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Nestlé Professional Nutrition Magazine

COOKING METHODS

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Nestlé PROFESSIONAL

COOKING METHODS

Moist-heat cooking methods

Generally, moist-heat cooking methods use a liquid for cooking – usually water, stock or steam. The advantage of steam is that it transfers more heat at the same temperature. As a result, the food cooks faster and fewer nutrients are lost. The cooking temperature may vary from 70°–120° C (158°–212° F). These methods are particularly suitable for preparing pasta, rice, pulses and vegetables. The methods referenced below, though not exhaustive, are the more common techniques.

Boiling:

Cooking in a lot of liquid at a temperature of about 100° C (212° F).

Tips:

- Generally use as little water as possible to minimize the loss of vitamins and minerals.
- When practical, save the cooking liquid for use in stocks, sauces and casseroles.
- To add vitamins, sprinkle some fresh herbs onto the cooked food.

Poaching:

Cooking in liquid at a temperature under the boiling point (75°– 95° C/ 167°– 203° F).

Tips:

- Not ideal for nutrient retention in vegetables and potatoes, because a long cooking time results in additional nutrient loss through osmosis (nutrients boiled out into the liquid).
- Use a pot with a large diameter.
- If possible, add herbs or spices to the poaching liquid rather than salt or sugar.

Steaming:

Cooking at a temperature of about 100°C (212° F) in steam, with the food and cooking liquid completely separated. You can use a commercial steamer or a pot with a rack that suspends the food above a small amount of simmering liquid.

Tips:

- Use a flavoured liquid like stock, wine, water infused with herbs, lemon, etc.

Stewing/Braising:

Meat is often browned before liquid is added. Meats and vegetables can be cooked or steamed in their own juice. A particular way of stewing is to glaze: vegetables (carrots, small onions) become covered with the stew stock, which is reduced and enriched with a little sugar.

GOOD TO KNOW

Blanching

Purpose:

- Deactivation of enzymes
- Preservation of the colour
- Killing of microorganisms that may be present

Note: loss of about 20–30% of vitamin C, but vitamin retention improves during subsequent storage (chill-freeze process).

Tips:

- Drain and refresh in cold or iced water immediately to prevent further vitamin loss through cooking.
- Do not leave the food in the water as this will cause further loss of nutrients through osmosis and will soften the texture of the food.

Note: Osmosis: Nutrients in food leak or diffuse to liquid with lower concentration. Therefore, it is important to use this liquid for the sauce or as stock for soups because it is rich in vitamins and minerals.

GOOD TO REMEMBER

Moist-heat cooking methods

	Food	+ Nutrition	−
Boiling	• food (e.g. vegetables) for soups; hot pots • starches such as rice, potatoes and pasta	• no fat / oil is needed	• great loss of nutrients (osmosis) e.g. water-soluble vitamins (folate, vitamin B_1, C)
Poaching	• meat with little connective tissue • eggs, fish, poultry, small sausages	• no fat / oil is needed	• great loss of nutrients
Steaming	• vegetables, fish, • potatoes	• nutrient-friendly method • minimal loss of vitamins	–

Tips:
- Use leftover water for the sauce or as stock for soups.
- Use a pot with a tight-fitting lid (as wide and flat as possible).

Pressure cooking:

Cooking in an airtight pressure cooker at about 105° – 120° C (221° – 248° F).
Note: higher temperature equals shorter cooking time. The steamer is also suitable for blanching, poaching and reheating.

Tips:
- It is important to keep to the exact cooking time, as the food over-cooks very quickly.
- Suitable for producing large batches (portion by portion) of food (vegetables, potatoes, fish), or for producing a smaller amount of food (e.g. for diet recipes).

GOOD TO KNOW

Phytochemicals

The term phytochemicals refers to a class of substances (at the moment 60 000 – 100 000 are known), which exist only in plants. They are classified into several groups (e.g. carotenoids, flavonoids, phytoestrogens, glucosinolates) and rated as health-supporting substances. They have, for example, antioxidant, anti-carcinogenic and anti-inflammatory effects and may also reduce blood cholesterol. These effects can only be verified when the phytochemicals are obtained from whole foods in fruits and vegetables. Their effect when taken as supplements cannot currently be verified. Their loss during cooking varies greatly. Some are soluble and sensitive to heat and air; others are better obtained from well-done foods (lycopene in cooked tomatoes). Tip: The best way to serve a variety of phytochemicals is to create a diet that includes every colour of the rainbow (red, orange, yellow, green, blue/violet).

COOKING METHODS

GOOD TO KNOW

How does a microwave work?

In other cooking methods food warms up from the outside in. But with the microwave, the heat comes from inside the food, from its water molecules. The electromagnetic waves of the microwave cause these water molecules to vibrate and the resulting heat cooks the food. Deciding factors for determining the required cooking time of certain products can be water content, molecular density, the starting temperature of the food, as well as the penetration or strength of the rays (normally 2–4 cm). According to current findings there is no risk of radiation exposure if microwave ovens are used properly.

Microwave cooking:

Cooking with electromagnetic waves, either with or without a small amount of added liquid. The food can be browned or given a crust only if combined with a dry-heat method such as grilling. It is ideally suited for reheating food.

Tips:

- The food may cook unevenly and have hot and cold spots.
  Note:
  – For liquids: stir about halfway through the cooking time to distribute heat more evenly.
  – For solid food: let sit for several minutes after cooking or reheating, before serving.
- If the thickness of food (e.g. piece of meat) is more than the penetration of the microwaves, there is a risk of the core remaining raw. As a result, any existing microorganisms (e.g. salmonellae in poultry) may not be killed.
- Frozen products do not conduct heat well, so there is a risk of the outside area overheating while the inside remains raw.
  Note: defrost on low heat and cook immediately.
- Suitable dishes: glass, porcelain, and microwave-safe plastic dishes.

GOOD TO REMEMBER

Moist-heat cooking methods

	Food	+ Nutrition	–
Stewing/ Braising	• vegetables (e.g. filled vegetables), fruits • fish, meats (with more connective tissue)	• vitamin and mineral retention if cooking liquid is kept for further use • light cooking method • nutrient-friendly method • minimal loss of vitamins	• addition of some fat if used for cooking or fat released from meat during cooking which is then absorbed by the sauce • heat-sensitive vitamins are partially destroyed
Pressure cooking	• see boiling, steaming, stewing • reheating	• comparable with steaming and stewing • less cooking time	–
Microwave cooking	• any kind of food but only in small quantities	• minimal loss of vitamins and minerals • short cooking time	–

Dry-heat cooking methods

Heat is transferred through air or fat. The cooking temperature is between 120°–150° C (248°–302°F), and for short periods up to 300°C (572° F). Suitable for foods rich in proteins, like meat, fish and seafood and where a crust is desired.

Roasting:

Cooking with browning on the stove or in the oven with or without adding fat, at a temperature of 140°– 200°C (284°– 392° F). A special form of short roasting is sautéing.

Tips:

- Important: roast at intense heat to seal the juices inside the meat, then cook at low heat until done. This reduces the loss of vitamins, minerals and moisture.
- Use vegetable oils that are high in polyunsaturated or monounsaturated fats like canola oil and sunflower oil. Roast meat in its own juice.
- Brush vegetables with a minimum of oil to decrease fat absorption during cooking.
- For a low-fat meal: do not serve or eat the crust as it contains the roast's fat.
  Remove the dark brown or black crust before eating, as it could contain carcinogenic (cancer-causing) substances.
- A special method: cooking at a low temperature – cook the meat at a temperature between 68°– 80° C (154,4°– 176°F) in the oven until done (up to 24 hours).
- Roasting in the pan or grilling better preserves the vitamins and minerals in meats, fish or chicken than roasting in the oven or boiling, due to heat, cooking time and loss of nutrients.

Sautéing:

Dry-heat cooking method in which heat is conducted by a small amount of fat (the food is kept in motion).

Tips:

- Use for tender cuts of meat and vegetables.
- If meat is marinated, dry before cooking to ensure proper browning.
- Cook only single layers, don't overcrowd the pan.

Grilling:

Cooking with radiant heat or contact heat, with or without added fat.

Grilling techniques:

Over-heat grilling: food is placed on a rack or grill over a gas, charcoal or barbecue grill.

Under-heat grilling: food is placed under a gas or electric salamander or heating element.

Between-heat grilling: this method uses radiant heat, convection heat or a combination of both.

Tips:

- Dry meat browns better than moist meat. The grill must be hot before the food is added. This way the juices are quickly sealed into the meat and are better retained, as are vitamins and minerals.
- Don't salt the food before grilling. Salt draws the juices out of the meat, resulting in a loss of vitamins, minerals, and moisture.
- Place food on a rack so fat can drain.When using a grill plate simply brush the plate with a minimum of oil (polyunsaturated or monounsaturated vegetable oil) before heating. Never grill cured (pickled) meat, because cancer-causing substances (nitrosamine) may be formed.
- Avoid overly moist marinades or fat dripping from the grilled food onto hot coals or heating elements, as this may cause toxic compounds to be released into the resulting smoke.

Baking:

Cooking with browning in dry heat at a temperature of 120°–250°C (248°–482°F).

GOOD TO KNOW

Cook & Chill

Cook & chill is a food preparation system, not a cooking method.
The principle: the food is cooked to 90–95% (depending on the system of regeneration/reheating), and all of the cooking methods described here may be used, except grilling.
This is followed by shock-chilling to a temperature of 1°–3° C (33,8°–37,4° F), packing the food in single or multiple portion containers, and storing. The storage time depends on the special cook & chill method and lasts between 3 and 21 days. The rapid cooling ensures minimum vitamin and mineral loss. The loss of vitamins depends on the choice of cooking method and on the storage time.
Note: the longer the food is stored, the greater the vitamin loss.

GOOD TO REMEMBER

Dry-heat cooking methods

	Food	+ Nutrition	−
Roasting	• meat, fish • vegetables, potatoes • eggs	• sometimes no fat added through cooking	• heat-sensitive vitamins are partially destroyed • some loss of water/fat vitamins if stock is not kept for the sauce • if fat is used, the fat content of the food becomes higher • formation of acrylamide
Grilling	• fish, meat (food with not much connective tissue) • vegetables, potatoes • fruit	• fat drains out	• heat-sensitive vitamins are partially destroyed
Baking	• dough products • potatoes	• no loss of vitamins and minerals into liquid • hard digestible dough and crusts become light and easy to digest	• heat-sensitive vitamins are partially destroyed • formation of acrylamide

GOOD TO KNOW

The forming of acrylamide

Acrylamide is formed from proteins and sugars in potatoes and cereal products at temperatures over 100° C (212° F). It is only produced through the dry-heat cooking method during the browning stage.

Note:

- The amino acid asparagine and sugar (glucose, fructose) are the main precursors of acrylamide.
- Acrylamide content increases consistently with higher temperatures and longer cooking times. Acrylamide may cause cancer. At this time there is no maximum for the reception of acrylamides.

Tips for reducing the content of acrylamide:

- Avoid heavy roasting in favour of light browning.
- Boil potatoes before roasting.
- Bake at a maximum temperature of 180° C (356° F) in an oven with air circulation, 200° C (392° F) in an oven without air circulation.
- Fry at a maximum temperature of 170° C (347° F) and in small portions. Proportion of frying food to oil should be 100 g to 1–1,5 l.
- French fries: thick fries are better than thin ones due to surface area.

Fry-cooking methods

Cooking with browning in hot oil at a temperature of 140°–190°C (284°– 374°F). The methods are defined according to the amount of fat used. Correct frying of potatoes and vegetables preserves vitamins and minerals better than boiling or steaming, but increases the amount of fat and energy.

Deep-frying:

The food is entirely submerged in hot fat.

Tips:

- Fry as quickly as possible. Longer frying time increases fat absorption.
- The smaller the food being fried, the greater the amount of fat absorbed.
- The higher the fat content of the meat, the less oil is absorbed.
- To reduce the formation of acrylamide, fry at maximum 170° C (338° F) for a slightly longer time.
- Drain the food of oil before serving.
- Avoid reusing the frying oil.
- When oil smokes, throw it away immediately. It may become toxic, producing free radicals.

Pan-frying:

A special form of deep-frying; browning raw or prepared foods in shallow amounts of fat.

Tips:

- Cook at proper temperature and make sure the food is well-breaded; this minimizes fat absorption and sogginess in the finished products.

Stir-frying/Wok:

A traditional Chinese method for cooking food in a frying pan (e.g. wok) with a small amount of oil.

- Soak food in a low-fat marinade before cooking. This may be all the oil necessary.
- Use spray oil or a pastry brush to coat food to avoid higher fat absorption or coat the pan with a minimum of oil.
- Non-leafy vegetables (e.g. broccoli, shredded carrots) absorb about as much oil as leafy vegetables.
- If food sticks to the pan during cooking, add a little stock or water rather than oil.

GOOD TO REMEMBER

Fry-cooking methods

	Food	+ Nutrition	−
Frying	• meat, fish, shellfish • vegetables, potatoes, • poultry	• no loss of water-soluble vitamins • only a small amount of heat-sensitive vitamins are destroyed • possible increase of vitamin E based on oil used for cooking	deep-frying: • high absorption of fat (energy rich) • formation of acrylamide

Vitamin loss

Tips to prevent vitamin loss:

- Whenever possible, wash vegetables whole and before peeling under running water.
- Peel thinly or cook with skin on.
- Cut into large pieces.
- Raw vegetables and fruit salads: add a little lemon juice or vinegar to slow down vitamin C loss.
- Use the smallest amount of water necessary.
- Cook with the lid on.
- Cook until just tender, not mushy.
- Serve immediately ➜ keeping food warm causes a vitamin C loss of 4–17% in one hour and 7–34% in two hours.

– Canned vegetables:

- Never boil canned vegetables.
- The best way to heat them is the microwave ➜ warm up the liquid first, then add the vegetables.
- Avoid excessive stirring while warming.
- Use the juice to cook the vegetables in, or add to soups or stocks.

– Frozen vegetables:

- Don't thaw them before cooking.
- Heat the water first, then add the vegetables.
- If you use them for cold food items, cook them thoroughly beforehand.
- The best way to heat them is in the microwave (less vitamin loss).

GOOD TO REMEMBER

Stability of vitamins

Vitamin	Acid low pH	Alkali high pH	Heat >70°C	Light	O_2
C	●	●	●	●	●
B_6	●	●	●	●	●
A	●	●	●	●	●
D	●	●	●	●	●
E	●	●	●	●	●

● no effect ● sensitive ● very sensitive

water-soluble vitamins (C, B vitamins)

fat-soluble vitamins (A, D, E, K)

GOOD TO KNOW

Vitamin loss by different cooking methods

Cooking methods	Vitamin loss in % (C, B_1, B_2, B_6)
Boiling	35 – 60
Poaching	Less than boiling
Steaming	10 – 25
Pressure cooking	5 – 10
Microwave cooking	5 – 25
Roasting	10 – 47
Stewing/Braising	10 – 12
Grilling	10 – 12
Baking	10 – 12
Frying	7 – 10

QUIZ

1. Which of the following cooking methods is a moist-heat cooking method?
- A Grilling
- S Poaching
- C Baking

2. Which of the following cooking methods is a dry-heat cooking method?
- U Steaming
- L Pressure cooking
- T Roasting

3. What is the reason for blanching vegetable?
- O To increase vitamin loss
- R To soften the texture of the food
- E To minimize vitamin loss during storage

4. For which cooking method can you use a steamer?
- I Boiling
- T Roasting
- A Stewing

5. With reference to fat intake, which cooking method is better?
- M Deep-frying
- A Stir-frying
- T Pan-frying

6. How are vitamins classified?
- I Water-soluble and fat-soluble substances
- A Major and trace substances

7. What is important to remember, if you use frozen vegetables?
- N Don't thaw them before cooking
- I Add lemon juice to cooking liquid to slow down vitamin C loss
- R Use a lot of fat

8. Which cooking method causes the greatest vitamin loss?
- R Microwave cooking
- P Baking
- G Boiling

1	2	3	4	5	6	7	8

Answer: STEAMING

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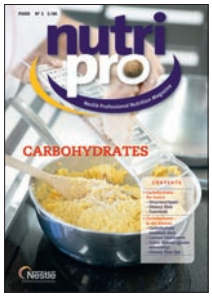

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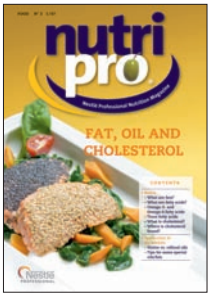

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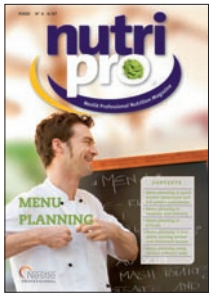

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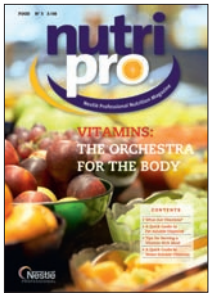
Menu Planning



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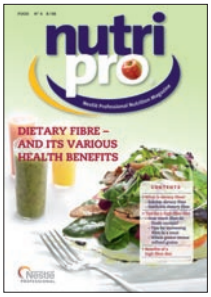
Nr. 5
Vitamins:
The Orchestra
For The Body



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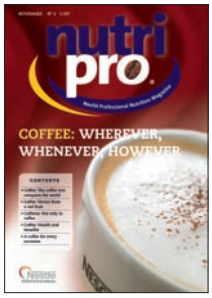

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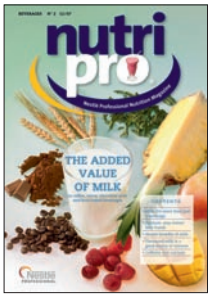
Coffee: Wherever,
Whenever, However



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