Fiber and the Gluten-Free Diet

Getting Enough Fiber on the Gluten-Free Diet

Getting adequate dietary fiber is especially important for people following the gluten-free diet. The benefits of fiber include:[1]

- **Normalizes bowel movements**. Fiber increases the weight and size of your stool and softens it. A bulky stool is easier to pass so there's less chance of constipation. If you have loose or watery stools, fiber will absorb the water and add bulk. Some people on the gluten-free diet may have trouble with constipation due to inadequate fiber in their diet.[1]
- **Helps maintain bowel health**. Fiber lowers the risk of developing hemorrhoids (swollen veins in the region of the anus) and diverticular disease (small, bulging pouches in the intestines). Researchers are studying how certain fermenting fibers may help prevent diseases in the colon.
- **Lowers cholesterol levels**. Soluble fiber found in beans, gluten-free oats and oat bran, chia seed and flaxseed may help lower total blood cholesterol levels. These fibers lower low-density lipoprotein, or "bad," cholesterol levels, reducing the risk of heart disease.
- **Helps control blood sugar levels**. Soluble fiber can help people, particularly those with diabetes, improve their blood sugar levels by slowing the absorption of sugar. A healthy diet that includes insoluble fiber, as well, may also reduce the risk of developing type 2 diabetes.
- **Aids in reaching a healthy weight**. High-fiber foods take longer to chew so your body has time to tell you when you're no longer hungry. This leads to less overeating. A high-fiber diet increases the volume (or visual size) of a meal and lingers longer in your body so you stay full for longer. High-fiber diets also tend to have fewer calories for the same volume of food.
- **Aids in shaping the healthy bacteria in your gut**. Fiber feeds the healthy bacteria in your gut (your microbiome) which, in turn, leads to a healthier body.

What is Fiber?

Fiber is the portion of a plant (made up of carbohydrate and lignin) inside the cell wall that is not digested by humans. It moves through our digestive system creating bulk and preventing constipation.[1] There are two kinds of dietary fiber, **soluble** and **insoluble**.

- **Soluble fiber** (dissolves in water): helps lower cholesterol, specifically low-density lipo-protein cholesterol (LDL), to aid in heart health.[1] It is found in whole grains as well as in many fruits, vegetables, nuts, seeds, and legumes, such as beans, soybeans, and peanuts.[2]
- **Insoluble fiber** (does not dissolve in water): is not digested, but it adds bulk to the stool and can be very helpful to treat constipation.[2] It is found in whole grains, nuts and seeds, as well as in many vegetables.

Many fibrous foods such as whole grains, fruits, vegetables, nuts and seeds have a combination of both soluble and insoluble fiber.

Why Should I Eat Gluten-Free Whole Grains?

Eating whole grains is good for us because they are high in fiber, low in fat, contain protein, and are rich in B vitamins.

Many *gluten-containing* grain products, such as whole grain breads and cereals, are made from whole grains, such as whole wheat and/or barley. They are typically high in fiber, vitamins and minerals.

This is not necessarily the case with gluten-free grain products which are often prepared with refined (low fiber) flours and grains (rice and rice flour, corn and corn flour, potato starch and tapioca starch). These ingredients are processed to produce foods that are similar in texture and taste to gluten-containing products. Many gluten-free products are also not enriched with vitamins and minerals (learn more about enrichment below).

A study done on the fiber content of gluten-free vs. gluten-containing cereals found that out of 85 gluten-free cereals, 26 cereals contained lower amounts of fiber than their gluten-containing counterpart.[3] That is almost 1 in 4 cereals!

Fortunately, manufacturers today are beginning to use more gluten-free whole grains in their products. By substituting the most common gluten-free grains and starches (white rice, potato and corn) with some of the gluten-free whole grains such as quinoa, brown rice, and millet, and high-fiber gluten-free breads and crackers, the nutrient content of your diet vastly improves.[1]

What Are Milled and Processed Grains?

Milling and processing of grains was originally done to increase the shelf life of the grains. The outer layer (bran) of the grain which contains most of the fiber is removed during refining, leaving only the starchy inner layer (endosperm) which contains very little fiber. Many vitamins and minerals are also removed. Removing the germ, which contains unsaturated fats that can spoil or go rancid over time when exposed to heat and sunlight, allows the grain to last longer.

However, whole grains (or foods made with whole grains) contain **all** the parts of the grain: the bran, germ, and endosperm.

- **Bran** is the outer layer containing:
    - Fiber
    - B vitamins
    - Minerals
    - Protein
- **Endosperm** is the middle layer containing:
    - Protein needed for germination

    - Carbohydrates
- **Germ** is the inner layer containing:
    - Minerals
    - B Vitamins
    - Vitamin E

To help identify foods that have been made with whole grains, the Whole Grains Council launched the "100% Whole Grain" stamp in 2003. This stamp is placed only on foods made with 100% whole grains and that have a minimum of 16 grams of whole grain per serving.

What Does Enrichment Mean?

The main source of B vitamins—thiamin (B1), riboflavin (B2), niacin (B3), and folate—in the American diet is enriched flours, breads, crackers, and breakfast cereals. This means that the vitamins removed during refinement are added back. Unfortunately, many gluten-free grains are not enriched and have fewer B vitamins than their gluten-containing counterparts.[1,4]

- Look for enriched gluten-free breads, pastas, and baking mixes and fortified breakfast cereals.[5]
- **Sample ingredient list of a gluten-free enriched refined bread product:**[5]
  White rice flour, Water, Tapioca Starch, Whole Eggs, Sugar, Yeast, Sunflower and/or Canola Oil, Dextrose, Poly Dextrose, Pea Protein, Sodium Carboxy Methylcellulose, Salt, **Vitamin Blend (Thiamin, Riboflavin, Niacin, Folic Acid, Iron)**

Tips for Adding Whole Gluten-Free Grains to Your Diet

- Drink water! Fiber without water can be constipating. Make sure you drink more water as you add whole gluten-free grains, or any fiber, to your diet.
- Look for the word "**whole**" in the ingredients list. Example: "whole grain brown rice" or "whole quinoa."
- Look for at least 2 grams of fiber per serving on the Nutrition Facts panel. Whenever possible, choose products that list 3 grams of fiber or more per serving (3 grams is considered high fiber).
- Rotate these high fiber gluten-free grains into your diet. Select several at a time and keep them ready to use. Don't rely on just one as your new wheat substitute since each one is high in certain vitamins and minerals, but not all.
- Consume at least one-half of your grains each day as whole grains. The US Department of Agriculture and the Whole Grains Council both recommend that at least three 1-oz. servings (48 grams of whole grain; this is different from fiber) or **half** of the grains we consume daily should be whole grains.[6]

What's an Example of a 1-Ounce Serving of a Whole Grain?[7]

- 1/2 cup cooked brown rice or other cooked whole grain

- 1/2 cup cooked 100% whole grain pasta
- 1/2 cup cooked hot cereal, such as oatmeal
- 1 oz. uncooked whole grain pasta, brown rice or other grain
- 1 slice 100% whole grain bread
- 1 very small (1 oz.) 100% whole grain muffin
- 1 cup 100% whole grain ready-to-eat cereal
    - All grains must be labeled gluten-free.

To learn much more about serving sizes and "ounce equivalents, visit the Whole Grains Council website.

How Much Fiber Do I Need Each Day?

- Americans typically don't get enough fiber in their diet. A 3-day diet analysis of adults on a gluten-free diet showed that more than 50% of females did not eat adequate amounts of fiber, iron, or calcium.[4]
- Per the US Department of Agriculture, dietary fiber intake is recommended at 14 grams per 1,000 calories of food. Per the USDA, "for example, at a 2,000 calorie reference level (which is appropriate for some but not all people) the daily dietary fiber intake should be 28 grams."[8] Check the Nutrition Facts label on the back or side of food packaging to see the fiber content of that food.
- Speak to your dietitian or doctor to discuss your **individual** fiber needs.

Is There a List of High Fiber Foods?

Gluten-Free Whole Grains, Legumes, High Fiber Fruits & Vegetables

Please note that this list is not comprehensive.

Whole Grains	Legumes	Fruits & Vegetables
Amaranth	Black beans	Artichoke hearts
Buckwheat	Edamame (soybean)	Raspberries
Brown rice	Garbanzo (chickpea)	Blackberries
Chia	Lentils	Figs(dried)
Corn	Lima beans	Prunes
Flax seed	Peas	Pear
Millet	Pinto beans	Kiwi

Gluten-free oats	Soybeans	Spinach
Popcorn		Squash
Quinoa		Parsnips
Sorghum		Broccoli
Teff		Turnip Greens
Wild rice		

Adapted from Higgins, L. Whole Grains = Nutritional Gold. In Real Life with Celiac Disease: Troubleshooting and Thriving Gluten-Free. Eds. Dennis M, Leffler D. AGA Press. Bethesda, MD, 2010. Thompson, T. The Gluten Free Nutrition Guide. McGraw Hill, 2008.

What Are A Few Examples of Grams of Fiber in Select Foods?

Dietary Fiber Content of Select Foods

Beans, Lentils, Peas (cooked)	**1 cup (weight in grams)**	**Dietary Fiber (grams)**
Lentils	198	15.6
Pinto Beans	171	14.7
Kidney Beans	177	13.1
Fruits	**Serving Size**	**Dietary Fiber (grams)**
Raspberries	1 cup	8.4
Raisins	1 cup	6.6
Apricots (dried)	1/2 cup	5.9
Pear	1 medium	4.0

Apple	1 medium	3.7
Vegetables (cooked)	**Serving Size**	**Dietary Fiber**
Squash, acorn	1 cup	9.0
Peas, green	1 cup	8.8
Beans, green	1 cup	8.0
Carrots	1 cup	5.1
Broccoli	1 cup	4.5

Case, Shelley. Gluten-free: The Definitive Resource Guide. Nutrition Consulting, Regina. 2016.

Which Gluten-Free Grains, Pseudo-Grains, and Starches Are High Fiber? Do They Have Other Benefits?

- **Amaranth**: A seed high in protein, fiber, calcium, iron, magnesium, phosphorus, potassium, zinc, B vitamins, and lysine (an essential amino acid)
- **Buckwheat**: A fruit kernel high in protein, magnesium, zinc, phosphorus, potassium, niacin, riboflavin, B vitamins, and fiber
- **Millet**: A seed high in easily digestible protein, as well as thiamin, riboflavin, niacin, vitamin B6, folate, fiber, iron, magnesium, and zinc
- **Quinoa**: A seed grain high in high quality protein, iron, magnesium, phosphorus, zinc, B vitamins and fiber
- **Pulses**: The edible seeds of legumes (plants with a pod), such as dried peas, lentils, dried beans, and chickpeas, and their flours
- **Sorghum**: A cereal grain high in protein, thiamin, niacin, vitamin B6, iron, phosphorus and potassium
- **Teff**: An Ethiopian seed grass high in calcium, iron, magnesium, thiamin, zinc, protein and fiber

Special Note: Quinoa, amaranth, and buckwheat are not grains. They are actually seeds, called pseudo-grains, which similar overall nutrient value as the gluten-free grains, namely a great source of protein, fiber and minerals. This group of pseudo-grains are also gluten-free.

How Do I Cook With Gluten-Free Grains?

- Rinse all grains well before cooking.
- Cook all grains well and according to the package directions.
- Use a gluten-free cookbook when using gluten-free flours to make baked goods. To achieve good quality in the finished product, the amounts and mixtures of flours is important.
- Do not purchase these grains from bulk bins. Purchase them in sealed packages labeled gluten-free to help prevent cross contamination.

For more ideas, check out the cookbooks listed in our Resources section.

What Are the Cooking Times for Gluten-Free Grains?

Cooking Time for Gluten-Free Grains

Grain	Amount of Liquid	Amount of Grain	Cooking Time	Uses
Amaranth	2-3 cups	1 cup	Simmer 7 minutes; keep covered 10 minutes	Hot or cold cereal, thickener for soups or stews
Buckwheat	2 cups	1 cup	Simmer 15 minutes	Hot cereal, side dish, soups, stews, casseroles
Quinoa	2 cups	1 cup	Simmer 15 minutes	Side dish, cold salad, soups, stews
Teff	2 cups	1/2 cup	Simmer 15-20 minutes	Hot cereal, side dish

Adapted from chart by Anne Roland Lee, MS, RD. In Higgins, L. Whole Grains = Nutritional Gold. In Real Life with Celiac Disease: Troubleshooting and Thriving Gluten-Free. Dennis M, Leffler D, eds. AGA Press. Bethesda, MD, 2010.

How Do I Store Whole Gluten-Free Grains?

- Whole grains are superior in nutrients but also have a shorter shelf life because they become rancid much more quickly than refined grains.
- Store them in airtight containers in a cool, dark and dry environment to prevent the healthy oils from oxidizing.

- Most whole grains can be stored at room temperature for up to one year under these specific conditions.
- Use millet and gluten-free oats within 2-3 months of purchase.
- Store whole grain flours in the refrigerator for up to 6 months or in the freezer for up to 1 year.

Storage Life of Whole Grains in Freezer

Gluten Free Whole Grains	Storage Life in Freezer (in airtight container)
Buckwheat	2 months
Brown Rice	5-6 months
Brown Rice Flour	4-5 months
Cornmeal	4-6 months
Kernels or popcorn	1 year
Oats	3 months
Oat Flour	2 months

Reference: Whole Grains Council

Where Can I Add Healthy Fiber into My Meals?[1]

Breakfast

- **Whole-grain gluten-free waffles** topped with almond or peanut butter and honey or syrup, and fruit: Make a whole batch and freeze them for the week. Waffles also make great sandwich bread in a pinch.
- **Hot gluten-free cereals** made from buckwheat, amaranth, quinoa, and/or specially produced, labeled gluten-free oats with sliced almonds, ground flax seed, dried or fresh fruit, and milk or non-dairy gluten-free beverage (gluten-free almond or rice milk), cinnamon, maple syrup, etc.

- **Whole-grain cold cereals**: brown rice, whole sorghum, ground flax seed, and whole grain corn with fruit and your choice of milk or non-dairy, gluten-free beverage
- **Smoothie bowl**: frozen fruit, calcium fortified milk, ground flax seed and/or chia seeds, and yogurt (if desired), top with gluten free granola or nuts, coconut flakes, seeds
- **Breakfast burrito**: gluten free wrap, eggs, cheese, salsa, avocado, and other veggies if desired (great for keeping meal prepped in freezer)
- **Yogurt** (preferably Greek yogurt) with a spoonful each of ground flax seed, sliced almonds, dried or fresh fruit, and other gluten-free toppings

Snacks

- **Brown rice or quinoa crackers** with peanut, almond, cashew, sun butter, or walnut butter
- **Popped corn** or popped sorghum
- **Yogurt** with a spoonful of **ground flax seed** and topped with **fruit**
- Fresh cut **vegetables** (peppers, cucumbers, celery) and hummus
- **Brown rice crackers** with hummus and gluten-free "tabbouli" (made with quinoa or brown rice instead of cracker wheat)
- Chocolate hummus with **gluten free crackers, strawberries, or apples**

Lunch & Dinner

- **Quinoa salad**: cooked quinoa mixed with a variety of chopped vegetables, seeds, nuts, and a mild lemon/olive oil/herb dressing
- **Brown or wild rice** with vegetables and chicken, fish, or meat and gluten-free sauce
- **Sandwich using high-fiber gluten-free bread**, turkey, chicken, tuna or egg salad, avocado, tomato, spinach leaves, mayonnaise or mustard
- **Buckwheat** mixed with sautéed onions, garlic, vegetables and nuts, lean chicken or turkey in your choice of gluten-free marinade
- **Enriched gluten-free pasta**, meat and spaghetti sauce with shredded cheese or non-dairy cheese, and your choice of vegetable
- **Brown rice and red beans** with salsa, avocado slices, and salad
- **Tacos** made with 100% corn tortillas (labeled gluten-free), vegetarian refried beans, tomatoes, lettuce, low-fat cheese, and fresh salsa

Note: All grain and flour based products, flax seed, chia seed, and non-dairy beverages should be labeled gluten-free. Oats should be specially produced, labeled gluten-free oats.

Adapted from Higgins, L. Whole Grains = Nutritional Gold. In Real Life with Celiac Disease: Troubleshooting and Thriving Gluten-Free. Dennis M, Leffler D, eds. AGA Press. Bethesda, MD, 2010.

What Else Should I Know About Fiber?

- As the bacteria in the colon break down fiber, it ferments, which can cause gas. Slowly increase the amount of fiber you are eating so your intestines have time to adjust to the increased fiber load.
- Space your fiber intake through the day so you are not eating it all at once.
- Be sure to drink plenty of water (6-8 cups) as you add more fiber to your diet.
- Eating too much fiber can bind with minerals like zinc, iron, calcium, copper, magnesium and selenium in your foods or supplements and keep them from being fully absorbed. Typically, however, this is not a common problem among people on the gluten-free diet.
- Aim for comfortable, well-formed bowel movements without straining.

What if I Can't Tolerate Fiber Very Well?

Some people are not able to tolerate moderate or high fiber diets due to certain medical conditions such as acute ulcerative colitis, severe diverticulitis, or a particularly sensitive gut. Others may have an intolerance or allergy to one or more grains. If this is you, speak to your doctor or dietitian about how to balance your diet using other foods, such as starchy vegetables and tubers (vegetables that grow from the ground like turnips, parsnips, etc.) and other sources of fiber.

What About Fiber Supplements on the Market?

Commercial fiber supplements can play an important role in getting enough fiber (or a particular kind of fiber) for some people. The health benefits of supplements have not been studied as well as dietary fibers and they may not have the same effect. Talk to your doctor or dietitian about using a fiber supplement if dietary fiber has not been successful for you.[2]

A Quick Word About Legumes

What Are Legumes?[9]

- Legumes are plants with a pod. To be specific, pulses are the edible seeds of legumes and they include:
    - Dry peas
    - Lentils
    - Dry beans
    - Chickpeas
- They do not include fresh green beans or fresh peas.
- While soybeans and peanuts are related to legumes, they are different because they have a much higher fat content.

Why Are Legumes So Important in the Gluten-Free Diet?

Eating legumes with gluten free grains, nuts or seeds provides high quality, complete protein. A **complete** plant-based protein is equal to animal protein. Among many other vitamins and

minerals, legumes are high in potassium which regulates our fluid balance and blood pressure. Legume (or pulse) flour, such as chickpea flour, adds nutrition, fiber and good taste to gluten-free baked goods.

What Are the Benefits of Legumes?[9]

Nutritional Benefits of Legumes

High in	Low in	Free of
Plant protein	Sodium (salt)	Trans fats
Soluble/Insoluble fiber	Fat (virtually free of fat)	Cholesterol
Complex carbohydrates		
Vitamins		
Minerals		

How Do I Find Gluten-Free Lentils?[10]

Per Gluten Free Watchdog, a third party gluten-free testing and reporting company, "lentils are allowed by law to contain a certain percentage of foreign grain, including wheat, barley, and/or rye. That said if lentils are labeled gluten-free they should contain less than 20 ppm of gluten."

Whenever possible, purchase lentils labeled gluten-free. Regardless of whether the lentils you buy are labeled gluten-free, please do the following:

- Canned lentils: rinse thoroughly under running water.
- Dry lentils: pour onto a cookie sheet and pick through them; rinse thoroughly under running water.

Where Can I Purchase These Grains and Legumes and Find Recipes?

Note: A few of the sites below offer both gluten-free and gluten-containing recipes and ingredients. Visit the CeliacNow Resources handout for more gluten-free recipes and cookbooks.

- Gluten Intolerance Group
- Ancient Harvest

- Nuts.com (gluten-free section)
- Gerbs
- Shelley Case, RD
- Schär
- Bob's Red Mill
- The Teff Company
- Thrive Market
- Pulse Canada
- Bloomfield Farms

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