

S-4 F/N NOTES

## Pulses and nuts

### Pulses

Pulses are the dried seeds of the legume plant family, which includes:


- beans
- peas
- lentils

Many varieties are grown all over the world, in different climates.

#### Types

There are many types of pulse grown, but the most familiar ones in the UK are:

- Beans**
- Seeds:** lentils (orange and brown)
- Peas:** whole, or split without skins (yellow or green)
- Peanuts and groundnuts** (strictly pulses)



Pulses (clockwise from top): red lentils, green lentils, haricot beans, kidney beans, butter beans, peanuts, green split peas

### Preparation

All pulses, except for lentils, should be soaked in water for approximately eight hours before cooking, to allow water to be taken up by osmosis. This causes the pulse to swell and soften. The addition of bicarbonate of soda to the water hastens this process without significantly affecting the nutritional value.

It is inadvisable to use pulses that are more than one year old, as the skins tend to harden during storage and are difficult to soften.

Once softened, pulses should be boiled gently in the minimum amount of water until tender. Red kidney beans *must* be boiled for at least 15 minutes, to destroy a natural toxin (poison) they contain. If eaten raw or partially cooked this toxin can cause food poisoning. Some people are allergic to peanuts and even the smallest amount can cause a severe reaction (see p. 72).

### Uses

Pulses are included in meals in a variety of ways:

- Soups and stews** - to thicken and add extra protein.
- Vegetable accompaniment** - served in a sauce with meat and other vegetables.
- Salads** Cooked pulses can be served cold in a dressing or with other salad vegetables.
- Soya** Soya beans are ground into flour or made into other products (see pp. 129-30).
- Vegetarian meals** Pulses are a main source of protein in vegetarian meals.

### Importance in the diet

Pulses make an important contribution to the diet in many Eastern countries, where they may be the main source of protein and can be produced relatively easily. In Western countries such as the UK, where a greater variety of foods are available, pulses are less important in the diet. However, in the UK approximately 300,000 tons of baked beans (haricot beans) in tomato sauce are consumed each year, which is more than in most other Western countries.

### Nutritional value

**Protein** Most pulses contain approximately 20 g LBV protein per 100 g (dry weight). Soya beans contain up to 40 g per 100 g (dry weight) of

HBV protein, so are an exceptionally good source compared with other pulses.

**Fat** Soya beans and groundnuts contain up to 20% and 40% fat respectively, so are a good source of fat compared with other pulses.

**Carbohydrate** Most pulses contain up to 20% carbohydrate.

**Vitamins** In general, pulses are a good source of B vitamins, except for riboflavin. They have no vitamin C in their dry state, but on germination, they provide a rich source. Bean sprouts provide a valuable source of vitamin C. Aduki and mung beans form sprouts within a few days if put onto damp kitchen paper and kept moist.

Because pulses are relatively easy to grow and have a high nutritional value, it has often been suggested that more should be eaten, particularly in poor countries. However, it may be difficult to change people's food habits, and in poor countries people may not have the facilities to prepare pulses for consumption.

### Nuts

Most people only eat nuts in small amounts because they are expensive, so their contribution to the diet is small.

#### Types

coconut palm	brazil	pistachio
walnut	hazelnut	pecan
almond	cashew	
chestnut	macadamia	

### Uses

Nuts are used in baking and confectionery, chiefly for their flavour and texture. They can also be used in poultry stuffings, served in salads, nut roasts, casseroles, and croquettes, and used as a garnish for vegetables.

### Importance in the diet

Most people eat nuts in such small amounts that they do not feature significantly in the nutrient content of the diet. However, they are a useful source of LBV protein and fat to vegetarians, and add variety to their diet. They also supply some carbohydrate, calcium, iron, plus a little thiamin.



**4.1 Ingredients used in family meals**

**4.1.1 Cereals**

Cereals are the seeds or grains of cultivated grasses and are used to produce a wide variety of foods. They provide a wide range of nutrients and many cereal foods are also fortified.

**Cereals and their products**

- Wheat** Flour, bread, semolina, pasta, breakfast cereals, e.g. Puffed Wheat
- Maize** Cornflour, custard powder, blancmange powder, cornflakes, corn on the cob
- Rice** Brown rice, polished rice, long grain and short grain rice, ground rice, rice flour, rice flakes, Rice Krispies
- Oats** Rolled oats, coarse, medium and fine oatmeal
- Barley** Pearl barley, barley flour, barley water, brewing
- Rye** Rye bread, crispbreads, rye flour

**Structure and nutritional value**

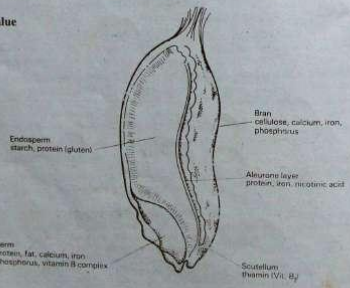


Fig. 4.1 A longitudinal section of a whole wheat grain

The diagram shown in Fig. 4.1 represents a whole wheat grain and is typical of all cereals. When the bran and germ are removed during milling, the nutrients they contain are also lost.

When we are advised to 'Eat more cereals' it is because they are a better source of energy than refined sugar and fats. They provide more micro-nutrients and dietary fibre, particularly if the whole grain is processed in the product.

**Wheat**

**The milling process and its products**

- 1 **Cleaning** to remove small stones, dust and chaff.
- 2 **Blending** Different grain varieties are blended to produce flours of different strengths.
- 3 **Grinding** Grains are crushed between grooved rollers to release the endosperm. Wholemeal flour is thus produced.
- 4 **Sieving** to remove the bran and germ.
- 5 **Grinding** The endosperm, now called **semolina**, is further crushed to produce a fine powder called flour.
- 6 **Fortification** Calcium carbonate, iron, thiamin and nicotinic acid are added to the flour to replace the nutrients lost with the germ and bran.

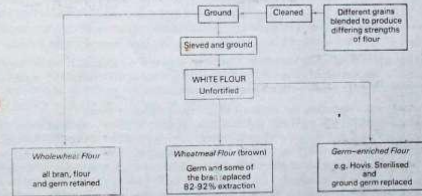


Fig. 4.2 Types of flour and how they are produced

**Types of flour**

- 1 **Stone ground**—100% of the grain is crushed between two round mill stones
- 2 **Soft Flour**—from wheat, mostly grown in this country, with a low gluten content.
- 3 **High ratio**—A very soft, fine, white flour used in packet cake mixes, but not widely available in this country.
- 4 **Medium strength household**—Flour made from a mixture of strong and weak wheats
  - (a) plain white flour
  - (b) self-raising flour which has a raising agent added
- 5 **Strong Flour**—made from hard wheat with a high gluten content. This wheat is mostly grown in Canada.

Table 4.1 Flours sold for domestic use

Type of flour	Use
Strong Plain Flour	Bread, other yeast mixtures, batters, flaky pastry, rough puff pastry, choux pastry
Plain White Flour (medium strength)*	Cakes, short pastries, biscuits, scones, sauces
*Soft Wheat Sponge Flour (SR)	Whisked sponges, creamed cake mixtures
Self-raising Flour (medium strength)	Plain cake mixtures, scones
Wholewheat Plain	Scones, cakes, bread, short pastries, biscuits
Wheatmeal Plain (Brown)	Scones, cakes
Wholemeal or Wheatmeal (SR)	Granary bread, pastry, scones

\*These two flours have just appeared in some supermarkets. They are produced by one of the well known manufacturers.

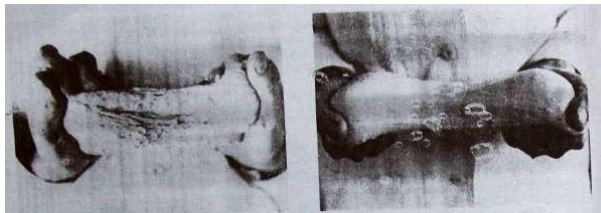


Fig. 4.3 Dough low in gluten

Fig. 4.4 Dough high in gluten

**The action of gluten** When wheat flour is worked with water the proteins, gliadin and glutenin form an elastic substance called gluten. Gluten traps bubbles of gas (air, carbon dioxide and water vapour) in the mixture. Heat causes these gases to expand, become lighter and rise so stretching the gluten. This, being protein, sets in the heat of the oven. It is the gluten which gives structure to bread and other baked starched mixtures (see Figs. 4.3 and 4.4).

**Softening white flour using cornflour** Cornflour contains no gluten. If added to white flour it reduces the proportion of gluten in the flour making it softer and suitable for cakes and biscuits. This gives a lighter result with a finer crumb structure.

**Extracting and comparing the amounts of gluten in different flours**

- 1 Take 50g of (a) Strong flour, (b) Soft flour and (c) Wholewheat flour
- 2 Mix each to a stiff dough with cold water
- 3 Soak each ball of dough in cold water for 15 minutes
- 4 Place each ball in a small piece of muslin and knead under a running cold tap until all the milky fluid has been removed
- 5 Place on a greased baking sheet, comparing the three balls for weight and elasticity
- 6 Bake for 20 minutes at 250°C

**Pasta**

Pasta is made from the middlings (semolina) of hard wheat. The semolina is made into a paste with water or sometimes with egg. The paste is then moulded or extruded to produce assorted shapes. Pasta is cooked to accompany dishes made with meat, milk, cheese, tomatoes.

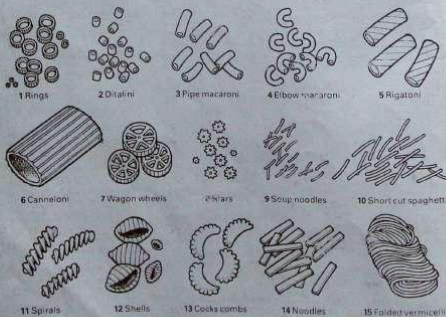


Fig. 4.5 Different types of pasta

**How to cook pasta**

- 1 Boil a large saucepan of water
  - 2 Add salt and then the pasta (allow 50g per person)
  - 3 Stir in one tablespoon of oil—prevents strands sticking together
  - 4 Cook for the time stated on the packet with the lid off and take care because the pan contents quickly bubble up and boil over. When cooked, pasta should be firm with a centre which is neither hard nor mushy.
  - 5 Drain
  - 6 Melt a little butter in the pan
  - 7 Return the pasta to the pan and shake with a little pepper or nutmeg
- NB Pasta has the nutritional value of the endosperm plus any nutrients that are added during manufacture. When cooked it has a high percentage of water. Pasta made from wholewheat is now available.

**Maize**

Maize is eaten as a vegetable (corn on the cob) or made into corn meal. Processing maize produces cornflour and cornflakes.

**Nutritional value of cornflour**

- 1 Made from the crushed endosperm of the maize grain
  - 2 Approximately 100% starch
  - 3 No gluten
- Uses of cornflour**
- 1 To soften white flour
  - 2 In the making of sauces when it is the thickening agent
  - 3 To produce a clear glaze to use on a fruit flan

**Gelatinization of starch** occurs when starch granules absorb water and swell when heated resulting in a thickening effect on the liquid.

Starch granules have been confused with the cellulose walls of the cells of the plant in which they are found, e.g. starch granules within potato cells. The starch granules themselves do not have a cellulose covering so they cannot burst.

- 1 Cornflour gelatinizes more readily than wheatflour
- 2 The presence of sugar slows down gelatinization
- 3 Overheating can cause the gelatinization of starch to convert to dextrose which makes the sauce go runny

**Rice, oats, barley, wheat and rye**

Table 4.2 A comparison of the nutritional value of rice, oats, barley, wheat and rye

	Brown rice	Polished rice	Oats	Barley	Rye	Whole wheat
Fibre	✓	Very little	✓	✓	✓	✓
Starch	✓	✓	✓	✓	✓	✓
Protein	✓	Very little	✓	Very little	✓	✓
Fat	✓	Very little	✓	No gluten	✓	✓
Calcium	✓	Very little	✓	Very little	Very little	✓
Iron	✓	Very little	✓	Very little	Very little	✓
B vitamins	✓	Most lost in polishing	✓	Very little	Very little	✓

**Notes on nutritional value**

- 1 The presence of phytic acid in the fibre of grains can inhibit the absorption of calcium and iron by the body.
- 2 In countries where polished rice is the main staple food the deficiency disease Beri beri, due to lack of Vitamin B<sub>1</sub>, occurs.
- 3 In a few places the polished rice may be fortified. Polished rice supplies the least micronutrients of all the cereals.

**Cooking rice**

- 1 **Savoury rice using long grain rice**
  - (a) Allow up to 50g (2oz) rice per person
  - (b) Pick over rice to remove bits other than rice grain
  - (c) Wash in several bowls of cold water to remove starch
  - (d) Rinse until water is clear

### Method I

600ml (1pt) water to 200g (8oz) rice + 5ml salt

Put the water and rice into a saucepan. Add salt and bring to the boil. Stir.

Cover the pan tightly with a lid.

Simmer for 15 minutes to allow the water to be absorbed.

Spoon rice into a hot serving dish.

Separate grains with a fork.

**NB** Brown rice takes longer to cook, approximately 40 minutes

### 2 Short or round grain rice used for desserts

To serve four people use:

(a) 50g (2oz) round grain rice;

(b) 2 level tablespoons caster sugar;

(c) 600ml (1pt) milk;

### Method II

Add the rice to large pan of boiling, salted water. Bring back to the boil.

Boil rapidly, uncovered, for 12 minutes.

The rice should now be tender.

Drain, Rinse with hot water. Drain.

Serve as for method I.

### Method I

Put rice, sugar and milk into a heavy based pan. Cook over a low heat until simmering point is reached. Cover and simmer for 30 minutes. Add essence.

Place in hot serving dishes and sprinkle with a little nutmeg.

Can also be served cold.

### Method II

Put all the ingredients into a buttered ovenproof dish (capacity 900ml/1½pt).

Bake at 150°C/300°F/mark 2 for two hours.

Stir after 30 minutes.

### Breakfast cereals

These cereals are quick and easy to prepare and serve. There is a wide variety to choose from. Allow 30g-50g per person.

They are low in fat and contain many other nutrients. Many are fortified with micro-nutrients which were present in the whole grain but were removed in the processing of the cereal. Serving with milk improves their food value. Sprinkling with sugar is not necessary and those already coated with sugar are not the best nutritional buy. The greater use of bran has provided a range of cereal products with a high fibre content.

### Starchy foods which are not cereals

**Arrowroot** is a fine starch powder obtained from the underground stem (rhizome) of the West Indian **maranta** plant. It **gelatinizes** and **thickens** with heat and moisture.

It is used to make a glaze for flans (1 heaped 5ml spoon to 125ml fruit juice), for making fruit sauces to serve with puddings, arrowroot biscuits, and also as a medicine to calm the stomach and reduce vomiting.

**Sago** comes from the pith of the **sago palm**. The pith is pulped, strained, dried, and sieved to produce grains of starch which are roasted and graded large, medium or small.

It is used to make a milk pudding.

**Tapioca** is made from the underground stem of the tropical **cassava** plant. The rhizomes are washed, pulped and boiled down to a thick fluid. The poisonous part of the juice is washed out and the residue dried and roasted.

It is used to make milk puddings.

### The storage of cereals

- 1 Store cereals in a dry place. Dampness will cause moulds to develop.
- 2 Use containers with tightly fitting lids. Wash these frequently.
- 3 Flour is best stored in its bag in the container.
- 4 Plain flour can be stored up to 6 months.
- 5 SR flour can be stored for about 3 months.
- 6 Wholewheat flour and whole cereal flour can be stored for up to 2 months. These contain fat which can become rancid because of the oxidation of the fat they contain.
- 7 Use store items in rotation.