

CHICKPEAS

Ingredients and Applications

Chickpeas (i.e. Garbanzo Beans) (*Cicer arietinum*), like all pulses, are members of the subfamily Faboideae of the family Fabaceae. Thought to have been first grown in Mesopotamia up to 7,500 years ago, there are two types of chickpeas: Desi and Kabuli.

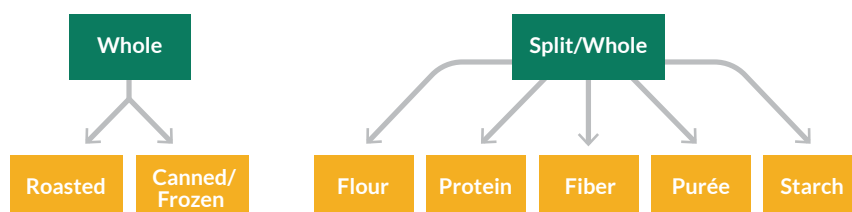
The classification is based on seed size, color and the thickness and shape of the seed coat. Desi types tend to be smaller, angular seeds with thick seed coats that range in color from light tan and speckled to solid black. If intended for human food, they require a specialized seed-coat removal process called decortication. This process requires adjusting the moisture level of the seeds to facilitate the mechanical removal of the thick seed coat, after which the seeds resemble a small yellow pea. Kabuli types, also known as garbanzo beans in the U.S., have larger seeds with paper-thin seed coats that range in color from white to pale cream to tan, which do not need to be removed before consumption.



Desi



Kabuli



FRYING OR ROASTING

Due to their high protein and low fat content, fried or roasted chickpeas are sold worldwide as a healthy alternative to other snack foods. In chickpea snack production, variety selection is key, as size, preparation time and other characteristics range greatly between varieties. The Kabuli offers a less wrinkled surface and generally requires less time to cook than the Desi. It also contains a seed coat that is very thin, but adheres well to the cotyledons. Before frying or roasting, chickpeas should be soaked for 10 hours in water that is held at room temperature. After soaking, the chickpeas are rinsed and drained to remove any excess surface water.

1 SOAK in room temperature water for 10 hours



2 RINSE and **DRAIN**



3 FRY at 356°F/180°C or **ROAST** at 212-266°F/100-130°C



NUTRITION FACTS

CHICKPEAS, ¼ CUP DRY

Calories	180
Total Fat	3g
Saturated Fat	0g
Cholesterol	0mg
Sodium	10mg
Potassium	438mg
Total Carbohydrate	30g
Dietary Fiber	9g
Trans Fat	0g
Sugars	5g
Protein	10g

FLOUR

Chickpea flour has a mild, neutral flavor which makes it suitable for baking applications. Both raw and pre-gelatinized flour are available depending on the use.

- **Raw (split/whole)**

Anti-nutritive factors in chickpea flour such as polyphenols, phytic acid and trypsin inhibitors, along with flavor, can limit the use of chickpea flour as an ingredient, especially in applications that go through less extensive heat treatment, like bakery and meat products. Chickpeas and other pulses can be treated to reduce the content of these anti-nutritive factors, and to improve the flavor and nutritional value of the ingredient.

- **Pre-gelatinized (split/whole)**

Treating raw pulse flour by heating partially gelatinizes the starches, inactivates enzymes, increases shelf life and improves flavor. These attributes make pre-gelatinized pulse flour suitable for some applications. The differences in gelatinization temperatures among flours from different pulses are attributed to differences in size, form, distribution of starch granules in the flours and to the internal arrangement of starch within the granule. Low protein and high amylose starches require high inputs of energy to undergo starch gelatinization. Low amylopectin starch has a higher gelatinization temperature, and is more resistant to enzyme and acid digestion compared to other starches. Pre-gelatinized chickpea flour serves as an effective flavor carrier, ideal for making more nutritious flatbreads, tortillas, pita breads, crackers, cookies, energy bars and extruded snacks. It also enhances dough yield, firmness and texture.

In general, pre-gelatinized flour is ideal for baking applications. Similar to flours derived from other pulses, using chickpea flour in baking applications provides nutritional benefits, including increased fiber, protein, micronutrients and better complimentary amino acid profile when used with wheat flour. Furthermore, chickpea flour in baking applications impacts functionality by increasing water absorption, thus increasing dough yield, increasing viscosity and altering the flavor characteristics of finished products.

TIPS:

- Pre-gelatinized flour provides more neutral flavor
- Use of additional ingredients (spices, cocoa, fruits, etc.) complements the flavor
- Addition of chickpea ingredients increases the viscosity of batter or dough
- Add water, as chickpea flour absorbs more water than wheat and other flours

EXTRUDED SNACKS

Chickpeas contain a high amount of fat (~6%) relative to other pulses. For this reason, they are often best-paired with corn, rice and other starch sources in the making of extruded snacks, as too high a proportion of chickpea flour in a formula (70–100%) can cause the dough to slip inside the extrusion barrel and prevent expansion.

Factors affecting extrusion include:

- **Protein, fiber, and fat content** – may lower expansion
- **Particle size** – may affect expansion by changing hydration and gelatinization properties
- **Type of starch** – may affect expansion by changing gelatinization properties, especially amylose and amylopectin content
- **Raw or pre-gelatinized flour** – Pre-gel flour may alter gelatinization properties during cooking

SAMPLE PULSE SNACK BASE FORMULA

Pulse grits (30-60 mesh)	60%
Corn grits	39.5%
Calcium carbonate	0.5%
Final moisture	10-15%
Additional dye and seasoning	

CHICKPEA FLOUR ANALYSIS (Value Per 100 Grams)

NUTRIENTS	CHICKPEA	% DAILY VALUE
Calories (kcal)	387.0	
Calories from Fat (kcal)	60.0	
Fat (g)	6.69	10
Saturated Fat (g)	.693	3
Trans Fatty Acid (g)	0.0	
Cholesterol (mg)	0.0	
Sodium (mg)	64.0	3
Carbohydrates (g)	57.82	19
Dietary Fiber (g)	10.8	43
Total Sugars (g)	10.85	
Protein (g)	22.39	45
Calcium (mg)	45.0	5
Iron (mg)	4.86	27
Potassium (mg)	846.0	24
Zinc (mg)	2.81	19
Vitamin A - IU (IU)	41.0	1
Vitamin C (mg)	0.0	
Thiamin (mg)	.486	32
Riboflavin (mg)	.106	6
Niacin (mg)	1.762	9
Vitamin B-6 (mg)	.492	25
"Folate, total (mcg)"	437	109

Compiled from the data provided by USDA database and ESHA Genesis SQL software