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# DRYING

## FRUITS AND VEGETABLES

### FOOD PREPARATION

You need 3 things for successful home food drying:

**Heat** - high enough to force out moisture but not hot enough to cook the food

**Dry air** - to absorb the released moisture

**Air movement** - to carry the moisture away

Natural drying, outdoors, requires warm days of 90 degrees F (32 degrees C) or more, low humidity, and control of insects. Oven drying or using a food dehydrator are alternatives for small quantities of food. The energy cost of operating an oven is high, however, compared to the cost of operating an electric food dehydrator.

- Many fruits and vegetables can be dried (Table 1). Only ripe foods should be used.

**Table 1. Fruits and Vegetables Suitable For Drying**

Fruit	Vegetable
Apples	Snap Beans
Apricots	Beets
Bananas	Carrots
Cherries	Sweet Corn
Citrus Peel	Garlic
Coconuts	Horseradish
Figs	Mushrooms
Grapes	Okra
Nectarines	Onions
Peaches	Parsley
Pears	Peas
Pineapples	Hot and Sweet Peppers
Plums	Irish Potatoes
Rhubarb	Pumpkin
Tomatoes	

- Rinse fruits and vegetables under cold running water and cut away bruised and fibrous portions. Seeds, stems and /or pits should be removed.
- Most vegetables and some fruits benefit from a pretreatment like blanching or dipping. Blanching is used for most vegetables. Blanching shortens the drying time, prevents enzyme action, and kills many spoilage organisms.

Vegetables may be steam or water blanched as follows.

### Steps for steam blanching

- Use a steamer or deep pot containing a wire basket that extends at least 5 inches from bottom of the pot.
- Add two inches of water to the steamer or pot.
- Place basket with vegetables into pot (Vegetables should not make contact with water).
- Cover steamer or pot and steam until vegetables are heated for recommended time (Table 2).
- Remove basket with vegetables and place in cold water to stop cooking.
- Drain and place vegetables on drying tray.

### Steps for water blanching

- Use a blancher or deep pot with a tight-fitting lid.
- Add water to cover vegetables and bring to a boil.
- Boil (Blanch) for recommended time (Table 2).
- Remove vegetable and place in cold water to stop cooking.

Written By: Tim Roberts, Extension Specialist, Assistant Professor, Virginia Tech; Ruby H. Cox, Extension Specialist and Associate Professor, HNF, Virginia Tech



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VT/131/1198/SM/991876/348597



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**Table 2. Blanching and Drying Times For Selected Vegetables**

Vegetable	Blanching Time		Drying Time*	
	Method	Minutes	Method	Hours
<b>Broccoli</b>	Steam	3 – 3½	Sun	8 – 10
	Water	2	Oven	3 – 4½
<b>Snap Beans</b>	Steam	2 – 2½	Sun	8
	Water	2	Oven	3 - 6
<b>Beets</b>	Cook before drying		Sun	8 - 10
			Oven	3½ - 5
<b>Carrots</b>	Steam	3 - 3½	Sun	8
	Water	3½	Oven	3½ - 5
<b>Onions</b>	Not necessary		Sun	8 - 11
			Oven	3 – 6
<b>Peppers</b>	Not necessary		Sun	6 – 8
			Oven	2½ - 5
<b>Summer Squash</b>	Steam	2½ - 3	Sun	6 - 8
	Water	1½	Oven	4 - 6
<b>Winter Squash</b>	Steam	2½ - 3	Sun	6 - 8
	Water	1	Oven	4 - 5
<b>Tomatoes</b>	Steam	3	Sun	8 - 10

\* *Dried vegetables should be brittle or crisp.*

- Drain and place vegetables on drying tray.

**Dipping** is an alternative to blanching used to prevent **fruits** such as apples, bananas, peaches, and pears from turning brown. Lemon juice, ascorbic acid, or commercial products containing ascorbic or citric acid may be used for dipping. For instance, dipping sliced fruit pieces in 1 teaspoon of ascorbic acid crystals per cup of water or directly in lemon juice for three to five minutes will prevent browning.

## DRYING

### Natural Sun Drying

- Dry in the sun by placing slices of food on a clean tray with sides and covering with cheesecloth or fine netting.
- If possible, place a small fan near the drying tray to promote air circulation.
- Drying times will vary (Tables 2 and 3).

- Turn food once a day. Dry until the food has lost most of its moisture (vegetables will be brittle; fruits will be chewy).

**NOTE:** Sun drying is not recommended in cloudy or humid weather. The temperature should reach 90 degrees F by noon and the humidity should be less than 60 percent.

### Oven Drying

- Dry food in an oven that can be maintained at 140 degrees F or lowest setting. Leave door ajar 2 to 3 inches. Place a fan in front of the oven to blow air across the open door.
- Spread the food in a single layer on racks or cookie sheet. Check food often. Turn food over to dry more evenly.
- Drying time will vary (Tables 2 and 3). Do not leave oven on when no one is in the house.

**Table 3. Blanching and Drying Times For Selected Fruits**

Fruit	Blanching Time*		Drying Time**	
	Method	Minutes	Method***	Hours
Apple	Steam	5	Sun	36 – 48
			Oven	6 – 12
Apricots	Steam	3 – 4	Sun	24 – 36
	Water	4 – 5	Oven	24 – 36+
Figs	Not necessary		Sun	48 – 60
			Oven	12 – 20
Grapes: seedless	Not necessary		Sun	36 – 60
			Oven	12 – 20
Peaches	Steam	8	Sun	36 – 60
	Water	8	Oven	36 – 48+
Pears	Steam	6	Sun	60
	Water	8	Oven	24 – 36+

\* Fruits may be dipped in ascorbic acid or citric acid in place of blanching.

\*\* Test for dryness by cutting the fruit. There should be no moist areas in the center of the fruit.

\*\*\* A food dehydrator could be used in place of a range oven due to the extended drying times for most fruits.

+ Drying times for whole fruits. Drying time may be shortened by cutting fruit into slices.

- When food is dehydrated 80 to 95% of the moisture is removed, making the dried weight of foods much less than the fresh weight.

**Table 4. Pounds of Dehydrated Food From Fresh Fruits and Vegetables.**

<b>Fresh Fruits</b>	<b>Dehydrated</b>
apples, 20 lbs.	2 lbs.
peaches, 20 lbs.	1½ - 2½ lbs.
pears, 20 lbs	2¼ lbs.
prunes/plums, 20 lbs.	2¼ lbs.
<b>Fresh Vegetables</b>	<b>Dehydrated</b>
snap beans, 20 lbs.	1¾ lbs.
beets, 20 lbs	2 lbs.
carrots, 20 lbs.	1¾ lbs.
onions, 20 lbs.	2½ lbs.
squash (summer), 20 lbs.	1½ - 2 lbs.
Tomatoes, 20 lbs.	¾ lbs.

## **PASTEURIZING AND CONDITIONING OF DRIED FOODS**

All sun-dried fruits and vegetables must be pasteurized to destroy insects. Place dried food evenly in shallow trays no more than 1 inch in depth. Vegetables should be heated at 150 degrees F for 30 minutes or 160 degrees F for 10 minutes. Fruits should be heated at 160 degrees F for 15 minutes.

Dried fruits must be conditioned prior to storage. Conditioning is the process of evenly distributing moisture present in the dried fruit to prevent mold growth. Condition dried fruit by placing in a plastic or glass container, sealing and storing for 7 to 10 days. The dried fruit in the containers should be shaken daily to distribute moisture. If condensation occurs, place the fruit in the oven or dehydrator for more drying and repeat the conditioning process.

## **STORING THE FOOD**

Cool dried food should be placed in a closed container that has been washed and dried before storing. Home canning jars are good containers for storing dried foods. Store in a cool, dry, dark place.

Dried foods should be used within 3 to 6 months as they will lose their flavor and color to some extent during storage.

## **RECONSTITUTING DRIED FOODS**

Dried fruits and vegetables may be reconstituted (restoring moisture) by soaking the food in water. Time for reconstituting will depend on the size and shape of the food and the food itself. Generally most dried fruits can be reconstituted within 8 hours, whereas most dried vegetables take 2 hours to be reconstituted. To prevent growth of microorganisms, dried fruits and vegetables should be reconstituted in the refrigerator. One cup of dried fruit will yield approximately 1½ cups of reconstituted fruit. One cup of dried vegetable will yield approximately 2 cups of reconstituted vegetable. Reconstituted fruits and vegetables should be cooked in the water in which they were soaking.

## **References**

Complete Guide To Home Canning, Extension Service, USDA, 1994.

Food Preservation in Alabama, Alabama Cooperative Extension Service, Auburn University, 1995.

*For additional information on drying fruits and vegetables, contact the local Virginia Cooperative Extension office in your area.*