

## FACTSHEET No. 25

# Bread

## Introduction

### What are carbohydrates?

Carbohydrates can be divided into two main groups, sugars and starch:

#### Sugars:

These can be made from one single sugar molecule (monosaccharides), such as glucose or fructose, or from two sugars joined together (disaccharides), such as sucrose (standard table sugar), which is made of a glucose and fructose molecule joined together. Sugars can be found naturally in foods like fruit, honey and milk and can also be added to foods in various forms.

#### Starch:

Starch is made up of long chains of glucose molecules joined together. It is found in foods like bread, rice, potatoes and pasta.

## The Composition of Bread

Table 1. The nutrient content of bread per 100g (FSA, 2002).

Nutrient Content/100g	White bread	Brown bread	Wholemeal bread
Energy, kJ	931	882	922
Energy, kcal	219	207	217
Protein, g	7.9	7.9	9.4
Fat, g	1.6	2.0	2.5
Carbohydrates, g	46.1	42.1	42.0
Sugars, g	3.4	3.4	2.8
Fibre (NSP), g	1.9	3.5	5.0
Fibre (AOAC)g*	2.5	4.7	6.7
Starch, g	42.7	38.7	39.3

\*Calculated from NSP value by multiplying by 1.33. The AOAC method of measuring fibre is used on food labels in Europe

As shown in table 1, bread contains between 42-46g of carbohydrate per 100g. The majority of this is starch, but bread contains a very small amount of sugar. Bread is low in fat, contains fibre and is a source of some vitamins and minerals. For example, white bread is a source of thiamin (vitamin B<sub>1</sub>) and calcium (FSA 2002).

The sugar in bread generally comes from sugars naturally present in flour or those produced from the starch in flour that has been broken down into sugar during the fermentation process. This means that bread inevitably contains a small amount of sugar (approximately 1g per slice or a quarter of a teaspoon). If sugar has been added to bread, then this will be included in the list of ingredients and the amount per slice may be higher. Bread makes only a small contribution to sugar intakes, contributing about 8% of total sugars (including natural and added sugars) to the diet on average for adults.

## **UK dietary recommendations**

The government's eatwell plate shows the UK food-based dietary recommendations. The eatwell plate is a model of the different types of food, and the proportions we should eat them in, to have a well balanced and healthy diet. Bread is included in the *Bread, rice, potatoes, pasta and other starchy foods* group, which should make up about one third of our diet. According to the eatwell plate, meals should be based on starchy foods. The UK Family Food Survey suggests that people in the UK are not currently following the dietary pattern suggested by the eatwell plate and that starchy foods make up only 20% of the diet compared to the 33% that is recommended. In contrast, the group *Foods and drinks high in fat and/or sugar* made up 20% of the diet compared to the recommended proportion of 8%.

Although the total amount of energy (calories) from carbohydrate in the UK diet is in line with the recommendation that carbohydrates should provide about 50% of our energy intake, too much of this is coming from added sugars. This means that the amount of carbohydrate we get from sugars that are added to foods and drinks needs to be reduced and the amount we get from starchy foods should be increased.

## **Digestion, absorption and metabolism of carbohydrates from sugars and starch**

During digestion, sugars and starches in foods and drinks are broken down into their individual sugar units by digestive enzymes in the stomach and small intestine, sucrose for example is broken down into glucose and fructose and starches are broken down to individual glucose molecules. These molecules are absorbed from the small intestine into the bloodstream. The rate at which this happens can be affected by many factors, including the type of the starch or sugar, the other components of the food such as fat, protein and fibre, the form of the food (i.e. whether it was liquid or solid), and the other foods that were consumed at the same time.

The rate at which glucose reaches the bloodstream after eating a food is related to its glycaemic index (GI). Based on a scale of 1 to 100, this gives a ranking of carbohydrate foods according to the rate at which they raise blood glucose levels; the higher the score the more quickly the glucose is released. While some breads have a low GI rating, both white and wholemeal versions generally have a higher GI, so glucose from the

starch in bread reaches the bloodstream relatively quickly when the bread is eaten on its own. However, it should be noted that if spread with butter or margarine, or if eaten with other foods for example as a sandwich or with a vegetable soup, then the speed at which glucose from starch in bread reaches the bloodstream would be different (and likely to be lower).

It is also important to note that GI in itself is not a good indicator of the 'healthiness' of foods, for example, high fat foods, such as confectionary and fried snacks, will have a lower GI but are not 'healthier' compared with higher GI foods like bread and rice. It is important to focus on the balance of our meals, which should be low in fat, salt and sugar and contain plenty of fruit and vegetables.

The release of glucose into the blood causes an increase in insulin production. This is a normal physiological response that allows glucose to enter the cells of the body and avoids excessive amounts of glucose in the bloodstream. In healthy people, the concentration of glucose in the blood is tightly controlled and not allowed to fluctuate beyond specific levels and so the commonly-held belief that blood glucose can vary greatly is not true for people with normal glucose control. Those with diabetes or impaired glucose tolerance (pre-diabetes) may suffer from extremes of blood glucose, which need to be managed with medication, insulin injections or lifestyle approaches. However, people with diabetes are still advised to follow the healthy eating recommendations for the general population i.e. that starchy foods (ideally those with a lower GI) should make up about a third of the diet and that meals should be based on starchy foods.

Once the glucose and other sugars have been absorbed, they are transported around the body and used to provide cells with energy. The brain in particular relies on glucose as its main fuel and uses about 120g of glucose per day. Muscles also preferentially use glucose during physical activity, making starchy foods important for those doing a lot of exercise. Any glucose that is not used by the cells of the body is converted into glycogen (chains of glucose) and is stored in the liver and muscles to be used when needed. When the glycogen stores are full, any excess glucose is converted to body fat.

## **Bread, carbohydrates and health**

There have been suggestions in the media in relation to stories on sugar and health, that consuming starchy foods like bread is the same as consuming foods high in added sugar, due to the fact that starches are broken down to sugars. However, it is important to note that, while people may consume sugar on its own in drinks or sweets, people never eat pure starch – starch is one component of a food consumed. Although starches from foods like bread are ultimately broken down to glucose, this argument ultimately ignores the wider importance of starchy foods for health and the important role of fibre and other nutrients that starchy foods contain. For example, a medium slice (36g) of average white bread contains about 17g starch, 1g sugars, 3g protein, 0.7g fat, 0.5g fibre and 13g water, as well as some vitamins and minerals. As outlined below, bread makes an important contribution to intakes of a number of nutrients in the UK.

Bread is an important part of the traditional British diet and, together with potatoes, pasta, rice and other starchy foods, is a source of starchy carbohydrate. Apart from carbohydrate, bread can also provide vitamins (such as thiamin, niacin and folate), minerals (such as calcium, iron and magnesium), as well as dietary fibre.

During the milling of white flour, a certain amount of bran and germ are removed from the grain, resulting in the loss of a number of key nutrients. In the UK, the composition of white and brown flours is controlled by government regulations, which require that the key nutrients lost through milling are restored. This ensures that white and brown bread contain similar levels of these key nutrients as wholemeal bread, which uses 100% of the wheat grain.

For a healthy, varied diet, it is important to limit the amount of foods containing added sugar, such as soft drinks, biscuits and cakes, and to keep an eye on what is eaten with the starchy carbohydrates we consume. The calorie content of starchy foods increases dramatically when extra fat is added during the cooking and serving process. Bread on its own is low in fat and sugar it is important to watch how much spread you use and to be careful with your choice of fillings and toppings.

Table 2: Average daily nutritional contribution of bread to the diet from the National Diet and Nutrition Survey (Henderson *et al.* 2002)

	All Bread	White Bread	Wholemeal bread	Brown and other
<b>Energy</b>	11%	6%	2%	3%
<b>MACRONUTRIENTS</b>				
<b>Carbohydrate</b>	21%			
<b>Sugar</b>	8%			
<b>Fibre</b>	20%	9%	6%	5%
<b>Protein</b>	12%			
<b>Fat</b>		2%		
<b>VITAMINS</b>				
<b>Thiamin</b>	14%	9%	2%	3%
<b>Folate</b>	11%	6%	2%	3%
<b>Niacin</b>	11%	7%	2%	2%

MINERALS				
Calcium	19%	13%	2%	4%
Iron	15%	9%	3%	3%
Magnesium	13%	6%	4%	3%
Zinc	11%	6%	3%	2%
Potassium	5%	3%	1%	1%

In the UK, bread makes a significant contribution to average nutrient intakes as shown in table 2 above, providing 21% of carbohydrate and 20% of fibre intakes. Bread also contributes to micronutrient intakes, providing 14% of thiamin intake, 11% of both niacin and folate, 19% of calcium, 15% of iron, 13% of magnesium and 11% of zinc.

Considering that average fibre intakes in the UK are well below recommended levels and that surveys show that there are groups within the population that have low intakes of these micronutrients, the role of bread in the UK diet remains an important one, particularly in relation to gut health.

### Acknowledgements

This factsheet was commissioned by the Federation of Bakers and prepared by the British Nutrition Foundation, February 2014.

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