

point of being crisp, while meat, fish and poultry must be sliced thinly and placed in an oven set to approximately 180°F (82°C) for around 12 hours. Oven drying may be most economical for people preserving only small amounts of food as it only requires you to use an oven that you will have already. Its disadvantages include the fact that it may not allow much flexibility to control lower temperatures and also because oven drying foods takes longer than drying foods in a dehydrator. This also becomes an extra expense when you consider the electricity that is used during the drying process.

Drying Food in a Dehydrator



Dehydrators are electrical appliances used to dry food indoors.

Dehydrators are electrical appliances used to dry food indoors. Dehydrators provide heat through an electric element and air circulation by vents. Dehydrators can be a very effective way of drying foods as they allow food to be dried much more rapidly and also to be dried at optimum temperatures. Their main disadvantages are that

there is an initial economic outlay to purchase a dehydrator and this may not be cost effective if you only have a limited amount of foods to preserve. Dehydrators must also be stored when not in use, which can be an issue where storage space is limited.

There are two main types of dehydrators:

1. Horizontal air flow dehydrators where the heating element and vents are situated on the side of the dehydrator. This method allows many foods to be dried at the same time as it reduces the transfer of flavours between foods
2. Vertical air flow dehydrators where the heating element and vents are situated on the base of the dehydrator. This method is suitable for drying batches of the same food but is less suitable for drying mixed batches of food where flavours can mix.

Time is a crucial point to consider whichever type of dehydrator you plan to use. There are many factors affecting the drying time of foods. These factors include the water content of the food to be dried as well as its size, shape and sugar content; factors related to the particular dehydrator used e.g. the amount of air circulation around the food; and the level of humidity and air temperature. It is important to follow specific guidelines for particular foods. For example, setting the temperature of your dehydrator at temperatures that are too low can make the food more prone to microorganisms, while high temperatures cause foods to cook/dry unevenly. Always refer to the operating instructions for your dehydrator for more specific guidance.

Drying methods for selected produce

Drying Fruit

Fruit can adapt well to the process of drying and dried fruit have a range of uses - from being a delicious snack food to making a tasty desert or addition to cereals such as muesli. Dried fruit may be eaten directly in their dried state, pureed and dried as fruit leather or dried and later soaked in water to rehydrate and then perhaps stewed as a pudding. Fruits that adapt particularly well to being dried include berries such as strawberries and blueberries, bananas (sliced and dried for a longer time to remove the majority of water to create crunchy banana chips, or left whole to create a chewy snack), plums (prunes) and grapes (raisins). Dried fruit is best stored in airtight containers at room temperature in a dark cupboard or pantry.

General considerations when drying fruit:

- Choose fruit of similar size and shape, or slice fruit into equal sizes.
- Select fresh ripe fruits - not under-ripe as they can lack flavour, or overripe which can be tough or mushy. Also only choose fruit that shows no signs of mould / decay.
- Wash fruit thoroughly to remove dirt and microorganisms.
- Many fruits are best peeled and sliced into thin, uniform pieces for drying.

- Lightly coloured fruits require you to take special precautions as otherwise these fruits will darken in the drying process. To pre-treat these fruit you can soak them for a couple of minutes in a fruit juice high in vitamin C such as orange or lemon juice, or dip in a sugar/ honey solution.



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Fruit leathers

Fruit leathers taste great and are an excellent method of preserving excess fruits. Fruit leathers are basically pureed fruits which are spread out and dried then rolled up / shaped to store.

Ingredients:

- Fresh fruit such as peaches, plums, berries, apples and grapes
- Water

- Lemon juice
- Sugar – this is optional and you may wish to reduce the amount used for health considerations
- Spices - again optional but spices such as cinnamon and nutmeg can add flavour

Method:

- Wash fruit, peel those with skins and remove seeds and stems.
- Place food in a saucepan add water simmer for 10-15 minutes or until fruit is cooked through then use a masher to mash up fruit.
- Taste fruit and use your judgment as to whether the fruit mixture would benefit from the addition of sugar, lemon juice or spices.
- Puree fruits with a blender to create a smooth puree, then taste again to check sweetness/spice mix- adjust if necessary. Experiment with different combinations of fruit and different spice mixes to find those you particularly like.
- Line a baking tray with lightly oiled greaseproof paper and pour your fruit puree onto the baking tray to a thickness of approximately 5mm.
- Put your fruit puree into an oven preheated to around 50°C and put in the oven for around 12 hours until the puree feels leathery and dry to touch - not sticky or tacky.
- Peel the fruit leather from the baking tray and shape or roll it and store in an airtight container.

Drying Vegetables

Vegetables can also be dried effectively although they are harder to dehydrate than fruits. Drying can in fact be used for virtually any type of vegetable to make your own soup powder (for instant soup), to preserve tomatoes, peppers or anything else to add to stews or casseroles, or to preserve tomato paste for spaghetti sauce, etc. Drying works particularly well for vegetables such as peas, potato, sweet-corn, peppers and beans. You can also create vegetable crisps out of coarse leafy greens such as Kale. When drying vegetables it is important not to over dry vegetables as this will reduce the quality of the production.

General considerations when drying vegetables:

- Dry food as soon as possible after they have been harvested.
- Wash vegetables and cut into uniform pieces.
- Blanch vegetables to inactivate enzymes blanching also helps to stabilize the colour of vegetables. The blanching of vegetables has been described previously. Typically blanching is achieved by placing vegetables in boiling water for around 3-5 minutes.
- Dry in an oven or dehydrator (not in the sun) in single layers until crisp.
- Store dried vegetables in sealed water proof containers. Stored dried vegetables will usually keep for between 6 and 12 months.

- To use dried vegetables soak in water first and then place in a saucepan and cover with hot water and simmer until tender, or eat as vegetable crisps.

Drying Herbs

Anyone can dry herbs. All you need is a cool, preferably dark, reasonably well ventilated room. Your harvest is simply tied in bunches and hung upside down from the roof (or even curtain rods). Don't do this in a room which will steam up (i.e. avoid kitchens and bathrooms), and try to find a relatively dark place (NB. Direct sunlight can

reduce oil content). In very humid climates bunches may not dry as well and may develop fungal growths. To minimize such problems be sure to use a well-ventilated room (a fan may be helpful), make small bunches and allow room for air to move between bunches. You can, of course, also dry herbs in a dehydrator.

After drying, foliage can be stripped and either used or stored in sealed, dry containers. Roots (and sometimes other parts) are often ground into a powder after drying. Containers should be labelled with the name of the plant and when it was harvested to avoid any confusion.



Herbs can be dried in a cool, dark, ventilated room, or in a dehydrator.

Drying Meat

Drying is an effective method to preserve meat for long periods of time. This process is used to produce Jerky - a lightweight dried meat made from lean meat such as beef and pork. In traditional meat preservation animal carcasses were hung over tree branches to dry in the sun. Although sun drying may still be used there is a much higher risk of microbial contamination and so today it is generally preferable to dry meat in an oven or dehydrator.

General recommendations for drying meat:

- Cut meat into thin slices to speed up the drying process.
- Choose lean meats/trim of excess fat. This is important as although the drying process preserves the meat itself it cannot stop the deterioration of fatty tissue around meat which could otherwise become rancid.
- Place meat on racks in a dehydrator or oven that is preheated to around 140°F (60°C) and dry for anywhere between 12 and 24 hours until a strip of meat cracks but does not break when it is bent in half.
- Try marinating meat before drying it as marinades can enhance the flavour of meat and make it tenderer.

Ensure you handle raw meat correctly as they may become contaminated. To do this follow basic hygiene procedures i.e. wash hands thoroughly, clean and disinfect surfaces, equipment and utensils. Keep raw meat and poultry refrigerated before it is dried.

General tips with drying foods - a summary

- Dry foods as quickly as possible but without baking the product - foods will have an optimum temperature for dehydration - high enough to evaporate moisture from food but not high enough to cause foods to cook. The optimum temperature at which foods should be dried is 60 – 70°C. Food should never be dried at high temperatures as this tends to cook the food and although these foods may appear dry on the hard outside surface they may be soft inside.
- Ensure you provide optimal humidity and air flow around foods that are being dried. Low humidity and good air flow helps speed up the drying process.
- Don't stop the drying process once it has started as microorganisms can start to grow and reproduce in partially dried foods as while the outside layer of foods may have been sealed the inside retains moisture which leads to growth of mould. Also do not dry food that has already been partially dried and left for any reason.
- Dry foods uniformly - cut into uniform size/shape pieces, move foods around periodically in the oven or on the rack of a dryer. This is important as the heat distribution will be different across the oven/ rack.



Dry food in uniform size and shaped pieces.

- Once dried, foods should be stored in moisture proof containers or jars in a cool, dark and dry place.
- Process foods to be dried as soon as possible after processing/ harvesting.
- Make sure that air moves freely around the ventilator. This avoids moisture laden air being trapped around the ventilator thereby stopping the dehydration process.
- Stir the food regularly and move the drying racks in the dryer or oven.
- Experiment to get the best possible results for your conditions.

CHAPTER 9 FERMENTATION

Fermentation involves the conversion of carbohydrates (sugars) into carbon dioxide and alcohol using yeast or bacteria. Fermented foods are foods or ingredients that are formed by the action of microbes. Foods formed by fermentation reactions include products formed from milk such as

cheese, yoghurt and sour cream which are produced by lactic acid bacteria; fermented sausage and hams which may be produced by lactic acid bacteria and mould; and wine, beer and spirits which are produced through the addition of yeast.



Food fermentation has a number of advantages including the fact that it can:

- Extend the shelf life of foods due to the production of acids which retard microorganisms
- Improve the nutritional benefits of a food by producing vitamins and breaking down indigestible materials so that nutrients can be released.
- Improve the texture and flavour of foods by producing compounds such as alcohol.

Fermentation reactions that are used to produce foods may occur naturally or may be artificially controlled. In natural fermentation you need to create conditions that allow favourable fermentation reactions to take place while inhibiting undesirable fermentation. This type of fermentation exploits the microorganisms that are naturally occurring in a food.

Natural fermentation reactions have been exploited for thousands of years to a time before humans understood the microorganisms involved e.g. people