



Product Profile

Pulse Flour Milling and Utilization Project | Cigi (Canadian International Grains Institute) | cigi.ca



**Chicken Nugget Formulated
with Yellow Pea Flour**

Yellow Pea Flour in Batters and Coatings

The functional and physical properties of yellow pea flour make it a suitable ingredient to use in batters and coatings for a variety of products. In addition to contributing protein and dietary fibre, yellow pea flour also has a golden colour that consumers find desirable. Different milling methods have been shown to produce yellow pea flours that vary in physical and functional characteristics. Selecting a flour with the right specifications will ensure that yellow pea flour can be incorporated into a batter or coating formulation without compromising end product quality.

Formulation and Processing

A pre-dust and batter were made and used in a coating system for chicken nuggets. The formulations are presented in Table 1. The batter was hydrated using 1 part dry batter and 1.5 parts ice water.

Prior to pre-dusting, nugget blanks were tempered to an external temperature of -4 to -2°C and then manually pre-dusted and battered. The nuggets were then par fried at 193°C for 20 seconds in non-hydrogenated canola oil. Par fried nuggets were allowed to drain on wire racks and then frozen overnight at -18°C on lined trays. Packaging of the chicken nuggets was completed after this initial freezing. After a minimum of 14 days, the chicken nuggets were fully fried at 185°C for 45 seconds in non-hydrogenated canola oil.

Table 1. Formulation for Pre-Dust and Batter Coatings Containing Yellow Pea Flour

Pre-Dust		Base Formula (%)	Dry Mix Formula (%)
Base	Cracker Meal	50.06	
	Corn starch, modified	22.30	72.71
	Oil, vegetable, non hydrogenated	0.35	
Yellow Pea Flour			27.29
Pre-Dust Dry Mix Formula			100.00
Batter		Base Formula (%)	Dry Mix Formula (%)
Base	Sodium bicarbonate	0.60	
	Sodium aluminum phosphate	0.60	
	Salt	2.80	
	Garlic powder	0.15	
	Onion powder	0.25	16.00
	Black pepper	0.50	
	Gum, methocel	0.10	
	Corn starch, modified	8.00	
Oil, vegetable, non hydrogenated		3.00	
Yellow Pea Flour			61.00
Corn Flour			23.00
Batter Dry Mix Formula			100.00

Table 2. Physical and Functional Specifications of Whole and Split Yellow Pea Flours and Corresponding Battered Product Quality.

Pea Flour Production Method	Whole/Split Flour Properties			Whole/Split Flour Batter Properties	
	Particle Size (µm)	Water Absorption Capacity (g/g)	Starch Damage (%)	Batter Viscosity (flow time, s)	Total Coating Pick-Up (%)
Wheat flour	ND ¹	ND ¹	ND ¹	10	34.5
Pin - Fine	97/44	1.3/1.0	1.34/1.49	10/13	32.5/32
Pin - Coarse	277/130	1.3/1.0	0.99/1.24	11/15	35/37
Roller	237/62	1.4/1.4	2.75/2.97	17.5/16	37.5/37
Hammer	274/175	1.6/1.1	1.01/1.31	17.5/17.5	40/39
Stone	596/330	1.9/1.1	1.21/1.53	29/24	45/44.5

¹Data for wheat flour properties not available

Results and Recommendations

Chicken nuggets made using yellow pea flour were crisper, had a more intense golden colour and enhanced flavour compared to those containing only wheat flour. Regardless of milling type or the use of whole/split flour, the addition of the yellow pea flour produced chicken nuggets with higher cook yield and overall quality compared to the nuggets made with 100% wheat flour.

Particle size, which is influenced by milling method, appeared to have the greatest impact on chicken nugget end quality. Flours with larger particles and higher fibre contents had higher batter viscosity and produced more golden nuggets with increased coating pick up, yield, fat content and portrayed ideal crispness and coating adhesion. Yellow pea flours with smaller particles performed similarly to the 100% wheat flour. Therefore, it would be recommended that whole yellow pea flours with particle sizes similar to the stone and hammer milled flours be used in batter and coating applications. Further work is recommended to examine the suitability of pulse flours in batters and coatings for vegetable and other meat products.



Chicken Nuggets Formulated with Whole Yellow Pea Flour Milled Using Different Milling Methods (L-R: 100% Wheat, Pin-Fine, Pin-Coarse, Roller, Hammer and Stone)

CONTACT US

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