

## Cereal grains and uses

**Wheat** - Wheat flour, pasta, bread, cakes.

**Barley** - Vinegar, beer, pearl barley.

**Rye** - Rye bread, Ryvita, rye beer.

**Rice** - rice cakes, rice noodle, rice milk.

**Maize (corn)** - Popcorn, corn chips, corn flour.

**Oats** - Flapjack, porridge, oat milk.

Others include; sorghum, quinoa, millet.

## Nutritional value of wheat

Wheat is a good source of starchy carbohydrate, found in the endosperm. It is also a good source of protein and provides us with a range of vitamins and minerals. If the wheat still has the bran it will provide dietary fibre in the form of non starch polysaccharides (NSP). B vitamins are found in the bran layers. Flour sold in the UK is fortified with calcium, iron and B vitamins.



## Nutritional value of rice

**White rice** is about 90% carbohydrate, 8% protein and 2% fat and is a good source of iron and B vitamins. It is low in fibre.

**Brown rice** is a whole grain. It is about 85% carbohydrate, 8% protein and 7% fat. It has four times as much fibre as white rice and more minerals. It is a good source of B vitamins.

**Beri beri** is a common deficiency disease in developing countries caused by a lack of Vitamin B1 (thiamine).

## Rice

Rice is a widely consumed staple food for a large part of the world. There are many different types of rice grown and used in cooking. Rice is categorised into long or short grain.

**Long grain**—a long thin grain, popular in all purpose cooking.

**Brown long grain**—nutty flavour and nutritionally the most complete rice. A versatile rice.

**Basmati rice**—flagrant flavour and aroma, used in Indian cuisine.

**Short grain**—plump grain which absorbs water easily giving a soft, sticky texture.

**Arborio rice**—Italian rice used to make risotto.

**Pudding rice**—used in desserts as its starchy qualities make for a smooth creamy finish.



## Coeliac disease

Coeliac disease is an autoimmune condition. This is where the immune system – the body's defence against infection – mistakenly attacks healthy tissue.

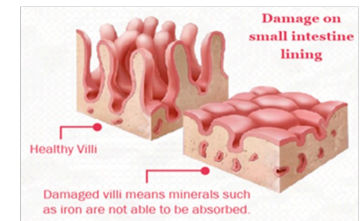
In coeliac disease, the immune system mistakes substances found inside gluten as a threat to the body and attacks them.

This damages the surface of the small bowel (intestines), disrupting the body's ability to absorb nutrients from food.

Gluten is found in wheat, barley and rye.

Symptoms can include:

- Fatigue
- diarrhoea,
- abdominal pain
- Indigestion
- Vomiting
- Bloating
- itchy rashes.



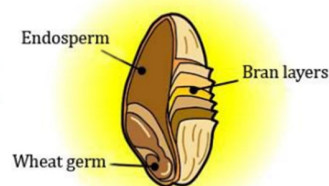
In order to get the nutrients they need, a coeliac should base their meals on gluten free sources of starchy carbohydrates such as:

- Rice
- Potatoes
- Gluten free products
- Oats



Each grain of wheat has three distinct parts.

1. Bran layers - the coarse outer.
2. Wheat germ – a new plant would grow from this part.
3. Endosperm (the starchy store of food which the germ feeds on while it grows).



## Ingredient functions in bread

**Flour**—adds bulk, gluten helps from structure, absorbs water, provides flavour and nutrition.

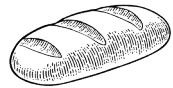
**Liquid**—Moisture allows yeast to grow. Turns to steam when baked to help the rise.

**Yeast**—Needs warmth, moisture, food and time to produce CO<sub>2</sub>.

**Salt**—improves taste, controls the yeast, aids gluten formation.

**Fat**—Gives a short texture, improves colour and flavour.

## Bread making stages



**Mixing** - Ingredients are mixed together and combined.

**Kneading** - During kneading, two proteins (gliadin and glutenin) become hydrated and when the dough is kneaded an elastic protein called gluten is formed. Gluten gives the bread structure.

**Proving** - Fermentation of the yeast takes place and CO<sub>2</sub> is produced allowing the bread to rise.

**Knocking back** - This removes any large bubbles of CO<sub>2</sub> to give an even texture and better rise.

**Shaping** - Bread is shaped as desired.

**Proving** - A further prove increases the rise.

**Baking** - The heat of the oven causes more CO<sub>2</sub> to be produced as the yeast ferments. The gluten traps the CO<sub>2</sub>. The heat eventually kills the yeast. The starch in the flour swells and the structure of the bread is produced.

## Key vocab

Cereal	An edible grass.
Staple foods	Food that forms a large part of the diet, usually from starchy foods.
Whole grain	100% of the grain, nothing has been removed.
Primary processing	The conversion of raw materials into food commodities e.g. milling of wheat grain into flour.
Secondary processing	Converting primary processed foods into other food products e.g. flour into biscuits.
Fortification	Adding vitamins and minerals to foods.
Gluten	Formed from the whole wheat proteins gliadin and glutenin, in presence of water. Gluten is developed by kneading.
Non starch polysaccharide (NSP)	Known as dietary fibre. NSP is a form of a complex carbohydrate that is found in wholegrain cereals, fruit and vegetables.
Fermentation	The chemical breakdown of sugar to acid, gas or alcohol by bacteria, yeasts or other microorganisms.
Lamination	A method of making pastry where alternate layers of dough and butter are pressed together.
Enrich	An ingredient added to improve the colour, flavour and nutritional properties of a food.

## Nutritional value of Pasta

Pasta is a staple food of Italy and together with bread, rice and potatoes, it forms part of the staple food range in the UK.



Pasta is a good source of starchy carbohydrates, protein and B vitamins. Whole wheat pasta also provides dietary fibre. Pasta is not suitable for a coeliac as it contains wheat flour.

## Pasta

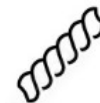
Pasta is made from 'durum wheat' due to its higher protein content. Pasta flour is sometimes labelled '00 flour'.



PENNE



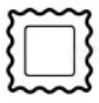
SPAGHETTI



FUSILLI



LASAGNE



RAVIOLI

Pasta can be fresh or dried. Fresh pasta is quicker to cook but has a shorter shelf life whereas dried pasta is cheap and readily available.

Different ingredients can be added to pasta dough to change the colour and the flavour. Fresh herbs such as basil and parsley can enhance the flavour. Ingredients such as spinach, tomato puree, beetroot and even squid ink can be added to change the flavour.