

Fiber

Fiber is a complex carbohydrate that comes from the edible parts of plants, including vegetables, fruits, grains and legumes. There is no dietary fiber in meat or dairy products. Fiber, which contains no calories, is vital for good health, yet it is not a nutrient. It can not be digested, absorbed into the bloodstream or used by the body for energy.

Types of Fiber

There are two types of fiber, soluble and insoluble. Some foods contain both types. Generally, vegetables have more insoluble fiber and fruits contain more soluble fiber. Consume adequate amounts of fiber from a variety of foods.

Soluble Fiber dissolves in water and develops a soft, mushy texture when cooked. Sources include: dry beans and peas, lentils, whole oats, oatmeal, oat bran, ground barley, flaxseeds, many vegetables and fruits, and psyllium seeds.

Insoluble Fiber does not dissolve in water but can absorb water. It has a tough, chewy texture. Sources are: whole-wheat products, wheat bran, oat bran, corn bran, flaxseeds, many vegetables, fruits with skins, root vegetables and legumes.

Health Problems From Eating Too Little Fiber

Over the course of a lifetime, a low fiber diet (less than 20 grams per day) can result in numerous health problems including:

- constipation.
- hemorrhoids.
- colon cancer.
- obesity.
- elevated cholesterol.
- elevated blood sugar levels.

Benefits of Fiber

A high-fiber diet (20 to 35 grams per day) may lower the risks for:

- hemorrhoids.
- diverticulosis.
- heart disease.
- obesity.
- type 2 diabetes.
- high cholesterol.
- certain types of cancer

Fiber helps provide the feeling of fullness on fewer calories; therefore, it is beneficial when trying to lose weight.

Soluble fiber mixes with liquid in the digestive tract, binds to fatty substances and removes them from the body without allowing them to be absorbed. Consuming adequate amounts of it may help to lower cholesterol, as well as reduce the amount of cholesterol manufactured by the liver. Foods high in soluble fiber help to lower LDL ("bad") cholesterol without lowering HDL ("good") cholesterol.

In addition, soluble fiber helps to lower or stabilize blood sugar levels by slowing the rate at which carbohydrates breakdown and glucose is released into the bloodstream; therefore, it plays a role in the prevention and treatment of type 2 diabetes.

Known as roughage, insoluble fiber helps the colon function properly. Insoluble fiber acts as "nature's broom," absorbing water and moving waste through the intestinal tract. It adds bulk and softness to the stool, which promotes regularity and relieves constipation. It also reduces formation of hemorrhoids and diverticulosis by putting less pressure on the colon walls. If the walls of the colon

get weak, tiny sacs can form and become infected, causing a painful problem called diverticulitis.

In addition to promoting regularity in children, fiber helps them establish eating patterns that may reduce the risk of developing heart disease and some types of cancer later in life.

How Much Is Enough?

Adults: There is no Recommended Dietary Allowance (RDA) for fiber. The American Dietetic Association recommends 20 to 35 grams of fiber per day for adults. At least 5 to 10 grams of this total should be soluble fiber. Currently most Americans fall short of this goal, consuming only 10-15 grams of fiber daily.

A diet too high in fiber is not recommended. Eating more than 50 to 60 grams of fiber daily may lower the body's absorption of certain vitamins and minerals. Adults over the age of sixty-five, as well as those who have had gastrointestinal surgery, may experience problems with added fiber.

Children: Like adults, most children do not get enough fiber in their diets. The fiber recommendation for children ages three to eighteen is to add five to the child's age. For example, a five-year-old child needs about 10 grams of fiber, $5 + 5 = 10$. As the child grows, this formula allows for increases in the need for fiber.

After children reach the age of two, their dietary fat should be lowered gradually, reaching the level recommended for adults around age five. As dietary fat is lowered, more foods rich in fiber, vitamins, and minerals should be consumed.

Since foods high in fiber tend to be bulky and low in calories, high-fiber diets can fill children up quickly, reducing the total calories and vital nutrients that they consume. In addition, fiber can interfere with vitamin and mineral absorption.

Children's dietary fiber should be increased gradually by consuming more fruits, vegetables, legumes, cereals, and other grain products. When increasing fiber intake, children should also drink more liquids, including water, juice, and milk.

Adding Fiber

The average American consumes only 10 to 15 grams of fiber daily, choosing grain products, fruits and vegetables that have only 1 to 3 grams of fiber per serving.

Avoid Fiber Pills & Powders: Their primary benefit is to relieve constipation, and the body may come to depend on them. Supplemental fiber may lead to mineral deficiencies, especially during pregnancy, lactation, adolescence or when mineral intake is too low. Therefore, save the expense of fiber pills and powders.

Drink Plenty of Liquids: When eating a high fiber diet, drink eight or more cups of liquids daily, including water, juice and milk. Fiber holds water like a sponge, while moving waste through the colon and avoiding constipation.

Add Fiber Gradually: A high-fiber eating plan is important to your health, but fiber can have side effects, including intestinal bloating and gas. These often result not only from what is eaten but how quickly it is eaten. Chewing more slowly to break down the fiber compounds makes digestion easier.

When adding higher-fiber foods to the diet, incorporate them gradually, allowing time for the digestive tract to adjust to the increase. It may take several months for the bacteria in the stomach and intestines to adjust. Otherwise, gas, diarrhea, cramps and bloating will occur.

Ways to Get More Dietary Fiber:

- At mealtime, fill 75% of the plate with fruits, vegetables and grain products.
- Increase daily intake of fruits and vegetables to 2 cups fruit and 2½ cups vegetables. This is based on a 2,000 calorie daily intake, so increase or decrease this amount depending on energy, or caloric needs.
- Eat a variety of fruits and vegetables, including all five vegetable subgroups: dark green, orange, legumes, starchy vegetables, and other vegetables.
- Check the Nutrition Facts on food labels, and select high fiber foods, as well as those with fiber-rich ingredients.
- Eat legumes two to three times per week. Legumes include beans, peas and lentils,

which are excellent, inexpensive sources of fiber and protein. One-half cup of cooked dry beans, peas or lentils counts as 1 ounce of meat in the diet.

- Try main dishes made with beans rather than meat, such as bean burritos and vegetarian chili with beans. If bean dishes cause intestinal gas, try eating smaller servings.
- Eat 6 or more ounce-equivalents* of grains per day, with at least half of this amount being whole grain products. Examples are 100% whole wheat, whole oats, brown rice, rye, barley and quinoa. The word "whole" should appear in front of the grain on the ingredient list of crackers, breads and cereals.
- *A 1 ounce-equivalent is: 1 slice of bread, 1 cup dry cereal, or ½ cup cooked rice, pasta, or cereal. Snack on high fiber foods like fresh fruit, raw vegetables, popcorn and nuts. Add sliced fresh fruit to yogurt or cottage cheese. Use fresh fruit slices instead of jelly on peanut butter sandwiches.
- Replace white rice with brown rice.
- Choose breakfast cereals with five or more grams of fiber per serving, and top with fruit for more fiber. An excellent choice is whole grain cereal with strawberries, blueberries or raspberries. Avoid refined, sugary cereals.
- Enjoy the edible skin and seeds of fruits and vegetables. For example, eat the skin of a baked potato for more fiber.
- Select whole fruits and vegetables over fruit and vegetable juice. The peel and pulp contain the fiber.
- Steam or stir fry vegetables just until they are tender but still crisp.
- Add high fiber ingredients in recipes:
 - ❖ Use oatmeal in meatloaf,
 - ❖ Add extra vegetables to salads, soups, casseroles and pasta dishes,
 - ❖ When baking, substitute up to one-third of the flour with quick or old-fashioned oats,
 - ❖ Replace all or part of the white flour with whole wheat flour,
 - ❖ Add ground flaxseeds, wheat germ, sunflower seeds or sesame seeds to baked goods, and
 - ❖ Top casseroles with wheat germ, sesame seeds or sunflower seeds.

Preparing Dry Beans

Yields: One pound of dry beans yields about 2¼ cups dry beans or 5 to 6 cups cooked beans. 2¼ cups dry lentils yields 3½ to 4 cups cooked lentils.

Soaking: Dry beans should be soaked before cooking. Remember that beans expand, so choose a pot that is large enough to allow for expansion. Lentils and split peas do not need soaking.

Leisurely Soak Method: Soak beans for at least four hours or overnight in a pot filled with room-temperature water. This reduces cooking time by up to half.

Quick Soak Method: When time is short, bring the water to a boil, then let beans soak in the hot water for one to four hours, depending on the variety of beans.

Discard the soaking water and rinse the beans to reduce problematic gas. The essential nutrients are retained in the beans, not the soaking water.

Cooking: To cook, cover beans with fresh water. Use about 6 cups of water for every pound of dry beans. Add seasonings to cooking water. Note that acid foods, such as tomatoes or vinegar, slow down the softening of the beans, and salt toughens them by removing the moisture. Therefore, these ingredients should be added at the end of cooking time.

Add about ¼ teaspoon cooking oil to the water to prevent foaming. Cover the pot partially and simmer until beans are cooked. Dry beans are easier to digest when they are thoroughly cooked.

Substituting Canned Beans: These can be used in place of dry beans when food preparation time is short. To "degas" canned beans, rinse them in a strainer under cool running water. This can reduce their sodium content by 30 to 40 percent. However, this process also rinses away some nutrients, such as B vitamins, which leach from the beans into the canning liquid.

Reading Food Labels

Dietary fiber is listed on the Nutrition Facts panel on most packaged food products. Nutrition Facts labels list goals for Americans as 25 grams of dietary fiber per day for a 2,000 calorie diet and 30 grams per day for a 2,500 calorie diet.

A food is a high source of fiber if the % Daily Value listed on the Nutrition Facts label is 20% or more. It is a low source of fiber if the % Daily Value is 5% or less.

Based on grams per serving, the categories of fiber sources include:

High Fiber = 5+ grams per serving

Good Source = 2.5 to 4.9 grams per serving
More Or Added Fiber = At least 2.5 grams more per serving than a standard serving size

The *Food Sources of Dietary Fiber* chart lists dietary fiber and caloric content of specific foods that are high to good sources of fiber.

Food Sources of Dietary Fiber

Food Standard Amount	Dietary Fiber (g)*	Calories
Navy beans, cooked, ½ cup	9.5	128
Bran ready-to eat cereal (100 %), ½ cup	8.8	78
Kidney beans, canned ½ cup	8.2	109
Split peas, cooked, ½ cup	8.1	116
Lentils, cooked, ½	7.8	115
Black beans, cooked, ½ cup	7.5	114
Pinto beans, cooked, ½ cup	7.7	122
Lima beans, cooked, ½ cup	6.6	108
Artichoke, globe, cooked, 1 each	6.5	60
White beans, canned, ½ cup	6.3	154
Chickpeas, cooked, ½ cup	6.2	135
Great northern beans, cooked, ½ cup	6.2	105
Cowpeas, cooked, ½ cup	5.6	100
Soybeans, mature, cooked, ½ cup	5.2	149
Bran ready-to-eat cereals, various, ~ 1 oz.	2.6-5.0	90-108
Crackers, rye wafers, plain, 2 wafers	5.0	74
Sweet potato, baked, with peel, 1 medium (146g)	4.8	131
Asian pear, raw, 1 small	4.4	51
Green peas, cooked, ½ cup	4.4	67
Whole-wheat English muffin, 1 each	4.4	134
Pear, raw, 1 small	4.3	81
Bulgur, cooked, ½ cup	4.1	76
Mixed vegetables, cooked, ½ cup	4.0	59
Raspberries, raw, ½ cup	4.0	32
Sweet potato, boiled, no peel, 1 medium (156g)	3.9	119
Blackberries, raw, ½ cup	3.8	31
Potato, baked, with skin, 1 medium	3.8	161
Soybeans, green, cooked, ½ cup	3.8	127
Stewed prunes, ½ cup	3.8	133
Figs, dried, ¼ cup	3.7	93
Dates, ¼ cup	3.6	126
Oat bran, raw, ¼ cup	3.6	58
Pumpkin, canned, ½ cup	3.6	42
Spinach, frozen, cooked, ½ cup	3.5	30
Shredded wheat ready-to-eat cereals, various, ~ 1 oz.	2.8-3.4	96
Almonds, 1 oz.	3.3	164

Food Sources of Dietary Fiber (continued)

Food Standard Amount	Dietary Fiber (g)*	Calories
Apples with skin, raw, 1 medium	3.3	72
Brussels sprouts, frozen, cooked, ½ cup	3.2	33
Whole-wheat spaghetti, cooked, ½ cup	3.1	87
Banana, 1 medium	3.1	105
Orange, raw, 1 medium	3.1	62
Oat bran muffin, 1 small	3.0	178
Guava, 1 medium	3.0	37
Pearled barley, cooked, ½ cup	3.0	97
Sauerkraut, canned, solids, and liquids, ½ cup	3.0	23
Tomato paste, ¼ cup	2.9	54
Winter squash, cooked, ½ cup	2.9	38
Broccoli, cooked, ½ cup	2.8	26
Turnip greens, cooked, ½ cup	2.5	15
Collards, cooked, ½ cup	2.7	25
Okra, frozen, cooked, ½ cup	2.6	26
Peas, edible-podded, cooked, ½ cup	2.5	42
*High Fiber = 5+ grams Good Source = 2.5-4.9 grams		
Source: ARS Nutrient Database for Standard Reference, Release 17. Adapted from 2002 revision of USDA Home and Garden Bulletin No. 72, Nutritive Value of Foods.		

Recipes Rich in Fiber

Smothered Greens:

3 cups water
 ¼ pound smoked turkey breast, skinless
 1 tablespoon fresh hot pepper, chopped
 ¼ teaspoon cayenne pepper
 ¼ teaspoon cloves, ground
 2 cloves garlic, crushed
 ½ teaspoon thyme
 1 stalk scallion, chopped
 1 teaspoon ginger, ground
 ¼ cup onion, chopped
 2 pounds greens (mustard, turnip, collard, kale, or mixture)

Place all ingredients except greens into large saucepan and bring to boil. Prepare greens by washing thoroughly and removing stems. Tear or slice leaves into bite-size pieces. Add greens to turkey stock. Cook for 20-30 minutes until tender. Makes 5 servings containing 1 cup each. Total fiber: 4 grams per serving.

(Keep the Beat: Heart Healthy Recipes)

Per serving: Calories 80, Total fat 2g, Saturated fat less than 1g, Cholesterol 16mg, Sodium 378 mg, Total carbohydrate 9g, Dietary fiber 4g, Protein 9g, Potassium 472 mg.

Vegetable Stew:

3 cups water
 1 cube vegetable bouillon, low sodium
 2 cups white potatoes, cut in 2-inch strips
 2 cups carrots, sliced
 4 cups summer squash, cut in 1-inch squares
 1 cup summer squash, cut in 4 chunks
 1 can (15 oz) sweet corn, rinsed and drained (or 2 ears fresh corn, 1½ cup)
 1 teaspoon thyme
 2 cloves garlic, minced
 1 stalk scallion, chopped
 ½ small hot pepper, chopped
 1 cup onion, coarsely chopped
 1 cup tomatoes, diced (add other favorite vegetables, such as broccoli and cauliflower)

Put water and bouillon in large pot and bring to a boil. Add potatoes and carrots, and simmer for 5 minutes. Add remaining ingredients, except for tomatoes, and continue cooking for 15 minutes over medium heat.

Remove the four chunks of squash and puree in blender. Return pureed mixture to pot and let cook for 10 minutes more. Add tomatoes and cook for another 5 minutes. Remove from heat and let sit for 10 minutes to allow stew to thicken. Makes 8

servings containing 1¼ cups each. Total fiber: 4 grams per serving.

(Keep the Beat: Heart Healthy Recipes)

Per serving: Calories 119, Total fat 1g, Cholesterol 0mg, Sodium 196mg, Total Carbohydrate 27g, Dietary fiber 4g, Protein 4g, Potassium 524 mg.

Easy Brown Rice and Beans:

4 tablespoons brown rice

¾ cup water

7-ounce can stewed tomatoes

⅓ cup chopped celery (1 stalk)

⅓ cup chopped onions (½ medium onion)

½ cup chopped green pepper (½ medium)

7-ounce can red kidney beans (half a 14-oz. can)

Pinch of garlic powder

2 drops hot sauce

Dash of pepper

Cook rice in water until water is absorbed. In skillet cook chopped celery, onion, and green peppers slowly over low heat about 10 minutes. Add drained canned beans, stewed tomatoes and seasoning.

Bring to a boil, and simmer uncovered about 10 minutes. Add cooked rice and mix thoroughly.

Makes 2 to 3 servings.

(Filling up on Fiber)

Per serving: Calories 154, Total fat 1g, Cholesterol 0mg, Sodium 327mg, Total carbohydrate 32g, Dietary fiber 7g, Sugar 4g, Protein 6g.

Sunshine Rice:

1½ tablespoon vegetable oil

1¼ cup celery, finely chopped, with leaves

1½ cup onions, finely chopped

1 cup water

½ cup orange juice

2 tablespoons lemon juice

Dash of hot sauce

1 cup long grain white rice, uncooked

¼ cup slivered almonds

Heat oil in medium saucepan. Add celery and onions, and sauté until tender (about 10 minutes). Add water, juices, and hot sauce. Bring to boil. Stir in rice and bring back to boil. Let stand covered until rice is tender and liquid is absorbed. Stir in almonds. Serve immediately. Makes 4 servings containing ⅓ cup each. Total fiber: 5 grams per serving.

(Keep the Beat: Heart Healthy Recipes)

Per serving: Calories 276, Total fat 6g, Saturated fat 1g, Cholesterol 0mg, Sodium 52 mg, Carbohydrates 50g, Dietary fiber 5g, Protein 7g, Potassium 406mg.

Bean Burritos:

1 16-ounce can pinto beans

1 tablespoon oil

1 package (10) flour tortillas

½ cup chopped onions

1 cup grated American or Longhorn cheese

chopped lettuce

salsa or taco sauce

Mash drained beans and heat in oil until hot. Simmer and stir over low heat until thick. Heat flour tortillas until warm and soft. Spread about 2 tablespoons of beans on each tortilla. Add cheese, onions, lettuce and salsa if desired. Fold one side of the tortilla up about one inch, then roll. Makes 5 servings.

(Filling up on Fiber)

Per serving: Calories 581, Total fat 14g, Cholesterol 0mg, Sodium 957 mg, Total carbohydrate 97g, Dietary fiber 9g, Sugar 1g, Protein 17g.

Yummy Yams:

3 medium yams

1 cup dried prunes (soaked, drained)

2 tablespoons lemon juice

2 teaspoons margarine

2 tablespoons fruit juice (orange, apple, etc.)

pinch of mace, pinch of ginger

½ teaspoon salt

Peel and cut yams into ¼-inch slices and steam. Arrange layer of yams on bottom of oiled, small baking dish. Dot with margarine. Top with layer of prunes. Alternate layers until all is used. Blend the rest of the ingredients together and pour over potatoes and prunes. Bake at 350 °F for about 35 minutes. Makes 3 servings.

(Filling up on Fiber)

Per serving: Calories 319, Total fat 3g, Cholesterol 0 mg, Sodium 43 mg, Total carbohydrate 74g, Dietary fiber 9g, Sugar 23g, Protein 3g.

Sources:

1. Cason, Katherine. *Filling up on Fiber* (2001). Penn State University Cooperative Extension Service. <http://pubs.cas.psu.edu/freepubs/pdfs/uk088.pdf>
2. Duyff, Roberta Larson. American Dietetic Association *Complete Food and Nutrition Guide, 2nd Edition*. 2002.
3. United States Department of Agriculture (USDA) and United States Department of Health and Human Services (HHS). *Dietary Guidelines for Americans*, 2005. <http://www.health.gov/dietaryguidelines/dga2005/document/pdf/DGA2005.pdf>
4. National Heart, Lung, and Blood Institute (NHLBI). (05/04). *Keep the Beat: Heart Healthy Recipes*.
5. Position of the American Dietetic Association. *Health Implications of Dietary Fiber*. www.eatright.org/cps/rde/xchg/SID-5303FFEA-2DF3DBDA/ada/hs.xsl/advocacy_adar2_0702_ENU_HTML.htm

This information has been reviewed and adapted for use in South Carolina by J.G. Hunter, HGIC Information Specialist, and K.L. Cason, Professor, State EFNEP Coordinator, Clemson University.(New 09/05.)

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