

September 2018

Gluten free tortilla formulation

Lone Baek, DuPont Nutrition & Health

Wheat tortilla

Soft, flexible, moist
Smooth, uniform
Stable during shelf life

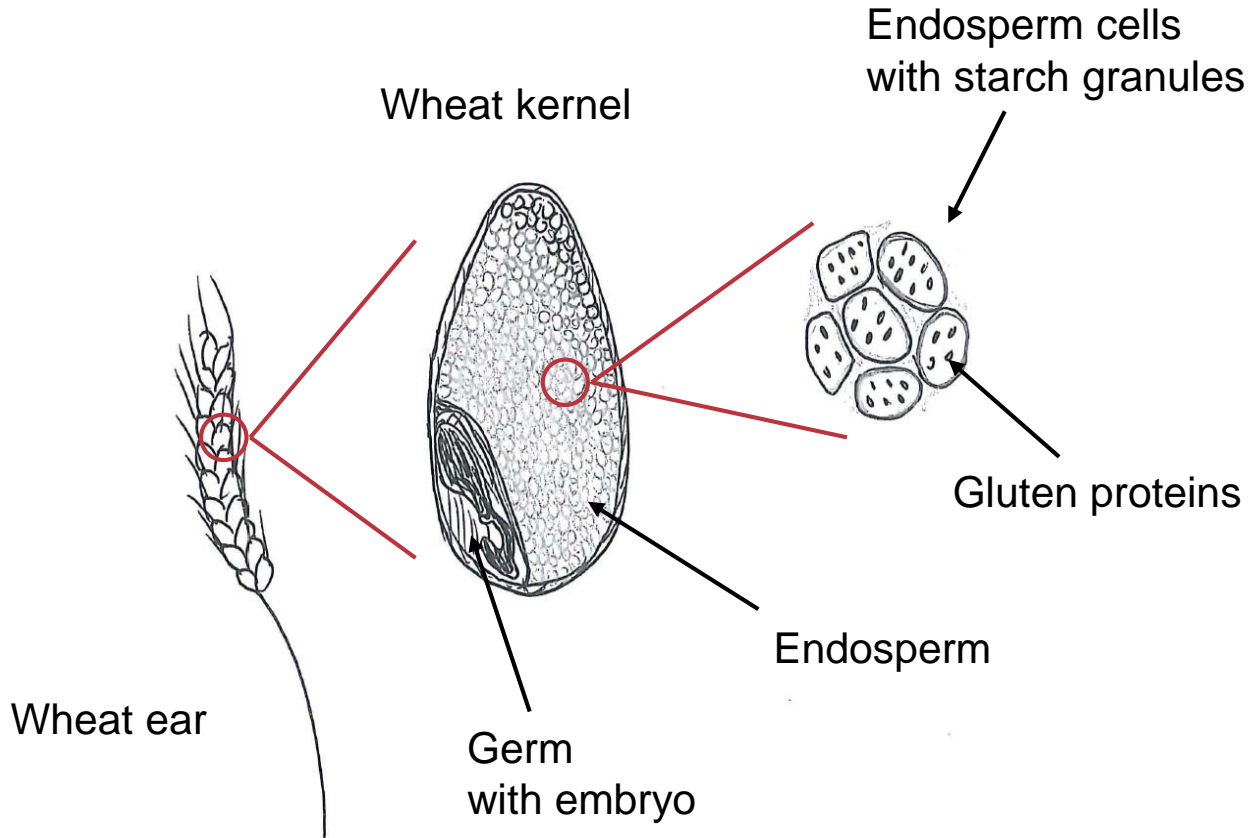


Wheat flour composition

- Starch (70-75%)
- Water (14%)
- Protein (10-12%)
- Non starch polysaccharides (2-3%)
- Lipids (2%)



Gluten proteins

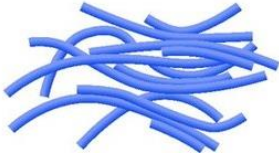


Gluten in bakery



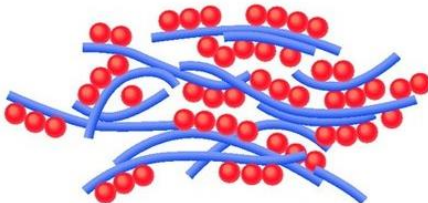
Gliadin

- Soluble in alcohol-water solution
- Limited elasticity and cohesive
- Contribute mainly to the viscosity and extensibility of the dough



Glutenin

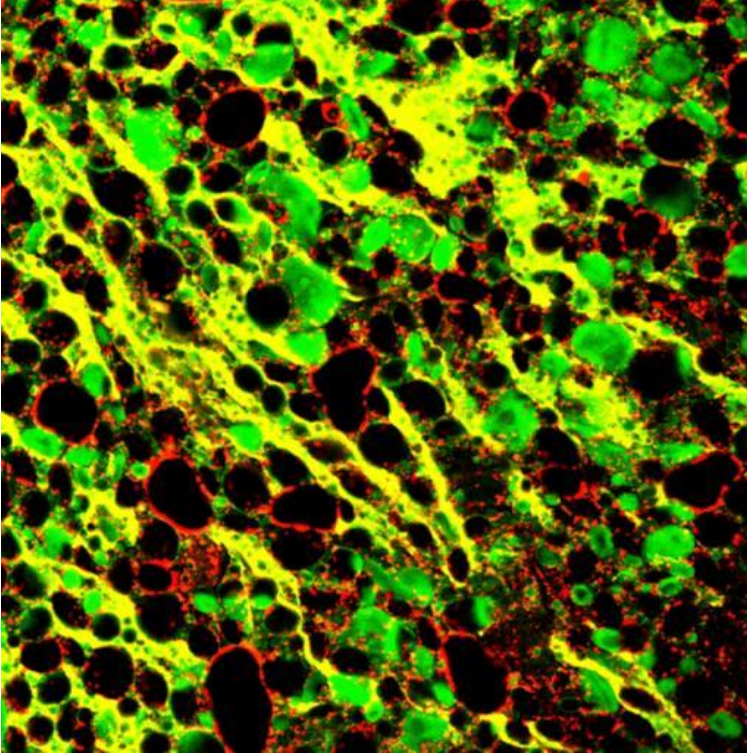
- Insoluble in alcohol-water solution
- Cohesive and elastic
- Responsible for dough strength and elasticity



Gliadin + glutenin = gluten

- Mixture of both is essential for the viscoelastic properties of the dough and the quality of the end product

Gluten network visualized by CLSM



Why gluten free tortilla

Diet for patients with gluten intolerance
(e.g. celiac disease)

Consumer focus on gluten free / increasing demand

High end product

Healthy bakery

Differentiation



Substitution of wheat flour with wheat starch

Nutrition Data (per 100g)		
(Calculated by Recipe Developer Version 1.10.013.32 © Hamilton Grant Limited 2014)		
Energy (kcal)	324.1	kcal
Energy (kJ)	1361.2	kJ
Protein	6.6	g
Carbohydrate	57.3	g
of which sugars	1.8	g
of which polyols	0.0	g
Fat	7.2	g
of which saturates	1.0	g
Fibre	2.3	g
Sodium	0.5	g

Protein
content

Fiber
content

Nutrition Data (per 100g)		
(Calculated by Recipe Developer Version 1.10.013.32 © Hamilton Grant Limited 2014)		
Energy (kcal)	314.7	kcal
Energy (kJ)	1321.6	kJ
Protein	0.3	g
Carbohydrate	62.3	g
of which sugars	1.0	g
of which polyols	0.0	g
Fat	6.8	g
of which saturates	1.0	g
Fibre	0.1	g
Sodium	0.5	g

Gluten-free tortilla

Key Challenges

Dry, inflexible wrap

Rapid staling – short shelf life

Sticky dough, poor elasticity

Less protein content

Lack of texture in final product

Difficult to process

Poor visual appearance



Gluten free formulation

Starch source

Viscosity

Elasticity

Protein source

Fiber

Water absorption capacity



Gluten free cereals



- > Rice, *Oryzoidae*
- > Maize, *Panicoideae zea maize*
- > Sorghum, *Sorghum bicolor*
- > Teff, *Eragrostis Tef*
- > Finger Millet, *Eleusin coracana*
- > Proso Millet, *Pennisetum glaucum*
- > Oat, *Avena Sativa*

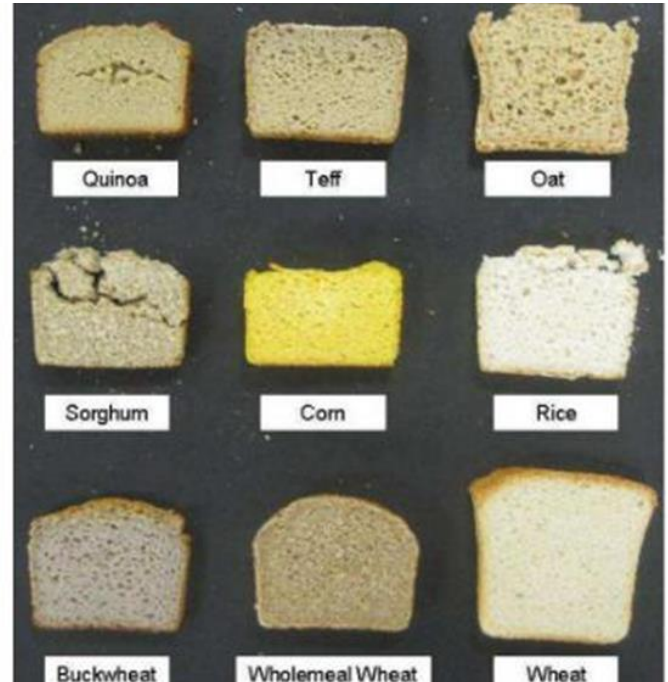
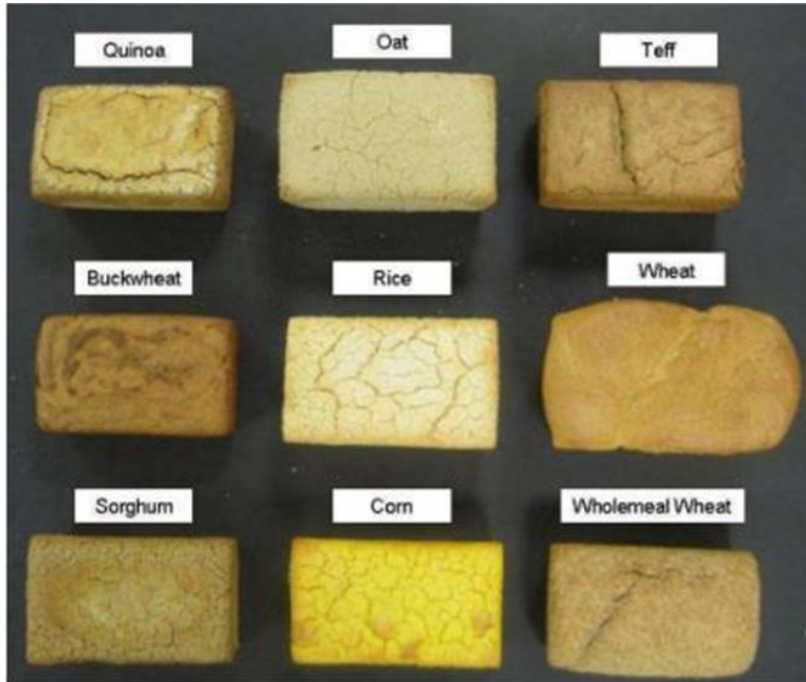


Gluten free pseudocereals

- > Buckwheat, *Fagopyrum esculentum*
- > Amaranth, *Amaranthus cruentus*
- > Quinoa, *Chenopodium quinoa*



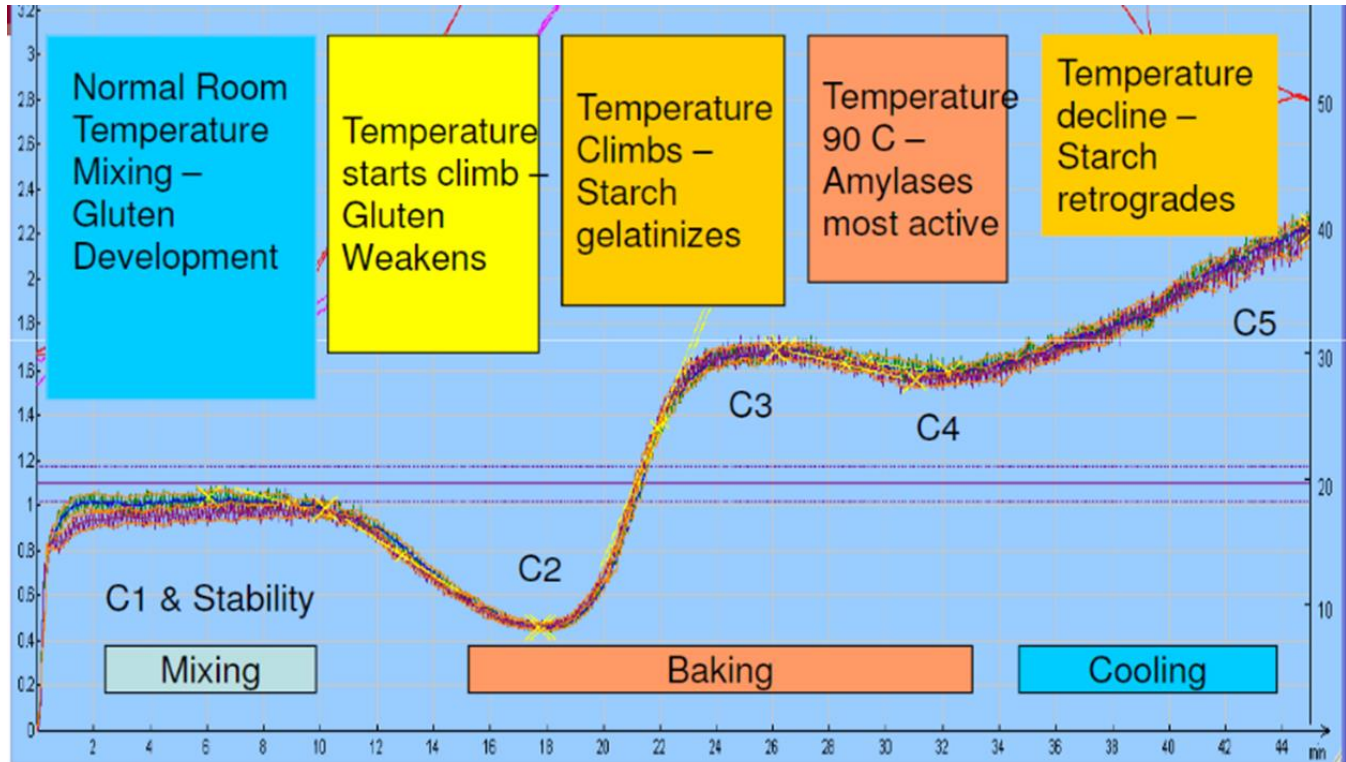
Bread baked with gluten free flours



Elke K. Arendt: "Replacing gluten as a functional constituent in baked goods"

Dough rheology/baking simulation

Mixolab



Or build your own

Starch source, i.e.

- Potato
- Rice
- Corn
- Potato
- Tapioca
- Wheat

Protein source, i.e.

- Soy protein
- Pea protein
- Potato protein



Gluten free/wheat free roll

Water, potato flour, corn starch, tapioca starch, brown rice flour, buckwheat flour, sunflower seeds, corn flour, thickening agent (xanthan gum, cellulose gum), treacle, linseeds, rice bran, pea protein, apple fibre, yeast, sourdough (fermented quinoa, rice and maize flour), psyllium husk, salt, rapeseed oil, inulin, ascorbic acid, acidifier (glucono-delta-lactone), citric acid, malic acid, tartaric acid, millet flakes

Value-adding benefits of POWERFlex®

for wheat tortilla

High flexibility

- Excellent rollability without cracking and no translucency

Efficient production

- Improved dough pressability
- Uniform shape of products

Reduced stickiness and good impression

- Ease of dispatch from package
- Reduction of dry edges

Stay-fresh quality

- Longer shelf life with freshly-baked characteristics

POWERFlex for gluten free tortilla

Starch source:

Rice, tapioca, potato
1:1:1

Protein source:

Soy protein concentrate
(Procon 2000)

POWERFlex GF 4201:
Gums, emulsifiers, coated
citric acid, enzymes

Water, shortening, glycerol,
bakery syrup, salt,
preservatives, raising agent

POWERFlex[®] GF 4201

Functionality

- > Dough consistency and handling:
Xanthan, guar, cellulose gum, LBG
- > Freshness, flexibility, adhesion control:
Distilled monoglyceride
- > pH regulation without translucency
Coated acid
- > Freshness and flexibility:
Enzymes



POWERFlex[®] GF 4201

Still roll-able after 4 months storage at ambient temperature



POWERFlex® GF 4201



Makes it possible to produce gluten-free tortillas with an appealing taste and texture



Facilitates the manufacturing process and improves roll-ability after 4 months of storage at ambient temperature

DuPont ingredients suitable for gluten-free bread

Ingredient category	Dough		Bread Functionality									
	Dough stiffness	Water uptake	Volume	Softness		Sensory Moistness	Resilience/ Cohesiveness	Crust color	Sweetener	Nutrition		Food Protection
				Intital	Shelf Life					Fiber	Protein	
Hydrocolloids	••	••	•	•	•	••	•			••		
Enzymes		•	••	••	••	••	•	•				
Emulsifiers	••	•	•	••	••							
Fibers			•		••	•		•		••		
Sweeteners									••			
Proteins											••	
Fermentates												••

• = small positive impact

•• = medium to high positive impact

Thank You



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