

Pulses are a type of legume, which are seeds that grow in their pods. The Food and Agriculture Organization (FAO) recognizes 11 types of pulses, including dry beans, chickpeas, lentils and dry peas.

The word “pulse” comes from the Latin word “puls,” which means thick soup. Pulses were first collected by hunter-gatherers. They were among the first plants to be domesticated and grown as a crop. The first evidence of agricultural production of pulses dates to 7000 to 8000 B.C. in a region in the Middle East called the Fertile Crescent, but some archeologists think they have been grown for more than 20,000 years.

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A POCKET GUIDE TO PREPARING Pulse Foods

NDSU EXTENSION

Pulses are Healthful Additions to Your Diet

Pulse foods are unique in that they can be counted towards the protein food group or the vegetable food group. 1 cup of whole or mashed pulses is equivalent to 1 cup of vegetables, and ¼ cup of cooked pulses counts as 1 ounce equivalent of protein. Adults should consume 2½ to 3 cups of vegetables each day and 5 to 6 ounce equivalents of protein per day.

Pulses are high in fiber, protein, vitamins and minerals. Pulses contain 7 to 8 grams of protein per ½ cup cooked. These nutrients can promote the health of the skin, bones, heart and eyes. Pulses also contain phytochemicals and antioxidants that may reduce the risk of certain types of cancers.

Pulses contain both insoluble fiber which helps prevent constipation, as well as soluble fiber which can lower blood cholesterol levels.

Pulses are also good sources of minerals, including iron, potassium, calcium, magnesium, phosphorus and zinc. The body can use these minerals, but absorption may be impaired by phytates found in pulses.

Pulses are high in B-vitamins, especially folate, which is essential for brain development and function. It is recommended that all women of childbearing age consume at least 400 micrograms of folate per day to reduce the risk of neural tube birth defects.

Table 1. Key nutrients in pulses per ½ cup cooked without added salt.

	Chickpeas	Lentils	Split peas	Black beans	Cranberry beans	Kidney beans	Navy beans	Great Northern beans	Pink beans	Pinto beans
Calories (kcal)	140	120	120	110	120	110	130	100	130	120
Total fat (g)	2	0	0	0.5	0	0	0.5	0	0	0.5
Saturated fat (g)	0	0	0	0	0	0	0	0	0	0
Trans fat (g)	0	0	0	0	0	0	0	0	0	0
Cholesterol (mg)	0	0	0	0	0	0	0	0	0	0
Sodium (mg)	6	2	2	1	1	2	0	2	2	1
Total carbohydrate (g)	23	20	21	20	22	20	24	19	24	22
Fiber (g)	6	8	8	8	9	7	10	6	5	8
Protein (g)	7	9	8	8	8	8	8	7	8	8
Folate (mcg)	141	179	64	128	183	115	127	90	142	147
Iron (mg)	2.4	3.3	1.3	1.8	1.9	2.6	2.2	1.9	1.9	1.8
Calcium (mg)	40	19	14	23	44	25	63	60	44	39
Potassium (mg)	239	365	355	305	342	357	354	346	429	373
Magnesium (mg)	39	35	35	60	44	40	48	44	55	43

These values are from the U.S. Department of Agriculture National Nutrient Database for Standard Reference and other published sources.

let stand for four to 24 hours. Drain beans and discard soak water. Rinse beans with fresh, cool water.

- **Quick soak:** Place pulses in a large pot and add 6 cups of water for every 2 cups of pulses. Bring to a boil and boil for an additional two to three minutes. Remove pulses from heat, cover and let stand for one hour. Drain pulses and discard soak water. Rinse beans with fresh, cool water.

Safety note: If you are soaking pulses for longer than four hours, place the container in the refrigerator to avoid the growth of bacteria and the production of harmful toxins.

Cooking Pulses

To cook soaked beans, add fresh, cold water to fully cover beans, plus 1 to 2 tablespoons of oil if you wish. Adding oil prevents foaming and boiling over. Foam also can be skimmed during cooking. Simmer the beans until they are tender.

- Cook only one kind of bean at a time if possible. Different types and ages of beans have different cooking times, so avoid cooking different types of beans together at the same time.
- Maintain water at a gentle simmer (not rapid boil) during cooking to prevent split skins.

Preparing and cooking pulses.

	Chickpeas	Lentils	Split peas	Whole dry peas	Black beans	Cranberry beans	Kidney beans	Navy beans	Great Northern beans	Pink beans	Pinto beans
Cooking time (minutes)	90-120	15-20	30	35-40	60-90	45-60	90-120	90-120	45-60	60	90-120
Soak	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yield per 1 cup dry (cups)	2	2½	2	2	2- 2½	2- 2½	2- 2½	2- 2½	2- 2½	2- 2½	2- 2½

Preparing Dry Pulses

Pulses are available canned, packed in water, in plastic bags, dried or in bulk. Canned chickpeas and beans are precooked and ready-to-use, while lentils and dried peas are usually purchased dry. Be sure to rinse canned pulses before use to reduce the sodium content by up to 40%.

Dry beans, whole peas and chickpeas need to be soaked before cooking, while dry lentils and split peas do not.

- **Dry lentils and split peas:** Rinse the pulses and remove any stones. Add pulses and water to a pot and heat water to boiling; you will need 2 ½ cups of water for every 1 cup of lentils and 2 cups of water for every 1 cup of split peas. Then, reduce heat and simmer until tender. Lentils will take 15-20 minutes, while split peas will take 35-40 minutes. Be sure to check the water every 5 minutes or so as dryness of pulses can vary, and you may need a little more.
- **Dry chickpeas, beans and whole peas:** Rinse the pulses and remove any stones. Then, soak using one of the methods below. If possible, it is best to use filtered water and water with the hardness removed. Drain and rinse the soaked pulses, then add to a pot with 2 cups of water for each 1 cup of pulses. Heat to boiling, then reduce heat and simmer until tender. Chickpeas will take 1.5-2 hours, whole peas will take 30-45 minutes, and beans will take 1-2 hours depending on the type.
- **Slow soak:** Cover 1 pound of dry pulses with 10 cups of water and refrigerate six to eight hours or overnight. Drain pulses and discard soak water. Rinse pulses with fresh, cool water.
- **Hot soak (preferred):** Place pulses in a large pot and add 10 cups of water for every 2 cups of pulses. Heat to boiling, then boil for another two to three minutes. Remove pulses from heat, cover and

- Do not add baking soda to beans at any time. It will make the beans more tender but destroys the B vitamin thiamine and also may impact the flavor negatively.
- Stir beans occasionally to prevent sticking during cooking.
- Keep beans covered with water during the cooking process. Add cold water periodically during cooking to ensure beans are covered.
- Check beans for doneness before eating. When cooked properly, beans should be tender but not mushy. Skins still should be intact, but the bean can be mashed easily between two fingers or with a fork.
- Drain beans immediately after they have reached desire texture to prevent overcooking.
- To add flavor after beans have finished cooking, try adding a drizzle of extra virgin olive oil immediately before serving rather than adding high-fat ingredients (such as bacon) during cooking.
- To cook beans quickly, try a pressure cooker, following the manufacturer's instructions. This allows beans to cook in half the time and eliminates the need for soaking. However, this does not give the beans much time to absorb flavors from other ingredients. Therefore, use a pressure cooker when beans are needed quickly or to be used as a part of another flavorful dish.

Pulses in Special Diets

- **Gluten-free diet:** Pulses are naturally gluten-free and can be tolerated by those with Celiac disease or gluten intolerances. Gluten is produced by substances found in common ingredients used for baking, including flour made from wheat, barley, rye, bran or graham. Gluten-free flours made from rice, almond and oats are popular, but pulses can also be ground into flour. As pulses also add additional fiber and protein, they are a great substitute for gluten-free baking.
- **Diabetic diet:** Pulses contain carbohydrates, but they are also a good source of fiber. As a result, they have a low glycemic index, which means that they raise blood sugar levels slower than foods with a high glycemic index. Pulses can be incorporated into a diabetic diet to help with blood glucose management.
- **Vegetarian diet:** Pulses play an important role in plant-based diets. Because they contain an average of 7 to 8 grams of protein per ½ cup cooked, they are an excellent source of plant-based protein. Pulses contain eight of the nine essential amino acids, but a complete protein source can be created by pairing a pulse with a grain, such as rice, quinoa or whole wheat bread.
- **Weight management:** Pulses are high in protein and fiber compared to other vegetables, which creates a longer feeling of fullness or satiation. Additionally, they are moderate in calories and low in fat.
- **Heart healthy diet:** Pulses contain little to no total fat, saturated fat, trans fat and cholesterol, and they are high in soluble fiber that reduces blood cholesterol levels. As a result, incorporating pulses into the diet can contribute to reduced blood cholesterol and blood pressure.



Photo by John Borge

Split Pea Salsa

- 1 c. dry green or yellow split peas, rinsed
- 2½ c. water
- 1 (19-oz) can black beans, drained and rinsed
- 2 c. frozen corn
- ½ c. red bell pepper, chopped
- ¼ c. fresh cilantro, chopped
- ¼ c. lime juice
- 2 medium tomatoes, diced
- ½ c. onion, diced
- 1 tsp. ground cumin
- Optional seasonings (cayenne pepper, hot sauce, etc.)

In a medium saucepan, bring peas and water to a boil, reduce heat, cover and simmer until peas are tender (about 20 minutes). Drain and transfer to a large bowl. Wash and prepare all produce. Combine all ingredients in a large bowl. Serve with tortilla chips.

Makes 10 servings. Each serving has 100 calories, 0 g fat, 6 g protein, 20 g carbohydrate, 6 g fiber and 100 mg sodium.



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Cowboy Caviar

- ⅓ c. olive or canola oil
- 2 Tbsp. sugar
- ⅓ c. white wine vinegar
- 1 tsp. chili powder
- 1 lb. fresh tomatoes, diced
- 1 c. red onion, chopped
- 1 (15-oz.) can chickpeas, drained and rinsed
- 1 (15 oz.) can black beans, drained and rinsed
- 1 (10 oz.) bag frozen corn, thawed
- 1 c. chopped cilantro
- ½ c. diced red bell pepper
- ½ c. diced green bell pepper

Wash all fresh produce. Whisk together olive oil, sugar, white wine vinegar and chili powder in a large bowl. Stir in the remaining ingredients, cover and refrigerate.

Makes 12 servings. Each serving has 170 calories, 7 g fat, 5 g protein, 23 g carbohydrate, 5 g fiber and 100 mg sodium.



Photo by John Borge

Savory Hummus

- 1 (15-oz.) can chickpeas, drained and rinsed
- 4 Tbsp. tahini
- ¼ c. lemon juice
- 3 cloves crushed garlic
- 1 tsp. salt

Puree chickpeas in blender or food processor. Add remaining ingredients and blend until smooth. The final product should be thick and smooth. Serve with carrot sticks and other vegetables, pita chips, or whole grain crackers. Or use as a spread on sandwiches.

Makes 12 servings. Each serving has 70 calories, 3 g fat, 3 g protein, 8 g carbohydrate, 2 g fiber and 200 mg sodium.



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Chocolate Dessert Hummus

- 1 (15-oz.) can chickpeas, drained and rinsed
- ⅓ c. honey
- ½ c. unsweetened cocoa powder
- 1 ½ tsp. vanilla
- ¼ tsp. salt
- 3-4 Tbsp. water

Drain and rinse chickpeas, and place in a food processor. Place all other ingredients into the same food processor and puree until a smooth texture is visible. If needed, add additional honey one tablespoon at a time until desired sweetness level is met. Serve with fruit such as strawberries, graham crackers or vanilla wafers.

Makes 11 servings. Each serving has 70 calories, 1 g fat, 2 g protein, 16 g carbohydrate, 2 g fiber and 105 mg sodium.

Photo by John Borge



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Greek Lentil Salad

- 1 (19-oz.) can lentils, rinsed and drained (or 1 c. of dry lentils, prepared according to pkg. directions)
- ½ c. calamata olives
- ½ c. onion, chopped
- 1½ c. grape tomatoes, halved
- ½ c. green peppers, chopped
- 1 c. cucumber, diced
- ¼ c. feta cheese, crumbled
- ¼ c. fresh parsley, chopped
- ¼ c. olive oil
- ¼ c. lemon juice
- 1 Tbsp. dried oregano

In a large bowl, combine lentils, olives, onion, tomatoes, green peppers, cucumber, feta cheese and parsley. Whisk oil, lemon juice and oregano together. Toss salad with dressing to coat.

Makes 16 servings. Each serving has 110 calories, 4.5 g fat, 4 g protein, 13 g carbohydrate, 3 g fiber and 200 mg sodium.

Recipe adapted from <https://www.lentils.org/recipe/greek-lentil-salad/>



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Three Bean Chili

- 1 lb. lean ground beef
- 1 c. onion, finely chopped
- 2 cloves garlic, minced
- 2 Tbsp. chili powder
- 1 tsp. ground cumin
- 3 Tbsp. brown sugar
- 1 (15-oz.) can diced tomatoes, undrained
- 2 c. tomato juice
- 1 (8-oz.) can tomato sauce
- 1 (15-oz.) can black beans, drained and rinsed
- 1 (15-oz.) can kidney beans, drained and rinsed
- 2 (15-oz.) cans pinto beans, drained and rinsed

Cook meat, onion and garlic in a large saucepan over medium heat until browned; drain. Add chili powder, cumin, brown sugar, undrained tomatoes, tomato juice and tomato sauce. Cook for 10 minutes or until thickened, stirring occasionally. Add beans, cook for five minutes.

Makes 16 servings. Each serving has 180 calories, 14 g protein, 3 g fat, 28 g carbohydrate, 3 g fiber and 390 mg sodium.



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Hoisin Turkey and Lentil Lettuce Wraps

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| Canola oil, for cooking | ¼ c. red lentils |
| 1 lb. ground turkey | ⅓ c. hoisin sauce |
| 1 red pepper, cored and diced | 1 Tbsp. soy sauce |
| 2 garlic cloves, minced | 2-3 green onions, chopped |
| 1 Tbsp. fresh ginger, grated | 1 head butter, romaine, or leaf lettuce |
| ¼ c. cilantro stems, chopped | Peanuts, for garnish |

Heat a drizzle of oil over medium-high heat in a large, heavy skillet. Add the ground turkey and red pepper and cook, breaking up with a spoon until the meat is no longer pink. Add the garlic, ginger, cilantro and lentils and cook, stirring, for a minute. Add 1/3 c. water and simmer for 10 minutes, until the lentils are tender, any excess moisture has evaporated, and the meat has started to brown. Add the hoisin sauce, soy sauce and green onions. Cook for another minute or two, stirring to coat everything well and heat through. Core the head of lettuce, separating the leaves, and serve the turkey-lentil mixture in a bowl, family-style, with lettuce leaves and your choice of garnishes.

Makes six servings. Each serving has 210 calories, 18 g protein, 14 g carbohydrate, 4 g fiber and 390 mg sodium.

Recipe courtesy of <https://www.lentils.org/recipe/hoisin-turkey-lentil-lettuce-wraps/>



Photo by John Borge

Chickpea Chocolate Cake

- 1½ c. semi-sweet chocolate chips
- 1 (15-oz) can chickpeas, rinsed and drained
- 4 eggs
- ¾ c. white sugar
- ½ tsp. baking powder

Optional toppings: powdered sugar, frosting or fresh berries

Preheat oven to 350 F. Grease a 9-inch round cake pan. Melt chocolate chips in a microwave-safe bowl, stirring occasionally until chocolate is smooth. Combine chickpeas and eggs in a food processor or blender and process until smooth. Add sugar and baking powder; blend. Pour in melted chocolate, then blend until smooth. Transfer batter to prepared cake pan. Bake for 40 minutes or until toothpick inserted in center of cake comes out clean. Cool on wire rack.

Makes nine servings. Without frosting, each serving has 320 calories, 13 g fat, 7 g protein, 47 g carbohydrate, 3 g fiber and 190 mg sodium.