

DEHYDRATING FOOD: AN EASY PROCESS FOR STORING AND USING WHAT YOU LOVE TO EAT

The following general information (pages 1-5 on this handout) about dehydrating is taken from <http://www.drystore.com/page/page/1346972.htm>. Please see Mary Bell's site for more information as this is but a few excerpts.

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, 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.

What are the benefits of food drying?

Many and 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-free 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.

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.

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.**

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

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 do you dehydrate food using your own oven?

*NOTE: This information is presented from the site http://www.ehow.com/how_4964887_dehydrate-food-oven.html. Please see the site for more information.

Drying food in an oven is one option for dehydration, but only if your oven will maintain temperatures of less than 200 degrees.

Begin by preparing food for dehydration just as you would using any other method including: washing, pitting/peeling, slicing and blanching (if needed). Arrange slices in a single layer on cookie sheets or racks.

Next, preheat oven to lowest temperature (about 140 degrees.) Your oven may not go that low but temperatures up to 170 degrees can be used. Prop the oven door open about two to three inches by putting a folded kitchen towel in the door. This will allow moisture to escape, air to circulate and prevent the oven from getting too hot if you can't set it to 140 degrees.

Dry fruit and vegetables for time shown in charts (see Resources.) Be sure to turn the food occasionally to allow for even drying. After the foods are dehydrated, use the same method of testing the food for lack of moisture and storage as any other method.

Tips and Warnings:

- Use leftover fruit from jelly making to make fruit leather. Put apples, berries, peaches, pears, or apricots in a blender and blend until smooth. You can use the fruits individually or mix and match. Add sugar, honey or agave nectar to taste (or leave it out all together for diabetics or others who don't want sugar/sweeteners.) Spread evenly on a cookie sheet to about 1/8 to 1/4 inches thick. Dry at 140 degrees until you can touch it in the center without leaving marks or indentations. This may take up to 18 hours in the oven. Remove from tray while still warm and pliable and lay a sheet of plastic wrap on top before rolling up.
- Since your oven will be on for up to several days, you should plan on being home during that time. Be careful with young children and curious pets. The open oven may be tempting; even at low temperatures, they can be burned.

YEAR-ROUND FOOD BUYING GUIDE

(Shared from [Preserve It Naturally](#) – Page 18)

JANUARY	FEBRUARY	MARCH	APRIL
Avocados Bananas Cabbage Cauliflower Mushrooms Pears Potatoes Turnips Winter Squash	Avocados Bananas Broccoli Cabbage Cauliflower Kumquats Mangoes Mushrooms Pears	Artichokes Asparagus Avocados Bananas Broccoli Kumquats Grapefruit Lettuce Mushrooms	Avocados Bananas Broccoli Cabbage Cauliflower Kumquats Mangoes Mushrooms Pears
MAY	JUNE	JULY	AUGUST
Asparagus Bananas Celery Papaya Peas Pineapple Potatoes Strawberries Tomatoes Watercress	Avocados Apricots Bananas Cantaloupe Cherries Corn Cucumbers Figs Green Beans Limes Mangoes Nectarines Onions Peaches Peas Peppers Pineapple Plums Summer Squash	Apricots Bananas Blueberries Cabbage Cantaloupe Cherries Corn Cucumbers Dill Eggplant Figs Gravenstein Apples Green Beans Nectarines Okra Peaches Peppers Prunes Watermelon	Apples Bananas Beets Berries (Seedless) Cabbage Carrots Corn Cucumbers Dill Eggplant Figs Melons Nectarines Peaches Peppers Plums Potatoes Summer Squash Tomatoes
SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Apples Bananas Broccoli Carrots Cauliflower Corn Cucumbers Dill Figs Grapes Greens Melons Okra Onions Pears Peppers Potatoes Summer Squash Tomatoes Yams	Apples Bananas Broccoli Grapes Peppers Persimmons Pumpkin Sweet Potatoes Yams	Apples Bananas Broccoli Cabbage Cauliflower Cranberries Dates Eggplant Mushrooms Pumpkin	Apples Avocados Bananas Grapefruit Lemons/Limes Mushrooms Oranges Pears Pineapple Tangerines

WEIGHT LOSS DUE TO DEHYDRATION
 (Shared from Preserve It Naturally – Page 19)

PRODUCE	AMOUNT PURCHASED OR PICKED IN POUNDS	POUNDS	PINTS
Apples	12	1-1/4	3
Beans, Lima	7	1-1/4	2
Beans, Snap	6	1/2	2-1/2
Beets	15	1-1/2	3-5
Broccoli	12	1-1/4 – 1-1/2	12-15
Carrots	15	1-1/4	2-4
Celery	12	3/4	3-4
Corn	18	2-1/2	4-5
Greens	3	1/4	5-1/2
Onions	12	1-1/2	Sliced 11-1/2 Shredded 4-1/2
Peaches	12	1 – 1-1/2	2-3
Pears	14	1-1/2	3
Peas	8	3/4	1
Pumpkin	11	3/4	3-1/2
Squash	10	3/4	5
Tomatoes	14	1/2	2-3

REHYDRATING DRIED FOODS
 (Shared from Dare To Prepare – Page 293)

FOOD	CUPS OF WATER TO ADD TO 1 CUP DRIED FOOD	MIN SOAKING TIME (HOURS)
<i>FRUIT – WATER IS AT ROOM TEMPERATURE</i>		
Apples	1-1/2	1/2
Peaches	2	1-1/2
Pears	1-1/2	1-1/2
<i>VEGETABLES – WATER IS BOILING</i>		
Asparagus	2-1/2	1-1/2
Beans, Lima	2-1/2	1-1/2
Beans, Green Snap	2-1/2	1
Beets	2-1/2	1-1/2
Carrots	2-1/2	1
Cabbage	3	1
Corn	2-1/2	1/2
Okra	3	1/2
Onions	2	1/2
Peas	2-1/2	1/2
Pumpkin	3	1
Squash	1-1/2	1
Sweet Potatoes	1-1/2	1/2
Turnip Greens & Other Greens	1	1/2

What kind of Dehydrator do you use?

I prefer the Excalibur line of Dehydrators. I love the company's reputation as well as outstanding warranties (mine has a 10 year warranty). I currently have the black, nine-tray 3900 model and I use it daily.

Why is a square-tray dehydrator better than a round-tray dehydrator?

In my opinion, the square-tray system uses the surface space to better advantage. More food can be placed on the each tray, thereby increasing the amount you can do per time you dehydrate. In this case, more is better!

What are some of your favorite foods to dehydrate?

I like doing a great variety of foods. However, some of my super favorites are: apples (either plain or with cinnamon/sugar), bananas, carrots, fish, jerkies, lemons/limes, oranges, pineapple, etc. I have yet to find a food that I don't like to dehydrate if I can do it well. ☺

Do you have a special method of choosing combinations of foods to keep flavors from mingling together?

I have yet to have any foods cross-share flavoring during dehydrating, but I like to follow a simple rule – DEHYDRATE LIKE KINDS OF FOODS TOGETHER. I like to dehydrate fruits with fruits, vegetables with vegetables and meats with meats. This way, I keep each food group safe within its recommended temperatures and times. I always take out one special time to do onions and garlic, though. I never do those with any other vegetables just in case.

Do you have a preferred method of preparing fruits/vegetables for the dehydrator (i.e. Sodium Bisulfate, Ascorbic Acid , lemon juice, etc)?

I prefer good ol' reliable lemon juice. I stock up on it when it is cheap, watch the expiration date and use it generously. I put it into a squirt bottle and use it full-strength on bananas. I like to cut apples a bushel at a time, so I use a large bowl and mix water and lemon juice half and half. As I cut the apples (or potatoes, bananas, pears, strawberries and apricots), I let them soak in the mixture until ready to put on the trays. I usually give them a final squirt from the full-strength bottle just for good measure.

For more questions, please contact Lily Herrmann at lilyloohoo@gmail.com. Best wishes and happy dehydrating!

Recommended Books For More Information:

Preserve It Naturally – Third Edition

*Can be purchased on the Excalibur Website at www.excalibur.com or on Amazon.com.

Mary Bell's Complete Dehydrator Cookbook: Everything You Need to Know to Make Delicious Dried Snacks, Jerkies, Fruit Leathers, Nutricious Meals, and Even Potpourri! (See her site online at www.drystore.com)

Just Jerky: The Complete Guide To Making It by Mary Bell

Dinner Is In The Jar by Kathy Clark – Buy this book at <http://www.dinnerisinthejar.com>

Mix-A-Meal Cookbook: Mixes & Recipes by Deanna Bean & Lorna Shute

Backpack Gourmet: Good Hot Grub You Can Make At Home, Dehydrate, and Pack for Quick, Easy, and Healthy Eating on the Trail by Linda Frederick Yaffe

Lipsmackin' Backpackin': Lightweight Trail-tested Recipes for Backcountry Trips by Christine Conners

Cookin' With Home Storage by Peggy Layton

Recommended Online Sites For More Information:

Dehydrating YouTube Videos and Information:

<http://www.dehydrate2store.com/>

Tammy has created a WONDERFUL site built to simplify and answer many questions about dehydrating. Click on the Videos tab for a several-part YouTube video series on the topic (I recommend beginners watch ALL the parts before dehydrating). Click on the Useful Tips link to see what she recommends. Click on the Recipes tab for great ways to use your already dehydrated foods. This site is a wonderful resource!

Make Your Own Solar Dehydrator From Cardboard Boxes:

Please visit <http://www.motherearthnews.com/Do-It-Yourself/1981-01-01/A-Solar-Food-Dryer-From-Cardboard-Boxes.aspx> for the instructions.

*NOTE: I have not tried this project at home. Should you decide to do, please email me and report your results. I would love to hear about it!

Build Your Own Solar Dehydrator:

A helpful article with ideas can be found at <http://www.motherearthnews.com/Do-It-Yourself/2006-08-01/Build-a-Solar-Food-Dehydrator.aspx>.

*NOTE: I have not built a solar dehydrator yet, but would love to hear about your experiences if you have.