

PRESERVATION METHODS





Preservation is a way of making food last longer. There are lots of advantages to preserving food, including:

- *You have a longer length of time to distribute food to organisations or people.*
- *People and organisations have more time to use the food.*
- *When you get a bulk load of one food you can preserve it and distribute it in smaller amounts throughout the year.*
- *It reduces the amount of food that gets wasted.*

There are lots of different ways to preserve food. This guide talks through the different preservation methods and the foods you can preserve.

This document should remain on site, in an easily accessible place, at all times.



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BLANCHING TECHNIQUE



What is blanching?

Blanching is when you cook a vegetable or fruit in boiling water for a short time. Immediately afterwards you put it into cold water to stop the cooking process. It helps to keep the original flavour and colour, It can extend the shelf life for a short time or it can be used before canning, freezing or drying.

What are the pros?

- It stops enzyme actions (proteins which speed up the rotting of food) which can cause loss of flavour, colour and texture.
- It removes dirt from the outside of the food and, brightens the colour.
- It helps stop the loss of vitamins and other nutrients.
- It can help extend the shelf life for a short time.

Water Blanching.

This is when you put cut vegetables in boiling water. To do this you need a blancher which has a blanching basket and cover. If you don't have a blancher you could fit a wire basket into a large pot with a lid.

Use 8 litres of water for every kg of prepared vegetables. Put the water in the blancher and heat it until it is boiling rapidly. Place the vegetables in the blanching basket and lower into the boiling water. Place a lid on the blancher. Keep the heat high and the water should return to boiling within 1 minute. Blanch for the length of time needed for the vegetable (see chart on pages 3-4).

Cooling.

As soon as the steam or water blanching is complete, vegetables should be cooled quickly and thoroughly to stop the cooking process. To cool, plunge the basket of vegetables immediately into a large quantity of cold water, 15°C or below. Change water frequently or use cold running water or ice water. Cooling vegetables should approximately take the same amount of time as blanching. Drain vegetables thoroughly after cooling.

What is usually blanched?

Blanching covers fruits like apples and pears, and vegetables like carrots and peas. Pasta can also be blanched.

What are the cons?

- It is important to blanch vegetables for the right amount of time (see the grid on pages 3-4).
- If you don't blanch for long enough it may increase the speed at which a vegetable rots.
- If you blanch for too long the vegetable will lose flavour, colour, vitamins and minerals.

Steam Blanching.

Heating in steam will also blanch vegetables. It takes longer than using water but the vegetables lose less vitamins and minerals and there is less waste.

To steam, use a pot with a tight lid and a basket that holds the food at least three inches above the bottom of the pot. Put an inch or two of water in the pot and bring the water to a boil. Then put the vegetables in the basket in a single layer so that steam reaches all parts quickly. Cover the pot and keep the heat high. Blanch for as long as is needed. See chart on pages 3-4.

VEGETABLES	BLANCHING (SECONDS)
Artichoke-Globe	420
Artichoke-Jerusalem	180 - 300
Small Stalk Asparagus	120
Medium Stalk Asparagus	180
Large Stalk Asparagus	240
Beans - Snap, Green, or Wax	180
Lima, Butter, or Pinto (Small)	120
Lima, Butter, or Pinto (Medium)	180
Lima, Butter, or Pinto (Large)	240
Beetroot	Cook
Broccoli Flowerets	180
Broccoli (Steamed)*	300
Brussel Sprouts (Small)	180
Brussel Sprouts (Medium)	240
Brussel Sprouts (Large)	300
Cabbage (Shredded)	90

VEGETABLES	BLANCHING (SECONDS)
Carrots (Small)	300
Carrots (Diced or Sliced)	120
Cauliflower Flowerets	180
Celery	180
Corn Cob, Small Ears	420
Corn Cob, Medium Ears	540
Corn Cob, Large Ears	660
Corn Cob, Whole Kernel	240
Eggplant	240
Greens, Collard	180
Greens, Other	120
Kohlrabi, Whole	180
Kohlrabi, Cubed	60
Mushrooms, Whole*	300
Mushrooms, Buttons or Quarted*	210
Mushrooms, Sliced*	180

VEGETABLES	BLANCHING (SECONDS)
Okra, Small Pods	180
Okra, Large Pods	240
Onions, Whole	180 - 420
Onions, Rings	10 - 15
Peas, Edible Pods	90 - 120
Peas, Black-Eye	120
Peas, Green	90
Bell Peppers, Halved	180
Bell Peppers, Strips or Rings	120
Potatoes, Irish	180 - 300
Pumpkin	Cook
Rutabagas	180
Soybeans, Green	300
Squash, Chayote	120
Squash, Summer	180
Squash, Winter	Cook

VEGETABLES	BLANCHING (SECONDS)
Sweet Potatoes	Cook
Turnips, Cubed	120
Parsnips, Cubed	120

***Unless stated otherwise, all times are for water blanching.**

Cooling.

As soon as the steam or water blanching is complete, vegetables should be cooled quickly and thoroughly to stop the cooking process. To cool, plunge the basket of vegetables immediately into a large quantity of cold water, 15°C or below. Change water frequently or use cold running water or ice water. Cooling vegetables should approximately take the same amount of time as blanching. Drain vegetables thoroughly after cooling.

SUGAR METHOD



What is sugaring?

Sugar acts as a preservative by maintaining and stabilising the water content in foods. Sugar helps to prevent or slow the growth of bacteria, moulds and yeast which prolongs the shelf life of food. It is often used to make food like jam and preserves. It can also be used to candied food. How to candy food is on page 16.

What are the pros?

- Sugar is widely available
- Easy to use
- Products have a long shelf life and can be stored at room temperature

What is jam, marmalade, jelly, and chutney?

- **Jam** is made by either using the whole fruit or pieces of fruit. You cook it with sugar until it creates a pulp. This produces a thick, fruity, spread. It can be stored for a long time as the sugar keeps the fruit edible. For Jam, you often need to use jam sugar (or gelling sugar). This is because each type of fruit has a different level of pectin – which is what helps the jam to set. For example citrus fruit, blackberries, apples, and red currants have high pectin levels. Soft fruits, such as peaches, have lower levels. By using jam sugar, this will help make sure you have a thick set jam
- **Marmalade** is similar to jam but only uses citrus fruit – often oranges. Pieces of fruit are cooked with the sugar in the same way we make jam. Small pieces of the citrus peel is also added – this gives it its characteristic bitter taste.
- **Jelly** is made using the juice of the fruit and sugar. To do this you need to cook the fruit, then strain it overnight through a muslin cloth or jelly bag – this removes the juice from the fruit. Then you cook the juice with sugar to produce the clear jelly.
- **Chutney** is made by cooking pieces of vegetables and fruit with sugar and vinegar. It is then cooled and stored in air tight jars.

What is usually sugared?

All fruits and vegetables can be used to make jams or chutneys. Marmalades are made from citrus fruits like oranges, lemon & lime. Quince and redcurrant are often used to make jellies. Chutneys are often made from mangoes, apricots, figs and tomatoes.

What are the cons?

- These products can contain a lot of calories.

How to make jam

- A ratio of 2:1 (2 kg of fruit, 1 kg of sugar) is a good starting point. If you like it more sweet you can go up to a ratio of 3:2.
- Cut the fruit or vegetable into even pieces.
- Mash the fruit or vegetables and sugar together. Optionally you can add lemon juice.
- Boil the fruit or vegetables for 20 minutes. Bring the fruit to a boil over medium heat, stirring occasionally.
- When the jam is set to your liking, remove the jam from the heat and transfer hot to the sterilised jars.
- Close the lid and let the jars cool upside down.

How to store jam, marmalade, jelly, and chutney

Jam, jellies, marmalades & chutneys should be stored in sterile air tight jars. These will keep for up to a year at room temperature.

CANDYING TECHNIQUE



What is candying?

Candying is when you heat fruits or citrus peels in a sugar syrup. The water in the fruit is replaced by the sugar syrup. The fruit becomes drier and harder. It keeps its original colour and flavour and can be stored for longer.

What are the pros?

- Sugar is widely available.
- Easy to use.
- Products have a long shelf life and can be stored at room temperature.

Method and Equipment

- Make a sugar syrup. Gently heat sugar and water together until the sugar melts. Use a 1:1 ratio - 1 kg of sugar with 1 litre of water.
- Blanch your peels/fruit/vegetables until tender (see the blanching section on pages 1-4 on how to do this).
- Transfer the blanched peels/fruit/vegetables to the sugar syrup. Bring the syrup to a very low simmer.
- Simmer for 15 to 30 minutes, depending upon the size of your slices.
- Remove the pot from the heat and allow it to cool.
- Roll the drained peels/fruit/veggies in sugar.

Tip: To keep them fresher longer, dip the drained slices in tempered chocolate.

What is usually candied?

Fruits and fruit peel (especially citrus fruits) are often candied. Grapefruit peel, kumquats, orange and lemon rind, fresh cherries, and pineapple are all good choices for candying. But carrots, beetroots or parsnips are also worthwhile to try.

What are the cons?

- These products can contain a lot of calories.

How to Store Candied Food

The candied fruit needs to be kept in an airtight container at room temperature.

SALT METHOD



What is salting?

Salt (Sodium Chloride) preserves food as it reduces the water content of food. This helps to prevent or slow the growth of bacteria, moulds and yeast meaning food lasts longer.

What are the pros?

- Salt is widely available
- Easy to use
- Products have a long shelf life and can be stored at room temperature

What is usually salted?

Curing is used for certain meat, fish and cheese. It is commonly used for fish. Often it is combined with drying or smoking techniques.

What are the cons?

- These products do contain a lot of salt which could lead to high blood pressure if eaten in large amounts.
- Today, few foods are preserved solely by the addition of salt.

Method and Equipment

Making Salted Cod, Bacalao, Stockfish:

- For a fillet of around 600g you need 500g of salt & 500g of sugar.
- Wash and dry the fillet of cod. Mix together the salt and sugar.
- Sprinkle half of the salt and sugar into a baking tray and lay the fish on top.
- Cover with the remaining salt and sugar and pack tightly.
- Cover with cling film and refrigerate for 24 hours. If the cod fillet is particularly thick it will need longer.
- Once the cod has firmed up rinse well in cold water and pat dry
- Wrap in muslin cloth and leave on a wire rack in the fridge for 7–10 days.
- It needs to be soaked in cold water for 24 hours before using, changing the water at least twice during this time.

Brining

Brining is when you store food in a mixture of salt and water (the brine). It preserves and seasons the food. Brining is used in pickling (found on pages 13-14) and fermentation (found on page 15-18).

ACIDIFICATION TECHNIQUE



What is acidification?

The acidity of a food is measured by pH (the power of Hydrogen). When food has a pH of more than 5.6, it is more likely to spoil and rot quickly. A lot of vegetables have a pH value higher than 5.6. When the pH is less than 4.6 food stores for longer. Acids, such as vinegar, have a low pH value. By using acid to pickle food, you can lengthen how long you can store food for.

What are the pros?

- Pickling extends the life of the food and helps keep the natural colour, can intensify flavour, and it is easy to do.
- It can also intensify the flavour.
- It's easy to do.

Method and Equipment.

Fruit and vegetables are mixed into vinegar. Sugar and spices such as mustard seeds, cloves, garlic or cinnamon are often added. The final food has to have a PH of 4.6 or below. Here is an easy way to do it:

- Wash the vegetables very well.
- Sterilize jars and place the vegetables in it
- Pour vinegar to the bottom of the jar (about 2 fingers).
- Optional: Put one teaspoon of sugar and one of salt in each jar. If you want to make sweet pickles (or sweeter), add 2-3 tablespoons of sugar.
- Add spices (eg. cinnamon, cloves, garlic, mustard seeds)
- Fill with water almost up to the rim.
- Tightly screw the lid on.
- Place jars in a large pot and cover with water up to the lid.
- Bring to boil and continue boiling for 5 minutes.
- Leave to cool for 1 hour, without removing from the pot.
- Transfer to a baking sheet, bottoms up, and place in a pre heated oven on low, for 15 minutes.

What is usually acidified?

Examples include acidic herring, onions, cabbage, salsas, and sauces, such as barbecue and chilli.

What are the cons?

- You need to start with clean fruits/vegetables.
- You need to have good food hygiene processes to keep the product clean.

Storing and serving.

Food that has been pickled needs to be stored in a cool environment out of sunlight – such as a cupboard. These pickles are good to serve after about 1 month. Once opened, jars should be stored in the fridge.

BRINING & PICKLING



What is brining and pickling?

Brining and pickling is when you store food in a mixture of salt and water (brining), or in vinegar (pickling). You can also add in spices such as mustard seeds, cloves, garlic or cinnamon. Brining and pickling extends the life of the food and helps keep the natural colour. The treatment of food in a concentrated saline solution. It can also intensify the flavour. Food that has been pickled needs to be stored in a cool environment out of sunlight.

What are the pros?

- Pickling extends the life of the food and helps keep the natural colour, can intensify flavour, and it is easy to do.
- Brine is easy to use, salt is widely available, and products have a long shelf life and can be stored at room temperature.

What is usually brined and pickled?

Commonly pickled and brined foods include onions, egg, cucumber (gherkin), and other vegetables. Foods that often come in brine include fish, such as tuna, and meat.

What are the cons?

- Pickling means you need to start with clean fruits/vegetables, and you need to have good food hygiene processes to keep the product clean.
- Brining means that these products do contain a lot of salt which could lead to high blood pressure if eaten in large amounts and today, few foods are preserved solely by the addition of salt.

Method and Equipment.

Fruit and vegetables are mixed into vinegar. Sugar and spices such as mustard seeds, cloves, garlic or cinnamon are often added. The final food has to have a PH of 4.6 or below. Here is an easy way to do it:

- Wash the vegetables very well.
- Sterilize jars and place the vegetables in it
- Pour vinegar to the bottom of the jar (about 2 fingers).
- Optional: Put one teaspoon of sugar and one of salt in each jar. If you want to make sweet pickles (or sweeter), add 2-3 tablespoons of sugar.
- Add spices (eg. cinnamon, cloves, garlic, mustard seeds)
- Fill with water almost up to the rim.
- Tightly screw the lid on.
- Place jars in a large pot and cover with water up to the lid.
- Bring to boil and continue boiling for 5 minutes.
- Leave to cool for 1 hour, without removing from the pot.
- Transfer to a baking sheet, bottoms up, and place in a pre heated oven on low, for 15 minutes.

Serving.

These pickles are good to serve after about 1 month. Once opened, jars should be stored in the fridge.

FERMENTING TECHNIQUE



Dithmarscher
Kellerkäse
halbfester Schnittkäse
50 % Fett i. Tr.
100 g / 2,10 €

Reichgraf
Schnittkäse
Fett: 50 %

Rotwe
Schnittkäse
Fett: 50 %

Kruses
kleiner Italiener
italienische Gewürzschmelz
45 % Fett i. Tr.
eigene Herstellung
halbfester Schnittkäse
100 g / 2,19 €

Kruses
Senf-Pfeffer-Käse
eigene Herstellung mit Senfkörnern u. geräuch.
halbfester Schnittkäse 45 % Fett
aus pasteurisierter Kuhmilch
100 g / 2,10 €

What is fermenting?

Fermentation is a natural process when micro-organisms convert carbohydrates/sugars into alcohol or acids. Yeasts are responsible to make alcohol and carbon dioxide gas out of sugar. In fermenting vegetables lactic acid bacteria (LAB) are used to produce lactic acid and lower the pH of products such as fermented pickles and sauerkraut. The final food has to have a PH of 4.6 or below. It is this alcohol or acid which helps to preserve the food for longer.

What are the pros?

- Fermentation preserves food and increases the nutritional content
- Fermentation changes the flavour profile
- You don't need a lot of equipment to ferment foods
- Very cheap way to preserve foods

Method and Equipment

There are various methods to ferment. In some products the micro-organisms are added (also called starters) and in others fermentation takes place spontaneously. Two easy fermentation techniques, making yoghurt and fermenting vegetables, are explained on the page 17.

What is usually fermented?

Dairy products like yoghurt and cheese come from fermenting milk using lactobacillus bacteria.

Vegetables, fruits, grains, nuts, cereals and legumes can be fermented. Kimchee and sauerkraut are examples of fermented vegetables.

What are the cons?

- The presence of acids in foods does not kill organisms. Following good hygiene practices is very important.
- Working with living organisms means you can't always predict the final flavour & texture.

How to Store

In air tight containers at room temperature and out of sunlight. After opening, cool storage is needed.

Fermenting Vegetables

- This method involves submerging a product in a salt brine, which ferments it. The process can take anywhere from 3 – 4 days for a mildly acidic preserve to 2 – 3 weeks for a fully fermented lacto preserve.
- Create a brine. You do this by adding salt to boiled water and allow it to cool to ambient temperature. (could we come up with a ration of salt to water)
- Wash the fruit or vegetables you want to ferment and put them in a jar.
- Completely cover with the cooled brine.
- Cover the jar and leave at room temperature. Open the jar once or twice a day to stop carbon dioxide from building up! Alternatively you can use an air-lock.
- After 5 days taste the ferment. The brine should be slightly tart and will continue to get more acidic as each day passes. If you have pH test strips you can check the pH is below 4.6.
- When the ferment is sour enough move it to the refrigerator and it is ready to eat.

If the vegetables won't stay down: weigh the vegetables down, either with fermentation weights or use a small ziplock back filled with water.



Making Yoghurt From Milk

- First you have to look for yoghurt that has the words 'live' or 'active cultures' on the packaging. This refers to the living organisms or 'good' bacteria which will convert your milk into yoghurt.
- Heat 1 litre of milk in a pan and let cool.
- Add a big spoon of yoghurt to the milk and let it ferment overnight in a warm place (best between 30-35°C) in a closed jar. And there you have it. Tangy, delicious, creamy yoghurt.
- Store in the fridge.



FOOD	PRINCIPLE INGREDIENT	KEY MICROORGANISMS
Wine	Grapes	Yeasts
Beer	Barley	Yeasts
Cider	Apples	Yeasts
Sake	Rice	Molds
Bread	Wheat	Yeasts
Yoghurt	Milk	Lactic Acid Bacteria
Cheese	Milk	Lactic Acid Bacteria
Buttermilk	Milk	Lactic Acid Bacteria
Kefir	Milk	Lactic Acid Bacteria + Yeasts
Vinegar	Grapes	Yeasts, followed by Acetobacter or Gluconobacter
Tempeh	Soybeans	Molds
Soy Sauce	Soybeans	Molds + Lactic Acid Bacteria + Yeasts
Pickled Cucumber	Cucumber	Lactic Acid Bacteria + Yeasts
Sauerkraut	Cabbage	Lactic Acid Bacteria
Pickled Olives	Olives	Lactic Acid Bacteria + Yeasts
Fermented Sausage	Meat	Lactic Acid Bacteria + Molds

ADDING PRESERVATIVES



What is a preservative?

Preservatives are substances that are added to foods to make products last longer. Preservatives have an E number. E-numbers can come from natural sources or be made artificially. The European Food Safety Authority (EFSA) assesses whether the substances can be used safely. The law states in which products an additive may be used and the maximum amount that may be added to products.

What are the pros?

- They can help to enhance the colour, flavour and texture of food.
- They prevent food from spoiling.

What is usually preserved?

Preservatives can often be found in highly processed foods, like potato crisps, chocolate, and sweets. They can also be used in vegetable and fruit products too.

What are the cons?

- Some people don't like eating food with artificial preservatives.

Guidance

- **UK** - www.food.gov.uk/business-guidance/approvedadditives-and-e-numbers
- **Belgium** - www.favv-afsca.be/professionelen/levensmiddelen/additieven/
- **France** - www.economie.gouv.fr/dgccrf/Publications/Vie-pratique/Fiches-pratiques/additifs-alimentaires-conditions-et-modalites-utilisation

FOOD DEHYDRATION



What is the drying method?

Drying is when water is removed from the food. Drying inhibits the growth of bacteria, which increases the amount of time it can be stored. It can be done through electric food dehydrators or by freeze drying food.

What are the pros?

- Stops bacteria and mould growing
- Increases the amount of time food can be stored.

Method and Equipment.

A dehydrator uses hot air convection to dry the food product. Vegetables should be blanched before drying. The time and temperature needed will depend on the food you are drying. The chart below gives you a guide.

The drying temperature should not exceed 70°C as this will seal the outside of the fruit or vegetable and prevent thorough drying. It should also not be lower than 55°C as this will promote bacterial growth. Tables can be found on page 23 and 24.

What is usually dried?

Most fruits and vegetables can be dried, such as apricots, apples, grapes, potatoes, garlic, carrots, beans, and legumes. Leafy vegetables are much tougher to dry.

What are the cons?

- Food has to be blanched before being dehydrated.
- Dehydrated food has a long drying time.

How to store dried food.

After drying, the water level should be checked to make sure that the food product is adequately dried ($a_w < 0,6$). Dried food needs to be kept in airtight packaging or containers and stored in a dark, cool environment.

FRUIT	FORM	FOOD DRYER TEMP. (°C)	DRYING TO	TIME IN HOURS
Strawberries	Halved	57 degrees	Bendable and Sticky	8 to 15 hours
Strawberries	Whole	57 degrees	Bendable and Sticky	15 hours
Strawberries	In Slices of 5mm	57 degrees	Bendable	7 - 10 hours
Pineapple	In Slices of 6mm	57 degrees	Bendable	10 - 18 hours
Canned Pineapple	In Slices	57 degrees	Bendable	28 hours
Apples	In Segments	57 degrees	Bendable	10 - 15 hours
Apples	In Slices of 4mm	57 degrees	Bendable	7 - 10 hours
Bananas	Halved	65 degrees	Leathery	12 hours
Bananas	In Slices of 4mm	57 degrees	Leathery	7 - 10 hours
Blueberries	Halved, Blanched	53 degrees	Bendable	10 - 15 hours
Lemons	In Slices of 4mm	54 degrees	Leathery	7 hours
Grapes	Halved, Blanched	57 degrees	Bendable	15 hours
Cherries	Cut into Quarters	57 degrees	Leathery	13 - 15 hours
Mango	In Slices of 3mm-4mm	57 degrees	Bendable	20 hours
Pears	Peeled, In Slices of 5mm	57 degrees	Bendable	8 - 15 hours
Plum	Halved, Blanched	57 degrees	Leathery	12 hours

VEGETABLE	FORM	FOOD DRYER TEMP. (OC)	DRYING TO	TIME IN HOURS
Asparagus	Cut Lengthwise, 2.5cm	52 degrees	Brittle	5 - 6 hours
Beans	Whole	52 degrees	Brittle	8 - 12 hours
Broccoli	6mm Pieces	52 degrees	Brittle	10 - 15 hours
Mushrooms	Halved, or 4mm Slices	50 degrees	Leathery	3 hours, or 4-6 hours, respectively
Bell Peppers	Strips of 7mm	60 degrees	Bendable	8 - 10 hours
Leeks	3-5mm Rings	52 degrees	Brittle	5 - 7 hours
Onions	3-6mm Rings	63 degrees	Leathery	4 - 8 hours
White Cabbage	3-5mm Rings	63 degrees	Brittle	7 hours
Carrots	In Slices of 3mm	52 degrees	Leathery	6 - 10 hours

HERBS/SPICES	FORM	FOOD DRYER TEMP. (OC)	DRYING TO	TIME IN HOURS
Basil	Whole	35 degrees	Pulverisable with Finger	12 - 13 hours
Chives	Whole	35 degrees	Brittle	6 hours
Stinging Nettles	Whole	68 degrees	Pulverisable with Finger	6 hours
Lemon Balm	Whole	35 degrees	Brittle	6 hours
Lemon	Zest	40 degrees	Brittle	7 hours
Chilli Flakes	Whole	70 degrees	Brittle	24 hours
Garlic Cloves	Whole	35 degrees	Leathery	48 hours
Bay Leaves	Whole	38 degrees	Brittle	12 - 24 hours
Lavender	Whole	35 degrees	Brittle	1.5 - 2.5 hours
Pumpkin Seeds	Whole	46 degrees	Bendable	3 hours
Sage	Whole	35 degrees	Brittle	12 hours
Elderflower	Whole	35 degrees	Pulverisable with Finger	6 hours

SMOKING TECHNIQUE



What is smoking?

Smoking is when food, often meat or fish, is preserved by the smoke from a burning material – often wood. This stops bacteria growing and can extend shelf life. There is also cold smoking which takes hours and where the temperature is often below 25 ° C.

What are the pros?

- Adds flavour to the food.
- Adds colour to the food.

What is usually smoked?

Various varieties of fish, and various cuts of meat are often smoked. In addition, some ingredients used in alcohols and tea can be smoked.

What are the cons?

- To make food last longer, smoking is best combined with other preservation methods, such as drying.
- Lots of attention has to be given to knowing the temperature throughout the smoking process. If the temperature is not correct, the food could be unsafe to eat.

Hot Smoking

Hot smoking is when meat or fish is slowly cooked and smoked at the same time. To do this you need a smoker. The smoker allows you to control the temperature so you safely cook the meat or fish. Often, meat and fish is brined first as this helps the food to retain moisture during when being smoked. Meat and Fish will need to be cooked smoked at different temperatures and for different lengths of time.

Cold Smoking

Cold smoking is when food is placed in a special smoking box and smoke is pumped through for 12- 48 hours. The temperature of the chamber is kept between 20-25°C. The fire which creates the smoke happens outside the box so the heat from the fire doesn't reach the food. Often food is cured before cold smoking. This draw out moisture from the food which means the smoke can infuse the food better. Curing also helps the food keep for a long time without refrigeration.

PASTEURISING TECHNIQUE



What is pasteurising?

Pasteurisation is when food or liquid drinks are heated up to 72°C and then cooled. It kills some bacteria and means food lasts longer. It is mostly used for liquids such as milk, soup and juices.

What are the pros?

- Kills heat sensitive micro-organisms and deactivates enzymes.

Method and Equipment

Large scale Pasteurisation requires special machines. For pasteurisation on a small scale you can use the technique of water batch canning (wecking). This is where you use glass jars to pasteurise food. The methods and times depends on the food you are using – so, it's best to seek expert advice on how to do this.

Large commercial organisations mostly use high-temperature, short-time (HTST) pasteurization - also known as flash pasteurization for liquid food products (mostly dairy products, juices etc). HTST pasteurization equipment uses Sanitary Plate Heat Exchangers utilizing hot water or steam to raise the temperature of products. This heating stage is then followed by a rapid cooling stage. The pasteurization temperature and time depend on the product.

(Water bath) canning can be used to pasteurise food on a smaller scale .The most important thing to consider when canning is to determine the pH of your food product. Acidic food (low pH) can use water bath canning, for food with low acidity (high pH) a pressure canner should be used.

The National Centre for Home Food Preservation has information on how to can food, such as fruit, vegetables, meat, and nuts. Their website can be found below:

- https://nchfp.uga.edu/how/can_home.html

What is usually pasteurised?

The most commonly pasteurised foodstuffs are liquids, such as juice, beer, ice cream and milk. However, crab and lobster meat could also be pasteurised.

What are the cons?

- It does not kill heat resistant micro-organisms. This means the shelf life is quite short and food will go off after the shelf life.

How to Store

As pasteurisation will not kill all heat resistant microorganisms, pasteurised products should be kept in the fridge.

STERILISATION TECHNIQUE



What is sterilisation?

In this process, products are (briefly) heated above 100°C. This kills all microorganisms. This is why sterilized products have a long shelf life and can be kept outside the refrigerator in closed packaging. The strong heating often results in a different taste and sometimes some loss of nutrients.

What are the pros?

- It kills all micro-organisms.
- Food can be kept for a long time.

What is usually sterilised?

Almost all canned fruit and vegetables can be sterilised, as well as soups, sauces, stews.

What are the cons?

- It can affect the taste of food.
- Nutrients in the food may be destroyed in the process.
- Equipment is expensive.

Method and Equipment

Specialised equipment is needed for this. In large scale productions a continuous sterilisator will be used. In small scale productions a batch steriliser called a retort or autoclave will be used. The details of the method vary depending on the food being sterilised, so expert advice is needed on how to do this.

How to Store

In air tight containers at room temperature and out of sunlight. After opening, cool storage is needed.

ULTRA HIGH TEMPERATURE



استوری پی
شیر تازه

What is Ultra High Temperature (UHT)?

A UHT product is heated above 140°C for only a short period of time (usually a few seconds) to kill bacteria in the food.

What are the pros?

- A safe food product with minimal heat damage to the product properties.

What is usually a UHT product?

Longlife milk and other milk based beverages are commonly a UHT product. Others include creams, custards, purees, smoothies, and nut drinks.

What are the cons?

- Can only be used for low viscous liquids. These are liquids that are easy to pour, like water.
- Equipment is expensive.
- Can only be done on a large scale.

UHT Method

Specialised equipment is needed for UHT treatments. Once food has been Ultra High Temperature treated, food can be stored at room temperature.

CHILL BLASTING



What is freezing?

By storing food at -18°C (0°F), microorganism growth stops altogether. Some microorganisms can survive freezing and can grow later so it is important food is cooked properly after freezing.

What are the pros?

- Very few ice crystals in the food, which improves the quality of the frozen product.
- It stops microbiological which makes the food safer.

What is usually frozen?

Almost anything can be frozen, such as fruits, vegetables, meats, and bread.

What are the cons?

- Some microorganisms can survive freezing and can grow later so it is important food is cooked properly after freezing.

Method and Equipment

A blast chiller is a piece of equipment that quickly lowers the temperature of food. Blast chillers are also referred to as blast freezers or flash freezers. They typically have multiple shelves where food pans or sheet pans can be stored and chilled at extremely low temperatures.

How to Store

After rapidly cooling your food product, they can be stored in a regular freezer.

VACUUM PACKING



What is vacuum packing?

Vacuum packing is a method of packaging which removes air from the package prior to sealing.

What are the pros?

- It stops bacteria growing so food lasts longer.
- It also preserves the flavour and smell of food.

What is usually vacuum packed?

It is commonly used to store dry food over a long period of time. This could be; cereals, nuts, cured meats, cheese, smoked fish, coffee. On a short-term basis, vacuum packing can also be used to store fresh foods, such as vegetables, meats, and liquids.

What are the cons?

- It can change the look of the food when the packaging material forms itself airtight around the product.
- Delicate food e.g. potato chips can be crushed by the vacuum packing process. In these situations, modified atmosphere packaging (MAP) is a better option (see below).
- It does not prevent the growth of anaerobic bacteria.

Vacuum Packing Method

A vacuum sealing machine is required. You place food in a plastic film package and then use the machine to remove the air and seal the packaging.

MODIFIED ATMOSPHERE



What is modified atmosphere packing?

MAP is a technique to extend the shelf life of fresh and minimally processed foods. This process often removes oxygen from inside the packaging and replaces it with a specific gas composition. MAP is used in a wide variety of products and the gas mixture used is selected and influenced by many factors. Such as the storage temperature, the type of product and the packaging material.

What are the pros?

- MAP packaging can increase the shelf life of meat from 3 to 21 days, cheese from 7 to 180 days, and fresh pasta from 3 to 60 days.
- Provides a high quality product.

What is usually modified atmosphere packed?

Most foods can be packed in a modified atmosphere. It is most frequently used for packaging meat, fish and other seafood, ready-meals but also vegetables, chips and dairy products can have a MAP.

What are the cons?

- Although MAP limits the growth of spoilage microbes, it does not slow the growth of some harmful bacteria. For this reason, MAP is usually used combined with other preservation techniques such as refrigeration.
- Once these food packages are open, the food has a normal shelf life.
- Added costs for gases, packaging materials and equipment.

MAP Method

A MAP packaging machine is required. There are different gas formulations for each product type (specific combinations of CO₂, N₂ & O₂). Expert advice should be gained before trying this.

Once food has been MAP packaged, it must be cold stored.

**BLANCHING**

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- <https://www.safefoodfactory.com/en/knowledge/25-pasteuriseren-steriliseren-uht-en/>
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PRESERVATIVES

- **UK:** <https://www.food.gov.uk/business-guidance/approved-additives-and-e-numbers>
- **Belgium:** <https://www.favv-afsca.be/professionelen/levensmiddelen/additieven/>
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PRESERVATION METHODS

There are lots of different ways to preserve food. This guide talks through the different preservation methods and the foods you can preserve.

