

Why do we preserve foods?

There are many reasons why we may choose to preserve food. Following are some of the main reasons:

Extend shelf life

Effective food preservation delays the deterioration of food by changing the raw ingredients of foods into more stable forms that can be stored for longer periods of time. Although today we have access to fruit and vegetables all year round as well as an extensive variety of foods in supermarkets, preserving foods is a great way of extending the shelf life of foods bought from a supermarket as well as extending the shelf life of foods that you have grown/produced yourself. As an example, raw meat should be kept at room temperature for a maximum of two hours (as beyond this it is subject to microbial contamination) or in a refrigerator for 3-5 days. If the same meat is stored in a jar and processed in a pressure canner, it can last for several years. In regard to home grown/produced products, if excess produce is turned into jams, jellies, chutneys, sauces, pickles, and bottled fruit, it will last through the winter months when less fresh produce becomes available.

Convenience

Food preservation allows foods to be available anywhere and at any time of the year. Preserving foods also allows foods to be available when you need them, preventing the need for last minute dashes to a local supermarket. Foods may also be prepared in a more convenient ready-to-use form.



Preserving foods is a great way of extending the shelf life of foods bought from a supermarket as well as extending the shelf life of foods that you have grown/produced yourself.

To retain nutrients

Eating a balanced diet provides us with all the vitamins and minerals we require as well as the right amount of the macronutrients - carbohydrate, fat and protein. While foods may be a plentiful source of nutrients, in many instances the nutrients in a food begin to decline as soon as it has been produced. In respect of fruit and vegetables, the nutritional value begins to decline as soon as a particular fruit and vegetable has been picked, so the less time taken to eat them, the more nutrients will be retained.

To reduce food waste and allow portion control

Preserving foods that you have harvested/produced that are in excess of your/your family's needs is an important way of preventing food wastage. Also, preserving leftover food is a good way of exercising portion control preventing the temptation to overeat when foods are in front of you.

Allows you to produce homemade gifts for friends and family

The recent interest in all things “homemade” is bringing about a (welcome) resurgence of appreciation for making things yourself – the good news – you can make the preserves you buy from the supermarket. The even better news, they won't include preservatives or nasty “numbers”, you will be able to make them for a fraction of the price, you can reuse old jars and bottles, they will taste better, you'll probably have enough left over to share with friends, plus you get the added satisfaction that you have made them yourself. There is nothing like the fun and rewards of harvesting fresh, juicy fruit from your own garden. If you garden organically you can be certain your produce is nutritious and chemical-free.

Start a business

The value of your preserved foods may also go beyond how much your family might need and use or for gifts, and you may go on to consider selling preserves/creating a small business, providing opportunities for an industrial scale niche business. These aspects are covered in the last lesson.

The water soluble vitamins in fruit and vegetables such as vitamin C, thiamine and folic acid are particularly likely to be destroyed during incorrect/lengthy storage. These vitamins are lost through factors such as exposure to heat, light, air, alkalinity and water. Freezing fruits and vegetables is a great way of preserving nutrients, and in fact, if these foods are frozen soon after harvest, they may be more nutritious than the same foods bought fresh from a supermarket/grocer/market. Tips to freeze fruits and vegetables are highlighted in lesson 4. Remember also that some fruits and vegetables should be blanched before freezing to stop enzymatic changes that destroy vitamins.

Another important aspect of nutrition is that some preservation techniques and recipes provide you with opportunities to decide on how much salt, sugar and other additives you want to add to food (compared to buying the same product from the supermarket which already has salt, sugar and additives added to it). This can help where you are trying to cater for different dietary requirements such as diabetes.

To make food taste better

Preserving foods can introduce new flavours and textures to foods improving palatability e.g. through your food preservation efforts you may develop a new taste for smoked food or for chutneys and preserves, even where you are less keen on eating the fresh ingredients. Preserving fresh seasonable and locally produced food can also allow you to enjoy the improved taste of these foods at any time of the year.

LEARN MORE >>>

Suggested Tasks

Conduct an internet search to see which fruits and vegetables should be blanched before freezing to preserve vitamins.

Try searching using phrases such as “list of vegetables and fruits to blanch before freezing”, “which vegetables and fruits must be blanched before freezing?”, or similar.

Make notes.

Overview of food preservation

There are 5 main methods of food preservation, each method is described in much greater detail in subsequent lessons but here is a brief overview:

1. **Canning** - this method of food preservation involves placing foods into a jar or can and heating foods to a temperature where microbes are destroyed and enzymes are inactivated. Canning food involves removing air from the container forming a vacuum seal.



Jams, jellies, pickles, chutneys, and sauces are popular ways to preserve produce.

2. **Pickling** - this method of food preservation involves the production of acid from foods via the process of fermentation or involves placing foods into brine (a high salt solution) or into vinegar which is too acidic for microorganisms to grow.
3. **The production of jams and jellies** - to produce jams and jellies sugar is added to foods making it difficult for microbes to grow. Fruits are also cooked in their production which also inhibits microbial growth
4. **Freezing foods** – this method of food preservation involves placing food in an environment which is too cold for microbes to grow. Freezing food places them in temperatures below zero degrees Fahrenheit (-18 degrees Celsius) which inhibits microbial growth and allows for longer term food storage, while refrigerating foods places them at temperatures below 40 degrees Fahrenheit (5 degrees Celsius) which slows down the rate of microbial growth prolonging the shelf life of food for a more limited period of time
5. **Drying foods** - drying foods is one of the most ancient methods of preserving food. Drying was traditionally achieved by using sunlight or wind to remove the moisture from foods and stop microbial growth. Current day applications use heat, vacuum drying (which pulls the water out of food), osmotic drying and freeze drying.

Choosing a food preservation method

When you come to choose a method of food preservation your choice will depend on a number of factors (covered below) from the type of food you are preserving, the equipment you have access to or costs of equipment you would need to buy, the recipes you have accumulated from this course and other resources, the anticipated quality of the product after preserving it and how long you would like to store a preserved product.

Type of food

Different foods lend themselves to different methods of food preservation and storage. Some foods are suited to storage at room temperature such as dry pasta, cereal, bread and flour, while other foods are most suited to cold storage such as milk and dairy products, eggs, meat and cooked foods.

When choosing any food preservation technique it is important to consider the end product. Some foods are best eaten fresh and do not tolerate food preservation techniques at all or the end product is compromised.

When selecting food to preserve, always aim to select high quality products. For example, when choosing fruit and vegetables, pick products that are at the best stage of maturity i.e. do not pick under-ripe fruit or immature vegetables and discard fruit and vegetables that show any sign of disease.



Dried Chorizo can be kept in the pantry for 4-6 weeks and up to 6 months in the refrigerator.

Equipment

The equipment required for some methods of food preservation can be a major financial investment. Equipment you may consider purchasing could range from jars and containers of various sizes, to expensive pressure canners and dehydrators.

Also added to the costs of the equipment are the costs of utilities such as electricity, gas and water as well as the added cost of labour - that is your own time as well as the time of any other people involved.

LEARN MORE >>>

Suggested Tasks

Think about what food you may be able to dry without expensive equipment.

Write a list and refer back to it later in the course when we discuss drying to see if your thoughts were accurate.

Workspace

The amount of workspace available to you will also impact upon your choice of food preservation. For example if you live in a large house with lots of storage space or outbuildings you will have more space to store bottles, jars, or other equipment than if you live in a small apartment.

Recipes

Aim initially to follow recipes as they have been written. Recipes should have been tested to ensure a food is safe and does not spoil during storage. Although some recipes may be amenable to small changes such as changing the levels of sugar and salt, bigger changes may have food safety consequences e.g. changing the amount of vinegar in a recipe reduces its acidity and increases the risk of microbial contamination.

Follow food safety guidelines

An ability to follow strict health and safety guidelines is essential to the health of anyone who consumes your preserved foods. Some foods have stricter hygiene and safety requirements than others e.g. the requirements around canning foods are particularly strict to prevent diseases such as Botulism (described in the next lesson and later in this course). Be honest with yourself regarding your ability to follow hygiene and safety guidelines, if you feel unable to meet the guidelines of a particular preservation method choose another safer way of preserving foods.

Length of anticipated storage

This is another key consideration in your choice of food preservation. For example, if you are wishing to store foods for extended periods of time, you may consider a technique such as canning as some canned foods can be stored safely for several years. In contrast frozen foods may be stored for between 6-9 months and refrigerated foods for under a week.

Note: more exact information on refrigeration and freezing foods is provided in lesson 4.

The remaining lessons of this course will give much more guidance regarding the different methods of food preservation which will help you to choose specific preservation techniques. Overall your choice will depend on weighing up the relative advantages and disadvantages of each technique as well as reflecting your own preferences and sense of enjoyment.

REVIEW WHAT YOU HAVE BEEN LEARNING

**»CLICK HERE«
TO ACCESS
LESSON REVIEW
QUESTIONS!**

Clicking this link will take you to our online site to do your lesson review questions. Once logged in, click on 'courses' up the top right then click the name of this course (in case you have purchased more than one course). Once you do this, click on 'lesson review questions' and this will give you access to your lesson review questions.

You will be able to re-sit review questions at any time and all attempts and results will be recorded as a printable transcript along with your certificate once you receive a pass (60% or more) on the final exam.

Note: You must be on a device with a connection to the internet when doing this for it to work.

LESSON 2 HOW FOOD DETERIORATES AND BECOMES UNSAFE



Bread becomes spoiled due to the presence of fungal spores in the grains used to produce bread.

Food spoilage

Food spoilage may be defined as undesirable changes taking place in food which makes food unfit/unacceptable for human consumption.

Food spoilage affects the way foods look e.g. the colour of food, the way foods smell, and the texture and consistency of foods. Food spoilage can

also lower the nutritional value of food and make food unfit for consumption due to the creation of toxins in food. It is estimated that around a third of manufactured foods is lost to food spoilage. Most households are also affected by food spoilage e.g. the development of sour milk, stale bread, mouldy cheese and soft fruit.

Different foods are subject to different types and methods of food spoilage

Food Microbiology

Food microbiology is the study of the microorganisms which inhabit food. These microorganisms can have beneficial or detrimental effects on food. The beneficial effects of microorganisms have been utilised in the food industry where they help provide taste and texture to food, including the use of microorganisms to produce bread, cheese, vinegar, beer and wine. A great example is the specially cultured moulds that are used in the production of specialty cheese – forming the coloured veins in blue and gorgonzola cheese, and the edible rinds on brie and camembert cheese.

On a negative side microorganisms can cause food-borne illnesses and food spoilage. The main types of microorganisms present in food are bacteria and fungi. Moulds are the most common microorganisms which cause food spoilage. Moulds are microscopic fungi which consist of filaments of cells which join together forming a network within foods. Moulds develop most rapidly in damp humid conditions. Moulds are generally not harmful to the consumer although a small portion of moulds are capable of producing toxins which are hazardous to health. Moulds can, however, affect the sight and texture of foods causing a fluffy growth on food which is typically coloured white, grey, yellow or blue depending on the type of mould.

Yeasts are another type of fungi which cause foods to spoil. This time food spoilage is caused by the ability of yeast to act on foods such as fruit juices and syrups and cause fermentation. Foods that are most effected by yeast

e.g. bread becomes spoiled due to the presence of fungal spores in the grains used to produce bread. Milk and dairy products sour due to effect of bacteria (lactobacillus and streptococcal bacteria) which survive the pasteurisation of milk, while meat becomes spoiled due to being stored at incorrect temperatures or being contaminated by bacteria on cutting boards and other equipment. Foods can be categorised according to the rate of food spoilage e.g. eggs, fruit and vegetables, milk and meat are categorised as being highly perishable, while potatoes and nuts are semi perishable and dry beans, flour and rice are stable foods (non-perishable).

Food spoilage can be due to insect damage, physical damage such as from bruising fruit and vegetables or damage caused by freezing foods. Food spoilage also results from the growth and multiplication of microorganisms and from the action of enzymes.



Whilst it is usually recommended to not eat mouldy food, some specially cultured moulds are used to produce specialty cheeses, such as gorgonzola, blue, brie, and camembert.

LEARN MORE >>>

Suggested Tasks

Draw up a table with four columns and label them as follows - food item, highly perishable, semi-perishable and non-perishable.

Now, take a look around your pantry, freezer and refrigerator. Record the name of each food item in your table and mark a cross or tick in the corresponding perishability column.

fermentation include fruit juices, honey, jams and jellies. Bacteria also cause food to spoil e.g. lactobacillus and lactococcus bacteria cause milk to sour, while some bacteria are also pathogenic causing disease

Microbes and the causes of food spoilage

We have noted some of the microbes which cause food spoilage. Food spoilage from these microorganisms is dependent on the ability of these microbes to grow and multiply. This is in turn affected by a range of factors such as water, pH, oxygen and temperature as well the physical structure of the food itself. Foods that spoil most rapidly are those that are moist, of neutral pH, are unrefrigerated, and ground or sliced. In contrast dry, acidic and refrigerated foods are more resistant to spoilage. Following we discuss how these factors affect food spoilage.

pH

pH is a measure of how acidic or alkaline something is. Environments that are acidic have a pH below 7 and environments that are alkaline have a pH over 7. Microorganisms tend to thrive at a neutral pH of between 6.6 and 7.5 whereas most bacteria are inhibited at a pH below 4, although yeast and moulds can tolerate lower pH levels.

Water

Water is an important constituent of all foods and even relatively dry foods such as bread and cheese contain over 35% water. Generally lack of water inhibits microbial growth. Bacteria in particular

are unable to grow and multiply in dry environments. This is why drier foods are most likely to be spoiled by yeast and mould which can survive in slightly drier environments. Availability of water is affected by drying foods and by adding salt or sugar to foods



Two methods to reduce food spoilage are to keep food covered, and to store in a refrigerator below 5°C, or freezer below -18°C.

Oxygen

Oxygen can cause food spoilage by enhancing the action of food spoilage microorganisms as most microorganisms require oxygen to