

# PULSES

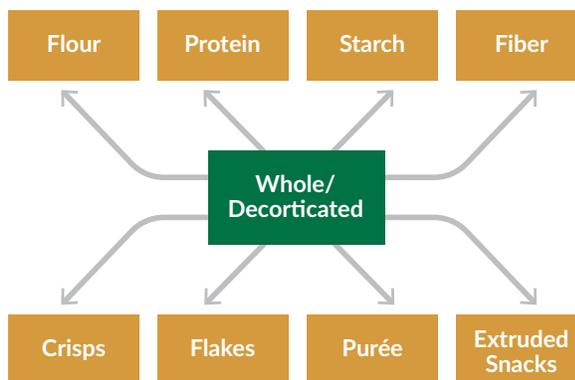


# DRY LENTILS

## *Ingredients and Applications*

Lentils (*Lens Culinaris*), named for their characteristic lens shape, are a member of the pulse family that offer a range of nutritional benefits and culinary applications.

There are a wide variety of lentils, in colors including yellow, red-orange, green, brown and black. Red, white and yellow lentils have their skins removed in a process called decortication. Many lentil types come in large and small varieties and are sold in many forms, with or without the skins, whole or split.



## COOKING

Cooking lentils is relatively easy compared to other pulses. Soaking is not necessary and cooking takes a shorter time than many other pulses, ranging from 5 to 40 minutes. Cooked lentils can be stored in the refrigerator or freezer for later use.

### Canning

Canning processes vary according to variety, size and period of maturation of pulses. Canned lentils can be found in most grocery stores, which can be a convenient option for meal preparation and baking use.

### Frying or Roasting

Lentils are soaked for three hours in water that is held at room temperature. Lentils are then rinsed and drained to remove excess water. When fried, lentils perform differently than dry peas or chickpeas. Because lentils are not as susceptible to thermal shock, a single temperature zone may be used. A temperature of 356 degrees F (180 degrees C) is used to quickly decrease the moisture content in the lentils. The required frying time tends to be very short. Final moisture after frying should be 1-2%.

**1** SOAK in room temperature water for 3 hours



**2** RINSE and DRAIN



**3** FRY at 356°F/180°C or ROAST at 257°F/125°C



Green



Red



Small Brown



French Green



Black

## FLOUR

Lentil flour available in the market includes raw and pre-gelatinized. Lentil flour has very neutral flavor, thus raw flour may be used in most applications. Pre-gelatinized lentil 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.

- **Raw (split/whole)**

Anti-nutritive factors in lentil flour such as polyphenols, phytic acid, and trypsin inhibitors, and color and flavor can limit the use of lentil flour as an ingredient in applications, especially those that go through less extensive heat treatment. Pulses can be treated to reduce the content of these anti-nutritive factors, to improve the nutritional value of the protein and remove strong flavors.

- **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.

*TIP: Applications determine which flour to use. Know the application!*

## FRACTIONATION

Lentils can be fractionated into starch, protein and fiber in the same manner as pea fractionated products. However, fractionation from lentils is less common compared to pea sources, and there are few commercial products available.

### 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	

## EXTRUDED SNACKS

Extrusion is a mechanical process in which materials are forced, under pressure, through a die opening to create products of a desired shape, size and/or texture, creating many products in the cereal, dairy, bakery and confection industries, like chips and puffs. Lentils can be extruded at formula rates up to 100%; however, high formula rates result in a dense product. Addition of corn, rice and other starch sources can aid in the expansion of the pulse snacks.

### Factors affecting extrusion are:

- **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-gelatinization flour** – Pre-gelatinized flour may alter gelatinization properties during cooking

### LENTIL FLOUR ANALYSIS (Value Per 100 Grams)

NUTRIENTS	LENTILS	% DAILY VALUE
Calories (kcal)	353.0	
Calories from Fat (kcal)	10.0	
Fat (g)	1.06	2
Saturated Fat (g)	.156	1
Trans Fatty Acid (g)	0.0	
Cholesterol (mg)	0.0	
Sodium (mg)	6.0	0
Carbohydrates (g)	60.08	20
Dietary Fiber (g)	30.5	122
Total Sugars (g)	2.03	
Protein (g)	25.8	52
Calcium (mg)	56.0	6
Iron (mg)	7.54	42
Potassium (mg)	955.0	27
Zinc (mg)	4.78	32
Vitamin A - IU (IU)	39.0	1
Vitamin C (mg)	4.4	7
Thiamin (mg)	0.873	58
Riboflavin (mg)	0.211	12
Niacin (mg)	2.605	13
Vitamin B-6 (mg)	0.54	27
"Folate, total (mcg)"	479.0	120

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



For more information, contact: **USA Dry Pea and Lentil Council/ American Pulse Association**  
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