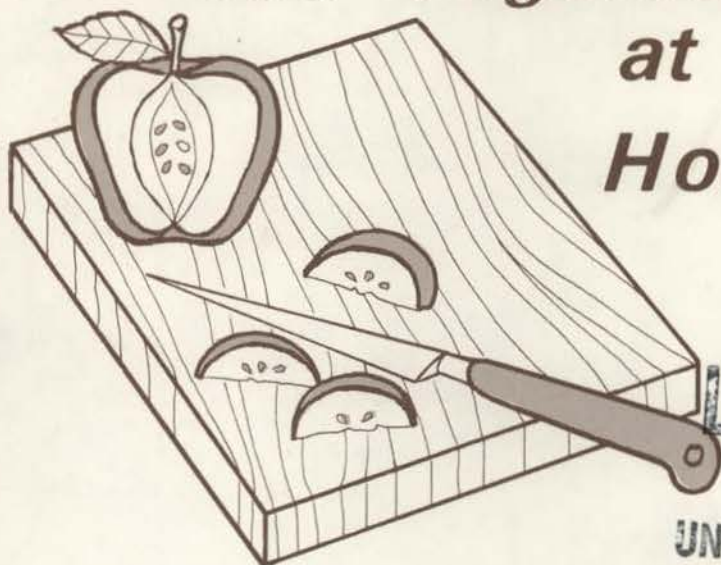


Drying Fruits and Vegetables at Home



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Drying is a comparatively simple preservation process that requires very little equipment and money. It also requires no additional sugar, a factor important for calorie counters and many others. The drying process is not difficult, but it does take time, constant attention and an understanding of some food-drying principles:

1. Drying simply means removing the moisture from foods. This prevents spoilage because it controls the micro-organisms that grow rapidly on raw or fresh fruits and vegetables.

2. Drying does not affect the natural enzyme action that occurs in fruits and vegetables as they mature. To control these enzymes and the off-flavors and undesirable textures they cause, you must heat the fruits and vegetables, either by steaming or scalding, before drying them.

3. Fruits and vegetables with light-colored flesh will discolor when exposed to air. Use an anti-oxidant pretreatment to protect them from discoloration.

4. Certain foods — lettuce, melons, cucumbers, radishes and asparagus, for example — aren't suitable for home drying.

5. For drying, select fruits and vegetables that are fresh, ripe and sound — just right for table use. Decay on one slice of apple or mold on one bean may give bad flavor to a whole tray.

6. Harvest or buy only the amount you can dry at one time. Dry vegetables promptly to retain their flavor and food value.



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Equipment

- Deep kettle with a close fitting lid.
- Perforated rack, or trivet, to fit into kettle.
- Wire basket, colander or open mesh cloth bag to hold products.
- Stainless steel knives.
- Vessels to hold saline or other dipping solutions.
- Sulfur cabinet (optional).
- Wooden racks for sulfur cabinet.
- Mesh racks for dryer. Squares of curtain netting, heavy nylon net or similar material to place on the racks, under the food, makes handling easier and keeps food from sticking to frames.
- Jars, cans, plastic containers for dried products.

Basic Procedure For Drying

1. Sort and wash produce thoroughly. Discard if bruised or overripe.
2. Peel, slice, pit, core and trim. Uniformly thin slices dry more evenly.
3. Sulfur or dip fruit to retain color. Steam or blanch vegetables.

To steam - place a thin layer of prepared food in a wire basket. Suspend over briskly boiling water. Cover and steam recommended time. Drain well. Dry with a towel.

To blanch - place prepared food in cheesecloth bag or wire basket and plunge into boiling water for recommended time. Drain well. Dry with a towel.

4. Dry in:
 - a. Oven (controlled heat)
 - b. Sun (no heat control)
 - c. Cabinet-type dehydrator (limited control)
5. Pack and store.

Oven Drying

Oven drying is small-scale drying. An oven can take up to 8 pounds — preferably 6 — of a prepared fruit or vegetable at one drying load. It takes most of a day for the load to dry.

You will need a thermometer to control temperature in oven drying. Use any deep-fat, candy, dairy or oven thermometer that registers both below and above 150°F.

Preheat the oven to 150°F. Don't turn on the top unit in an electric oven. If necessary remove it.

Loading And Stacking

Spread 1 to 2 pounds of food evenly on each tray. Lighter loads dry faster. If a gas oven floor has corners cut out, don't spread food on tray corners. It will scorch.

Stack 2 loaded trays together, using a wood block at each corner so air can circulate between trays. Place a stack on each oven rack. If there is only 1 rack, use extra blocks and stack 3 or 4 trays together.

If you dry different foods at one time, don't include onions, celery, kale or other foods with strong flavor or odor.

Not Too Hot

Put the thermometer on the top tray. Temperature should stay about 150°F. Prop an electric oven door open about one-half inch by tucking a folded hot pad holder on top corner. Prop a gas oven door open about 8 inches at top. The right opening helps control heat and lets out moist air.

Rotate trays periodically.

When Food Is Done

When food seems done, take a sample out. Cool it and test according to the Drying Table. Food that overheats near the end of drying will scorch easily. If pieces around tray edges dry first, take them right out. When rest of the food tests dry, turn off heat.

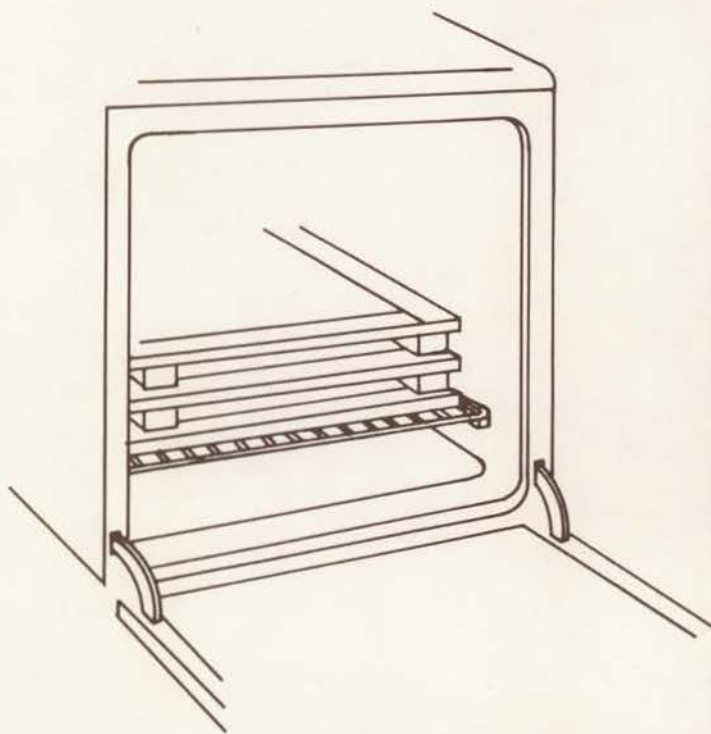


Fig. 1

Trays should be centered in the oven and separated with 1½-inch blocks. Trays should be 1½ inches shorter and 1½ inches narrower than the inside of the oven to allow for air circulation.

Sun Drying

Sun drying is natural drying by sun and movement of air. Successful sun drying requires a period of bright sunshine and low humidity, coinciding with product maturity. This method is slow and requires considerable care. Products must be protected from insects and must be sheltered at night.

Fruit Drying

Use proper treatment, then place fruit on trays one layer deep. Air circulation below and above fruit will speed drying time.

- Place in direct sun, turn occasionally. Cover the fruit lightly with cheesecloth or a screen to protect it from insects.
- After several days in direct sun, when the fruit is about two-thirds dry, move the trays to a shady area where there is good air circulation and continue drying until leathery.

Vegetable Drying

Use the recommended treatment. Spread in thin layer on trays.

- Place trays in the direct sun and turn occasionally.
- Expose to sun for only 1 or 2 days. Direct sun on vegetables produces sunburn or scorching. Finish drying in the shade.

Dehydrator Drying

Prepare foods and load trays as you would for oven-drying. Trays should be rotated and checked frequently.

Pretreatment For Fruits

Apples and other light-colored fruit tend to darken when they are dried. Sulfuring will help preserve natural color and will also decrease loss of vitamins A and C. You can sulfur fruits either outdoors in a sulfur box, or indoors by soaking in a sulfite solution.

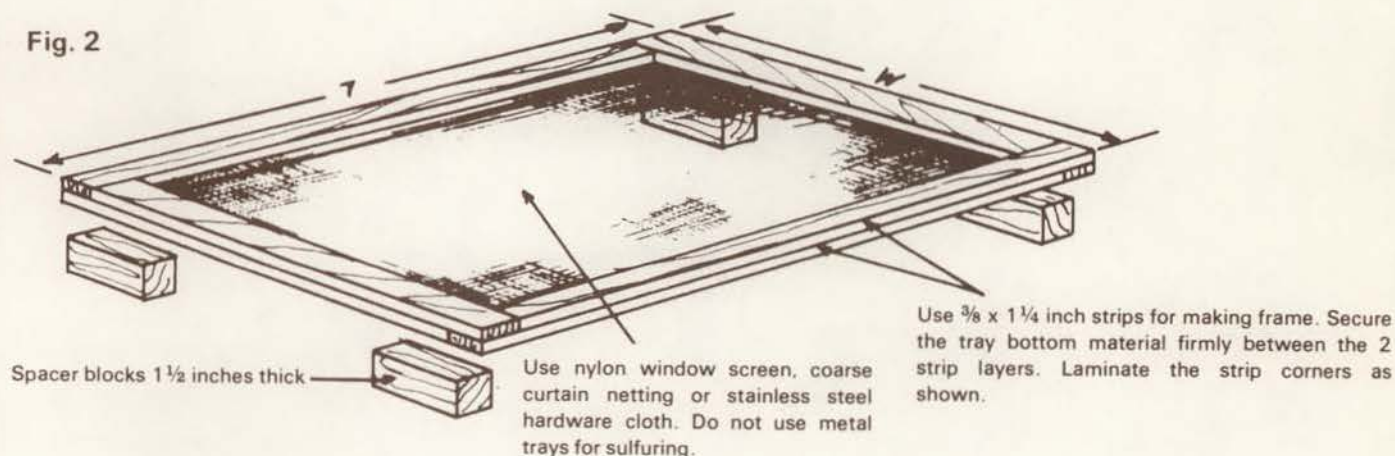
Sulfuring Indoors

Pare with a stainless steel knife and cut the fruit into thin, even slices or uniform pieces.

Prepare a solution of 1 to 2 tablespoons of sodium sulfite in 1 gallon of water. You can use sodium sulfite, sodium bisulfite or sodium metabisulfite. The compounds are available in drug stores, from food chemical wholesalers or from stores that sell wine-making supplies. **Be sure that you purchase U.S.P. (food grade) or Reagent Grade (pure) sulfur material.** Practical grade is not pure.

Soak the fruit 10 to 15 minutes. Drain well and spread to dry.

Fig. 2



DRYING TRAY CONSTRUCTION

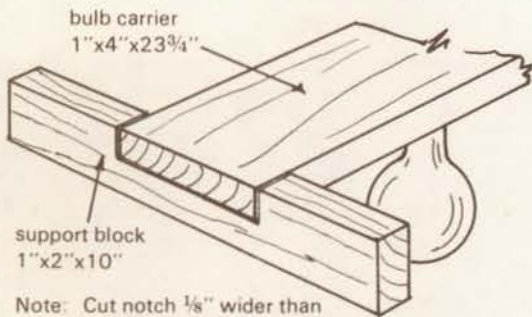
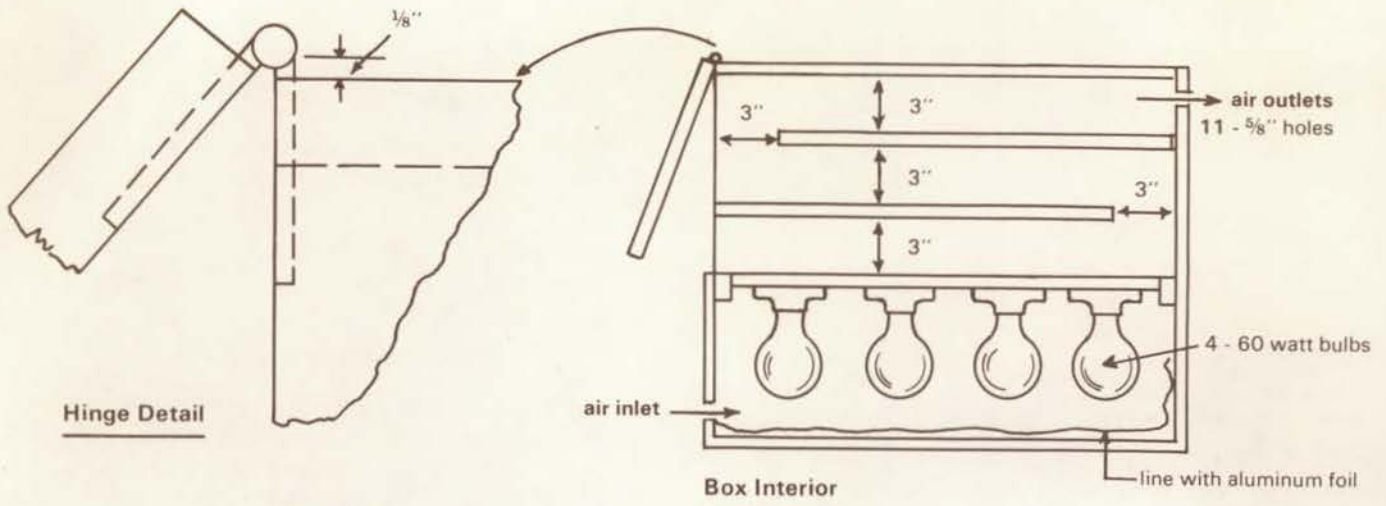
Materials: Soft lumber, nails or corrugated fasteners, coarse curtain netting or stainless steel hardware cloth, string, carpet tacks or thumbtacks. Do not use galvanized or chromated screen.

Tray Dimensions: Make each tray frame with an outside dimension $1\frac{1}{2}$ inches smaller than the oven inside length and width measurements. For cabinet driers, trays should be $\frac{1}{4}$ inch narrower than the inside width of the cabinet and the length should be 3 inches less than the cabinet compartment length.

Tack strings diagonally between corners of each frame. Stretch the strings tight and twist where they cross. Stretch a single layer of netting on top of the strings, tightly across the frame, turn in a hem and tack down on the underside of the frame.

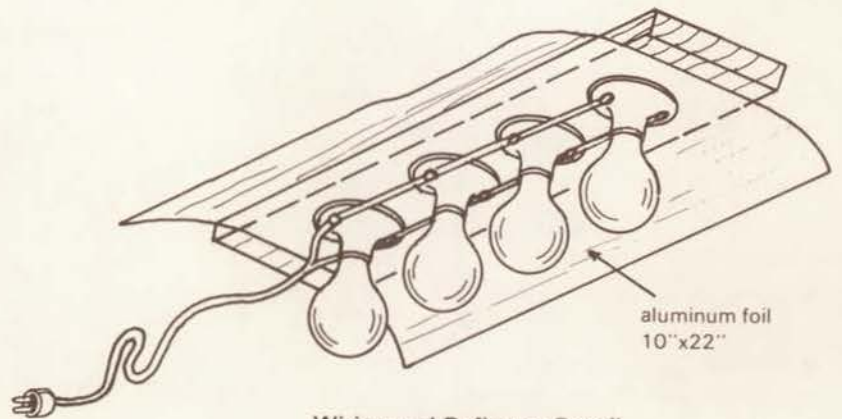
Care of Trays: These trays can be cleaned without disassembly. Wash the netting with a brush and warm soapy water, rinse, then dry trays in oven or sun.

Blocks for Tray Stacking: Cut blocks $1\frac{1}{4}$ x $1\frac{1}{4}$ x 3 inches. Cut as many blocks as needed.



Note: Cut notch $\frac{1}{8}$ " wider than bulb carrier. Do not nail or glue carrier in.

Notch Detail



Wiring and Reflector Detail

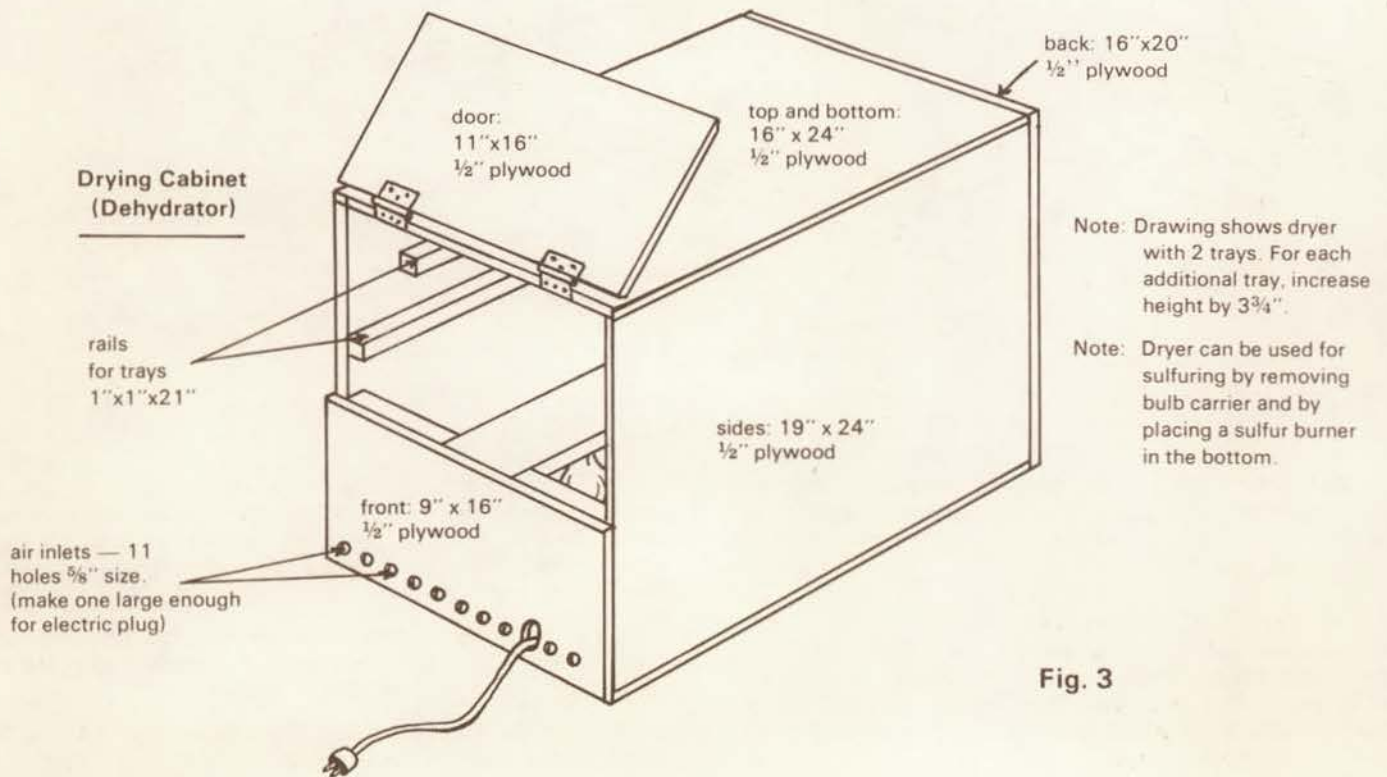


Fig. 3

Sulfuring Outdoors

To sulfur fruit outdoors, you will need a sulfur box and wooden trays similar to those in Figs. 2 and 4 and either sulfur candles or resublimed flowers of sulfur. These are available at many drug stores. Again, pare the fruit with a stainless steel knife and cut it into uniform pieces.

Place fruit not over one layer deep on wooden, slatted trays. Place the skin side down to prevent loss of juices. Use wooden trays — metal will react with the sulfur.

Stack the trays about 1½ inches apart to permit the sulfur fumes to circulate. Cover trays with a tight wooden box or heavy carton. It should be slightly larger than the stacked trays. Cut a small opening at the bottom of the box for lighting the sulfur and for ventilation.

Place sulfur in a clean metal container such as a tin can, shallow but deep enough to prevent overflow. If you are using resublimed flowers of sulfur, use 1 teaspoon of sulfur per pound of prepared fruit if sulfuring time is less than 3 hours; 2 teaspoons if the sulfuring time is 3 hours or longer.

Place the can beside the stacked trays and light the sulfur. Do not leave the match in the can. It may keep the sulfur from completely burning. Leave space for the sulfur to burn freely — no less than 3 inches between the metal can and the trays, 3 inches between the can and the inside of the cover.

Burning time varies with ventilation, shape of container and weather.

Salt Water Dip

Instead of sulfuring, you may use a salt water dip for fruits. Immerse the fruit and stir gently in a salt solution (4 to 6 tablespoons salt to 1 gallon water for 10 minutes). This method is not as good as sulfuring.

Ascorbic acid solution

Fruits may also be immersed and stirred gently in an ascorbic acid solution (1 to 1½ tablespoons ascorbic acid to 1 gallon water). This preparation retards oxidation and reduces darkening. Follow directions on the container if using a commercial ascorbic acid product.

Fruit Leather

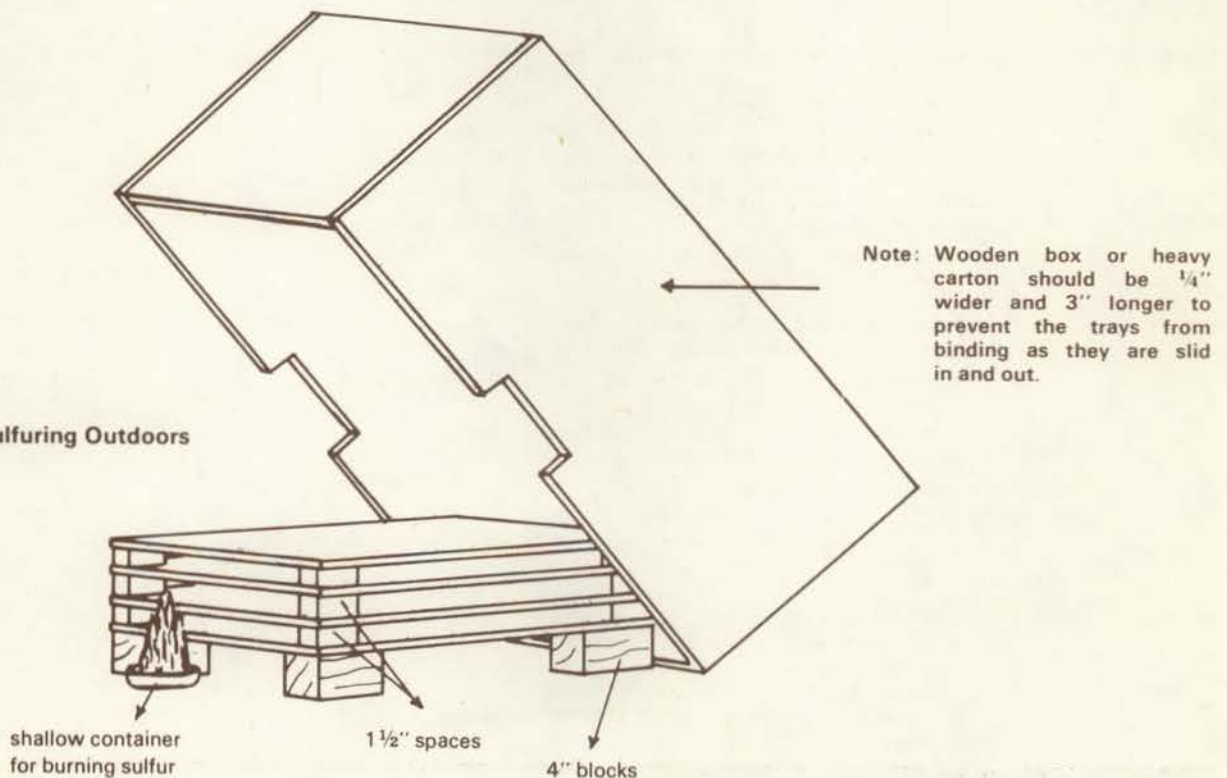
Fruit Leather can be made from apples, apricots, blueberries, cherries, plums, peaches or raspberries.

Place in a blender 2 cups fruit. Add 1 tablespoon honey or sugar per cup, more for tart fruit. Add food coloring if desired. Puree fruit mixture and pour into a teflon cookie sheet or plastic lined pan. The mixture should be bright, translucent and chewy. Dry in the oven or in the sun. When dry, it should peel away from the plastic or pan. Store by rolling on film and covering with more plastic. Leathers will keep at least 1 month at room temperature, 4 months if refrigerated.

Variations: Add cinnamon, nutmeg, lemon or orange peel; raisins, coconut or chopped dates to apple leather.

Fig. 4

Equipment for Sulfuring Outdoors



DRYING TABLE FOR

Selection and preparation	Treatment before drying		Tests for dryness (cool a piece before testing)	
	Method	Time in minutes		
Fruits				
Apples	Peel and core. Cut into slices or rings about 1/8 inch thick.	Sulfur	60	Leathery; glove-like section cut in half, no moist area in center.
Pears	Peel, cut in half lengthwise and core. Section or slice about 1/8-inch thick.	Sulfur (Dip or precooked)	60, sliced 120, quartered	Springy feel
Peaches, Apricots, Prunes, Plums	Peel and slice peaches. Cut apricots, nectarines, large plums and prunes in half and pit. Fruits dry more rapidly if quartered or sliced.	Steam (may omit) Sulfur	5 to 20 60, sliced 120, quartered	Pliable; leathery; a handful of prunes properly dried will fall apart after squeezing.
Berries (except strawberries)	Pick over, wash if necessary	Steam	1/2 to 1	Hard; no visible moisture when crushed.
Cherries	Pit only large cherries	Sulfur (white cherries)	10 to 15	Leathery but sticky
Figs	If figs are small or have partly dried on the tree, they may be dried whole without blanching. Otherwise, cut in half.	Steam	20	Pliable; leathery; slightly sticky
Grapes, small plums, small prunes	If dried without blanching, a much longer drying time is required. Only Thompson Seedless or other seedless varieties should be dried.	Blanching or no treatment	—	Pliable; leathery
Rhubarb	Cut in 1 inch lengths. Dip in actively boiling water 3 minutes.	—	—	Very brittle, dark green and red
Vegetables				
Beans: bush varieties	Remove defective pods. Wash. Remove strings from string varieties. Split pods lengthwise to hasten drying.	Steam or pressure saucepan	15 to 20 5	Brittle
Beets	Select small, tender beets of good color and flavor, free from woodiness. Wash, trim the tops but leave the crowns. Steam until cooked through. Cool, trim off roots and crowns, peel. Cut into shoestring strips or into slices about 1/8-inch thick.	Steam	30 to 45	Tough; leathery or brittle
Broccoli	Trim and cut as for serving. Wash, quarter stalks lengthwise.	Steam	8 to 10	Crisp
Cabbage	Remove outer leaves, quarter, core. Cut into shreds about 1/8-inch thick.	Steam until wilted		Tough to brittle
Carrots Parsnips	Select crisp, tender carrots, free from woodiness. Wash, trim off the roots and tops. Cut into slices or strips about 1/8-inch thick.	Steam	8 to 10	Tough; leathery
Rutabagas Turnips	Quarter, peel, cut in 1/8-inch slices or strips.	Steam	15	Leathery
Mushrooms	Peel larger mushrooms, dry whole or sliced, depending on size. No pre-cooking necessary. If stems are tender, slice for drying; if tough, discard. Spread not more than 1/2-inch deep on trays.	—	—	Leathery to brittle

RUITS & VEGETABLES

	Selection and preparation	Treatment before drying		Tests for dryness (cool a piece before testing)
		Method	Time in minutes	
Soybeans, edible green	Blanch pods until beans are tender but firm. Shell.	Steam	10 to 15	Shatter when hit with a hammer
Okra	Use young, tender pods only. Cut $\frac{1}{2}$ -inch crosswise, slices or split lengthwise. Spread not more than $\frac{1}{2}$ -inch deep on trays.	Steam	5 to 8	Very brittle
Peppers Pimientos	Cut in $\frac{1}{2}$ -inch strips or rings. Remove seeds. Spread rings 2 layers deep, strips not more than $\frac{1}{2}$ -inch deep.	Steam	10	Pliable
Cauliflower	Separate into flowerlets, cut large ones in half. Dip in salt solution (6 tablespoons salt/gallon of water).	Steam until tender	—	Hard to crisp, tannish yellow
Celery	Strip off leaves, cut stalks into $\frac{1}{2}$ -inch pieces. Stir occasionally during drying.	Steam until tender	—	Very brittle
Corn (cut)	Select tender, sweet corn. Husk. Steam on the cob immediately, 10 or 15 minutes, or until milk is set. Cut from cob.	—	—	Dry; brittle
Parsley and other herbs	No precooking necessary. Hang bunches of whole plant in dry warm place to dry. When dry, crush leaves and remove stems. Store in tightly closed containers.	—	—	Brittle
Onions	Remove outer, discolored layers. Slice.	—	—	Brittle; light colored
Peas	Select young, tender peas of a sweet variety. Shell. Stir frequently while drying.	Steam immediately	10	Hard; wrinkled shatter when hit with a hammer
Potatoes	Peel, cut into shoestring strips $\frac{3}{16}$ -inch cross section, or slice about $\frac{1}{8}$ -inch thick.	Rinse in cold water; steam	4 to 6	Brittle
Spinach and other greens	Select young, tender leaves. Wash. See that leaves are not wadded when placed on trays. Cut large leaves crosswise into several pieces to facilitate drying.	Steam until wilted	4	Brittle
Squash (banana)	Wash, peel, slice in strips $\frac{1}{4}$ -inch thick.	Steam	6	Tough to brittle
Squash (Hubbard) Pumpkin, yellow	Chop into strips about 1-inch wide. Peel off rind, scrape off fiber and seeds. Cut peeled strips into pieces about $\frac{1}{8}$ -inch thick.	Steam until tender	until tender	Tough to brittle
Squash (summer) crookneck, scallop, zucchini, etc.	Wash, trim, cut into $\frac{1}{4}$ -inch slices.	Steam	6	Leathery to brittle
Tomatoes for stewing (meaty varieties)	Select tomatoes of good color. Steam or dip in boiling water to loosen skins. Chill in cold water, peel. Cut into sections not over $\frac{3}{4}$ -inch wide. Cut small pear or plum tomatoes in half.	No further treatment or may sulfur	10 to 20	Leathery
Powdered vegetables	For use in soup or puree, powder leafy vegetables after drying by grinding fine in a blender or in an osterizer.			
Soup mixture	Cut vegetables into small pieces; prepare and dry according to directions for each vegetable. Combine and store. Satisfactory combinations may be made from cabbage, carrots, celery, corn, onions, peas. Rice, dry beans or split peas and meat stock are usually added at the time of cooking.			

Package Your Product

Cool vegetables after drying, then package at once. Most fruits should be allowed to "sweat" for a week after drying. This equalizes the moisture and, for apricots particularly, develops a candy-like consistency. To sweat fruits, place them in a sturdy carton, a graniteware canner or crock.

Before packaging for storage, pasteurize all products, especially if they have been sun-dried. Preheat the oven to 175°F. Spread the food loosely, not more than 1 inch deep on trays. Do not put more than 2 trays in the oven at once. Heat brittle-dried vegetables for 10 minutes, fruits for 15 minutes. Cool each batch before packaging.

Fill containers as tightly as possible without crushing the food. This forces air out. Seal tightly. Moisture-vapor proof is the rule.

Glass canning jars are especially good for dried foods. If old jar rings are used, use 2 for a tight seal. You also can pack food in old coffee cans or other tins with a tight lid. Use transparent or adhesive tape or paraffin — dipped cloth around the lid to help make a seal.

Another possibility is to use heavily waxed paper cartons with tight-fitting lids or bags especially made for storing dried foods. These can be sealed with a warm iron.

Properly dried and stored, most vegetables keep well about 6 months. Tomatoes and mushrooms are exceptions: Use them within about 3 months. Fruits well dried keep a year or longer. Package vegetables in fairly small quantities. One to two cups of dried food will serve 6 people. Leafy vegetables take 4 to 6 cups, so pack accordingly. Dried food is best soon after opening. Don't expose the lot to air and dampness when you take out a little.

Store Dry, Cool, Dark

Store in a dry, cool place, to hold food color and flavor. If necessary, make a blackout for glass jars. Examine food in storage occasionally. If you find signs of moisture, heat the food again to 150°F. for 15 minutes and repackage.

Although most dried foods store well at room temperature when tightly sealed, some should be kept in the freezer. Those foods need not be dried as completely.

Herbs dried on the stem may be stored on the stem in plastic or paper sacks to protect them from dust. Otherwise, remove the leaves from the stems and store whole, or crush in small cans or screw-top jars.

For Good Eating

1. Soak dried foods in just enough cold water to cover, until food is plump. Few foods need more than 2 hours, some less. Dried greens, finely cut vegetables and thinly sliced fruits don't require soaking.

2. Use the same water and boil gently in covered pan until tender. Cooking time may be 10 to 30 minutes depending on the food.

3. Sweeten fruits only if necessary. Season vegetables with fat, meat, garlic, onion — or use in soups, stews or baked dishes. It's best to add salt to vegetables when cooked to desired tenderness.

4. Use all dried food within a year for best flavor.

Oven-Drying Arithmetic

How much will a peck of fresh produce yield in dried food? Here are some approximations. Weights per peck given below are approximate:

	Fresh weight per peck (lb.)	Dried yield	
		Lb.	Pint
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 1/2-4
Corn	18	2 1/2	4-4 1/2
Greens	3	1/4	5 1/2
Onions	12	1 1/2	11 1/2, sliced 4 1/2, shredded
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 1/2-3

Prepared by Esther H. Wilson, Food and Nutrition Specialist, and Roy E. Taylor, Extension Agricultural Engineer, University of Idaho Cooperative Extension Service, with thanks to Peggy Pletcher, Joanne Anderson and Marilyn Jordan, Extension Home Economists, for their suggestions.

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