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The Fibers

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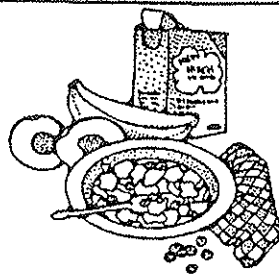
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Cooperative Extension Service
Utah State University



Nutrition and Food Sciences Fact Sheet

EL 222

THE FIBERS

DEFINITIONS

FIBER: A loose term denoting the substances in plant food that are not digested by human digestive enzymes.

CRUDE FIBER: The residue of plant food remaining after extraction with acid and alkali in the laboratory.

DIETARY FIBER: The residue of plant food resistant to hydrolysis by human digestive enzymes. (1 gm crude fiber = 2-4 gm dietary fiber.)

CELLULOSE: The unavailable carbohydrate fiber which is not digested by human digestive enzymes.

PECTIN & HEMICELLULOSE: Carbohydrate fibers found in plant foods.

LIGNIN: A noncarbohydrate fiber that occurs in plant foods.

GUMS & MUCILAGES: Often used as thickening agents in prepared foods.

FUNCTIONS

The major impact of dietary fiber is on the colon, the last part of the gastrointestinal tract, where colon cancer and diverticular disease can arise, but the addition of fibrous foods to the diet increases the bulk of food all along the intestine.

Some of the ways in which food fibers are thought to prevent disease states are:

By promoting weight loss by enhancing satiety and displacing the kcalories of concentrated fats and sweets—achieved by adding more servings of fruits, vegetables, and whole grains to the diet.

By attracting water into the digestive tract, thus softening the stools and preventing constipation.

By preventing increased abdominal pressure and enlargement of veins from prolonged straining on defecation, which may lead to the swollen veins of hemorrhoids. Softer stools allow for decreased straining of rectal muscles.

By preventing formation of small fecal stones, which could obstruct the appendix, increase abdominal pressure, and allow for bacterial invasion of the appendix, resulting in appendicitis.

By exercising the muscles of the digestive tract so that they retain their health and tone and resist bulging out into the pouches characteristic of diverticulosis.

By speeding up the passage of food materials through the digestive tract, thus shortening the “transit time” and helping to prevent exposure of the tissue to cancer-causing agents in food.

By binding lipids such as cholesterol and carrying them out of the body with the feces so that the blood lipid concentrations are lowered, and possibly the risk of heart and artery disease as a consequence.

By binding the bile salts and reducing their absorption in the intestinal tract.

By modulating the body’s response to glucose; monosaccharides from complex carbohydrates, in the presence of fiber, produce a more even rise in blood glucose.

Not all the fibers have similar effects. For example, wheat bran, which is composed mostly of cellulose, has no cholesterol-lowering effect, whereas oat bran and the fiber of apples (pectin) do lower blood cholesterol. On the other hand, wheat bran seems to be one of the most effective stool-softening fibers. Fibers that form gels in water (pectin, guar) prolong the time of transit of materials through the intestine, whereas insoluble fibers (cellulose) tend to decrease the time.

AMOUNT OF FIBER NEEDED IN DIET

No Recommended Dietary Allowance has been established for fiber. It is suggested that the average person needs about 20 grams of dietary fiber per day.

FOOD SOURCES

Fiber is found only in foods of plant origin including fruits, vegetables, nuts, peas, and other legumes. Whole grain cereals and breads provide a very good source, especially bran cereals. The following chart gives a comparison of some dietary fiber values.

	<u>Grams</u>		<u>Grams</u>
Broccoli, 1/2 C. cooked	3.20	Peaches, canned, 1/2 C.	2.05
Cabbage, 1/2 C. cooked	2.00	Bread, cracked wheat, 1 slice	1.25
Green beans, 1/2 C. cooked	3.13	Bread, white, 1 slice	0.68
Lettuce, 1/6 head	1.45	Bread, whole wheat, 1 slice	3.17
Tomato, raw, 1 medium	2.16	All-Bran cereal, 1/3 C.	8.40
Apple, with peel, 1 medium	4.28	40% Bran Flakes, 1 C.	5.50
Banana, 1 medium	3.26	Pork & beans, 1 C.	18.60
Cantaloupe, 1/2 medium	2.67	Peanut butter, 2 Tbs.	2.40
Orange, 1 medium	2.97		

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