HOW TO DEHYDRATE FOODS

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What is food drying?

Food drying, also called food dehydration, is the process of removing water from food, thus inhibiting the growth of microorganisms (enzymes) and bacteria by the circulation of hot, dry air through the food. Removing water from food is the easiest, cheapest, and, in my opinion, the most appropriate method of food preservation.

Will I have a lot to learn before I can start drying food?

No, food drying is not difficult. It means less work, not more. And the benefits are many. Your dehydrator heats the air inside the unit; it dries and circulates the air so that it absorbs the water in the food placed in the drying chamber. The temperature of the air is low enough to dry the food, not cook it. It is as simple as that.

What are the benefits of food drying?

Many. Here are some:
1) You will save money. Keep in mind that food drying is a one-time cost. Canned foods, once opened, must be used promptly, but containers of dried foods can be repeatedly opened, ingredients removed or added, and closed again with no deleterious effects on the contents.
2) You will be able to reap the rewards of your own garden and of both locally grown and regionally grown produce, because you can keep up with abundant seasonal harvests. There is a movement now away from the importation of foodstuffs, not so much because of safety considerations but because of an increasing awareness of the importance of self-sufficiency when it comes to one's own food supply.
3) You will be able to feed family and friends safer, pesticide-and chemical-free foods because you control what you are drying.
4) You can create a food supply which, in a financial crisis or when a natural disaster strikes, can be like money in the bank.
5) You will be able to take advantage of supermarket specials and the savings they offer. Food drying is a form of creative recycling. In drying your own foods, you are cutting down on packaging; wait until you see how little storage space you will need. You can store 20 to 25 dried bell peppers in a 1-quart jar; 16 to 20 dried tomatoes in a 1-quart jar.
6) What I like best about incorporating dried foods into my diet is that it allows me to control the quality of the food I eat whether I am at home or backpacking in the wilderness. Dried foods are tasty, nutritious, lightweight, easy to prepare, easy to carry, and easy to use.

What does dehydrated food look like?

Many foods are a little darker in color, more fragrant, and sweeter in taste. Do not expect food dried at home to look or taste like commercially dried food. In my opinion, home-dried is much better. Much industrial food drying uses additives and preservatives that the home food dryer does not need to and-more important-want to add.

Does drying affect the nutritional value of foods?

Dehydration only minimally affects the nutritional value of foods, especially when the process takes place in your own home. Most research on the nutritional value of dried foods has been conducted on foods that are commercially dried. When you dry foods at home under gentle conditions (correct temperature and a reasonable amount of drying time), you produce a high-quality product. Compared with canning and freezing, both of which involve extreme temperatures, food drying is the least damaging form of food preservation.
Here are some specifics:

Vitamin A is retained during the drying process. Because vitamin A is light sensitive, foods that contain it-like carrots, bell peppers, mangoes-should be stored in a dark place.

Some vitamin C is lost during the drying process because vitamin C is an air-soluble nutrient and food drying is an air-based process. When a food is sliced and its cells are cut, the surfaces that are exposed to air lose some vitamin C content.

The caloric value of a fresh food stays the same when it is dried, although some dried foods, fruits for example, taste sweeter because the water has been removed and the sugar is concentrated.

Dried fruits and vegetables are high in fiber and carbohydrates, neither of which is affected by drying.

Dried fruits and vegetables are naturally low in fat. Minerals available in certain fresh fruits-such as potassium, sodium, magnesium, and so on-are also not altered when the fruit is dried.
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How safe to eat is dried food?

In comparison with foods preserved by other methods, like canning, it is quite safe. Botulism is feared in canning because the bacteria that cause it thrive in a liquid environment. Botulism could only occur with a dried food that had been rehydrated, then left unattended long enough for bacteria to grow.

Mold may form on dried food if it was not dehydrated long enough or if the container it was stored in had moisture in it. If you see or smell mold, all the food in that container must be discarded.

Remember that the organisms that cause food spoilage, mold, yeast, bacteria-are always present in the air, water, and soil. It is important to observe sanitary precautions at all stages of the drying process.

As to the safety of drying meats, the latest word from food-science researchers at the University of Wisconsin in Madison is that microorganisms are effectively killed when the internal temperature of meat reaches 145°F for 45 minutes; or 167°F for 20 minutes; or 200°F for 15 minutes. This means that the internal temperature of the meat must remain steady for the designated amount of time, which is not the same as putting meat in a 200°F oven for 15 minutes. If your food dehydrator does not reach a temperature of 145°F or if its temperature control is inaccurate, then transfer the food to a preheated 200°F oven for a minimum of 20 minutes to eliminate safety concerns.

You can also store dried food in the freezer, another form of ensuring its safety.

What equipment is needed?

In addition to your food dehydrator, of course, you will need:

- A good sharp knife
- A spatula or two
- Several heavy-bottomed saucepans
- A blender for pureeing and chopping
- A strainer
- Steamer trays

Nice to have on hand and very helpful, but not mandatory are:

- A cherry pitter
- An apple parer-slicer-corer
- A corn kernel cutter
- A pea and bean sheller
- A bean Frencher
- A mortar and pestle
- A salad spinner (for pre-drying herbs and flowers and for washing greens)
- A food processor with a shredding disk
- A Salad Shooter for slicing potatoes

But what is *really necessary?* **A good sharp knife.**

Is it necessary to pretreat foods before drying them?

Pretreatment is not necessary for successful drying, but it can enhance the color, flavor, and texture of certain foods.

Pretreatment options include dipping, blanching, marinating, and sulfuring.

Pretreatment affects the enzymes, a group of special proteins that cause chemical reactions-ripening and eventual spoilage-and determine the color, texture, flavor, and aroma of certain foods. The microorganisms that cause spoilage need moisture to live and reproduce. Drying foods above 140°F halts enzyme activity.

Foods also contain simple yeasts, molds, and bacteria, all of which can cause deterioration. Again, reducing the moisture content of food inhibits their growth. When dried, vegetables contain only about 3 percent moisture, and fruits, depending upon sugar content, up to 15 percent water.

For an in-depth discussion of pretreatment methods for fruits and vegetables, see pages 33-37.

What is sulfuring?

In the most simple definition, sulfuring helps to preserve the color of some dried foods, like apricots. Fumes from burning sulfur or gaseous sulfur dioxide penetrate the surfaces of foods before they are dried. I do not sulfur the foods I dry. I do not believe that it is necessary when drying foods in an electric food dehydrator. Sulfuring is mainly used as a pretreatment when foods are dried out-of-doors.

What foods can be dried?

You can dry fruits, vegetables, meats, fish, herbs, flowers, and much more, including frozen and canned foods.

In fact, you can dry almost anything that contains water-items you may never have considered, such as tofu. Here are some other ideas that will keep your dehydrator in constant use:

Use it to revive limp potato chips or soggy popcorn.

Dry leftover bread to make crumbs and croutons.

Instead of draping homemade noodles to dry all over the kitchen and dining room, dry them in your dehydrator.

Make your own bagel chips by seasoning thinly sliced bagels with garlic, onion powder, or cinnamon sugar, then drying them until crisp in your dehydrator.

How long does it take to dry food?

This is the question I am asked most frequently and it is the hardest one to answer because many factors affect drying time:
- The water content in the food
- The sugar content in the food
- The size of the piece of food
- The amount of air circulation when the food is dried
- The level of humidity in the air entering the dehydrator
- The air temperature inside the dehydrator.
- Last and most important, the type of dehydrator you are using will affect the time needed to dry food.

The lower the air temperature inside the dehydrator, the longer the drying time. Raising the temperature in the unit will increase the amount of water removed from the food and decrease the length of time it will take to dry. The temperature should be high enough to draw the moisture from the food but not high enough to cook it. Temperatures that are too low may cause food to spoil; temperatures that are too high may cause the surface area of the food to harden and prevent moisture from escaping.

The three food categories -meats and fish, fruits and vegetables, and herbs- require different drying temperatures:

- Meats and Fish: 145°F and above
- Fruits and Vegetables: 130°F to 140°F
- Herbs and flowers: 100°F to 110°F

Will flavors mingle if I dry different foods at the same time?

I am often asked this question. In my experience, the answer is no, although I do not recommend drying pears and onions at the same time! If you combine foods that are in the same category -fruits with other fruits, vegetables with other vegetables- each retains its own flavor.

How can you know when foods are dry?

The best way of finding out if a food is dry is to touch it. It will feel sticky, moist, leathery, or hard. When touching foods for dryness, remember that they feel softer when they are warm. Therefore, always let the foods cool for a few moments -either turn off the dehydrator or remove the drying tray. If you are not sure if an item is sufficiently dry, it is better to overdry it somewhat than to underdry it. However, know that foods that are overdried in some dehydrators may turn brown and become brittle.

If you are concerned about the safety of a dried food, you can freeze it. The freezer will keep frozen any water remaining in the food, thus preventing spoilage. You can freeze dried foods at any stage of the drying process. A woman I once met at a home show told me that she only half-dries her mushrooms because she likes how quickly they rehydrate.

How do you store dried foods?

Moisture is the enemy of dried foods. Dried foods exposed to the air absorb the moisture in the air and become limp.

Always store dried foods in airtight containers and label the contents. Store the containers in a dry, dark place with a moderate temperature. Your kitchen cupboard is an ideal spot. After all, dried foods take up so much less space than fresh or canned ones that it is easy to keep them in a handy place.

Remember to store any dried food containing vitamin A away from direct light.

Here is how I store certain items: I always keep some dried tomatoes in the refrigerator. When I want to make spaghetti sauce, I retrieve the tomatoes from the fridge, take my dried herbs from the cupboard, and collect my dried peppers and onions from the pantry.

Economies of scale make all of this possible, and if you have a small kitchen, you will appreciate the extra space

gained simply by using dried foods.

When storing dried foods, contamination from insects may occur. The only insect I have ever found to be a problem is the Indian meal moth, in both the worm and adult stages. A University of Wisconsin food researcher told me that the food may have been contaminated with the insect eggs already sealed in the jar.
To destroy the insects, pasteurize the food right after it has been dried. There are two ways to do this:

Place the food in the freezer for 48 hours, or

preheat your oven to 175 degrees F., or the lowest possible setting, and heat the infested food on a cookie sheet in the oven for 15 to 30 minutes. Let cool before rewrapping.

How long can dried foods be stored?

Dried foods will last from one season to the next. Dry garden tomatoes this year and replace them next year when fresh ones are again dropping from the vines. When fresh tomatoes have gone, I immediately start using dried ones. (And if I run out of dried tomatoes -what an awful thought!- I just promise myself to grow and dry more of them next year.)
For optimum quality, dried fruits and vegetables should be replaced annually. Herbs and flowers, once dried, last a very long time. And although our ancestors may have kept dried meats for long periods of time without benefit of refrigeration, I recommend storing dried meats in the refrigerator or freezer after one month at room temperature. Remember, many jerkies, with the exception of poultry jerkies, have not been cooked.
I repeat, I think it is a good idea to use dried foods within one year of drying them, just as you would canned and frozen foods. First of all, you will enjoy their quality year round by using them at their peak and replacing them when fresh foods are in season again. Second, and no less important, dried foods that have been squirreled away for too long lose their taste and tend to darken in color. Follow the rule of first in/first out and be sure to rotate the containers on the shelf so that you use the oldest dried foods first.

Is it possible to dry food in a microwave oven?

I have never attempted to dry food in a microwave oven. A food dehydrator is always my first choice. I have, however, heard of people who have dried herbs or flowers in a microwave. Before attempting either of those procedures, it is important to check the warranty of the microwave oven you own to see if the manufacturer recommends using it for these purposes. Some manufacturers do not and will not honor the warranty agreement if their machine breaks down when it has been used for this purpose.