

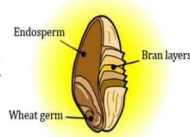
## Wheat

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.

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).



## 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 and itchy rashes.



## 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.

## 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 CO2 is produced allowing the bread to rise.

**Knocking back** - This removes any large bubbles of CO2 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 CO2 to be produced as the yeast ferments. The gluten traps the CO2. The heat eventually kills the yeast. The starch in the flour swells and the structure of the bread is produced.

## 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 CO2.

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

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

## 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

**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

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

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

## 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).

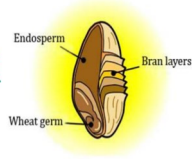
## Key vocabulary

Cereal	An edible grass.
Endosperm	The main part of the grain, a starch and protein supply.
Germ	Source of fat and B vitamins, it is where the new plant grows.
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.
Gelatinisation	The thickening of a mixture, in the presence of heat, due to swelling of starch grains.
Gluten	Formed from the whole wheat proteins gliadin and glutenin, in presence of water. Gluten is developed by kneading.

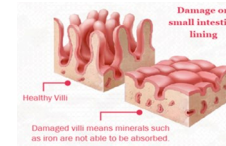
## Wheat

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).



## Coeliac disease



## Cereal grains and uses

## Bread making stages

## Rice

## Key vocabulary

Cereal	
Endosperm	
Germ	
Staple foods	
Whole grain	
Primary processing	
Secondary processing	
Fortification	
Gelatinisation	
Gluten	

## Ingredient functions in bread

## Nutritional value of rice