
Food processing and nutrition

Summary

- The nutrient value of food is almost always altered by the kind of processing it undergoes.
 - The water-soluble vitamins are the most vulnerable to processing and cooking.
 - Careful cooking and storage will help retain the nutrients in your food.
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Almost all food is processed in some way before it is eaten. Commercially, the main reasons to process food are to eliminate micro-organisms (which may cause disease) and to extend shelf life.

Simply cooking or combining a food with other foodstuffs to create a recipe is also considered a form of food processing. Whatever the case, the nutrient value of any food is often altered by the processing.

Effects of processing and storage of food

Some vitamins are more stable (less affected by processing) than others. Water-soluble vitamins (B-group and C) are more unstable than fat-soluble vitamins (K, A, D and E) during food processing and storage.

The most unstable vitamins include:

- folate
- thiamine
- vitamin C.

More stable vitamins include:

- niacin (vitamin B3)
- vitamin K
- vitamin D
- biotin (vitamin B7)
- pantothenic acid (vitamin B5).

Processes affecting food nutrient content

A variety of things can happen during the growing, harvesting, storage and preparing of food that can affect its nutritional content. Processes that expose foods to high levels of heat, light or oxygen cause the greatest nutrient loss.

Fertilisers

Most plant crops are produced with the aid of fertilised soils. High use of nitrogen fertilisers tends to reduce the vitamin C content in many fruit and vegetable crops. It does not seem to make any difference to the plant's nutrient value whether the fertiliser is organic or not.

Milling

Cereals such as wheat can be ground to remove the fibrous husks. The husks contain most of the plant's dietary fibre, B-group vitamins, phytochemicals and some minerals.

That is why products such as white bread are less nutritious than wholemeal varieties, even if they have been artificially fortified with some of the nutrients that were lost after milling. It is impossible to add back everything that is taken out, especially the phytochemicals. The 'fibre' that is added back to some products is often in the form of resistant starch, which may not be as beneficial as the fibre removed.

Blanching

Before a food is canned or frozen, it is usually heated very quickly with steam or water. The water-soluble vitamins, including vitamin C and B-complex, are sensitive and easily destroyed by blanching.

Canning

Food is heated inside the can to kill any dangerous micro-organisms and extend the food's shelf life. Some types of micro-organisms require severe heat treatment and this may affect the taste and texture of the food, making it less appealing. Preservatives are generally not needed or used in canned foods.

Water-soluble vitamins are particularly sensitive to high temperatures. Many people believe that canned foods are not as nutritious as their fresh counterparts, but this is not always the case, as fresh food often deteriorates more rapidly than canned foods.

Freezing

The nutrient value of a food is retained when it is frozen. Any nutrient losses are due to the processing prior to freezing and the cooking once the frozen food is thawed.

Pasteurisation

Pasteurisation involves heating liquid foods such as milk and fruit juices to specific temperatures to destroy micro-organisms. The nutrient value of milk is generally unaffected. In the case of pasteurised fruit juices, some losses of vitamin C can occur.

High pressure processing

This alternative preservation method subjects a food to elevated pressures, with or without the use of heat to kill micro-organisms. This method has been used in foods such as fruit juices. As heat is not required, this process impacts less on the vitamin content, flavour and colour of foods.

Dehydrating

Drying out foods such as fruits can reduce the amount of vitamin C they retain, but it can also concentrate other nutrients, particularly fibre in plant foods. Dehydrating food also makes food products more energy dense, which may contribute to weight gain. If a dehydrated food is reconstituted and cooked with water, further nutrients are leached out of the food and lost in the cooking water.

Preparation of vegetables

Most vegetables are peeled or trimmed before cooking to remove the tough skin or outer leaves. But most nutrients, such as vitamins, tend to lie close to the skin surface, so excessive trimming can mean a huge reduction in a vegetable's nutrient value.

Losing nutrients through cooking

Some vitamins dissolve in water, so you lose your vitamins to the cooking water if you prefer to boil your vegetables. For example, boiling a potato can cause much of the potato's B and C vitamins to migrate into the boiling water.

It is still possible to benefit from these nutrients if you consume the liquid, for example, by turning the potato and the liquid into a soup. Alternative cooking methods such as grilling, roasting, steaming, stir-frying or microwaving generally preserve a greater amount of vitamins and other nutrients.

Benefits of cooking food

It would be inaccurate to say that cooking food always lessens the nutrient value. Cooking can be advantageous in many ways, including:

- making the food tastier
- breaking down parts of vegetables that would otherwise be indigestible
- destroying bacteria or other harmful micro-organisms
- making phytochemicals more available, for instance, phytochemicals are more available in cooked tomatoes than in raw tomatoes. (Phytochemicals are chemicals produced by plants).

Preserving the nutrient value of vegetables

Some suggestions to retain the maximum nutrition in the foods you cook include:

- Store foods properly, such as keeping cold foods cold and sealing some foods in airtight containers.
- Keep vegetables in the crisper section of the refrigerator.
- Try washing or scrubbing vegetables rather than peeling them.
- Use the outer leaves of vegetables like cabbage or lettuce unless they are wilted or unpalatable.
- Microwave, steam, roast or grill vegetables rather than boiling them.
- If you boil your vegetables, save the nutrient-laden water for soup stock.
- Use fresh ingredients whenever possible.
- Cook foods quickly.

Where to get help

- Dietitians Association of Australia Tel. 1800 812 942

Things to remember

- The nutrient value of food is almost always altered by the kind of processing it undergoes.
- The water-soluble vitamins are the most vulnerable to processing and cooking.
- Careful cooking and storage will help retain the nutrients in your food.

This page has been produced in consultation with and approved by:

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