

Fibre in food

Dietary fibre is found in cereals, fruits and vegetables. Fibre is made up of the indigestible parts or compounds of plants, which pass relatively unchanged through our stomach and intestines. Fibre is mainly a carbohydrate. The main role of fibre is to keep the digestive system healthy.

Other terms for dietary fibre include 'bulk' and 'roughage', which can be misleading since some forms of fibre are water-soluble and aren't bulky or rough at all.

Benefits of fibre

Dietary fibre is mainly needed to keep the digestive system healthy. It also contributes to other processes, such as stabilising glucose and cholesterol levels. In countries with traditionally high-fibre diets, diseases such as bowel cancer, diabetes and coronary heart disease are much less common than in Western countries.

Most Australians do not consume enough fibre. On average, most Australians consume 20–25 g of fibre daily. The Heart Foundation recommends that adults should aim to consume approximately 25–30 g daily.

Children aged between four and eight should consume 18 g of fibre each day. Girls aged 9 to 13, and 14 to 18 years, need 20 g and 22 g per day respectively. Boys aged 9 to 13, and 14 to 18 years, need 24 g and 28 g per day respectively.

Disorders that can arise from a low-fibre diet include:

- constipation
- irritable bowel syndrome
- diverticulitis
- heart disease
- some cancers.

Types of fibre in food

There are two categories of fibre and we need to eat both in our daily diets, which are:

- soluble fibre – includes pectins, gums and mucilage, which are found mainly in plant cells. One of its major roles is to lower LDL (bad) cholesterol levels. Good sources of soluble fibre include fruits, vegetables, oat bran, barley, seed husks, flaxseed, psyllium, dried beans, lentils, peas, soy milk and soy products. Soluble fibre can also help with constipation.
- insoluble fibre – includes cellulose, hemicelluloses and lignin, which make up the structural parts of plant cell walls. A major role of insoluble fibre is to add bulk to faeces and to prevent constipation and associated problems such as haemorrhoids. Good sources include wheat bran, corn bran, rice bran, the skins of fruits and vegetables, nuts, seeds, dried beans and wholegrain foods.

Both types of fibre are beneficial to the body and most plant foods contain a mixture of both types.

Resistant starch

Resistant starch, while not traditionally thought of as fibre, acts in a similar way. Resistant starch is the part of starchy food (approximately 10 per cent) that resists normal digestion in the small intestine. It is found in many unprocessed cereals and grains, unripe bananas, potatoes and lentils, and is added to bread and breakfast cereals as Hi-Maize. It can also be formed by cooking and manufacturing processes such as snap freezing.

Resistant starch is also important in bowel health. Bacteria in the large bowel ferment and change the resistant starch into short-chain fatty acids, which are important to bowel health and may protect against cancer. These fatty acids are also absorbed into the bloodstream and may play a role in lowering blood cholesterol levels.

Fibre keeps the digestive tract healthy

The principal advantage of a diet high in fibre is in improving the health of the digestive system. The digestive system is lined with muscles that massage food along the tract from the moment a mouthful is swallowed until the eventual waste is passed out of the bowel (a process called peristalsis). Since fibre is relatively indigestible, it adds bulk to the faeces.

Soluble fibre soaks up water like a sponge, which helps to bulk out the faeces and allows it to pass through the gut more easily. It acts to slow down the rate of digestion. This slowing down effect is usually overridden by insoluble fibre, which does not absorb water and speeds up the time that food passes through the gut.

Drink lots of water

A high-fibre diet may not prevent or cure constipation unless you drink enough water every day. Some very high-fibre breakfast cereals may have around 10g of fibre per serve, and if this cereal is not accompanied by enough fluid, it may cause abdominal discomfort or constipation.

Fibre and ageing

Fibre is even more important for older people. The digestive system slows down with age, so a high-fibre diet becomes even more important.

Lowering blood cholesterol

There is good evidence that soluble fibre reduces blood cholesterol levels. When blood cholesterol levels are high, fatty streaks and plaques are deposited along the walls of arteries. This can make them dangerously narrow and lead to an increased risk of coronary heart disease. It is thought that soluble fibre lowers blood cholesterol by binding bile acids (which are made from cholesterol to digest dietary fats) and then excreting them.

Fibre and weight control

A high-fibre diet is protective against weight gain. High-fibre foods tend to have a lower energy density, which means they provide fewer kilojoules per gram of food. As a result, a person on a high-fibre diet can consume the same amount of food, but with fewer kilojoules (calories).

Fibrous foods are often bulky and, therefore, filling. Soluble fibre forms a gel that slows down the emptying of the stomach and the transit time of food through the digestive system. This extends the time a person feels satisfied or 'full'. It also delays the absorption of sugars from the intestines. This helps to maintain lower blood sugar levels and prevent a rapid rise in blood insulin levels, which has been linked with obesity and an increased risk of diabetes.

Fibre and diabetes

For people with diabetes, eating a diet high in fibre slows glucose absorption from the small intestine into the blood. This reduces the possibility of a surge of insulin, the hormone produced by the pancreas to stabilise blood glucose levels.

Conditions linked to low-fibre diets

Eating a diet low in fibre can contribute to many disorders, including:

- constipation – small, hard and dry faecal matter that is difficult to pass

- haemorrhoids – varicose veins of the anus
- diverticulitis – small hernias of the digestive tract caused by long-term constipation
- irritable bowel syndrome – pain, flatulence and bloating of the abdomen
- overweight and obesity – carrying too much body fat
- coronary heart disease – a narrowing of the arteries due to fatty deposits
- diabetes – a condition characterised by too much glucose in the blood
- colon cancer – cancer of the large intestine.

Diet, cancer and heart disease

Increasing dietary fibre and wholegrain intake is likely to reduce the risk of cardiovascular disease, type 2 diabetes, weight gain and obesity, and possible overall mortality.

It is also very likely that these observed health benefits occur indirectly, through the protective effects of 'phytochemicals' (such as antioxidants) that are closely associated with the fibre components of fruits, vegetables and cereal foods.

Studies have shown that dietary fibre, cereal fibre and wholegrains are protective against colorectal cancer. Fibre is thought to decrease the risk of colorectal cancer by increasing stool bulk, diluting possible carcinogens present in the diet and decreasing transit time through the colon.

In addition, bacterial fermentation of fibre results in the production of short-chain fatty acids, which are thought to have protective effects against colorectal cancer. It is recognised that dietary fibre protects against colorectal cancer, each 10 g per day intake of total dietary fibre equates to a 10 per cent reduction in risk of colorectal cancer.

Ways to increase your fibre intake

Simple suggestions for increasing your daily fibre intake include:

- Eat breakfast cereals that contain barley, wheat or oats.
- Switch to wholemeal or multigrain breads and brown rice.
- Add an extra vegetable to every evening meal.
- Snack on fruit, dried fruit, nuts or wholemeal crackers.

A daily intake of more than 30 g can be easily achieved if you eat wholegrain cereal products, more fruit, vegetables and legumes and, instead of low-fibre cakes and biscuits, have nuts or seeds as a snack or use in meals.

You do not need to eat many more kilojoules to increase your fibre intake. You can easily double your fibre intake without increasing your kilojoule intake by being more selective. Compare the tables below.

Fibre intake of less than 20 g per day

	Fibre (g)	Kilojoules (kJ)
1 cup puffed rice cereal	0.4	444
4 slices white bread	3.0	1166
1 tablespoon peanut butter	2.7	610
1 piece of fruit (apple)	1.7	268
1/2 cup canned fruit, undrained	1.4	468
1/2 cup frozen mixed vegetables	4.3	102
Mashed potato 120 g	1.7	336
1 cup white cooked rice	1.0	999
2 plain dry biscuits	0.4	150
1 slice plain cake 60 g	0.6	643

1 cup commercial fruit juice	0.8	391
TOTAL	17.9 g	5,557 kJ

Fibre intake of more than 30 g per day

	Fibre (g)	Kilojoules (kJ)
2 wholewheat cereal biscuits (for example Weetbix or Vita Brits)	3.2	398
4 slices wholegrain bread	5.7	1085
1 tablespoon peanut butter	2.7	610
2 pieces of fruit (apple & pear)	4.9	515
1 cup frozen mixed vegetables	8.6	203
1 small boiled potato with skin, 100 g	2.8	338
1 cup white cooked spaghetti	2.5	696
2 wholemeal dry biscuits	1.5	209
25 almonds	3.0	852
1 cup whole fruit juice	0.5	362
TOTAL	35.4 g	5,118 kJ

A sudden increase in dietary fibre

A sudden switch from a low-fibre diet to a high-fibre diet can create some abdominal pain and increased flatulence (wind). Also, very high-fibre diets (more than 40 g daily) are linked with decreased absorption of some important minerals such as iron, zinc and calcium. This occurs when fibre binds these minerals and forms insoluble salts, which are then excreted.

This could increase the risk of developing deficiencies of these minerals in susceptible people. Adults should aim for a diet that contains 25 g to 30 g of fibre per day, and should introduce fibre into the diet gradually to avoid any negative outcomes.

It is better to add fibre to the diet from food sources rather than from fibre supplements, as these can aggravate constipation, especially if you do not increase the amount of water you drink daily.

Where to get help

- Your doctor
- Dietitians Association of Australia Tel. 1800 812 942

Things to remember

- Dietary fibre is found in the indigestible parts of cereals, fruits and vegetables.
- A diet high in fibre keeps the digestive system healthy.
- Most Australians don't eat enough fibre.

This page has been produced in consultation with, and approved by:

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