



# Cereals and their Benefits

From Select Stores Health Food Store, Dalkey.

[www.selectstores.ie](http://www.selectstores.ie)

## Cereals



**All too often, cereal products are thought of as nothing more than starchy fillers, and indeed, when you consider how some commercial products like cakes and biscuits and breakfast cereals are made from over-refined grains with nearly all the nutrients except the starch extracted, and then loaded with fat, sugar, artificial flavourings etc., you might be forgiven for thinking that's true.**

**But go back to the original, unrefined grains and you have a wealth of nutrients in a small package.**

**Grains have been the staple foods of many civilisations for thousands of years. Wheat, barley, oats and rye in Europe, maize in America, quinoa in South America, rice in the East, and millet in Africa.**

### Nutrition

Cereals are seeds of plants, usually members of the grass family but there are a few exceptions. They are annuals, that is they have to be planted every year and at the end of the summer, when they have produced ripe seeds, they die down. Like all seeds, cereals are very nutritious because they contain all the nutrients the embryo plant needs to start growing. Unrefined cereals are valuable sources of proteins, carbohydrates, B vitamins and also contain some fat, iron, vitamin E and trace minerals and are a very good source of fibre in the diet. Some cereals (wheat, barley, rye and oats) contain the protein gluten, which is essential for leavened bread-making. Without sufficient gluten, bread will not rise. People suffering from gluten intolerance or coeliac disease must avoid any cereal containing gluten. In some parts of the world unleavened (unrisen) bread is eaten or the staple cereal is made into noodles or pasta. They are usually cheap to buy and are a valuable source of variety in the vegetarian diet.

### Storage

Keep in airtight containers in a cool, dark, dry place. Whole grains can be stored for up to 2 years; flaked, cracked grains and flours should be used within 2-3 months of purchase.

### Sprouting

Whole grains can be sprouted, which greatly enhances their nutritional value, e.g. wheat grains, raw buckwheat and barley.



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## Cooking

Cereals can be used in other ways, besides being ground into flour for bread, cakes etc. Whole grains can be added to stews and casseroles, or cooked until soft. Cracked or kibbled grains are cut or broken pieces of whole grains e.g. kibbled wheat and bulgur wheat. Meal, a coarse kind of flour, can be used to make porridge, thicken soups or mixed with wheat flour to add interesting flavours and textures to ordinary breads, biscuits, muffins etc.

Whole grains should be washed thoroughly. Boil the required amount of water, add the washed grain, stir once, put a tight-fitting lid on the pan and simmer for the required cooking time or until the liquid is absorbed. Turn off the heat and leave to stand for 5 minutes before removing the lid.

## Barley

Barley grows in a wider variety of climatic conditions than any other cereal. It used to be a very important source of direct human food, but its use has diminished over the last 250 years, replaced by wheat, and it is now used almost exclusively as animal feed or for making beer and whisky. It contains gluten, so barley flour can be made into bread. More usually found in the shops as whole or pot barley, or polished pearl barley, it is also possible to buy barley flakes or kernels. The whole barley is more nutritious with 100g providing 10.5g protein, 2.1g fat, 69.3g carbohydrate, 4g fibre, 50mg folic acid, 6mg iron and 50mg calcium. It can be cooked on its own (1:3 parts water for 45-60 minutes) as a pleasant alternative to rice, pasta or potatoes, or added to stews. Malt extract is made from sprouted barley grains.

## Buckwheat (gluten free)

Buckwheat is not a true cereal as it is not a member of the grass family, instead being related to sorrels and docks. If you look at docks closely, you can see that the seeds, though smaller, have the same distinctive triangular shape. Buckwheat, a native of central Asia, is now grown in Europe, N America and the former USSR countries, but it is still not widely used in Britain. 100g of buckwheat provides 11.7g protein, 3.9mg iron and it is very high in calcium with 114mg per 100g. Available raw the seeds are greenish-pink, or roasted (known as kasha) the seeds are darker reddish-brown. It can be cooked (1:2 parts water for 6 minutes, leave to stand for 6 minutes) and served like rice or you can add it to stews and casseroles. Buckwheat flour can be added to cakes, muffins, pancakes etc. where it imparts a distinctive flavour. Look out too for buckwheat spaghetti, soba.

## Corn or Maize (gluten free)

Maize is the principal food plant of America and was unknown in other parts of the world until Columbus reached America in 1492. It was grown by the Maya, Inca and Aztec civilisations, and by various North American Indian tribes and now has spread to Canada, USSR, Italy, Spain, Egypt, India and South Africa. It is used for human food, animal feed and as a source of raw materials for industry. 100g maize gives 9g protein. Fresh maize is often available (sweet corn, corn on the cob) but remember that nutritional values will be lower because less concentrated. We most often see maize as cornflakes or popcorn, but cornmeal or polenta is available and can be added to soup, pancakes, muffins etc. Tortillas are made from maize meal, as are quite a lot of snack foods. Do not confuse cornmeal with highly refined corn starch/flour, used for thickening.

## Millet (gluten free)



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Millet is the name applied to a variety of grasses first cultivated in Asia or Africa. It is a staple crop in Africa because it is drought resistant and keeps well. 100g millet provides 9.9g protein, and 6.8mg iron (higher than other cereals). Millet makes a delicious alternative to rice but the tiny seeds need to be cracked before they will absorb water easily, so they should be first sauteed with a little vegetable oil for 2-3 minutes until some are seen to crack, then add water with care (1:3 parts), bring to the boil and simmer for 15-20 minutes until fluffy. Millet flakes can be made into porridge or added to muesli and millet flour is available, sometimes also made into pasta.

## Oats

Oats are thought to have originated in Western Europe and may originally have appeared as a weed in barley and so got spread with the barley. They're now grown in many parts of the world including N W Europe, the former USSR countries, North America, Canada, Australia and China. Used mostly as animal feed, they are very nutritious. In fact, as they are usually inexpensive to buy, they can be a real boon to people trying to get a good diet on a low budget. 100g oats gives 13g protein, 55mg calcium (more than any other cereal except buckwheat), and 4.6mg iron. Available as groats (whole grains with the husks removed) but more usually as various grades of oatmeal, rolled oats or jumbo oat flakes. Oat groats need cooking for 45 minutes in 1:3 parts water. All forms can be used to make porridge, combined with ground nuts to make a roast or added to stews. Oatmeal is low in gluten so can't be used to make a loaf, but can be mixed with wheat flour to add flavour and texture to bread, muffins, pancakes etc.

## Quinoa (gluten free)

Quinoa is an ancient crop which fed the Central American Aztec Indians for thousands of years, and which has recently been cultivated in Britain. Unlike most grains, it does not belong to the grass family, but is a relative of the garden weed called Fat Hen. It is very nutritious, containing between 13-14% protein with a good amino acid composition but has no gluten so it cannot be used for bread making. Instead, it is cooked for 15 minutes in 1:3 parts water and served as a side dish or may be used in risotto, pilaff, vegetable stuffings etc.

## Rice (gluten-free)

Rice is one of the world's most important crops. It originated in Asia but is now grown throughout the humid, sub-tropical regions. It differs from most other cereals in requiring land that is submerged in water to grow, though some varieties do grow in upland areas. Rice is a good source of carbohydrate but doesn't have quite as much protein as some other cereals (6.5g per 100g). Unpolished rice (i.e. wholegrain/brown rice) is a good source of B vitamins too. There are three basic kinds in culinary terms: long, medium and short grain. Long used traditionally in savoury dishes, short in dessert cooking, although this varies across the globe and it is really a matter of personal preference. Long wholegrain rice needs to cook in 1:2 parts water for 35-40 minutes. Rice flour is available but because of the lack of gluten, it cannot be used to make a yeasted loaf but can be used for cakes, biscuits and pancakes. Rice flakes (brown and white) can be added to muesli or made into a milk pudding or porridge.

## Wild Rice

Wild rice is not a rice at all but an American grass used as an important food by the Indians and early settlers. Difficulty in harvesting makes it expensive, but the colour, a purplish black and its subtly nutty



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flavour make it a good base for a special dish and it can be economically mixed with other rices, but may need pre-cooking as it takes 45-50 minutes to cook in 1:3 parts of water.

## Rye

Rye is the least important cereal crop and is usually only grown where conditions are relatively unfavourable and other cereals don't do well. It probably originated in S W Asia, but the name occurs in Northern European languages, which suggest early cultivation in that area. It is very hardy and so grows in temperate and cool regions and at high altitudes, and is very tolerant of poor soil fertility. It is the only cereal apart from wheat and barley that has enough gluten to make a yeasted loaf, but it has less gluten than wheat, so rye bread is denser. It is more usual to mix rye flour with wheat flour. Rye grains should be cooked in 1:3 parts water for 45-60 minutes. Kibbled rye is often added to granary-type loaves. You can also add rye to stews and rye flakes are available, which can be used in muesli. 100g of rye gives 9.4g protein.

## Spelt

Spelt is closely related to common wheat, originating in the Middle East, and has been popular for decades in Eastern Europe. Higher in protein than wheat, it appears to have a different molecular structure, appearing to cause less problems than wheat for some sufferers of grain allergies. It has an intense nutty, wheaty flavour. The flour is excellent for bread making and spelt pasta is becoming more widely available.

## Wheat

This is the most familiar cereal used in Britain today, it is used for bread, cakes, biscuits, pastry, breakfast cereals and pasta. All the present varieties of wheat seem to be derived from a hybrid wild wheat that grew in the Middle East 10,000 years ago. Over 30,000 varieties are said to be in cultivation. Wheat can be grown in a very wide range of climatic conditions but is most successful in temperate zones including the UK, North America, Southern Russia and South West Australia.

Nutritionally, 100g whole wheat provide 14g protein, 2.2g fat, 69.1g carbohydrate, 2.3g fibre, 3.1mg iron, 36mg calcium. Wheat grains, also called wheat berries, can be eaten whole, cooked in 1:3 parts of water for 40-60 minutes, they have a satisfying, chewy texture. Cracked or kibbled wheat is the dried whole grains cut by steel blades. Bulgur wheat, made from the whole grains steamed before cracking, only needs re-hydrating by soaking in boiling water or stock. Couscous is the steamed, dried and cracked grains of durum wheat and is more refined than bulgur. Soak in 2 parts of water/stock to re-hydrate, traditionally it is steamed after soaking. Strong wheat flour (high gluten content) is required for yeasted bread making and puff pastry. Plain flour is used for general cooking including cakes and shortcrust pastry. Wheat flakes are used for porridge, muesli and flapjacks. Wheat germ is an excellent source of nutrients, especially vitamin E.

Peas, beans and lentils are known as pulses. They are the seeds of plants belonging to the family Leguminosae, which gets its name from the characteristic pod or legume that protects the seeds while they are forming and ripening. With approximately 13,000 species, the family Leguminosae is the second largest in the plant kingdom and it is very important economically.

Different kinds of legumes provide us with food, medicines, oils, chemicals, timber, dyes and ornamental garden plants. Legume products include cereals, cereals, gum arabic, balsam, indigo and licorice. Pulses are



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valuable because they contain a higher percentage of protein than most other plant foods.

## Origins

Pulses have been used as food for thousands of years. The lentil was probably one of the first plants ever to be domesticated by humans. Most pulses prefer warm climates but there are varieties which grow in temperate regions. They can be eaten fresh or dried and come in a great number of varieties with a range of colours, flavours, and textures. In spite of its common name, the peanut or groundnut is also a legume rather than a nut.

## Nutrition

All pulses, except for soya beans, are very similar in nutritional content. They are rich in protein, carbohydrate and fibre, and low in fat which is mostly of the unsaturated kind. They are also important sources of some B vitamins. Fresh pulses contain vitamin C, but this declines after harvesting and virtually all is lost from dried pulses. Canned pulses however, retain about half their vitamin C except for canned, processed peas which have been dried before canning. Canning doesn't affect the protein content, eliminates the need for soaking and considerably reduces the cooking time compared with dried pulses. Frozen peas will have also lost about a quarter of their vitamin C content.

Pulses are usually eaten for their high protein content. A typical nutritional breakdown is that for haricot beans which are used to make baked beans, contain, per 100g dried beans: 21.4g protein, 1.6g fat, 45.5g carbohydrate, 25.4g fibre, 6.7mg iron and 180mg calcium.

The nutritional quality of the soya bean is superior to that of other pulses. It contains more protein and is also a good source of iron and calcium. The nutritional breakdown of soya is per 100g of dried beans: 34.1g protein, 17.7g fat, 28.6g carbohydrate, 8.4mg iron and 226mg calcium. Dried soya beans are lengthy to prepare because they need at least 12 hours soaking and 4 hours cooking time, boiling for the first hour, but nowadays a large number of soya based foods including tofu, tempeh and textured vegetable protein (soya mince or chunks) are available.

## Storage & Cooking

One advantage of dried pulses is that they will store very well for long periods if kept in a dry, airtight container away from the light. However it is best to eat them as fresh as possible. Pulses toughen on storage and older ones will take longer to cook. Allow about 55g dried weight per person, once soaked and cooked they will at least double in weight. Most dried pulses need soaking for several hours before they can be cooked, exceptions are all lentils, green and yellow split peas, blackeye and mung beans. Soaking times vary from 4-12 hours, it is usually most convenient to soak pulses overnight. Always discard the soaking water, rinse and cook in fresh water without any salt, which toughens the skins and makes for longer cooking. Changing the water will help to reduce the flatulence some people suffer when eating pulses, also reputed to help is the addition of a pinch of aniseeds, caraway, dill or fennel seeds.

## Toxins in Pulses

Consumers should be aware that it is not safe to eat raw or undercooked kidney and soya beans. There is no need to avoid them as long as they are thoroughly cooked.



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**Red kidney beans:** Incidents of food poisoning have been reported associated with the consumption of raw or undercooked red kidney beans. Symptoms may develop after eating only four raw beans and include nausea, vomiting and abdominal pain followed by diarrhoea. A naturally occurring haemagglutinin is responsible for the illness, but can be destroyed by high temperature cooking, making the beans completely safe to eat. For this reason, kidney beans must not be sprouted. Kidney beans should be soaked for at least 8 hours in enough cold water to keep them covered. After soaking, drain and rinse the beans, discarding the soaking water. Put them into a pan with cold water to cover and bring to the boil. The beans must now boil for 10 minutes to destroy the toxin. After this the beans should be simmered until cooked (approximately 45-60 minutes) and they should have an even creamy texture throughout - if the centre is still hard and white, they require longer cooking.

**Soya beans:** Contain an anti-trypsin factor (or trypsin inhibitor) which prevents the assimilation of the amino acid methionine. Soya beans also require careful cooking to ensure destruction of this factor. They should be soaked for at least 12 hours, drained and rinsed then covered with fresh water and brought to the boil. Soya beans should be boiled for the first hour of cooking. They can then be simmered for the remaining 2-3 hours that it takes to cook them.

Soya flour should state heat treated on its packaging. Other soya products (e.g. tofu, tempeh, soya milk, soya sauces and miso) are quite safe to use. Soya beans can be sprouted, but the sprouts should be quickly blanched in boiling water to inactivate the trypsin inhibitor.

**Pressure cooking:** The temperatures achieved in pressure cooking are adequate to destroy both haemagglutinins and the trypsin inhibitor. Pressure cooking also considerably reduces cooking times - kidney beans 10-20 minutes, soya beans 1 hour.

**Canning:** The temperature achieved in the canning process also renders pulses quite safe.

**Slow cookers:** Pulses must be soaked and boiled for 10 minutes before being added to a slow cooker, as they do not reach sufficiently high temperatures to destroy the toxins.

As beans and peas are all very similar nutritionally, with the exception of soya, they can be interchanged in most recipes if you want to experiment or have run out of one kind, as long as you take into account the different cooking times. If the beans are likely to need a lot longer to cook than the other ingredients, try pre-cooking them in a separate pan before adding to the other ingredients or using canned beans.

## Sprouting

Many whole pulses (e.g. aduki, chickpeas, whole lentils, marrowfat peas, mung and soya beans) can be sprouted which increases their nutritional value.