CN complete nutrition

A QUICK GUIDE TO...

Fibre

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Government guidelines published in July 2015 advise increasing dietary fibre intake to 30 g a day; yet most adults are only eating 18 g a day.[1, 2]

What is fibre?

Dietary fibre is a term used for plant-based carbohydrates (polysaccharides and oligosaccharides) that are not digested in the small intestine; it also includes other plant components such as lignin.[1, 3] As dietary fibre is not digested in the small intestine it reaches the large intestine or colon where it is completely or partially broken down by bacteria.[1, 3]

Types of fibre

Food sources of dietary fibre are often divided according to whether they provide predominantly soluble or insoluble fibre.[4]

Soluble fibre including pectins and beta glucans can be found in fruit, oats, barley and psyllium.[4] Soluble fibre dissolves in water, it is readily fermented in the colon into gases and physiologically active by-products, and it can be prebiotic and viscous.[4] Soluble fibre delays gastric emptying which, in humans, can result in an extended feeling of fullness, it also blunts glucose and lipid absorption.[4]

Insoluble fibre, including cellulose and resistant starch, is found in wholegrains and nuts. Insoluble fibre does not dissolve in water, it is metabolically inert and provides bulking, it can also be fermented in the large intestine.[4] Insoluble fibre helps to decrease transit time and the bulking fibres absorb water as they move through the digestive system, easing defecation.[4]

Psyllium or ispaghula is the common name used for several members of the plant genus Plantago whose seeds are used commercially to produce dietary fibre.[5] It relieves symptoms of both constipation and mild diarrhoea.[5] Psyllium lowers blood cholesterol levels in people with hypercholesterolaemia and lowers blood glucose levels in those with type 2 diabetes.[6, 7]

Prebiotics were first identified and named by Marcel Roberfroid in 1995.[8] Prebiotics are short-chain carbohydrates that alter the composition of the gut microbiota in a beneficial manner. It is therefore expected that prebiotics will improve health in a similar way to probiotics. Three prebiotics, oligofructose, galacto-oligosaccharides and lactulose, have been found to change the balance of the large bowel microbiota by increasing numbers bifidobacteria and lactobacillus. The short-chain carbohydrates/prebiotics are fermented and give rise to short-chain fatty acids and intestinal gas.[9] Foods which contain high levels of prebiotic fibre include chicory root, Jerusalem artichoke, garlic, leek, onion and asparagus.

Resistant starch is a form of starch that cannot be digested in the small bowel, as such it is a type of fibre. It is found naturally in some foods such as bananas, potatoes, grains, and legumes, and is also produced or modified commercially and incorporated into some food products. Including foods rich in resistant starch within a meal is useful for controlling blood glucose, and there is some evidence that it might help us to feel fuller after meals, which could mean we snack less. There is also a lot of interest in the potential benefits for gut health, as resistant starch is broken down in the large intestine to short chain fatty acids.[3]

Some fibre fractions, such as phytates, bind with minerals such as magnesium, calcium, zinc and iron. Diets high in fibre and low in certain micronutrients could lead to deficiencies over time; however, this is unlikely to occur in the UK where diets are quite varied.[10]

Sources of dietary fibre

A food can be classed as being 'high fibre' if it contains 6 g (or more) of fibre per 100 g, or a 'source of fibre' if it contains at least 3 g of fibre per 100 g. Pulses, nuts, seeds, berries, wholegrains, and vegetables, such as broccoli, sweetcorn and cabbage, are good high fibre choices as well as potatoes with their skins.[1] See **Table One**.

The role of fibre

Fibre benefits our health in many ways:

- Fibre is recommended to alleviate constipation in conjunction with adequate volumes of fluid. Soluble fibre allows more water to remain in the stool, making it softer and larger and, thus, easier to pass through the intestines. Insoluble fibre adds bulk to the stool, which hastens its passage through the gut[3]
- Soluble fibre helps to improve symptoms of irritable bowel syndrome (IBS), however, this is not the case for insoluble fibre which tends to be discouraged in this instance. Resistant starch from processed or re-cooked food (as opposed to naturally occurring resistant starch) should also be reduced. People suffering from wind and bloating may find it helpful to eat oats and linseeds (up to 1 tablespoon a day)[11, 12]
- Increased fibre intake helps lowers cholesterol (total cholesterol and LDL cholesterol) and the risk of heart disease.[13] Soluble fibre, in particular oat and barley beta-glucan has been found to lower cholesterol when consumed in amounts greater than 3 g daily.[14, 15] Psyllium also has a cholesterol lowering effect and has been recommended at a dose of 7 g or more daily[5]
- Higher consumption of beta-glucan (e.g. oats and barley) fibre is also associated with lower systolic and diastolic blood pressure.[16, 17] This can help contribute to the prevention of hypertension and stroke
- Soluble fibre significantly improves glycaemic control in those with type 2 diabetes.[18] Recent epidemiological findings have suggested that there is an association between high fibre intake and a reduced risk of developing diabetes and coronary heart disease.[19] Soluble fibre delays gastric emptying[20] and is associated with lower postprandial glucose levels and increased insulin sensitivity in diabetic and healthy subjects; these effects are generally attributed to the viscous and/or gelling properties of soluble fibre[20]
- A high intake of dietary fibre, especially from cereals and wholegrains is associated with a reduced risk of colorectal cancer. A 10% reduction in risk of colorectal cancer has been noted for each 10 g of fibre consumed daily intake.[21] There is a linear decrease in the risk of colorectal cancer with increasing fibre intake (EPIC).[22] One study noted an 18% increased risk of developing colorectal cancer when a low fibre diet is consumed (≤10 g/day versus 10-15 g/day)[23]
- High fibre diets improve metabolic syndrome, Abutair *et al.* found a significant reduction in fasting blood sugar, triglycerides, total cholesterol, systolic blood pressure, diastolic blood pressure and waist circumference in a randomised controlled study where the participants were given 10.5 g psyllium daily for 8 weeks[24]
- The European Food Safety Authority[25] suggests that including fibre rich foods in a healthy balanced diet can improve weight maintenance. High-fibre foods tend to be more filling than low-fibre foods, so you are likely to eat less and stay satisfied longer. Furthermore high-fibre foods tend to take longer to eat and to be less energy dense
- Prebiotics induce the growth or activity of beneficial microorganisms and as such can alter the composition of the gut microbiome. Their potential health benefits are still being investigated.[9]

Table One: Foods & Typical Fibre Content

	Food	Grams of fibre per 100 g
Fruits	Raspberries	6.5
	Strawberries	1.4
	Blueberries	2.4
	Banana	4.2
Vegetables	Broccoli	2.3
	Kale	3.1
	Sweetcorn	1.8
	Potatoes with skin	3.3
	Parsnip	4.9
	Sweet potato	3.0
	Pumpkin	8.3
Wholegrains	Oats	9.8
	Quinoa	2.2
	Wholemeal flour	9
	Wholemeal bread	5.8
	Wholewheat pasta	3.6
	Brown rice	2.0
Pulses	Baked beans in tomato sauce	3.7
	Chickpeas	4.6
	Kidney beans	5.5
	Red lentils	3.3
Nuts	Almonds	5.6
	Brazil	5.4
	Peanuts	6.3
Seeds	Pumpkin	3.9
	Sunflower	5.7
	Linseed	28
Cereals	Bran Flakes	14.7
	Shredded Wheat	10.1
	All-Bran	15
	Corn Flakes	3

Fibre – Useful online resources

- www.gov.uk/government/publications/sacn-carbohydrates-and-health-report
- www.nutrition.org.uk/healthyliving/basics/fibre.html
- www.nhs.uk/Livewell/Goodfood/Pages/how-to-get-more-fibre-into-your-diet.aspx
- www.bda.uk.com/foodfacts/fibrefoodfactsheet.pdf

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