



Product Profile

Cigi (Canadian International Grains Institute) | cigi.ca



Gluten-Free Pan Bread Formulated with Fava Bean Flour

Pulse Flours in Gluten-Free Pan Bread

As the gluten-free market continues to grow, consumers are searching for gluten-free products that are both great tasting and nutritious. Pulse flours are high in protein, dietary fibre, vitamins and minerals. Incorporating them into gluten-free bread formulations creates an opportunity to enhance the nutritional profile. This information sheet will demonstrate how the addition of pulse flours affects the quality of gluten-free bread and illustrate the advantage of using pulse ingredients in gluten-free food applications.

Gluten-Free Bread Formulation and Lab Scale Processing

Gluten-free pan bread was made using three different pulse flours according to the formulation listed in Table 1. Fava bean, chickpea or split yellow pea flour was incorporated at 30 or 50% to show the potential of using different pulse types.

Water, sugar and yeast were combined and allowed to sit until a foam developed, approximately 5 minutes. In a separate bowl, flours and starches were sifted and then whisked with the remaining dry ingredients. Oil and vinegar were added to a KitchenAid stand mixer bowl, followed by the yeast mixture and the dry ingredients. Mixing was done using the whisk attachment on speed 1 for two minutes, stopping to scrape down the sides of the bowl after 1 minute. The batter was poured into a loaf pan and a wet knife was used to smooth the top. The batter was covered and allowed to proof at room temperature for 30 minutes. The loaf was baked for 1 hour at 375°F. Bread was allowed to cool before slicing.

Table 1. Formulations for Gluten-Free Pan Bread Containing Pulse Flours

	Formulation Amount (Bakers %)		
	Control	30% Pulse Flour	50% Pulse Flour
Flour blend	100	100	100
• White rice flour	• 68.2	• 47.7	• 34.1
• Potato starch	• 22.7	• 15.9	• 11.4
• Tapioca starch	• 9.1	• 6.4	• 4.5
• Pulse flour	• 0	• 30	• 50
Sugar	5.9	5.9	5.9
Whole egg powder	3.6	3.6	3.6
Yeast	2.2	2.2	2.2
Salt	2.2	2.2	2.2
Egg white powder	2.0	2.0	2.0
Xanthan gum	1.6	1.6	1.6
Water (30°C)	90.9	90.9	90.9
Canola oil	13.6	13.6	13.6
Cider vinegar	1.1	1.1	1.1

Results and Recommendations

Adding pulse flours increased the nutritional profile of the bread, and depending on the inclusion level, made them eligible for a dietary fibre nutrient content claim. The addition of pulse flours resulted in breads with a firmer texture and smaller cell diameters compared to the control bread (Table 2). On day 4, bread made with fava bean flour required the least amount of force to compress suggesting it resisted staling more than the other pulse flours. Among the three pulse types, the bread containing fava bean flour produced a bread with milder flavor as indicated in preliminary taste trials. Cigi's technology staff are continuing to optimize gluten-free pulse bread formulations to meet the needs of gluten-free companies, retailers and consumers.

Table 2. Gluten-Free Pan Bread Quality when Formulated with Selected Pulse Flours

Bread Type	Force Required for Compression			Slice Characteristics	
	Day 0 (g)	Day 1 (g)	Day 4 (g)	Cell Diameter (mm)	Height (mm)
Control	980.7	2166.7	2569.2	2.23	10.2
30% Fava Bean Flour	1537.5	2827.1	2702.9	1.86	10.0
50% Fava Bean Flour	1566.5	2564.8	2514.9	1.95	10.0
30% Chickpea Flour	1533.0	2998.3	3159.6	1.83	10.1
50% Chickpea Flour	2167.4	3472.7	ND ¹	1.67	9.8
30% Split Yellow Pea Flour	1558.9	2724.2	2573.9	1.96	10.1
50% Split Yellow Pea Flour	1996.8	3360.9	3249.1	1.89	10.1

¹ Data unavailable



Nutrition Facts for Gluten-Free Breads Formulated with Fava Bean Flour (L to R: control, 30% fava bean, 50% fava bean)

Nutrition Facts Valeur nutritive		Nutrition Facts Valeur nutritive		Nutrition Facts Valeur nutritive	
Serving Size (60 g) / Portion (60 g)		Serving Size (60 g) / Portion (60 g)		Serving Size (60 g) / Portion (60 g)	
Amount Teneur	% Daily Value % valeur quotidienne	Amount Teneur	% Daily Value % valeur quotidienne	Amount Teneur	% Daily Value % valeur quotidienne
Calories / Calories 150		Calories / Calories 120		Calories / Calories 100	
Fat / Lipides 4.5 g 7 %		Fat / Lipides 4.5 g 7 %		Fat / Lipides 4.5 g 7 %	
Saturated / saturés 0.4 g + Trans / trans 0 g 2 %		Saturated / saturés 0.4 g + Trans / trans 0 g 2 %		Saturated / saturés 0.3 g + Trans / trans 0 g 2 %	
Cholesterol / Cholestérol 0 mg		Cholesterol / Cholestérol 0 mg 0 %		Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 250 mg 10 %		Sodium / Sodium 250 mg 10 %		Sodium / Sodium 250 mg 10 %	
Carbohydrate / Glucides 27 g 9 %		Carbohydrate / Glucides 25 g 8 %		Carbohydrate / Glucides 23 g 8 %	
Fibre / Fibres 1 g 4 %		Fibre / Fibres 3 g 12 %		Fibre / Fibres 4 g 16 %	
Sugars / Sucres 2 g		Sugars / Sucres 2 g		Sugars / Sucres 2 g	
Protein / Protéines 3 g		Protein / Protéines 5 g		Protein / Protéines 6 g	
Vitamin A / Vitamine A 0 %		Vitamin A / Vitamine A 0 %		Vitamin A / Vitamine A 0 %	
Vitamin C / Vitamine C 0 %		Vitamin C / Vitamine C 0 %		Vitamin C / Vitamine C 0 %	
Calcium / Calcium 0 %		Calcium / Calcium 2 %		Calcium / Calcium 2 %	
Iron / Fer 2 %		Iron / Fer 4 %		Iron / Fer 6 %	

CONTACT US

To learn more or to discuss your application needs please contact:

Heather Maskus, MSc
Project Manager
Pulse Flour Milling and
Food Applications
Tel: 204-984-3139
hmaskus@cigi.ca

Lindsay Bourré, MSc
Technical Specialist
Pulses
Tel: 204-984-1063
lbouurre@cigi.ca

Project Funding Provided By:

