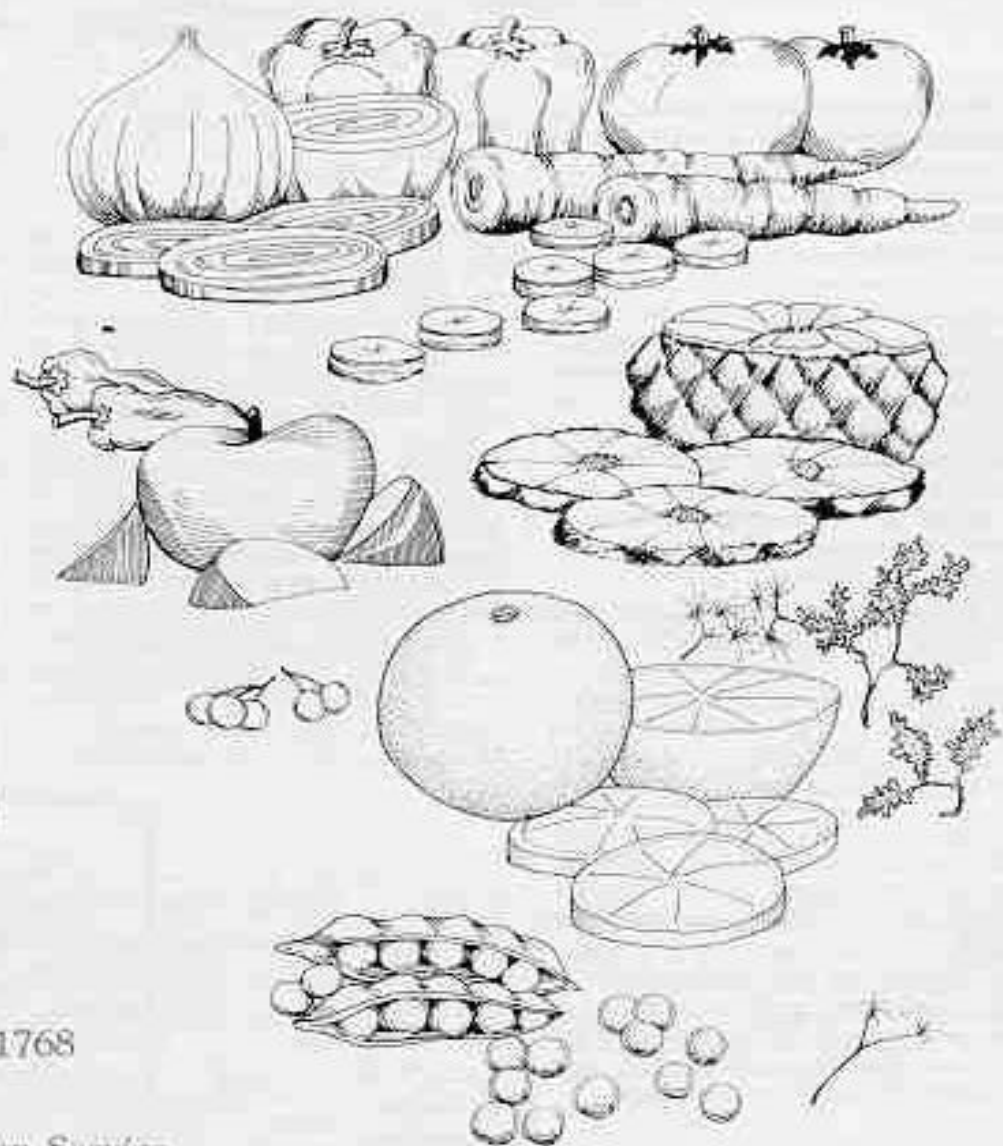


DRYING FOODS AT HOME

354



by
Penny Ross
Extension Food and
Nutrition Specialist

Extension Bulletin E-1768
June 1984

Cooperative Extension Service

Michigan State University

DRYING FOODS AT HOME

by

Penny Ross

Extension Food and Nutrition Specialist



Drying is one of the oldest methods of food preservation--dating back thousands of years. Preserving seasonal foods by drying is still useful and convenient. Drying reduces the weight and bulk of food, making it possible to store large quantities in a small space. Dried foods are easily prepared and add variety to the diet.

How does drying preserve foods? Successful drying depends upon the removal of enough moisture from a food to prevent the growth of spoilage organisms. The water content of properly dried food varies from 5 to 25 percent.

Home drying, if done properly, can work well for many fruits and vegetables. They can be dried:

• In your kitchen oven. You will need drying trays, an oven thermometer and a small fan.

• In a food dehydrator. Food dehydrators can be constructed with rather simple building materials or purchased from a commercial outlet.

There are, however, varying recommendations for treatment before drying, methods of drying, temperatures and length of drying time and for conditioning foods prior to storage. You may have to use the "trial and error" approach in finding out which drying technique works best for your situation. Whatever method you use, remember that a quality dried product depends on quality fresh products.

Preparing Foods for Drying

Foods selected for drying should be of the

highest quality possible--fresh, sound and fully ripened. Wilted or inferior produce will not make a satisfactory dried product. Immature produce lacks flavor and color. Over-mature produce may be tough and fibrous or soft and mushy.

Prepare the produce immediately after gathering, and begin drying at once. Wash or clean all fresh produce thoroughly to remove all dirt or spray residues. Sort and discard any defective food. Decay, bruises or mold on any piece may affect an entire batch of food being dried. Peel, pit and/or cut the food into uniform sized pieces.

Most fruits and vegetables will require pretreating prior to drying. Antioxidant coating, blanching and/or sulfuring may be recommended.

Proper pretreatment is necessary to retard or destroy the enzymes in foods that are responsible for color and flavor changes during ripening. Unless a food is pretreated, enzymatic changes will continue during drying and storage and eventually spoil the food.

Pretreating Vegetables

Most vegetables can be dried successfully. Table 1 lists vegetables that do not dry well, although they will still be safe to consume if drying is attempted.

Blanching is the recommended pretreatment for vegetables. The steam blanching method is preferred over the boiling water method because it retains more of the water soluble nutrients.

Blanching before drying helps save some of the vitamin content, sets the color, hastens drying by relaxing the tissues, helps prevent undesirable changes in flavor during storage and helps insure satisfactory restoration during cooking.

Table 1. Foods Not Recommended For Drying.

<i>Fruits</i>	<i>Vegetables</i>	<i>Jerky</i>
Avocados	Asparagus	Lamb
Berries with seeds	Broccoli	Pork
Citrus fruits	Brussels sprouts	Fish with a high fat content
Crabapples	Cauliflower	Chicken - the size of most chicken makes it
Cranberries	Eggplant	impractical for
Melons	Greens	making jerky
Pomegranates	Lettuce	
Quince	Radishes	
	Winter Squash	

With Steam

Make a steamer out of a kettle with a tight-fitting lid. Use a vegetable steamer, colander or sieve to hold the food. Layer the vegetables loosely in the basket, no more than 2 1/2 inches deep. Add several inches of water to the kettle and bring to a boil. Place the basket of prepared vegetables in the kettle, making sure the food is above the water level. Steam the vegetables until each piece is heated through and is thoroughly wilted. See Table 2 for recommended blanching times. Test food by cutting through a piece. If sufficiently blanched, it should appear cooked (translucent) nearly to the center.

With Water

Use enough water to cover the product. Bring the water to a boil and gradually stir in the vegetables. Begin to count blanching time immediately. Follow the times given in Table 2. Re-use the same water for additional lots when blanching the same vegetable, adding more water as necessary. Keep the lid on the kettle while blanching.

Pretreating Fruits

Unlike vegetables, pretreatment of fruits is optional. Fruits will make a better product, however, if they undergo one of the treatment methods given below. Each method will differ with respect to its effectiveness.

Sulfuring

Many fruits, especially apples, apricots, peaches, nectarines and pears, tend to darken during drying and storage. Sulfuring fruit (exposing it to sulfur fumes) preserves color, prevents souring, and also decreases loss of vitamins A and C during drying and storage. Commercially produced fruits are usually sulfured, since

preventing color and flavor losses. The sulfuring process requires some special equipment and extra time and work, but the results are well worth it. Unsulfured fruit is less attractive but safe to eat.

Materials Needed

- **Trays**, slatted, wood. Do not use aluminum or galvanized screening materials because sulfur fumes corrode these metals. If slatted wooden trays are not available, wooden lids from lug boxes may be used.
- **Thread spools**, wood or plastic (but not styrofoam), or small wooden blocks. Place at corners of trays to separate the trays at least 1 1/2 inches apart when stacked.
- **Box**, heavy cardboard or wood with no cracks or openings. It must be large enough to place over stacked trays with 1 to 1 1/2 inches to spare between the trays and the inside of the box. The box should also be large enough to accommodate the container of burning sulfur under the stacked trays.
- **Firebricks** to raise the stack of trays high enough off the ground to accommodate the container of burning sulfur.
- **Sulfur** Use elemental sulfur, also called sulfur flowers or flowers of sulfur. Use U.S.P. (food grade) quality, which is free of impurities and burns readily. It may be purchased at most pharmacies.



Clean metal container to hold sulfur.

For small amount of fruits, a flat tuna can or an aluminum pie tin will be large enough. Heavy aluminum foil, molded around a shallow dish, makes an excellent disposable container in which to burn sulfur.

How to Sulfur

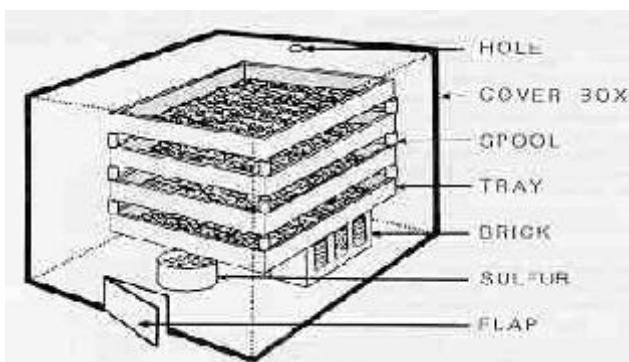
Always sulfur outdoors in the open air since sulfur fumes will irritate eyes and breathing passages. Choose a spot that is away from close contact with plants, shrubs and trees. Sulfuring times will differ depending on the fruit. See Table 3 for recommended sulfuring times.

1. Spread fruits in a single layer on trays, pit cavity side or cut surfaces up. Pieces should not touch each other.

2. Stack trays 1 1/2 inches apart, separated by spools or wooden blocks placed at the corners.

3. Make a 6 x 2 inch flap at the bottom of the box and a small slash or hole at the upper edge of the opposite side (as shown in the drawing). Cover the stacked trays with the box. The flap can be opened when necessary to facilitate sulfur burning.

4. Measure the sulfur and place it in the container. The amount used varies with the length of time the fruit is to be sulfured, the weight of the fruit, and the dimensions of the box. Generally, if you are using a cardboard box to cover the trays, you will need 1 to 2 teaspoons of sulfur per pound of fruit. If you have constructed a more airtight sulfuring box from wood, you need no more than 1 teaspoon of sulfur per pound of fruit. Sulfur spread 1/2 inch deep burns better than that 1 inch or more deep. Sulfur fumes do the work, not the burning sulfur, so it is important that the box be tight.



this is the most effective means of

5. Place can of sulfur under the box near the lower opening and light the sulfur. It melts before it ignites, but soon burns with a clear blue flame that produces the acrid sulfur dioxide fumes. Do not leave burned matches in the container; they impede the burning of the sulfur.

6. Immediately lower the box over the stack and seal the bottom edges with soil, leaving the flap open.

7. When sulfur is burning well, close the flap and start timing.

8. The proper burning time of sulfur varies with ventilation, shape of container, and weather conditions. Sulfuring is complete when fruit appears bright and glistening and a small amount of juice appears in the pit cavity.

NOTE: Since sulfur fumes are given off in small amounts during the drying process, it is best to dry sulfured fruits in a dehydrator that can be placed in a garage or other well-ventilated room. While the fumes are not a health hazard in amounts recommended here, they can irritate eyes and nose similar to the effect of wood smoke. If an oven is used, use a fan for air circulation and check the foods only when necessary.

Although not as effective overall as sulfuring, the following pretreatment methods can be used when sulfuring is not possible or small batches of fruits are to be dried. They are listed in order from most to least effective. Fruits pretreated by one of these soaking methods will take longer to dry than fruit that is not soaked.

Sulfiting

Soaking fruits in a solution of sodium bisulfite has an effect similar to sulfuring. Mixing sodium bisulfite with water releases sulfur dioxide which penetrates the surface of the fruit, retarding oxidation and enzymatic browning. Sodium bisulfite looks similar to table salt. Food grade (U.S.P.) sodium bisulfite can be purchased at wine-making supply stores or pharmacies. **DO NOT use sodium bisulfate.** While the two products may seem similar in name and appearance, their chemical properties are not the same. Due to its chemical structure, bisulfate is unable to

inhibit the oxidation and enzymatic browning reactions that cause a fruit to ripen.

Sodium bisulfite is preferred for sulfiting because of its strength, but sodium sulfite or sodium metabisulfite may also be used. The strength ratio is: 1 tablespoon bisulfite = 2 tablespoons sodium sulfite = 4 tablespoons metabisulfite. You will need to use 2 times as much sodium sulfate or 4 times as much metabisulfite to achieve the same results as one part bisulfite. Sodium sulfate and metabisulfite can be purchased at wine-making supply stores or pharmacies.

Prepare a solution of 1 to 2 tablespoons bisulfite per gallon of water. Soak fruit slices for 5 minutes and halved fruit for 15 minutes. When soaking is completed, remove the fruit and rinse it lightly under cold tap water. Pat dry with paper towels and proceed with drying.

NOTE: Sodium bisulfite is an antidarkening agent that may be used to pretreat fruits before drying. While use of this preparation presents no problem to most people, recent evidence suggests that sulfites may cause adverse reactions in some asthmatic individuals. Thus, these individuals may choose to use another type of pretreatment.

Ascorbic Acid Dip

Pure ascorbic acid (vitamin C) is an antioxidant that helps to keep fruit from darkening as it is being prepared for drying. Dissolve 2 tablespoons of ascorbic acid crystals, 2 tablespoons of ascorbic acid powder, or 5 crushed one-gram vitamin C tablets in one quart of lukewarm water. Slice or chop fruits directly into the solution. Drain fruit well before loading onto drying trays. Ascorbic acid preparations can be purchased at pharmacies or wherever vitamin supplements are sold.

Commercial antioxidant mixtures containing ascorbic acid and citric acid are not as effective as pure vitamin C although they are often easier to come by. Follow package directions for cut fruits when using these mixtures.

Syrup Blanching

Syrup blanching will hold natural fruit color fairly well during drying and storage,

but it will produce a softer textured and sweeter flavored fruit than other methods.

Prepare a sugar syrup by mixing 1 cup sugar, 1 cup light corn syrup and 2 cups water. Bring the mixture to a boil. Add the prepared fruit and simmer for 10 minutes. Remove fruit from heat and let it stand in the hot syrup for an additional 15 minutes. Drain fruit well and proceed with drying.

Salt Water Dip

Dissolve 4 tablespoons of table salt in 1 gallon of lukewarm water. Slice or chop the fruit directly into the water. Allow it to soak no more than 10 minutes or fruit will absorb too much water and acquire a salty taste.

Drying Trays

Shallow wooden trays with slatted, perforated or woven bottoms are ideal for drying foods. They can be used in the oven or a home-constructed dehydrator. Open bottoms allow for proper air circulation. A uniform size is important for easy stacking.

Many directions for home-constructed drying trays suggest the use of aluminum, galvanized or copper screening for the tray bottom. These should not be used because of the possible chemical reaction between the food and metal coating during sulfuring or drying. Fiberglass screening is also not suitable because repeated handling may cause the fiberglass to splinter and contaminate the product. Nylon screening, cheesecloth or wooden slats or dowels



are ideal for tray construction. Nylon screening can be purchased at sporting good stores. If wooden slats or dowels are used, cover the trays with netting to prevent sticking and to keep food pieces from falling through the spaces left for air circulation.

Drying Foods

In a Dehydrator

1. Place the dehydrator in a well-ventilated room.
2. Distribute the food to be dried on trays in a single layer. Different foods may be dried at different times but strong smelling vegetables should be dried separately.
3. If you have purchased a commercial dehydrator, follow the manufacturer's directions for preheating it.
4. Place the trays of prepared food in the heated dehydrator.
5. If your dehydrator has a thermostat, it should be set between 140 and 150°F while the food is drying. Some dehydrators are preset to the proper temperature by the manufacturer and require no adjustments during drying.
6. Examine the food at 1 1/2 to 2 hour intervals, depending on the food. To assure uniform drying, rotate the trays periodically.
7. The time for drying varies according to the type of food, size of pieces and amount of food in the dehydrator. Consult the drying tables for approximate drying times.
8. Cool the food before testing for dryness. Foods that are warm from the dehydrator may seem softer, more moist and more pliable than they actually are.

In an Oven

Test the temperature of your oven with



an oven thermometer when it is set at its lowest setting. To successfully dry in the oven, the temperature must be no higher than 150° F. If your oven cannot be held this low, alternative drying equipment must be used.

Use trays that are at least 1 1/2 inches smaller than the width and depth of the oven to allow for air circulation. Allow at least 2 1/2 inches between trays and 3 inches of free space at the top of the oven.

1. Load 2 or 3 trays with no more than 4 to 6 pounds of prepared food distributed among them. Oven racks can double as drying trays if they are first covered with nylon screening or cheesecloth. Pieces of food should be in a single layer. More than one kind of food can be dried at the same time. Strong-smelling items, however, should be dried separately.
2. Preheat the oven to 150° F and add the loaded trays. Prop the oven door open at least 4 inches to let moisture escape during drying.
3. Place a fan outside the oven so that air is directed through the opening and across the oven.
4. Turn the food occasionally on the trays. Trays next to the top and bottom dry the fastest. Rotate the trays frequently and turn them front to back.



5. Maintain the temperature at 150° F. Use a thermometer to check the temperature throughout the drying process. Watch the temperature carefully toward the end of drying to prevent the food from scorching. If food pieces around the tray edges dry first, remove them.

In a Microwave Oven

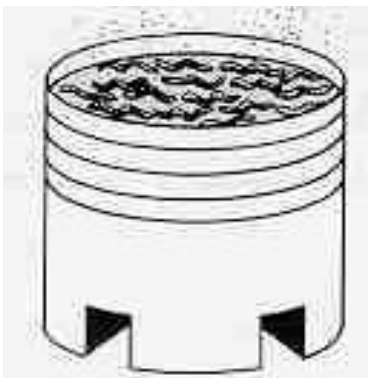
Herbs, because of their low moisture content, are the only food recommended for drying in a microwave oven. Microwaves produce heat energy that causes food to cook very rapidly. Dehydration, on the other hand, requires evaporation of water in foods, usually taking several hours. If foods are placed in a microwave oven for drying, they will begin cooking on the outside, forming a hardened surface that prevents moisture escaping. This is known as "case hardening." It prevents a food from drying adequately. For this reason, a microwave oven is not recommended for drying foods, other than herbs.

In the Sun

Drying in the sun is unpredictable unless temperatures are over 100°F each day and the relative humidity is low. If the temperature is too low, humidity too high, or both, spoilage (souring or molding) will occur before drying is achieved. Weather conditions in the southwest (U.S.) make sun drying a viable alternative. There, temperatures average over 100°F, humid - readings are less than 25 percent and 17 out of 31 days are clear. The climate of Michigan, however, is not conducive to successful sun drying. Here, the average summer temperature is 81°F, the humidity at the driest time of the day averages 56 percent and only 10 days a month are clear.

When is Food Dry?

Judging when food is dry requires experience. Check food to be sure enough moisture has been removed to make it impossible for mold and bacteria to grow and cause decay. It is better to overdry



than to underdry. When in doubt, continue drying for additional time. Dehydrator drying generally takes less time than oven drying. Allow the product to cool before testing.

Vegetables are sufficiently dried when they are hard and brittle or tough and leathery, depending on the vegetable. Edges will be sharp. Beans, corn and peas are hard and will shatter when hit with a hammer. Leafy and thin vegetables should be brittle. Larger chunks or slices of vegetables should be leathery.

Fruits are adequately dried when moisture cannot be squeezed from them. Most fruits will feel leathery and pliable when dried properly.

Fruit leathers may be slightly sticky to the touch but separate easily from the plastic wrap. For long term storage, dry leathers until they are no longer sticky.

Herbs are brittle when dried. Their leaves shatter when rubbed together.

Meats and all protein foods should be VERY dry unless they are to be refrigerated or frozen for long-term storage. Meat is sufficiently dried when it is dark in color and fibrous.

Conditioning

When drying is completed, some fruit pieces will be more moist than others because of their size or location in the oven or dehydrator. **Conditioning** is a process used to distribute the residual moisture evenly in the fruit. It reduces the chance of spoilage, particularly from mold. To condition, place fruit in covered glass or plastic containers until uniform moisture levels are reached. Metal containers may give an unpleasant flavor to the fruit. Let the fruit stand for 4 to 10 days. The excess moisture in some pieces will be absorbed by the drier pieces. Shake the containers daily to separate the pieces, and check for signs of condensation on the lids. If moisture appears on the lid, the food is not dry enough. The drying process must be continued or the product will mold.

Pasteurizing

There is always a possibility that insect larvae or harmful spoilage organisms may be present on the surface of dried fruits and vegetables. It is wise to prevent potential problems by pasteurizing the food, using one of the following methods.

1. Freezer. Package the dried product in plastic freezer bags and store in the freezer a minimum of 48 hours. Remove and package for permanent storage.

2. Oven. Layer dried food loosely in roasting pans and heat in a 175° F oven for 15 minutes or at 160° F for 30 minutes. Remove and cool the product. Package for permanent storage.

Packaging

To maintain product quality, containers of dried food should be stored in a dry, dark, cool place. The shelf life of the dried product may be extended by storing it at low temperatures.

Package food in amounts that can be used within several days after opening. Foods should be packaged quickly after pasteurizing since moisture will begin to accumulate in dried foods that are exposed to air. Use rodent-proof, insectproof containers such as pickle, mayonnaise, or home canning jars with tight fitting lids. Coffee cans may be used if the dried foods are first placed in plastic bags. They should be packed into the container as tightly as possible without crushing.

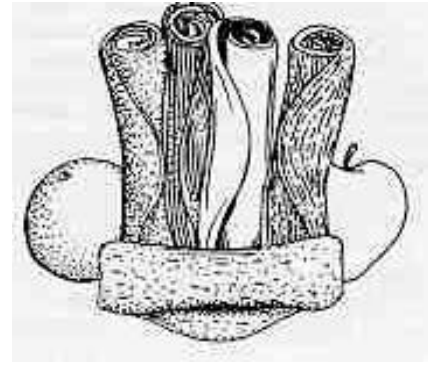
When storing sulfured fruit, do not use metal lids unless a cellophane or polyethylene sheet is placed under the lid to prevent sulfur fumes from reacting with the metal.

Dried foods keep well for six months to a year if they are properly stored; and longer if kept refrigerated or frozen. Storage longer than a year results in loss of color, flavor, aroma, and vitamins. The major factors contributing to a shorter shelf life are heat, moisture and light. Dried foods should be examined occasionally for signs of moisture or spoilage.

Fruit and Vegetable Leathers

Leathers are pureed fruits and vegetables that have been dried to a chewy, leathery consistency. They may be sweet or sour in flavor.

Fruit leather is perfect for lunch boxes during the winter when fresh fruit is expensive or unavailable. It can also be used in baking or cut into small pieces and added to cereals, puddings, and desserts for a fresh fruit flavor.



Vegetable leathers make great snacks and can be served plain or with your favorite dip. They may also be added to soups or used to flavor sauces.

Any fruit or vegetable, or combination of them, can be made into leather. Raw or cooked fruits or vegetables may be used.

Preparation

Use high quality, fresh produce.

1. Wash fruits and vegetables to remove dirt and any spray residues.

2. Remove blemishes, pits and seeds. Fruit peels may be left on if desired.

3. Soft fruits need no cooking. Firmer foods or fruits that darken when exposed to air should be heated to soften the food or destroy enzymes before pureeing. Avoid scorching by placing food pieces in the top of a double boiler to heat. Cover and cook over boiling water for 15 minutes. Remove from heat and cool.

4. Use a food mill, blender, sieve, or food processor to puree the fruit or vegetable. Puree until mixture is smooth with no lumps or pieces. A small amount of liquid may be needed to begin pureeing in a blender.

5. Once the product has been pureed, add any desired sweetenings, spices or flavorings. Fruit that is fully ripe produces the best flavored leather and usually needs no sweetening. If a fruit puree is too tart, add 1 tablespoon sugar, white corn syrup or honey, to each quart of puree Repeat until the puree is sweet enough. Remember, however, that fruits become more concentrated, and therefore sweeter as they dry.

6. For oven drying a leather, a baking sheet with 1/4 inch sides makes an ideal drying tray. Many electric dehydrators come equipped with special trays for leather drying, or, plastic wrap can be placed over the regular trays. Line the tray with plastic wrap. Do not use wax paper or aluminum foil since they tend to stick to the leather. Wet the edges of the tray to hold the wrap in place. Pour the puree onto the trays 1/8 to 1/4 inch thick. Tilt the tray slightly to help spread the puree evenly. Two to three cups of puree are enough for an 11 x 15 inch cookie sheet.

7. Place the puree in a dehydrator or oven heated to between 120°F and 150°F. Temperature control is important. If the thermostat of your oven does not control heat at this low temperature, experiment by propping the door open and manually controlling heat BEFORE attempting leather drying. just the heat of the gas pilot or oven light may be enough to sustain the low temperature needed. Always prop the door open to allow the moisture to escape.

8. Check the leather as it dries, turning the tray for even drying. Drying may take from 6 to 24 hours depending on the thickness of the puree oven or dehydrator temperature and the water content of the product being dried. Leather is ready when it feels leather-like and is pliable. There should be no sticky spots in the center. Brittle leather indicates over drying.

9. Remove the leather from the tray while it is still warm. Peel off the plastic wrap. Roll the leather as you would a jelly roll. Cooled fruit leather does not roll as easily. The leather is now ready to store.

10. Wrap each roll in a moisture-vapor proof wrap, aluminum foil or freezer bag. Do not roll plastic wrap inside the fruit leather since some leathers will stick to the wrap. Store in a cool, dry, dark place. For longer storage, place leathers in the refrigerator or freezer. Under proper storage conditions, leathers will keep from

one month to a year.

Meat Jerky

Use fresh or frozen lean meat for jerky. The leaner the meat, the better the quality of the finished product.

Preparation

1. Slice 5 pounds of lean meat (flank steak or similar cut) into strips 1/4 to 1/2 inch thick, 1 to 1 1/2 inches wide, and 4 to 12 inches long. Cut against the grain of the meat; remove the fat and any membranes adhering to the meat. Partially freezing the meat will make slicing easier.

2. Place the strips of meat in single layers on a clean, flat surface.

3. If smoke flavor is desired, brush each strip of meat with 1/2 teaspoon of liquid smoke mixed in 2 tablespoons water. Sprinkle both sides of strips liberally with salt. Add pepper, garlic powder, garlic salt or other seasonings, if desired.*

4. Place meat strips in a tightly covered glass, stoneware, plastic or stainless steel container and let marinate in the refrigerator for 6 to 12 hours. Stir occasionally to be sure each piece is covered with the salt and seasoning mixture.

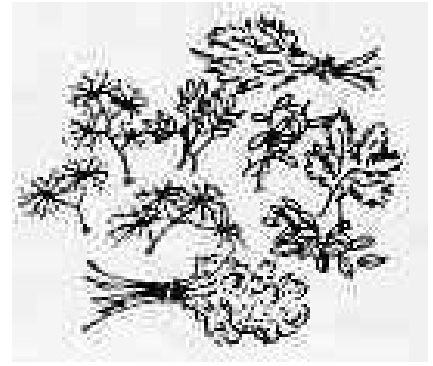
5. Remove strips and blot dry with clean paper toweling.

**Other seasonings can be used to flavor jerky. Marinate the strips before drying in mixtures like teriyaki sauce, sweet and sour sauce, soy sauce, hot chili sauce, or Worcestershire sauce- Be sure to sprinkle liberal amounts of salt on the meat, in addition to other seasonings or marinades you may choose.*

Oven Drying

Place the meat strips on drying trays or use the racks in your oven. Do not overlap the strips to ensure good air circulation.

Set the temperature at 140° F and let strips dry. Check early in the drying process for excessive drip. This drip can be caught on aluminum foil placed in the bottom of the oven. Blot the jerky



occasionally with paper towels as it dries to remove beads of oil.

Jerky is ready when the dried meat is dark in color, fibrous and bends without breaking.

Drying Herbs and

Other Seasonings

Herbs and other seasonings can add flavor and color to almost any food. Herbs are defined as seed plants that form soft leaves and tender stalks. Examples of popular herbs include rosemary, thyme, basil, sage, mint, parsley, and dill. When allowed to mature, the seeds are often gathered and used for seasoning. Dill seeds are the most commonly dried seed.

The young, tender leaves of herbs can be gathered anytime during the growing season and used fresh. For drying, however, leaves should be harvested just before the plant begins to flower. The new leaves at the tip of the plant are usually the most flavorful. Lightly rinse leaves and stems in cold water, drain and dry on paper towels until no visible water remains. Cut off dead or discolored leaves or stems.



Bag Drying

Bag drying is one of the simplest ways to dry herbs with long stems. Tie the herbs in small bunches by the ends of the stems. Place the herbs inside paper bags, with leaves down and stems at the open end. Tie a string firmly around the top of each bag. Cut several small holes in the sides of the bag. Hang them anywhere there is a warm, even temperature and good air circulation.

Herb leaves or seeds will crumble easily when dry. Store in glass jars, metal containers or plastic freezer bags. Cover tightly to preserve the odor and flavor. Keep glass jars in a dark place to prevent bleaching of the green leaves.

Microwave Oven Drying

Microwave ovens may be used to dry small quantities of herbs. Since the moisture content of herbs is extremely low, however, a small container of water should be placed in the oven during drying to prevent damage to the magnetron tube.

Place 4 or 5 herb stalks with leaves between paper towels. Microwave on high for 2 to 3 minutes. Check herbs for dryness. If additional time is needed, set timer for 30 seconds. Check again and repeat with 30 second intervals, if necessary.

Preparing Dried Foods for Table Use

Rehydration and reconstitution refer to returning water to dried foods. These terms can be used interchangeably. Rehydration is accomplished by soaking the dried food in water or juice until the desired volume is restored.

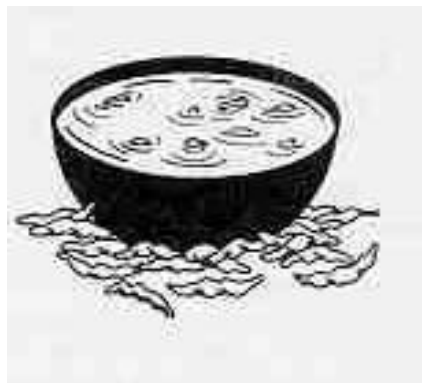
Rehydrating Vegetables

Dried vegetables are usually more tender if they are soaked long enough to reabsorb most of their moisture before being cooked. Use only as much water as necessary to cover the vegetables. Rehydrating may take 1/2 to 2 hours, depending on the type of vegetable and the temperature of the water used. Boiling water shortens the rehydration time considerably. Do not allow rehydrating vegetables to stand for more than 2 hours at room temperature. Refrigerate vegetables, if necessary, to finish rehydration and to prevent bacterial growth. After soaking, the vegetables are simmered until tender.

One cup of dried vegetables reconstitutes to about 2 cups.

References

Drying Foods at Home. United States



Department of Agriculture Home and Garden Bulletin No. 217, 1977.

Garden Way's Guide to Food Drying

by Phyllis Hobson, Garden Way Publishing, Charlotte, VT.

Rehydrating Fruits

Dried fruits can be eaten as is or

rehydrated and cooked as you would for dried vegetables. Cover the dried fruit with boiling water or fruit juice and let stand until plump. Cook the fruit in hot water or juice, if desired. If additional sugar is needed, it should be added at the end of the cooking time, so it will not interfere with the fruit's absorption of water.

One cup of dried fruit reconstitutes to about 1 1/2 cups.

Nutritional Value of Dried Foods

Fresh fruits and vegetables supply the diet with calories, fiber, vitamins and minerals. As is true with other food preservation methods, drying will result in the destruction of certain nutrients. Some of the nutritional changes you can expect with drying are:

- **Calories:** No change. On a pound-for-pound basis, however, dried foods will have a substantially higher caloric content than fresh because nutrients become more concentrated as water is removed.
- **Fiber.** The fiber content of dried foods is the same as fresh.
- **Vitamins:** Vitamins A and C are the chief nutrients found in fresh fruits and vegetables. Both are destroyed by exposure to air, and vitamin C is also destroyed by heat. Other factors that affect vitamin loss are exposure to light, prolonged storage periods and improper storage conditions. Sulfuring helps protect these vitamins from destruction.
- **Minerals.** Mineral losses may occur with soaking, however, these losses are usually minimal.

How To Dry Foods by Deanna DeLong, H. P. Books, Tuscon, AZ.

Putting Food By by Ruth Hertzberg, Beatrice Vaughan and Janet Greene, The Stephen Greene Press, Brattleboro, VT.

Stocking Up edited by Carol Stoner, Rodale Press, Emmaus, PA.

Table 2. Home Drying of Vegetables.



Vegetable	Preparation	Blanching Time (minutes)		Drying Time (hours)		Characteristics
		Steam	Water	Dehydrator	Oven	
Beans—green	Wash and cut off ends. Cut lengthwise or in short pieces.	4	2	8-14	18-24	Brittle, crisp
Beets	Cook as usual. Cool; peel. Cut into 1/8" strips.	None		8-10	10-12	Crackling, brittle
Carrots	Trim tops and peel. Slice crosswise or diagonally no thicker than 3/8" thick.	3-4	2-3	12-18	18-24	Brittle, crisp
Celery	Wash stalks. Cut crosswise into 1/4" to 1/2" slices.	None		12-18	18-24	Crisp
Corn—on-the-cob	Husk. After blanching, cut kernels from cob.	4	3	12-18	18-24	Brittle, crisp
Mushrooms—(non-toxic edible varieties)	Wash and trim any woody portions from stems.	None		8-12	12-14	Crisp or brittle
Onions	Trim ends and remove "paper shells." Slice 1/8" to 1/4" thick.	None		9-12	18-24	Brittle
Peppers—bell	Wash, stem, core. Slice into rings 3/8" thick.	None		8-12	18-24	Leathery to brittle
Peppers—red chili	Wash and leave whole.	None		6-10	14-18	Shriveled dark red pods
Potatoes	Wash, peel. Slice 1/8" thick or in shoestring strips 1/4" thick.	6-8	5-6	12-18	18-24	Crisp
Squash—summer	Wash, trim, cut into 1/4" slices.	3	2	6-8	6-8	Tough to brittle
Tomatoes— for stewing	Dip in boiling water to loosen skins. Chill in cold water. Peel. Slice crosswise, 1/2" thick.	3	1	10-18	18-24	Tough to crisp

Table 3. Home Drying of Fruits*.



Fruit Variety	Preparation	Pretreatment		Drying Time (hours)	Test for Dryness
		Sulfur (hours)	Other		
Apples—firm-textured, tart varieties	Peel, if desired, and core. Cut into slices $\frac{3}{8}$ " to $\frac{1}{4}$ " thick.	4	Sodium bisulfite or ascorbic acid dip.	6-12	Soft, pliable, no moist area in center when cut
Apricots	Pit and halve.	2	Steam blanch for 3-4 minutes or use sodium bisulfite dip.	24-36	Pliable with no pockets of moisture
Bananas	Use solid yellow or slightly brown flecked bananas. Avoid bruised or overripe bananas. Peel and slice $\frac{1}{4}$ " to $\frac{3}{8}$ " thick, crosswise or lengthwise.	1	Dip in ascorbic acid or undiluted pineapple juice. Sulfur if a lighter color is desired.	8-10	Pliable to crisp
Berries—firm, well ripened	Wash and drain berries with waxy coating (blueberries, currants, gooseberries).		Dip in boiling water 15-30 seconds to split skins. Drain on paper towels. No further pretreatment necessary.	12-24	Leathery and pliable with no moisture
Cherries—sweet or tart	Wash and pit fully ripe cherries. Cut in half, chop or leave whole.		Dip whole cherries in boiling water for 30 seconds to crack skin. No further pretreatment necessary.	24-36	Shriveled and leathery with no pockets of moisture
Citrus peel	The peels of citron, grapefruit, kumquat, lemon, lime, tangelo, orange, or tangerine can be dried. Thick skinned navel orange peel dries better than thin-skinned Valencia peel. Wash thoroughly.		No pretreatment necessary. Thinly peel the outer $\frac{1}{16}$ " to $\frac{1}{8}$ " of the peel. Avoid white bitter pith.	6-8	Crisp
Grapes—Thompson seedless	Leave whole or cut in half for faster drying.		Whole: dip in boiling water for 30 seconds to crack skins. No further pretreatment necessary.	24-48	Raisin-like texture, no moist center
Nectarines, Peaches—freestone or clingstone	Wash and scald to remove skins; halve and pit. Leave in halves, slice or chop.	2-3	Sodium bisulfite or ascorbic acid dip.	10-24	Leathery and pliable with no pockets of moisture
Pears—Bartlett	Peel thinly. Cut in half, core and slice $\frac{1}{2}$ " thick.	5	Sodium bisulfite or ascorbic acid dip.	18-24	Leathery and pliable with no pockets of moisture
Pineapple	Peel and remove thorny eyes. Slice lengthwise and remove core. Cut crosswise into $\frac{1}{2}$ " slices.	1	Pineapple may be dried without pretreatment. Sulfur for long term storage. Excellent when syrup blanched.	18-24	Leathery, but not sticky
Plums—(Prunes)	Wash and pierce skins several times with a fork.		No pretreatment necessary.	24-36	Pliable and leathery
Strawberries	Wash and cap berries. Slice $\frac{1}{4}$ " thick.		No pretreatment necessary.	12-18	Leathery and pliable with no pockets of moisture

*Times given are for dehydrator drying since the high moisture content of most fruits makes oven drying impractical. The controlled environment of an electric dehydrator provides the most successful results.

Vegetable Soup

8 cups water
4 beef bouillon cubes
3 cups mixed dried vegetables (Corn, green beans, carrots, onions, celery, potatoes)
1 1-lb. can tomatoes, undrained
Seasonings to taste such as: pepper, bay leaves and parsley
1/2 cup rice, barley or noodles

6 to 8 servings

Bring water to a boil. Add bouillon cubes and dried vegetables. Simmer 30 to 40 minutes, depending on type of vegetables and size of pieces. Add tomatoes, seasonings and rice, barley or pasta. Simmer 15 to 20 minutes longer. Serve.

Corn Chowder

1/2 cup dried corn
1 1/2 cups boiling water
4 strips bacon
1 medium onion, chopped
2 cups water
1 medium potato, diced
2 1/2 cups water
2 cups nonfat dry milk
1 tablespoon flour
1 1/2 teaspoons salt
1/2 teaspoon pepper

6 servings

Rehydrate corn in 1 1/2 cups water. Let stand for 30 minutes. Brown bacon in soup pot until crisp. Remove and drain. Brown onion in bacon fat until tender. Add onion to bacon. Discard all fat except for 2 tablespoons. Place undrained rehydrated corn into soup pot. Add 2 cups water and simmer for 45 minutes. Add potato and cook until tender. Combine milk, flour, salt and pepper with 2 1/2 cups water and mix well. Add milk mixture to soup pot and bring to a simmer, stirring occasionally. Add onions and crumbled bacon. Stir well. Serve.

Baked Lima Beans

1 1/2 cups dried lima beans
3 cups boiling water
4 slices bacon, chopped
2 tablespoons flour
1 1-lb can tomatoes
3 tablespoons dried celery
1/4 cup dried onion, minced
1 clove garlic, minced
2 teaspoons salt

4 servings

Pour boiling water over beans. Cover and cook until tender, about 2 hours. Drain. Saute bacon in a skillet. Stir in flour. Add remaining ingredients. Cook over low heat, stirring constantly until thickened. Combine beans and bacon mixture in a casserole dish. Cover and bake 1 hour at 300° F.

Green Bean Casserole

1 cup dried green beans
2 cups boiling water
1 can mushroom soup
1/2 cup milk
1/4 teaspoon onion powder
French fried onion rings

4 servings

Pour boiling water over beans and let stand 30 minutes. Cook to desired degree of doneness. Drain. Mix soup and milk. Combine soup, beans and onion powder in a casserole dish. Top with french fried onion rings. Bake 30 minutes at 325° F.

Corn Fritters

1 cup dried corn
4 cups boiling water
1 1/2 cups flour
1 teaspoon baking powder
1/2 teaspoon salt
2 eggs, beaten
1/2 cup milk

4 servings

Pour boiling water over corn and let stand 20 minutes. Simmer corn until tender. Mix flour, baking powder and salt in a large bowl. Combine eggs and milk, mixing well. Add the liquid ingredients to the flour mixture all at once and stir just until moistened. Fold in drained corn. Drop small mounds of batter into a well-greased frying pan and cook until brown on both sides. Remove fritters and drain on paper towels. Serve.

Trail Mix (Gorp)

about 6 cups

½ cup dried apples
½ cup dried apricots
½ cup dried peaches
½ cup dried dates
½ cup dried pineapple
½ cup coconut flakes
½ cup raisins
1 cup sunflower seeds
2 cups mixed nuts
(cashews, almonds, walnuts)

Cut apples, apricots, peaches and dates into ½ inch pieces. Combine all ingredients and store in an airtight container.

Teriyaki Beef jerky

2 pounds lean beef
¼ cup Worcestershire sauce
¼ cup soy sauce
1 ½ tablespoons brown sugar
2 garlic cloves, mashed
1 teaspoon powdered ginger

Trim all fat from meat and partially freeze it. Using a sharp knife, cut the meat across the grain into very thin (1/8 to 1/4 inch) slices and about 6 inches in length. Combine remaining ingredients in a blender or shaker jar. Arrange the meat strips in a single layer in a covered dish or baking pan. Pour marinade over meat and refrigerate 6 to 12 hours. Drain off liquid and pat strips dry with paper towels. Arrange meat on drying trays and dry.

Apple Leather

Wash and core apples. Puree apple chunks, with or without skins, in a blender. A small amount of water or cider may be added to start the blending action. Cinnamon, ginger, or other spices, and sugar or honey can be added for flavor. Pour puree onto drying trays.

Peach Leather

Dip peaches in boiling water for 1 minute to loosen skins. Peel, halve and remove pits. Puree fruit in blender. Cook over low heat to almost boiling. Season with cinnamon, cloves, ginger or honey, if desired. Pour puree onto drying trays.

Strawberry-Rhubarb Leather

Combine one cup each of sliced strawberries, rhubarb stalks cut into 1 inch pieces and sugar. Cook over low heat for 10 minutes. Puree fruit in blender. Pour onto drying trays.

Tomato Leather

Small cherry tomatoes or varieties with a high solid content are best for leather. Wash thoroughly and remove stems and blemishes. Begin pureeing with a few tomato wedges to obtain juice. Add more tomatoes, as needed, to reach the desired amount. Pour onto drying trays.