

# Complex Carbohydrates



## Carbohydrates

Carbohydrates form the basis of most of the food that we eat. Vegetables, pastas, breads, fruits are mainly composed of carbohydrates. We should aim to get around 60% of calories from carbohydrate. Found in both plants and animals (though mainly from plants), carbohydrates are formed from Carbon, Hydrogen and Oxygen.

Carbohydrate is easily broken down by the body to form glucose, which is the basic unit of fuel. If we have too much fuel available then we get high blood sugar (glucose) which is Hyperglycaemia. If we have too little then we have low blood sugar (glucose) and become Hypoglycaemic. Both of these conditions can be very damaging for us, and subsequently our bodies have complex mechanisms for regulating blood sugar.

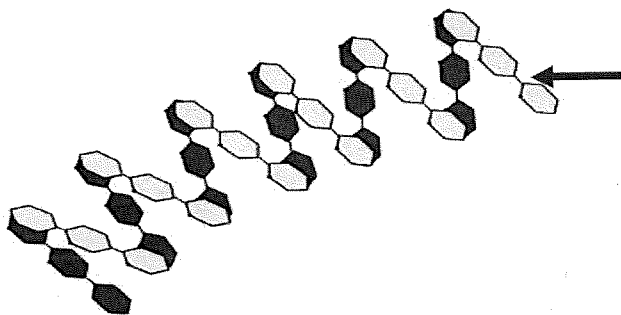
Unfortunately many of today's highly refined and sugar-laden products make it very difficult, if not impossible for the body to effectively regulate blood sugar levels. This leads to immense and often serious health problems for us, and we must therefore aim to take the strain off our overworked digestive system and try to achieve a gradual release of energy throughout the day, by eating natural foods that release their energy slowly.

## Starches versus sugars

Carbohydrates can be split into two categories Sugars and Starches. Sugars are known as simple carbohydrates, and starches are known as complex carbohydrates. Sugars consist of one or two carbohydrate molecules, whilst starches can be in chains of a thousand or more.

## Starches

Complex carbohydrates are made of long strands of sugar molecules. Due to the size and complexity of the chain, accompanied by the fact that these carbohydrates may be bound in fibre, the body takes time to break down the food into the basic sugar molecules.



Starches have  
hundreds of bonds

This normal process of digestion is favourable, and the presence of many of the other food components such as vitamins, minerals, protein, fibre and water make this the ideal way to get the bulk of our energy.

The fibrous content of most natural starch foods will further act to maintain a healthy colon, and will help to stop the build up of potential dangerous toxic and carcinogenic compounds within the colon. The best complex carbohydrates to eat are things like wholegrains, beans, pulses, fresh fruit and vegetables.

**Regularly eat these foods, and make them the mainstay of your diet.**

**Fruit and veg** all varieties and in particular fibrous fruits such as apples and pears. Different coloured vegetables of all varieties and lots of leafy green veg.

**Grains**, such as barley, whole wheat, maize, corn, buckwheat, oats, flaxmeal, wild or brown rice.

**Beans & pulses (legumes)**

The bean family is a group of highly nutritious foods that is an excellent source of complex carbohydrate, dietary fibre and protein. In addition beans are a good source of B vitamins, and minerals such as calcium, potassium and iron. Look for Black beans, Lima beans, Broad beans, Butter beans, Kidney beans, Pinto beans, Soya beans, Adzuki beans, Mung beans and peas, chick peas, and lentils.

**Fruit and veg calorie values**

Check out the calorific values of some of the more popular fruits and veg, and it soon becomes obvious which ones we want to load our plates with. Try to have a broad variety of all fruits and veg, but take care with the considerably more calorie dense versions. Gram for gram, for instance baked potatoes are 7 times more calorie dense than courgettes.

<u>Fruit per 100g</u>	<u>Kcals</u>		<u>Veg per 100g</u>	<u>Kcals</u>
Apples	45		Potatoes baked	136
Plums	36		Boiled	75
Oranges (flesh)	37		Roasted in oil	150
Pear	40		Mashed (butter & milk)	104
Grapes	60		Onion raw	36
Pineapple	41		Onion boiled	17
Avocado	190		Carrots boiled	24
Melon – water	31		Cabbage boiled	16
Melon – honey	28		Peas frozen	70
Strawberries	27		Courgettes	19
Cherries	48		Cauliflower	28
Peaches	33		Broccoli	24
Bananas	95		Spinach	19
Coconut	355		Brussels sprouts	35

To help us consume more complex carbohydrate it's important that we try to include a variety of food sources. Have a look through a recipe book, search the internet or ask friends and family to recommend a recipe that includes a new complex carbohydrate ingredient that you haven't cooked with before i.e. a new fruit or vegetable, a different type of grain, or try a recipe that uses beans or pulses.

# CARBOHYDRATE IN BRIEF

The body's main energy supply

**SIMPLE, FAST RELEASE**

**2 MAIN FORMS**

**STARCH, SLOW RELEASE**

sugar, honey, malt, sweets, most refined foods.

releases sugar quickly into the system

release sugar more slowly into the system

wholegrains, vegetables, most fruits. Contain more Complex carbohydrate and/or fibre.

Give sudden bursts of energy and then a slump

Give a more even sustained supply of energy

If you are experiencing dips in energy this may be caused by the consumption of too many quick releasing carbohydrates and not enough slow releasing ones.

## BLOOD SUGAR TOO LOW?

You may experience fatigue, poor concentration, irritability, nervousness, depression, sweating, headaches, digestive problems.

## WHAT TO DO?

EAT MORE SLOW RELEASING CARBOHYDRATES

## BLOOD SUGAR TOO HIGH?

You may experience swings of energy. When your energy dips this often results in a craving for sweet foods such as chocolate; this then raises blood sugar only for it to dip afterwards to an even lower state, thus the cycle continues.

## A NOTE ON FIBRE

FIBRE IS MADE UP OF COMPLEX CARBOHYDRATES

### 2 TYPES OF FIBRE

#### INSOLUBLE

Found mainly in WHEAT PRODUCTS - wholemeal flour, bread, pasta, some breakfast cereals, bran and fibrous vegetables such as carrots

#### IMPORTANT BECAUSE

stimulates the digestive system, helps prevent constipation, makes us feel full, helps reduce the risk of digestive disorders & contributes fewer calories.

#### SOLUBLE

Found in significant amounts in virtually all FRUITS and VEGETABLES. The richest sources are pulses, eg red kidney beans, baked beans, & lentils.

# Fibre



## Fibre – what is it?

Fibre is a type of carbohydrate that is classified as being “foodstuffs that remain mainly undigested as they enter the large intestine”. Fibre is found in plants such as fruits vegetables and grains; it is also referred to as Non-starch Polysaccharides (NSP). The part of the plant fibre that you eat is called dietary fibre and is an important part of a healthy diet. Dietary fibre is made up of two main types: soluble fibre and insoluble fibre, and both kinds are needed for good health.

Many plant foods have a combination of both soluble and insoluble fibre, though some are noted for having better sources of one or the other.

## Soluble fibre

Soluble Fibre is important in that it assists digestion by allowing the stomach to adopt a slower emptying time; this is probably due to its “gelling” capacity once mixed with water and digestive enzymes. This has the benefits of allowing the digestible carbohydrates contained in the food to be absorbed more gradually, allowing for a steady energy release.

Soluble fibre has also been proven to assist in lowering levels of harmful LDL cholesterol. As soluble fibre passes through the gastrointestinal tract, it binds to bile acids, which are made of cholesterol, and carries them through the intestines, thereby limiting the amount of cholesterol the body absorbs.

Further studies have shown that our gut bacteria can digest soluble fibre, producing a series of short chain fatty acids: acetic acid, propionic acid and butyric acid. These can be absorbed from the colon into the cells lining the colon, providing an energy source. They can also pass through into the bloodstream to help reduce cholesterol. It is now thought that butyric acid helps protect the cells lining the colon from pre-cancerous change.

## Insoluble fibre

Insoluble fibre does not dissolve in water and passes through the digestive tract largely intact. It has a binding effect, increasing the bulk in the colon with relatively coarse material, which has the effect of absorbing and removing toxins along the way.

Insoluble fibre helps decrease the transit time through the system, which inhibits the build up of waste products and potential carcinogens, therefore contributing significantly to reducing many common modern day bowel problems, and potentially dangerous cancers.

Bran is perhaps the most commonly known insoluble fibre, though most grains and unrefined wholegrains are equally high in this type of fibre.

## What are the benefits of fibre in our diet?

- It keeps the digestive system in good working order
- It helps prevent bowel problems such as constipation and diverticular disease (irritable bowel syndrome) and colorectal cancers
- It slows down absorption of carbohydrates, thus producing a slower rise in blood sugar levels, which results in less hunger pangs and lower insulin levels
- High fibre foods are also a good source of vitamins and minerals
- A high fibre diet can help to protect against heart disease by lowering LDL cholesterol
- High fibre foods are filling, not fattening

### How much Fibre do we need?

The British Nutrition Foundation recommended that people consume 18g grams of fibre be consumed every day. However there is a growing feeling that this is insufficient, and for people on weight loss programmes they should aim for 24 grams as a minimum. At present the average UK diet provides around 12 grams of fibre per day

**Caution** Bran is a rich source of soluble fibre, and during the fibre craze of the 80's people were adding bran to everything. It was discovered however, that too much bran will inhibit the absorption of calcium, and this is due to the phytate content.

### Where do we find high fibre foods?

#### Food Sources of Fibre

Food	Serving size	Total fibre (grams)	Soluble fibre (grams)	Insoluble fibre (grams)
Spaghetti, cooked	1 cup	2.0	0.5	1.5
Whole-wheat bread	1 slice	2.5	0.5	2.0
White rice, cooked	1/2 cup	0.5	0	0.5
Bran flake cereal	3/4 cup	5.5	0.5	5.0
Corn flake cereal	1 cup	1.0	0	1.0
Oatmeal, cooked	3/4 cup	3.0	1.0	2.0
Banana	1 medium	2.0	0.5	1.5
Apple, with skin	1 medium	3.0	0.5	2.5
Orange	1 medium	2.0	0.5	1.5
Pear, with skin	1 medium	4.5	0.5	4.0
Strawberries	1/2 cup	1.0	0	1.0
Broccoli	1/2 cup	2.0	0	2.0
Corn	1/2 cup	1.5	0	1.5
Potato, baked with skin	1 medium	4.0	1.0	3.0
Spinach	1/2 cup	2.0	0.5	1.5
Kidney beans	1/2 cup	4.5	1.0	3.5

Check the fibre content of the foods that you eat, and estimate you daily fibre intake. Make adjustments accordingly.

- Try to eat a couple of thick slices of wholemeal bread each day.
- Always try to use wholemeal flour instead of whit flour
- Eat breakfast cereals and go for whole grain and whole wheat varieties
- Use more peas, lentils and beans. These are very cheap and very nutritious
- Eat potatoes in their skins where a lot of the fibre is contained. Try Cassava, plantain And yams as alternatives, they're delicious and high in fibre.
- Brown rice has a lot more fibre than white rice as does brown pasta.
- Eat more unsalted nuts and dried fruit, ideal for snacks and adding to cereals
- Always eat at least one piece of fruit every day