



OKLAHOMA COOPERATIVE
EXTENSION SERVICE

Dietary Fiber

Family and Consumer Sciences

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What Is Dietary Fiber?

Dietary fiber is the part of whole grains, fruits, vegetables, beans, nuts, and seeds that we cannot digest. Dietary fiber is not a single substance, but a group of substances with similar properties. Some of the components of fiber are cellulose, hemicellulose, lignin, gum, and pectin.

Two Types of Dietary Fiber

Dietary fiber can be separated into two basic types based on its properties and effects on the body. These two types are insoluble and soluble fiber.

Insoluble fibers, such as cellulose, hemicellulose, and lignin, do not dissolve in water. Insoluble fibers are found in foods such as wheat bran, whole grains, and vegetables. Insoluble fibers absorb water and increase the intestinal bulk, which helps the intestine function properly.

Soluble fibers, such as gum and pectin, dissolve in water and are found in beans, oats, barley, and some fruits and vegetables. Soluble fibers may play a role in lowering blood cholesterol and in regulating the body's use of sugar.

What Foods Supply Fiber?

Plant foods are the only source of dietary fiber. The best sources of fiber are whole grain breads and cereals, fruits and vegetables, and dried beans and peas. These foods provide both soluble and insoluble fibers.

Food Sources of Insoluble Fiber

<i>Cellulose</i>	<i>Hemicellulose</i>	<i>Lignin</i>
Whole Wheat Flour	Bran Cereals	Bran Cereals
Unprocessed Bran	Whole Grains	Unprocessed Bran
Cabbage	Brussels Sprouts	Strawberries
Peas	Mustard Greens	Eggplant
Green Beans	Beet Root	Pears
Wax Beans		Green Beans
Broccoli		Radishes
Brussel Sprouts		
Cucumber with Skin		
Green Peppers		
Apples		
Carrots		

Food Sources of Soluble Fiber

<i>Gum</i>	<i>Pectin</i>
Oatmeal	Squash
Rolled Oat Products	Apples
Dried Beans	Citrus Fruits
Cauliflower	
Green Beans	
Cabbage	
Dried Peas	
Carrots	
Potatoes	
Strawberries	

What Does Dietary Fiber Do?

Dietary fiber has important benefits in nutrition and health. Dietary fiber has preventive health benefits for many conditions, including diverticular disease, colon cancer, heart disease, and diabetes.

Digestive System

Dietary fiber has health benefits through its effect on the digestive system. A high-fiber diet helps relieve constipation. Both types of fiber play important roles in the digestive tract. Insoluble fiber draws water from the system and increases the bulk and softness of the food mass in the intestine. This decreases the time it takes to travel through the digestive system, making elimination easier. Soluble fiber seems to delay the digestion and absorption of nutrients and alters the action of digestive enzymes and hormones.

Diverticular Disease

Diverticular disease is characterized by protrusions or out-pouches in the wall of the colon. These pouches, or diverticula, are believed to develop from excessive pressure, which weakens the wall of the colon. As much as one-third of the U.S. adult population has diverticula. In many cases, there are no obvious symptoms but in some people the diverticula become inflamed and painful. High-fiber foods may help in the prevention of diverticular disease by making a larger softer stool that requires less pressure to pass through the digestive system.

Colon Cancer

High-fat intake has been correlated to the incidence of colon cancer. A high fiber, low-fat diet may reduce the risk of colon cancer in several ways. First, fiber absorbs water, lowering the concentration of potential carcinogenic (cancer causing) substances in the intestine. Second, since insoluble fiber speeds up the movement of waste material in the intestine, the colon is exposed to any cancer causing substance in the intestine for a shorter length of time. Finally, diets high in fiber are typically lower in fat and may help protect against colon cancer by reducing fat intake.

Heart Disease

Soluble fiber may have a role in reducing heart disease risk by lowering blood cholesterol concentration in some people. As it passes through the intestine, soluble fiber binds to dietary cholesterol, helping the body to eliminate it. There is also some evidence that soluble fiber can slow the liver's production of cholesterol, as well as alter low-density lipoprotein particles to make them less of a health risk. A high-fiber diet, combined with a low-fat diet, can be an effective approach to reducing the risk of heart disease.

Diabetes

Diabetes is a condition characterized by high blood sugar levels. Dietary fiber has a favorable effect on blood glucose (blood sugar). Soluble fiber delays digestion and absorption of glucose into the blood, which may help prevent wide swings in blood glucose throughout the day.

Are Your Getting Enough Fiber?

The average American consumes between 10 and 15 grams of fiber per day. The National Cancer Institute recommends we consume between 20 and 30 grams per day from a variety of foods. You can increase dietary fiber in your diet from whole grain breads and cereal. Other good fiber sources are fresh fruits and vegetables with peels, dried beans, and peas.

Fiber on Food Labels

The amount of dietary fiber in a serving of food is listed in grams and as a percent of the Daily Value on the nutrition label. The Percent Daily Value for dietary fiber shows how much fiber a serving contributes to a 2,000

calorie reference diet. The manufacturer may also list the amount of insoluble fiber and soluble fiber.

Claims that Can Be Made on Food Packages About Dietary Fiber

Dietary Fiber Claims that Can Be Listed on the Food Label	
Good Source of Fiber, Contains Fiber, Provides Fiber	3 to less than 5 grams of fiber (10 to 19 percent of the fiber Daily Value)
High Fiber, Rich in Fiber, Excellent Source of Fiber	5 grams or more fiber (20 percent or more of the fiber Daily Value)
Other	Any product making a fiber claim must qualify for a "goodsource" or "high" claim and must state the level of total fat per serving if the food is not "low fat" (3 grams or less fat).

In 1993 a health claim regarding fiber was approved by FDA which allowed the statement that diets low in fat and rich in fiber-containing grain products, fruits, and vegetables may reduce the risk of some types of cancer. The most recent claim approved by FDA in 1997, allows the statement that foods with soluble fiber from whole oats may reduce heart disease risk when eaten as a part of a diet low in saturated fat and cholesterol.

Healthy Choices for Increasing Fiber Through the Food Guide Pyramid

Bread, Cereal, Rice, and Pasta Group

- To increase the fiber content in breads, look for whole-grain breads with "whole wheat flour," "stone-ground whole wheat flour" or "100 percent whole wheat flour" as the first ingredient.
- To increase the fiber content in cereals, look for "whole-grain wheat," "whole-grain oats" or "whole-grain rice" as the first ingredient.

- Brown rice is higher in fiber than refined white rice.
- Experiment with different grains such as couscous, barley, bulgur, quinoa, and kasha in salads, soups, and casseroles to increase fiber.

Fruit and Vegetable Groups

- Fruits are naturally high in fiber. Fresh fruits are higher in fiber than frozen or canned. Peels and seeds in fruits increase fiber.
- Vegetables are also naturally high in fiber. To keep the fiber content of vegetables high, try eating them raw or steam just until tender. Leaving the skins on vegetables can also increase fiber.
- Add dried fruits to cereal, muffins, and quick breads to increase fiber.

Meat, Poultry, Fish, Dry Beans, Eggs, and Nut Group

- Dried beans and peas are low in fat and an excellent source of fiber, vitamins, and minerals. Add beans, peas and lentils to soups, stews, salads, and rice dishes.
- Nuts are a good source of fiber but are also high in fat.

Fiber Supplements

You can get enough dietary fiber without using fiber supplements by following the Food Guide Pyramid recommendations. The Food Guide Pyramid recommends at least six grain bread and cereal servings and at least five fruit and vegetable servings each day, which provide fiber in the diet. Foods are our best source of dietary fiber. Foods provide both soluble and insoluble fiber. In addition, food sources of fiber can be spaced out over the whole day.

Guidelines for Increasing Dietary Fiber

When you increase fiber in your diet, it's important to do so gradually. Increasing dietary fiber too rapidly can initially cause excess gas formation or diarrhea. Since water-insoluble fibers absorb water, it is also important to drink plenty of liquids along with increased dietary fiber intake. Include at least six, eight-ounce glasses of fluid each day. Also, try to spread high fiber foods out throughout the day, at meals and snacks. Some guidelines for increasing dietary fiber are:

- Go gradually.
- Drink plenty of water.
- Spread fiber out throughout the day.

Fiber Content of Foods

Rich Sources of Dietary Fiber (4 or more grams of fiber per serving)

(Foods with an * have 6 or more grams of fiber per serving)

Breads and Cereals	*All Bran, *100% Bran or *Bran Buds	1/3 cup
	Bran Chex	1/2 cup
	Cracklin' Oat Bran	1/2 cup
	Grape-nuts	1/2 cup
Legumes (cooked)	*Beans, brown	1/2 cup
	*Beans, kidney	1/2 cup
	*Beans, large lima	1/2 cup
	*Beans, navy	1/2 cup
	*Beans, pinto	1/2 cup
	*Beans, white	1/2 cup
	Lentils	1/2 cup
	*Peas, black-eyed	1/2 cup
Fruits and Vegetables	*Artichoke, cooked	1 ea.
	Blackberries	1/2 cup
	Prunes, dried	4 ea.
	Raspberries	1/2 cup

Moderately Rich Sources of Dietary Fiber

(1 to 3 grams per serving)

Breads	Bagel, 3.5" diameter	1 each
	Bread, cracked wheat	1 slice
	Bread, whole wheat	1 slice
	Bread, pumpernickel	1 slice
	Bread, rye	1 slice
	Corn bread	2" square
	Crackers, whole wheat	4 each
	Muffin, bran, blueberry, cornmeal	1 each
	Muffin, English	1 each
Cereals	Bran, rice or wheat	2 tbs.
	Bran flakes, 40%	1/2 cup
	Corn bran cereal	1/2 cup
	Fruitful bran cereal	1/2 cup
	Grape-nuts	1/4 cup
	Grape-nut flakes	1/2 cup

Moderately Rich Sources of Dietary Fiber

(1 to 3 grams per serving) (continued)

	Granola-type cereals	1/4 cup
	Nutri-grain cereal	1/2 cup
	Oatmeal, cooked	1/2 cup
	Puffed wheat	1/2 cup
	Raisin bran	1/2 cup
	Ralston, cooked	1/2 cup
	Rice, brown, cooked	1/2 cup
	Shredded wheat	2/3 cup
	Total cereal	1/2 cup
	Wheaties	1/2 cup
	Wheat germ	2 tbs.
Fruits	Apple, 2 3/4" diameter	1 each
	Applesauce	1/2 cup
	Apricots, canned	1/2 cup
	Banana	1 each
	Cherries, canned or fresh	1/2 cup
	Cranberries, fresh	1/2 cup
	Dates, whole	3 each
	Figs, fresh, medium	2 each
	Fruit cocktail, canned	1/2 cup
	Grapefruit	1 half
	Kiwi fruit	1 each
	Orange, 2 5/8" diameter	1 each
	Peaches, canned	1/2 cup
	Peaches, fresh	1 each
	Pears, canned	1/2 cup
	Pears, fresh	1/2 each
	Plum, medium, 2 1/8" dia.	1 each
	Raisins	1/4 cup
	Strawberries, fresh	1/2 cup
	Tangerine	1 each
Vegetables	Bean sprouts, raw	1/2 cup
	Beets, diced, canned	1/2 cup
	Broccoli, chopped, frozen, boiled	1/2 cup
	Brussels sprouts	1/2 cup
	Cabbage cooked	1/2 cup
	Carrots	1/2 cup
	Cauliflower	1/2 cup
	Corn	1/2 cup
	Eggplant	1/2 cup
	Kale, boiled	1/2 cup

Moderately Rich Sources of Dietary Fiber

(1 to 3 grams per serving) (continued)

	Okra, frozen, boiled	1/2 cup
	Potatoes, baked or mashed	1/2 cup
	Spinach	1/2 cup
	Squash, winter or summer	1/2 cup
	Sweet potatoes	1/2 cup
	Tomatoes, canned	1/2 cup
	Turnip greens	1/2 cup
	Yams	1/2 cup
	Zucchini, cooked	1/2 cup
Misc.	Almonds	2 tbls.
	Flour, whole wheat	2 tbls.
	Peanuts	2 tbls.
	Popcorn, popped	1 cup

Low Sources of Dietary Fiber

Breads	Bread, pita	1 each
and Cereals	Bread, raisin	1 each
	Bread, white	1 each
	Corn flakes	1 cup
	Crackers, saltine	4 each
	Crackers, trisket	4 each
	Crackers, graham	2 each
	Product 19	1 cup
	Rice, white	1/2 cup
	Roll, white dinner	1 each
	Special K cereal	1 cup

Low Sources of Dietary Fiber (continued)

Fruits	Cantaloupe	1/6 each
	Grapes, Thompson seedless	1/2 cup
	Juices, grape, orange, etc.	1/2 cup
	Mandarin oranges	1/2 cup
	Watermelon	1 cup
Vegetables	Asparagus, cooked	3 spears
	Beans, green	1/2 cup
	Chestnuts, water	1/2 cup
	Lettuce, iceberg, chopped	1 cup
	Mushrooms, canned	1/2 cup
	Mustard greens, fresh	1/2 cup
	Onions, chopped, raw	1/4 cup
	Pepper, sweet green	1/2 cup
Misc.	Flour, white	2 tbls.

References

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