may be gluten-intolerant/sensitive
- I was testing to see if I am gluten-intolerant/sensitive
- I am sure I am gluten-intolerant/sensitive
- Other

Gluten-free's "healthy halo"

Respondents buy gluten-free products for perceived benefits

46% 

"I think gluten-free products are generally healthier than regular products/more nutritious."

35% 

"I am trying to lose weight."

31% 

"Gluten-free products don't have unnecessary ingredients."

A clear majority enjoys gluten-free

61%

OF RESPONDENTS EAT GLUTEN-FREE AT LEAST HALF THE TIME.





GLUTEN-FREE TORTILLA FORMULATION CHALLENGES

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Flour tortilla parameters

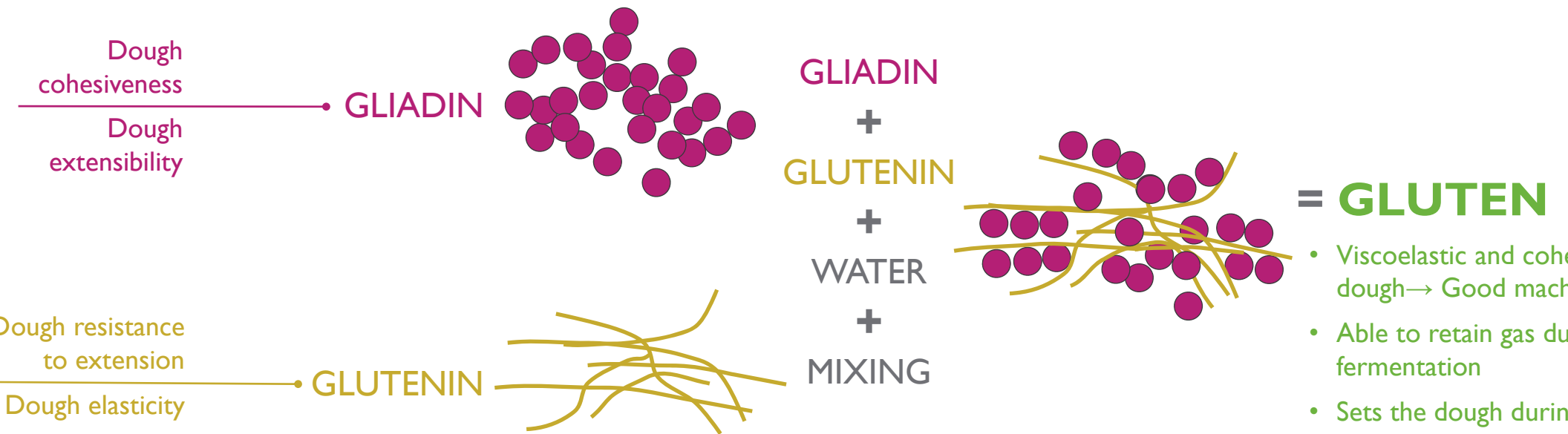
Flour tortillas should be:

- Flexible
- Easy to roll without cracking or ripping
- Round with even shape
- Somewhat elastic in texture, but not rubbery, and layered
- Slightly moist without being tacky
- Easily separated








Gluten is the main components in flour tortilla responsible to provide functionality to tortillas

What is gluten?

Wheat contains 8-16% of gluten-forming proteins:



Challenges in gluten-free tortilla product formulation

<p>PROCESSING </p>	<p>TEXTURE, TASTE, APPEARANCE </p>	<p>SHELF LIFE </p>	<p>NUTRITION PROFILE </p>
<p>Lack of viscosity or elasticity compared to the wheat-containing dough, leading to difficulties in processability and machinability</p>	<ul style="list-style-type: none"> • Poor rollability • Dry, powdery, and rubbery texture • Poor surface color • Off flavor 	<ul style="list-style-type: none"> • Shorter shelf life • Increased staling rates due to increased water mobility 	<ul style="list-style-type: none"> • Lack of protein, nutrients and fiber • Use of high levels of sugars and fats to mask the texture and flavor challenges
<p>SAFETY, QUALITY ASSURANCE, DISTRIBUTION </p>	<p>INGREDIENTS SOURCING AND COSTING </p>		<p>LABELING </p>

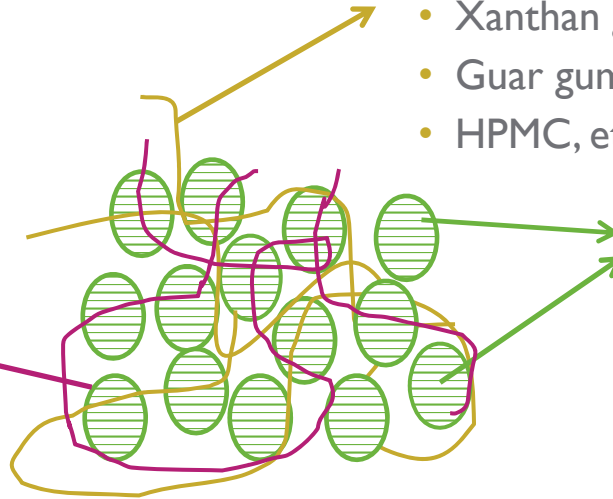
Gluten-free challenges: processing



GLUTEN-FREE BAKED GOODS

PROTEIN

- Egg
- Whey
- Pulses



HYDROCOLLOIDS

- Xanthan gum
- Guar gum
- HPMC, etc.

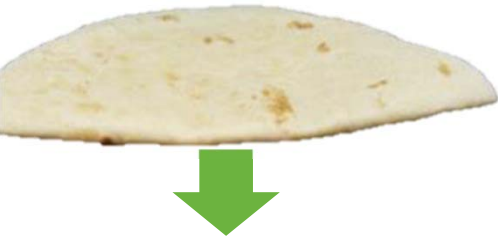
STARCH GRANULES

- Gluten-free flours
- Cook-up starches
- CWS (cold water swelling) starches

Gluten-free challenges: storing

Gluten-free products suffer changes upon storing:

- Dry
- Loss of elasticity/rollability
- Hard
- Rancid



Fresh tortilla folded in half: no cracking



Old tortilla tortilla folded in half: cracking

STORAGE REQUIREMENTS

Most gluten-free tortillas in the U.S. are sold frozen:

Important to maintain soft texture and freshness after freeze/thawing



Freeze/thaw stability

Some gluten-free tortillas are sold at room temperature:

Shelf-stable: ≈ 10-35 days

Important to maintain soft texture and freshness after storing at room temperature



Shelf life stability

Gluten-free challenges: texture, taste, and appearance



Regular tortillas

- Good rollability
- Moist and cohesive texture
- Light yellowish color with small brown blisters on the surface
- Opaque
- Hearty flavor



Gluten-free tortillas

- Poor rollability
- Dry, powdery, and rubbery texture
- Poor surface color with large blisters
- Translucent
- Off flavor

Gluten-free challenges: nutrition profile

Leading REGULAR TORTILLA

Nutrition Facts	
Serving Size 1 tortilla (49g)	
Servings per Package 10	
Amount per Serving	
Calories 140	Calories from Fat 30
% Daily Value*	
Total Fat 3.5g	5%
Saturated Fat 1.5g	8%
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 1g	
Cholesterol 0mg	0%
Sodium 420mg	18%
Total Carbohydrate 24g	8%
Dietary Fiber 1g	4%
Sugars 1g	
Protein 4g	
Vitamin A 0% * Vitamin C 0%	
Calcium 8%	* Iron 8%
* 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
Sat 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

Leading GLUTEN-FREE TORTILLA

Nutrition Facts	
Serving Size 1 Tortilla (49g)	
Servings Per Package 8	
Amount Per Serving	
Calories 130	Calories from Fat 35
% Daily Value*	
Total Fat 4g	6%
Saturated Fat 1.5g	8%
Trans Fat 0g	
Polyunsaturated Fat 1.5g	
Monounsaturated Fat 0.5g	
Cholesterol 0g	0%
Sodium 410mg	17%
Total Carbohydrate 24g	8%
Dietary Fiber 2g	8%
Sugars 1g	
Protein 2g	
Vitamin A 0% • Vitamin C 0%	
Calcium 6%	• 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

Caloric content

Total fat content

Protein and carbohydrate content

Mineral content

LESS CALORIES BUT MORE CALORIES FROM FAT

SLIGHTLY HIGHER IN FAT

LOW IN PROTEIN

LOW IN MINERALS

Bakery products vs. gluten functionality

Typical defects
of commercial
products

BISCUITS & COOKIES

- Grittiness
- Sandiness
- Lack of bite
- Taste



CAKE/MUFFIN

- Lack of volume
- Crumbliness
- Dryness
- Gumminess
- Taste
- Nutrition profile



BREAD, PIZZA, TORTILLAS

- Lack of volume
- Lack of elasticity
- Dryness
- Gumminess
- Not homogeneous
- Crumb
- Taste
- Nutrition profile



Increased
functionality
of gluten

Functionality of ingredients used

TYPE	EXAMPLES	USAGE LEVEL	FUNCTION
Native flours and starches	Corn, potato, rice, tapioca, sorghum, amaranth, buckwheat, quinoa, soy, millet, teff, pulse, nut	20-50%	<ul style="list-style-type: none"> • Bulk/backbone of the recipe • Texture modifier: body, elasticity and chewiness, crumb structure
Cook-up native functional or modified starches	Corn, tapioca, rice, potato	20-50%	<ul style="list-style-type: none"> • Texture modifier: body, elasticity and chewiness, crumb structure • Freeze/thaw stability
Pre-gelatinized native functional or modified starches	Corn, tapioca, rice, potato	2-10%	<ul style="list-style-type: none"> • Dough viscosity control • Texture modifier • Prevent staling • Freeze/thaw stability
Proteins	Whey protein, soy protein, zein, egg white powder, pulse proteins	2-5%	<ul style="list-style-type: none"> • Build structure • Color development
Other hydrocolloids/gums	Xanthan gum, guar gum, cellulose gum, alginates, konjac, psyllium husk	-.5-3%	<ul style="list-style-type: none"> • Dough viscosity control • Texture modifier • Prevent staling • Freeze/thaw stability

Measure gaps using Descriptive Sensory Analysis



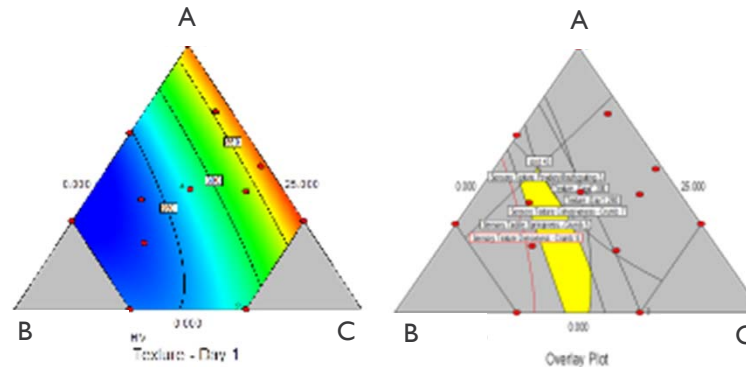
Cohesiveness of mass: the degree to which a chewed product forms a bolus/ball/holds together



Toughness of mass: the amount of graininess as perceived on the surface of the product during its mastication

Experimental approach

TYPE	EXAMPLES	USAGE LEVEL	FUNCTION
Dry fibers and starches	Corn, potato, rice, tapioca, sorghum, amaranth, buckwheat, quinoa, soy, millet, ruff, yuca, etc.	20-50%	<ul style="list-style-type: none"> Build backbone of the recipe Texture modifier: body elasticity and chewiness, crumb structure
Starches	Corn, tapioca, rice, potato	20-50%	<ul style="list-style-type: none"> Texture modifier: body elasticity and chewiness, crumb structure Freeze/thaw stability
Prefermented native starches or modified starches	Corn, tapioca, rice, potato	1-10%	<ul style="list-style-type: none"> Dough viscosity control Texture modifier Prevent staling Freeze/thaw stability
Leaveners	Whey protein, soy protein, corn, egg white powder, pea protein	2-5%	<ul style="list-style-type: none"> Build structure Color development
Water-soluble hydrocolloids/gums	Xanthan gum, guar gum, cellulose gum, alginate, locust, pectin, etc.	~3-5%	<ul style="list-style-type: none"> Dough viscosity control Texture modifier Prevent staling Freeze/thaw stability



Preliminary screening

Optimization DOE

Final optimal composition

Process

Dispersibility, dough rheology, machinability, handling

Descriptive Sensory Analysis

Cohesiveness, graininess, dissolvability, hardness, denseness, firmness, springiness, mouthcoating

Final product measurements

Hardness via Texture Analyzer, yield, height, moisture, cost



GLUTEN-FREE FORMULATION SOLUTIONS

Gluten-free flour and starch systems

Pulse flours and proteins

Fiber

Hydrocolloids



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Use of gluten-free flour and starch systems in gluten-free tortillas



Gluten-free tortilla solutions



- Manual Texture
- In-Mouth Texture

Formulation Solution I

INGREDIENTS	TRUE %
Tapioca flour and rice flour blend	39.47
Chickpea flour	14.89
Pregelatinized tapioca flour	6.38
Faba bean protein concentrate	1.80
Water	25.53
Vegetable oil	9.06
Salt	0.74
Sugar	0.98
Glycerin	1.06
Xanthan gum	0.08
TOTAL	100

Nutrition Facts	
Serving Size (49g)	
Servings Per Container	
Amount Per Serving	
Calories 160	Calories from Fat 45
	% Daily Value*
Total Fat 5g	8%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 26g	9%
Dietary Fiber 0g	0%
Sugars 1g	
Protein 2g	
Vitamin A 0%	• Vitamin C 0%
Calcium 2%	• Iron 2%
*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	

Solution 1

Base flour made out of a blend of **rice and tapioca flour**

What's unique about Solution 1?

- Good dough handling properties: good stretchability, low stickiness, good dough elasticity and sheetability
- Chewy texture and bland flavor
- Light golden color with blisters distributed among surface and layered internal texture
- Clean label and simple flour label declaration



Gluten-free tortilla solutions



- Manual Texture
- In-Mouth Texture

Formulation Solution 2

INGREDIENTS	TRUE %
Modified tapioca, corn starch, and potato starch blend	37.10
Blackpea flour	14.00
Vegetatinized modified tapioca starch	6.00
Chickpea bean protein concentrate	1.69
Water	30.00
Vegetable oil	8.52
Salt	0.69
Sugar	0.92
Ceritin	1.00
Xanthan gum	0.08
TOTAL	100.00

Nutrition Facts	
Serving Size (49g)	
Servings Per Container	
Amount Per Serving	
Calories 150	Calories from Fat 45
% Daily Value*	
Total Fat 5g	8%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 180mg	8%
Total Carbohydrate 23g	8%
Dietary Fiber 0g	0%
Sugars 1g	
Protein 2g	
Vitamin A 0%	Vitamin C 0%
Calcium 2%	Iron 2%
*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	

Solution 2

Base flour is a highly functional starch-based solution made out of **modified tapioca starch, potato starch, corn starch**

What's unique about Solution 2?

- Excellent dough handling properties: good stretchability, no stickiness, good dough elasticity, and excellent dough sheen
- Soft to the touch, flexible while bending, not hard or tough when bitten, forms a ball and absorbs moisture when chewed, but not powdery in the mouth, bland flavor
- Light golden color with darker blisters distributed among layered internal texture



Gluten-free tortilla solutions



- Manual Texture
- In-Mouth Texture

Formulation Solution 3

INGREDIENTS	TRUE %
Starch and gum blend	51.94
Salt	0.87
Double acting baking powder	0.27
Distilled monoglycerides	0.52
Fumaric acid	0.08
Baking soda	0.14
Postassium sorbate	0.08
Enzymes	0.25
Sodium stearoyl lactylate	0.25
Sodium Acid Pyrophosphate powder	0.25
Vegetable oil	7.10
Water	38.25
TOTAL	100.00

Nutrition Facts			
Serving Size (49g)			
Servings Per Container			
Amount Per Serving			
Calories 130	Calories from Fat 35		
% Daily Value*			
Total Fat 4g	6%		
Saturated Fat 0g	0%		
Trans Fat 0g			
Cholesterol 0mg	0%		
Sodium 270mg	11%		
Total Carbohydrate 23g	8%		
Dietary Fiber 1g	4%		
Sugars 0g			
Protein 1g			
Vitamin A 0%	• Vitamin C 0%		
Calcium 4%	• 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

Solution 3

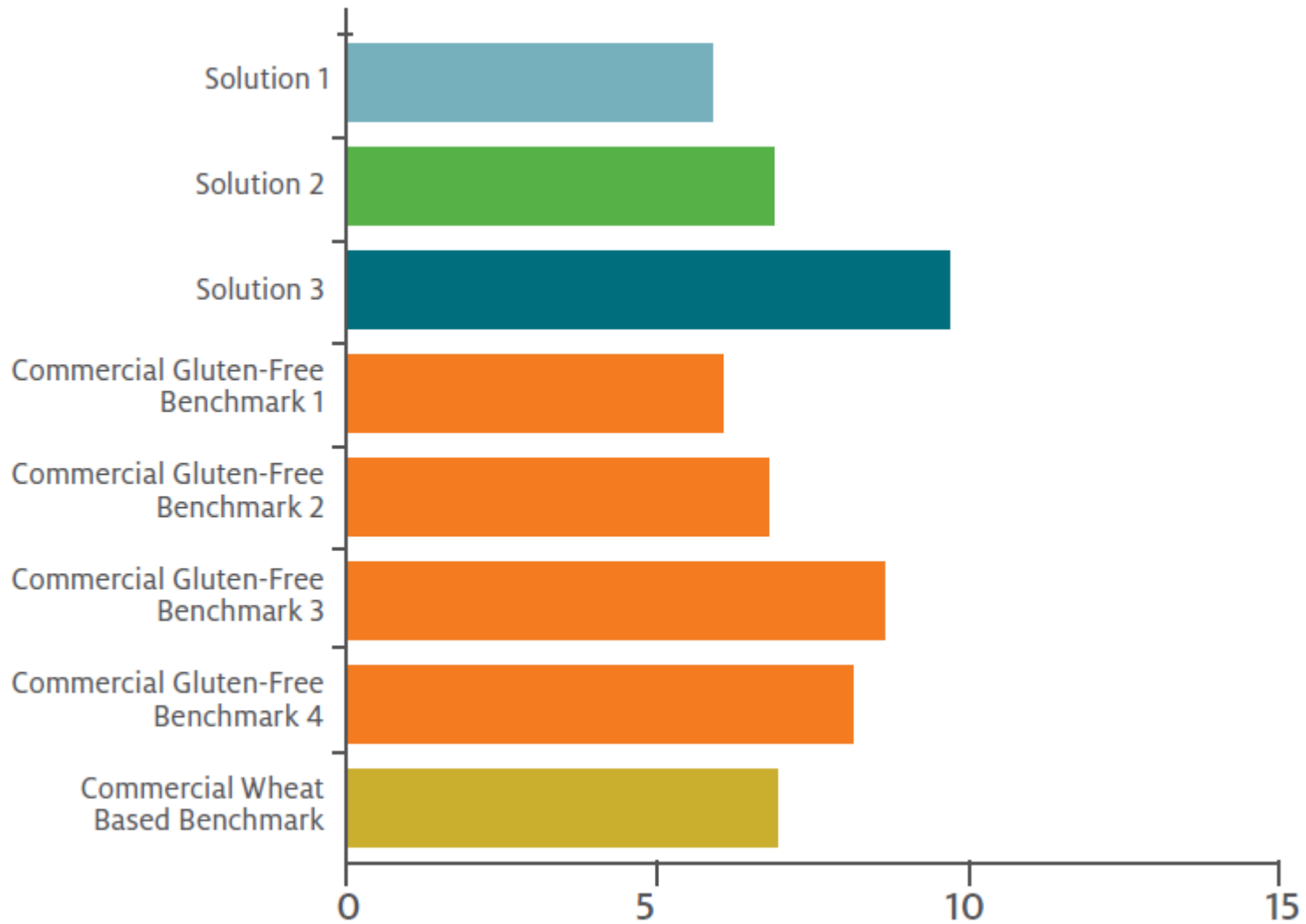
Base flour is a highly functional blend of starches and gums made out of **rice flour, food starch, rice flour, potato starch, tapioca starch, carboxymethyl cellulose, dextrose, guar gum, and xanthan gum**



What's unique about this product?

- Especially designed to make high-quality gluten-free tortillas
- Provides excellent tortilla stretchability, rollability without cracking, flexibility, good machinability, bland flavor and high water-holding capability

Stretch to Break



Use of pulse flours and proteins in gluten-free tortilla formulations

What are pulses?

Pulses are the **dried seeds of plants in the legume family.**

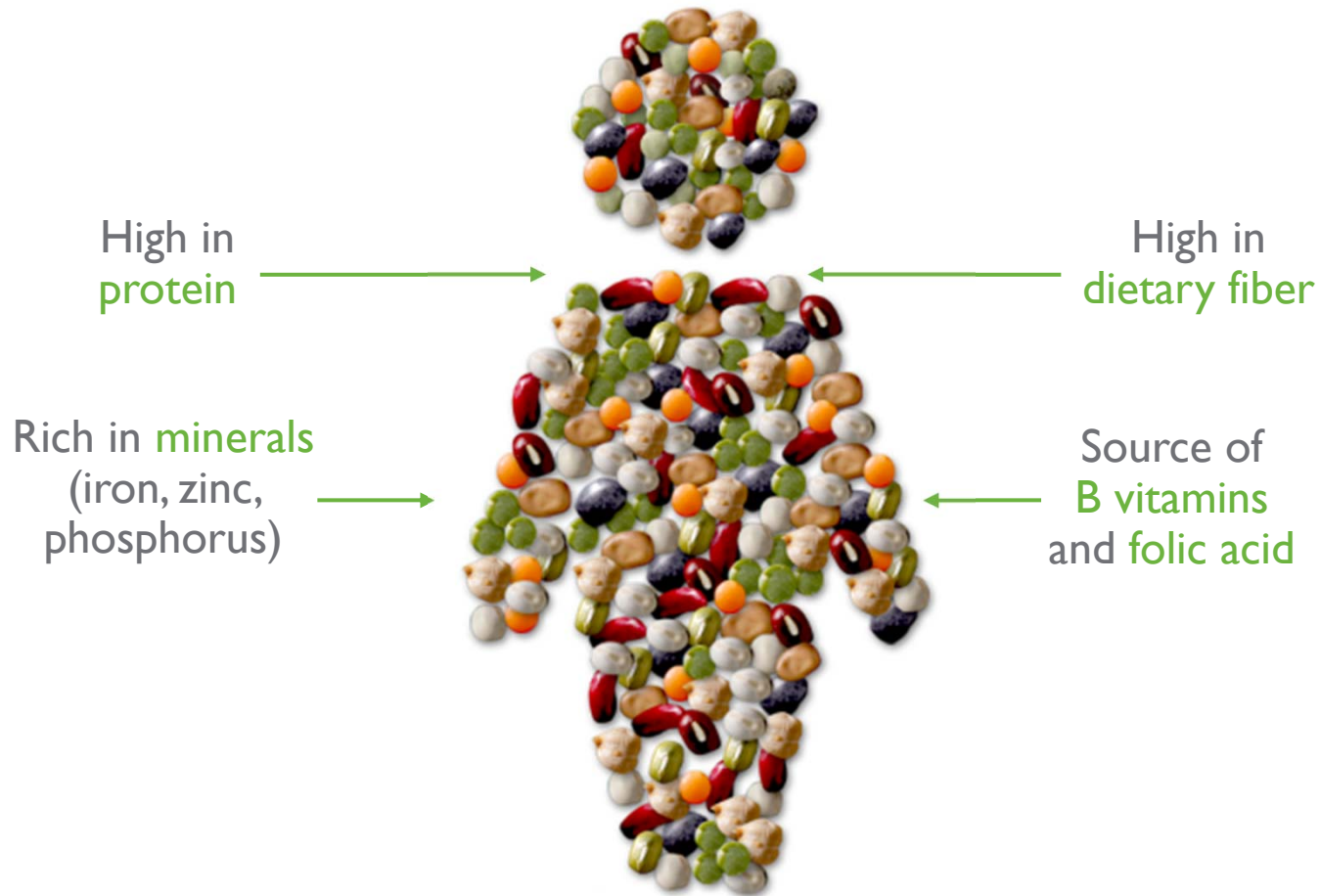
They include:

- Peas
- Beans
- Lentils
- Chickpeas



Pulses are nutrition powerhouses

ENRICHMENT BENEFITS



Pulse flours vs. other flours

FOOD	PROTEIN	FAT	STARCH & SUGAR	FIBER
Cassava flour	0.2	0.0	87.8	0.9
Whole corn flour	8.0	7.0	62.0	8.0
Whole rice flour	5.6	1.4	77.7	2.4
Whole soy flour	35.0	20.0	25.6	9.6
Whole wheat flour	13.2	2.5	61.3	10.0
Dry pea	23.7	1.3	45.5	16.6
Lentil	26.3	1.1	45.0	13.6
Chickpea	24.4	5.9	41.1	8.7
Dry bean	24.5	1.5	41.5	22.5

Exceptional nutrition value

- High in protein (high in lysine), dietary fiber, micronutrients (iron, zinc, selenium, β -carotene)
- Low glycemic index (GI=40-55)

Ingredients for innovation

Pulse flours and pulse protein concentrates

FUNCTIONALITY	VALUE	REGULATORY STATUS
<ul style="list-style-type: none">• Emulsification• Texture• Gelation• Water-holding• Adhesion• Film forming• Blending	<ul style="list-style-type: none">• Enhance texture and provide moist mouthfeel• Good synergy with other gluten-free flours• Increase protein• Eliminate other proteins, such as egg whites	<ul style="list-style-type: none">• Certified as FSSC, ISO 9000, Kosher, Halal• Capability to produce organic product• Certified as Gluten-Free by Intertek• Certified as Non-GMO Project Verified• GRAS status:<ul style="list-style-type: none">– Pulse flours considered traditional food ingredients– Pulse proteins are self-affirmed GRAS

Use of pulses in gluten-free tortillas

Gluten-free tortillas with an enhanced nutrition profile that deliver the taste and texture of wheat-based versions

Modified tapioca starch mimics the functionality of wheat flour in gluten-free products

Chickpea flour is a gluten-free, pulse-based flour. Adds color to the tortilla and improves nutrition

Pregelatinized modified tapioca starch is a high-performance cold water swelling modified food starch derived from tapioca; it exhibits many of the properties of a modified cook-up starch and possesses a very bland flavor profile with good melt-away characteristics

Faba bean protein concentrate helps with dough handling, adds color, improves elasticity and tortilla resilience

INGREDIENTS	PERCENT %
Modified tapioca starch	37.10
Chickpea flour	14.00
Pregelatinized modified tapioca starch	6.00
Faba bean protein concentrate	1.69
Water	30.00
Vegetable oil	8.52
Salt	0.69
Sugar	0.92
Glycerine	1.00
Xanthan gum	0.08
TOTALS	100.00



Nutrition Facts	
Serving Size (49g)	
Servings Per Container	
Amount Per Serving	
Calories 150	Calories from Fat 45
% Daily Value*	
Total Fat 5g	8%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 170mg	7%
Total Carbohydrate 24g	8%
Dietary Fiber 0g	0%
Sugars 0g	
Protein 2g	
Vitamin A 0%	Vitamin C 0%
Calcium 2%	Iron 2%
*Percent Daily Values are based on a diet of 2,000 calories. 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	

PROCEDURE

1. Pre-heat griddle to 400F and tortilla press at 130F
2. Combine dry ingredients in mixing bowl with paddle at speed 1 for 30 seconds
3. Add glycerine and combine at speed 1 for 30 seconds
4. Add slowly the water and the oil simultaneously while mixing at speed 1 until a cohesive dough starts forming
5. Switch to dough hook and continue mixing at speed 1 for another 1.5 min or until dough is properly mixed
6. Cover dough with plastic wrap; let dough rest for 5-10 min
7. Divide dough into 58g balls
8. Lightly coat both tortilla press surfaces with spray oil and remove excess with a paper towel
9. Place dough ball in the center of the tortilla press and press down strongly
10. Cook tortilla in the griddle for 60 seconds on each side
11. Let tortilla cool down covered with a paper towel

Improve processability of sheeted products

AFTER MIXING



SHEETING



AFTER CUTTING



HEMOCRAFT®
Pulse CT 1203
clean-taste pea flour

Gluten-free crackers were scaled up on pilot-scale sheeting equipment

- No issues with sticking or breaking observed

Versatility in gluten-free baked goods

Protein level (g/28g serving):

2g/serving



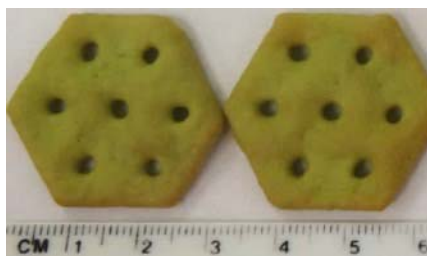
Low pea flour

2g/serving



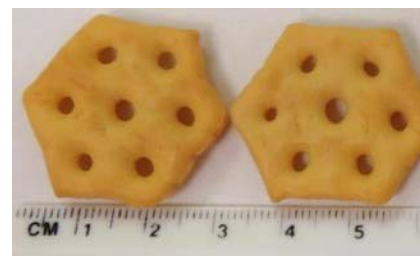
Yellow pea flour

5g/serving



Green pea flour

6g/serving



Yellow pea flour
Yellow pea protein

PULSE INGREDIENTS PROVIDE:

- Golden brown color contributed by protein
- Natural color (e.g., yellow, green, red, etc.) inherited from pulses
- Characteristic pulse flavor from conventional pulse ingredients or neutral flavor from clean-taste ingredients
- Adjustable protein level

Applicable to a wide variety of baked goods such as tortillas, pasta, puffed snacks, etc.



Use of fibers in gluten-free tortilla formulations



Great eating experience in fiber-enriched products

Potato and corn starch based fibers:

- Allows to create new high-fiber tortillas with taste and texture of regular “white flour” applications
- Similar water-holding capacity to wheat flour for ease of processing
- Clean and mild sensory properties with little or no impact on taste, texture and color of products
- Process-stable fiber that enables savings through reduced cost-in-use
- Inherently reduce the calories in formulations when substituted for flour, starches or other fully caloric carbohydrates (0.47-0.60 kcal/g)

Use of fiber in gluten-free flat bread

free tortillas with an enhanced nutrition that deliver the taste and texture of based versions

Modified tapioca starch mimics the quality of wheat flour in gluten-free

Chickpea flour is a gluten-free, pulse-based adds color to the tortilla and nutrition

Starch is an invisible source of gluten-free fiber provides a good source of fiber formulation

Modified tapioca starch is a high-temperature cold water swelling modified food derived from tapioca; it exhibits many of properties of a modified cook-up starch and has a very bland flavor profile with good melt-away characteristics

Faba bean protein concentrate helps with handling, adds color, improves elasticity tortilla resilience

i2S NUTRITION™

INGREDIENTS	PERCENT %
Modified tapioca starch	34.03
Chickpea flour	9.44
Pregelatinized modified tapioca starch	3.10
Corn starch	9.00
Faba bean protein concentrate	1.74
Water	29.78
Vegetable oil	8.52
Salt	0.71
Sugar	0.92
Yeast, instant	0.83
Distilled mono- and diglycerides	0.25
Xanthan gum	0.25
Olive oil	7.94
Honey	2.93
TOTALS	100



Nutrition Facts	
Serving Size (50g) Servings Per Container	
Amount Per Serving	
Calories 140	Calories from Fat 40
% Daily Value*	
Total Fat 5g	8%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 180mg	8%
Total Carbohydrate 26g	9%
Dietary Fiber 4g	16%
Sugars 1g	
Protein 2g	
Vitamin A 0%	Vitamin C 2%
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Dietary Fiber	25g 30g
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

PROCEDURE

- Using stand mixer fitted with paddle attachment, blend all of the dry ingredients together in a stand mixer on lowest
- Dissolve honey in water (≈40°F) and Gradually add the water, honey, and mixing on low speed for 1 minute.
- Switch to medium speed and mix for seconds or until a smooth, uniform created and begins to pull from the bowl.
- Cover bowl with plastic wrap and minutes on benchtop.
- Pre-heat convection oven with low 500° F.
- Divide dough into 50g rounds, using BAKE GF as dusting flour.
- Dust surface with PRECISA BAKE G dough to 0.15" thick and let rest minutes.
- Bake for 7 minutes, flipping flatbread half way through baking (at 3.5 minutes lightly browned).
- Remove from oven and place on rack
- Pack and freeze to store.

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Use of hydrocolloids in gluten-free tortillas

Use of hydrocolloids in gluten-free tortilla formulation

PRODUCT	FUNCTIONALITY
Xanthan gum	Batter viscosity and cohesive texture
Guar gum	Batter viscosity, freeze/thaw stability and moisture retention
CMC	Structure and moisture retention
Psyllium husk	Upfront dough viscosity, dough malleability and moisture retention

Key takeaways



Gluten-free by choice – the majority of products purchased is for reasons other than intolerance/sensitivity¹



Gluten is an essential component of taste and texture of tortillas through its unique functional properties



Removing gluten results in formulation challenges when developing gluten-free tortillas, e.g. building back the texture to maintain the original eating experience and texture



Using the right combination of key functional ingredients can replace gluten without compromising the eating quality of gluten-free tortillas

Create gluten-free tortillas that delight ...



Let's get started!

www.ingredion.us/glutenfree

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Thank you!

Q&A

