

# HOME DRYING OF FOODS



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## Acknowledgments

This bulletin was originally written by Ruth N. Klippstein, Professor, Division of Nutritional Sciences, Extension, Cornell University, Ithaca, New York, and Katherine J. T. Humphrey, Cooperative Extension Agent, Livingston County, Mount Morris, New York. Printed materials on drying foods at home from the Cooperative Extension Service in Arkansas, California, Nebraska, and Oregon were used in its preparation. Reprinted with permission by the Ohio Cooperative Extension Service, The Ohio State University, Columbus, Ohio.

## References

Names and publishers of some available books on home drying are listed below. Most contain information in greater detail than is possible in this bulletin.

**A.B.C.'s of Food Drying.** Densley, Barbara. Horizon Publishers, P.O. Box 4953, Bountiful, Utah 84010. Soft cover. 112 pp. \$3.95.

**Garden Way's Guide to Food Drying.** Hobson, P. Garden Way Publishing, Charlotte, Vermont 05445. Soft cover. 216 pp. \$5.95.

**Home Food Dehydrating.** Bills, J., and Bills, S. Horizon Publishers, P.O. Box 4953, Bountiful, Utah 84010. Soft cover. 151 pp. \$3.95.

**How to Dry Foods.** DeLong, Deanna. H. P. Books, P.O. Box 5367, Tucson, Arizona 85703. Soft cover. 160 pp. \$5.95.

**How to Dry Fruits and Vegetables at Home.** Elise Manning, Food Editor. Farm Journal, Inc., 230 W. Washington Square, Philadelphia, Pennsylvania 19105. Soft cover. 128 pp. \$2.95.

**Putting Food By.** Hertzberg, R., Vaughn, B., and Greene, J. 3d ed. Stephen Greene Press, Brattleboro, Vermont 05301. Soft cover. Pp. 376-420. \$11.95.

**Stocking Up.** Carole Store, ed. Rodale Press, Inc., Book Division, Emmaus, Pennsylvania 10849. Hardback. Pp. 95-128. \$13.95.

## Dehydrators

Contact your county Ohio Cooperative Extension Service office for further information on purchasing commercial food dehydrators or for plans for constructing a home-built dehydrator.

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# Pretreating

## Fruit

Drying does not improve the quality of fruit. Use only fully ripened fruit. If it is at the right stage for eating fresh, it is also suitable for drying.

Sort and discard defective fruits. Wash, pit, and halve when necessary (as with stone fruits). Most fruits are pretreated immediately before drying to maintain an attractive appearance—to prevent darkening, loss of flavor, and loss of vitamin C.

Grapes and prune plums to be dried whole may be dipped in boiling water and held 30 seconds to help break the skin.

### With Steam

Make a steamer out of a kettle with a tight-fitting lid. Place a colander, wire basket, or sieve inside the kettle, making sure the food will be above the water level. Add 1 1/2 to 2 inches of water and heat to boiling. Place the container with the loosely packed food in the steamer, cover, and leave for the amount of time suggested in Tables 2 and 3. Test food by cutting through a piece. If sufficiently blanched, it should appear cooked (translucent) nearly to the center.

### With Water

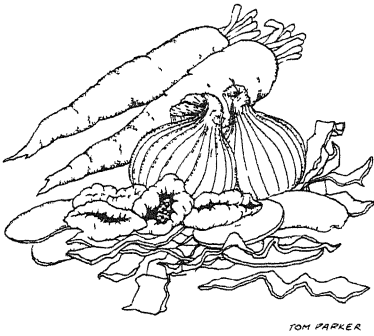
Use enough water to cover the product. Bring the water to a boil and gradually stir in the food to be blanched, following the directions in Tables 2 and 3. Reuse the water for additional lots when blanching the same food, adding more water as necessary. Keep the lid on the kettle while blanching.

### Microwave Blanching

There is no consensus regarding the use of the microwave oven for blanching. The major problem is achieving a uniformly blanched product. Large amounts of food are blanched more efficiently in steam or boiling water on the kitchen range.

Small amounts of food, however, can be easily blanched in the microwave. Refer to the direction book for your model microwave oven and follow blanching instructions for drying, if they are provided. If not, use this handy rule-of-thumb guide:

Turn to the fresh vegetable or fruit cooking chart for your microwave oven. Use the amount of water specified for the amount of product suggested. Omit salt. Cook in a covered casserole as specified for one-quarter to one-third the time given for cooking the fresh food. Stir well after one-half of the time has elapsed and again after the blanching is completed. Allow to stand a minute or two until uniformly colored throughout. Plunge into ice water and, when cold, spread on paper towels to absorb surface water. Fill trays and proceed with drying instructions.



## Drying— one of the oldest methods to preserve food

For thousands of years, people have dried foods to preserve them for leaner times. Preserving seasonal foods by drying is still useful and convenient. It also conserves storage space.

How does drying preserve food? Basically, sufficient moisture is removed from a food material to prevent decay; water content of properly dried food varies from 5 percent to 25 percent.

In hot, dry climates, the moisture content in foods will be reduced in a few days to a level that preserves them. In any climate, however, satisfactory drying conditions can be created at moderate expense by using artificial heat and circulating air over the food.

Vegetables and fruits can be dried:

- in your kitchen oven. You need drying trays, an oven thermometer, and a small fan.
- in a special food dehydrator. Directions for constructing food dehydrators are available. See references listed on the opposite page.

Food dehydrators may also be purchased from commercial outlets.

## Vegetables

Select vegetables carefully. Only vegetables that are in prime condition for cooking are suitable for drying. Vegetables not listed on Table 1 can be dried, but quality will be sacrificed. Vegetables should be washed and prepared on the same day they were harvested. (See Table 1 for approximate yields of dried food from a given amount of fresh produce.)

## Blanching

Blanching is the process of heating foods to inactivate enzymes, the biological catalysts that facilitate chemical reactions in living plant tissue. If certain enzymes remain active, they cause color and flavor to deteriorate during drying and storage. Therefore, many vegetables and some fruits, when dried, will have a better flavor and color if they are blanched. Hot water or steam may be used in blanching. Water blanching usually results in more leaching of nutrients but is less time-consuming than steam blanching under kitchen conditions.

Blanching produces a slightly cooked flavor, particularly with pears, cling peaches, and apricots. Either steam or water blanching may loosen the skins enough so they peel off, making these fruits soft and difficult to handle. (In commercial operations skins usually are not removed.)

## Sulfuring (optional)

Apricots, peaches, apples, and pears are the fruits most often sulfured. Sulfuring fruit (exposing it to sulfur fumes) helps preserve color, prevent souring, and retain vitamins A and C during drying and storage. Thiamine is lost, however, if this pretreatment is used. Unsulfured fruit is less attractive but acceptable.

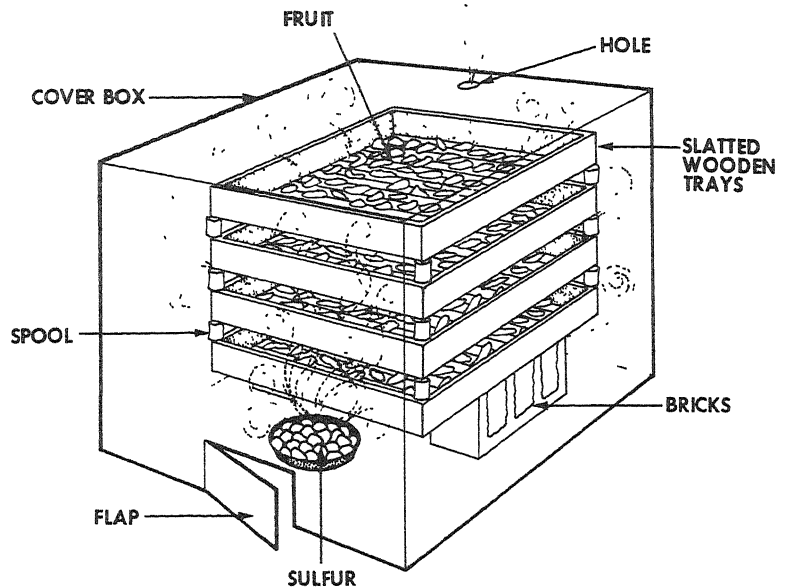
### Materials needed

- **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 1½ 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 1½ 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. quality, which is free of impurities and burns readily. It may be purchased at most pharmacies.
- **Clean metal container** to hold sulfur. For small amounts of fruit, 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 do it

Always sulfur outdoors away from close contact with plants, shrubs, and trees. Consult Table 2 for recommended amount of time for sulfuring different fruits.

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 1½ inches apart, separated by spools or wooden blocks placed at the corners.

3. Make a 6" x 2" 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. Open the flap 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 to use 1 to 2 teaspoons of sulfur per pound of fruit (a stack of four trays holds about 40 pounds of fresh 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 one inch or more deep. Sulfur fumes do the work, not the burning sulfur, so it is important that the box be tight.

5. Place the can of sulfur under the box near the lower opening and light the sulfur. 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 dirt, leaving the flap open.

7. When the 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.

### Drying Trays

Many directions for home-constructed drying trays suggest the use of aluminum, galvanized, or copper screening. These should not be used, however, because of possible chemical reaction between the food and metal during sulfuring or drying. Fiberglass screening is also not suitable because repeated handling may cause fiberglass to splinter, thus contaminating the product. Nylon screening or netting or wooden slats are suitable materials for tray construction. Nylon screening is available at sporting goods stores. Cover wooden trays with nylon netting to prevent sticking and to keep small pieces of food from falling through the spaces left for air circulation.

## Sulfiting (optional)

Those who do not have outdoor facilities for burning sulfur can use a solution of sodium bisulfite to prevent the color and flavor changes caused by oxidation and enzymatic browning. Although not quite as effective as sulfuring, sulfiting is easier to do, and sulfited products are superior to untreated ones.

Purchase food-grade sodium bisulfite at wine-making supply stores or ask for it at a pharmacy. The amount of bisulfite to use per gallon of water varies with the size, ripeness, and thickness of pieces of fruit being used. A general guideline is to use 1 to 2 tablespoons of bisulfite per gallon of water.

Cut fruit quickly and immerse in bisulfite solution 5 minutes for fruit slices (apples and peaches) and 15 minutes for halves. Pour off the solution and remove the surface sulfite with a quick rinse under the water faucet. Pat dry with paper towels and proceed with drying. Bisulfited fruits will take about 20 percent longer to dry than unsulfited fruits, but they will retain color and flavor for longer periods of time than untreated fruits.

DO NOT USE THE HOUSEHOLD OVEN to dry bisulfited fruits. The sulfur fumes that form have an unpleasant odor and are harmful to health. If using this method, dry the foods in equipment that can be vented outdoors or move the dryer outdoors for the first hour or so.

Fumes from sulfuring should not be inhaled. Keep household plants, animals, and children away from sulfuring procedures during the first hour of drying.

Individuals allergic to bisulfite should avoid the sulfiting method described here.

## Drying Food In a Dehydrator

1. Place the dehydrator in a well-ventilated room.
2. Distribute the food to be dried on the trays in a single layer. Different foods may be dried at the same time, but strong-smelling vegetables should be dried separately.
3. Set thermostat at 150° F and preheat the dehydrator.
4. Place the trays of prepared food in the heated dehydrator.
5. Place an easily read thermometer on the bottom tray.
6. After the trays are placed in the dehydrator, the temperature will drop. Reset the thermostat to 140° F and maintain the temperature until the drying is complete.
7. Examine the food at hour-and-a-half to two-hour intervals, depending on the food. To assure uniform drying in the dehydrator, rotate the trays. At the start of the drying process there is little danger of scorching. Near the end of the drying time lower the temperature to 120° F. When nearly dry, the food scorches easily. Even slight scorching destroys the flavor and may lower the nutritive value.

8. The time for drying varies according to the type of food, size of pieces, and load in the dehydrator. See Tables 2 and 3 for drying times.

9. Cool the food before testing for dryness.

10. If drying fruits or herbs, proceed with conditioning and pasteurizing (directions p 5). Food should be cooled and packaged before storing. After the dehydrator has cooled, trays should be cleaned with soapy water, rinsed, and dried.

## In an Oven

Test the temperature of the oven at its lowest setting. Many ovens in modern ranges cannot be held below 200° F. This is too hot for successfully drying food. Alternative drying equipment must be used.

Trays upon which the food is placed must be at least 1½ inches narrower than the inside of the oven to allow for air circulation. Allow at least 2½ inches between trays and 3 inches of free space at the top of the oven. Cover the trays with nylon netting or screening to facilitate removal of dried food.

1. Load two or three trays with no more than 4 to 6 pounds of prepared food distributed among them. 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. Place an accurate and easily read thermometer on the top tray toward the back.

3. Preheat the oven to 150° F, and then add the loaded trays. Prop the oven door open at least 4 inches.

4. Place a fan outside the oven so that air is directed through the opening and across the oven.

5. Maintain the temperature at 140° F. Watch the temperature carefully toward the end of the drying to prevent scorching, lowering it to 120° F if possible. Examine the food often and turn the trays frequently. Consult Tables 2 and 3 for the time needed for various foods.

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NOTE: Oven drying is not recommended for sulfured fruits because the sulfur fumes create an objectionable odor. If the oven must be used to dry fruits, choose steam or water blanching in place of the sulfur treatment.

## In the Sun

Drying in the sun is unpredictable unless temperatures are over 100° F 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. The climate in the Northeast does not lend itself to successful sun drying.

## When Is Food Dry?

Judging when food is dry requires experience. It is better to overdry than to underdry. When in doubt, continue drying for additional time. Allow the product to cool before testing.

**Vegetables** are sufficiently dried when they are leathery or brittle. Leathery vegetables will be pliable and spring back if folded. Edges will be sharp. Corn and peas shatter when hit with a hammer.

**Fruit leathers** may be slightly sticky to the touch but separate easily from the plastic wrap.

**Fruits** are adequately dried when moisture cannot be squeezed from them.

**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, fibrous, and forms sharp points when broken.

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

## Conditioning and Pasteurizing

Most authorities include instructions to condition and/or pasteurize dried fruits, herbs, and seeds to improve storage.

## Conditioning

The moisture content of dried fruits and herbs as they come from the dryer is not uniform. Thin fruit slices and edges are drier than thicker centers. Condition these foods by allowing them to stand in

covered glass or china containers until uniform moisture levels are reached, approximately 2 to 4 days for fruits, 1 or 2 days for leafy herbs. If moisture (condensation) appears on the lid of the container, the food is not dry enough. The drying process must be continued or the product will mold.

Vegetables are normally dried to a much lower water content than fruits and do not need conditioning.

## Pasteurizing

There is always a possibility that insect larvae may be present on the surface of fruits and vegetables. It is wise to prevent insect problems by pasteurizing the food using one of the following methods:

1. Freezer. Package dried product in plastic bags and store in the freezer a minimum of 48 hours. Remove and package promptly for permanent storage. Do not allow sweating to take place.

2. Oven. Layer food loosely in roasting pans and heat in 175° F oven for 15 minutes or at 160° F for 30 minutes. Remove and cool quickly. Package for permanent storage. This treatment results in loss of vitamins.

## Packaging and Storing

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

All dried vegetables deteriorate to some extent during storage, losing vitamins, flavor, color, and aroma. They will not retain their appeal indefinitely.

Carrots, onions, and cabbages deteriorate more rapidly than do other vegetables; their shelf life is only about 6 months. Most vegetables, however, retain good quality after a year's storage.

Dehydrated foods are free from insect infestation when removed from the dehydrator or oven. They are immediately susceptible to contamination, however, and should be packaged as soon as they are cool. Use dry, scalded, insect-proof containers such as home canning jars with tight-fitting lids. Coffee cans may be used if the dried foods are first placed in plastic freezer bags. They should be packed into the container as tightly as possible without crushing. Packaging should be rodent-proof. Reports indicate

that mice and rats have no trouble eating through the plastic lids of coffee cans.

Note: Sulfuring does not prevent insect infestations, so pack the sulfured dried product immediately after drying.

Another point to remember with sulfured fruit: Do not use metal lids unless plastic wrap is placed under the lid to prevent sulfur fumes from reacting with the lid. To keep their original color, dried fruits should be stored away from light in tightly sealed plastic freezer bags.

## Fruit and Vegetable Leathers

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

Hikers find them a lightweight, nutritious, and satisfying trail food.

People like their sweet taste and chewy texture for snacks.

Calorie-conscious adults appreciate small pieces used as chips for favorite dips.

Cooks use vegetable leathers to flavor favorite pasta sauces and fruit leathers in place of raisins or candied fruits in baking.

## Preparation

Use good-quality products in prime condition.

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

2. Remove blemishes, stems, leaves, buds, pits, and seeds.

3. Slice, halve, or cube as appropriate. Peel or not, depending on food. Banana peels should not be used. Apple and tomato peels are edible and may be used. Peach and apricot skins are usually used. Grape seeds and excess seeds from berries may be removed if desired.

4. Soft fruits need no cooking. Firmer foods or those that change color when exposed to air should be heated to

Table 1. Yield of dried food

Produce	Amt. Purchased or Picked in pounds	Amt. Dried Product	
		Pounds	Pints
Apples	12	1¼	3
Beans, lima	7	1¼	2
Beans, snap	6	½	2½ 1" pieces
Beets	15	1½	3-5
Broccoli	12	1¼-1½	12-15
Carrots	15	1¼	2-4
Celery	12	¾	3½-4
Corn	18	2½	4-4½
Greens	3	¼	5½
Onions	12	1½	11½ sliced 4½ shredded
Peaches	12	1-1½	2-3
Pears	14	1½	3 quartered
Peas	8	¾	1
Pumpkin	11	¾	3½
Squash	10	¾	5
Tomatoes	14	½	2½-3

Marjorie M. Phillips, *Drying Foods at Home*, Cooperative Extension Service, University of Arkansas, Little Rock, Arkansas 72203. Reprinted with permission.

soften the food or destroy enzymes before puréeing. To prepare, place pieces of fruit in the top of a double boiler to avoid scorching. Cover and cook over boiling water for 15 minutes. Remove from heat and cool.

5. Use a food mill, cone, sieve, or electric blender to purée the fruit or vegetable. The purée should be smooth, without lumps or pieces. A small amount of water or juice may be added to facilitate puréeing in a blender. Up to 1 tablespoon sugar per cup of fruit may also be added.

6. Dry the purée on a baking sheet. A no-stick coated baking sheet with 1/4-inch sides all around is ideal. Line the sheet with plastic wrap. Wet the edges of the sheet to hold the wrap in place. Spread the purée to 1/8" to 1/4" thick. Two to three cups of purée are enough for an 11" x 15" cookie sheet.

7. Place the purée in the oven heated to between 120° F and 150° F. Temperature control is important. If the thermostat of the 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. Prop the door open to allow the moisture to escape.

8. Check leather as it dries, turning the sheet for even drying. It may take anywhere from 6 to 24 hours to dry depending upon the thickness of the purée, temperature of the oven, and which product is being dried. Leather is ready when it has a leathery appearance and is pliable enough to roll up without breaking. Brittle leather indicates over-drying. Test by lifting the plastic wrap and separating the dried food from the wrap. If it separates easily, ease the leather from the baking pan and gently peel off the plastic wrap.

9. Allow the leather to cool a short time.

10. Place the leather on a clean piece of plastic wrap and roll, jelly-roll fashion, with the plastic wrap separating the layers of leather. The leather is now ready to store.

11. Overwrap in moisture-vapor-proof materials, freezer bags, or aluminum foil. Store in a dark place at room temperature or in the freezer. Leathers will keep from one month to a year though most will be eaten long before storage times can be tested!

**Apple Leather.** Purée apple chunks, with or without skins, in a blender. Cider or other liquid may be added to start the blending action. Puréed mixtures of apples with either apricots or berries are tasty. Cinnamon or ginger, sugar or honey make interesting flavor combinations. Apple leather can also be made from fresh or canned applesauce. When cut into 1/2-inch squares, apple leather can be a wonderful chip with your favorite dip.

**Apple-Apricot Leather.** For a tasty flavor combination add a jar of puréed baby food apricots to a #2 can of applesauce. Fresh fruits can be used when in season.

**Banana Chips.** Peel firm, ripe bananas and slice evenly 1/4 inch thick. Dip slices in pineapple juice or lemon juice, then in granulated sugar. Place on plastic wrap. Dry. Dried banana chips are a sweet and chewy snack that can be dipped in sour cream.

**Grape Leather.** Wild or cultivated grapes make a delicious grape leather. Wash and remove stems from grapes. Cook the grapes 15 to 20 minutes in a double boiler to prevent scorching. Press through a sieve or food mill to remove seeds and tough skins. Add sugar to taste (1 tablespoon per cup of purée). Most grape varieties need no sweetening. Spices may be added.

**Sweet Tomato Leather.** Small cherry tomatoes or varieties with high solid content are best for leathers. Wash thoroughly and remove stems and blemishes. Purée in a blender. Begin with a few wedges of tomato to obtain juice, then add more tomatoes to reach the desired amount. The addition of a lemon wedge and 1 tablespoon of honey per cup of purée makes a delightfully sweet leather.

**Tomato Vegetable Leather.** Follow general instructions for sweet tomato leather. Whirl prepared onion, green pepper, and garlic in blender until fine. Add diced, unpeeled tomatoes, a few at a time, blending until smooth. Add cloves or other seasonings as desired. Dry.

Proportions vary with personal taste. For a beginning, try one medium onion, one green pepper, and one garlic clove per three cups of prepared tomatoes.

This leather may be eaten as is or, with the addition of water and a little seasoning, becomes an excellent tomato sauce. A little may be added to soups for flavoring. One-half to 1-inch squares of leather may be used with dips.

## Meat Jerky

One way to preserve part of a venison harvest is to prepare some as jerky.

### Preparation

1. Slice 5 pounds lean beef or venison (flank steak or similar cut) into strips 1/4 to 1/2 inch thick, 1 to 1½ inches wide, and 4 to 12 inches long. Cut with grain of meat; remove the fat and any membranes adhering to the meat. Note. Partially freezing the meat makes it easier to cut.

2. Lay out in a single layer on a smooth, clean surface. Use a cutting board, counter, bread board, or cookie sheet. Wash any wooden surface after use.

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

4. Place strips, layer on layer, in a large glass bowl or crock. Cover with a plate. Place a weight on top to press out drip as it forms.

5. Refrigerate and let stand for 6 to 12 hours.

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

**Other flavors.** Brush or marinate the strips before drying in such mixtures as teriyaki sauce, sweet and sour sauce, soy sauce, hot chili sauce, or Worcestershire sauce—or combinations of these according to choice. Use liberal amounts of salt in addition to the chosen flavors.

### Oven Drying

Remove racks from oven and stretch meat strips across the racks. Allow the edges of the meat strips to touch but not overlap. Leave enough space free on the racks for air to circulate in the oven.

Set the temperature at 140° F and let strips dry for about 11 hours. Check early in the drying process for excessive drip. This drip can be caught on aluminum foil on a rack placed near the bottom of the oven.

Jerky is ready when the dried meat is dark in color, fibrous, and forms sharp points when bent.

**Beef Jerky.** Partially freeze lean meat (flank, rump, brisket, or round steak) Using a sharp knife, trim all fat. Cut the meat *with* the grain into narrow strips not more than 1 1/4 inch thick and about 6 inches in length.

Vary seasonings to taste.

For 4 pounds of meat, combine:

- 1 1/3 tablespoons salt
- 1 teaspoon pepper
- 2 teaspoons onion powder
- 1 teaspoon garlic powder
- 1 teaspoon Worcestershire sauce
- 12 drops Tabasco sauce
- 1/4 teaspoon thyme

Stir seasonings into water (use only enough water to barely cover the meat) Soak meat overnight in the refrigerator Drain off liquid and pat dry with paper towels. Lay directly on drying rack that has been covered with paper towels and cheesecloth. Do not overlap meat strips.

Preheat oven to 140° F and leave door ajar for air circulation. The drying process takes 4 to 10 hours. Check the meat often.

Meat is ready when it is dark in color, fibrous, and forms sharp points when bent Absorb fat on surfaces of jerky with paper towels. When cooled, store in an airtight jar or plastic freezer bag. Store in freezer to obtain maximum safe storage. Yield: 150 pieces per pound, 2" x 1/4" x 1/4" (measured before drying).



## Drying Herbs and Other Seasonings

Herbs are defined as seed plants, which form more or less soft, succulent leaves and tender stalks. Herbs are used for flavor or scent. Examples of popular herbs include rosemary, thyme, basil, sage, mint, 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 storage, however, leaves should be harvested when the plants begin to blossom. Pick tender stems containing mature, succulent leaves from rapidly growing plants. Wash the stems and leaves in cold water, drain, and dry on paper towels until no visible water remains.

### The less tender herbs

The more sturdy herbs such as sage, thyme, summer savory, and parsley are the easiest to dry. They can be tied into small bundles and air dried. Air drying outdoors is often possible; however, better color and flavor retention usually result from drying indoors.

### The tender-leaf herbs

Basil, tarragon, lemon balm, and the mints have a high moisture content and will mold if not dried quickly. Avoid exposure to light during the drying period because light bleaches the color. Try hanging the tender-leaf herbs or those with seeds inside paper bags to dry. Tear holes in the sides of the bag. Suspend a small handful (large amounts will mold) of herbs in a bag and close the top with a rubber band. Place where air currents will circulate through the bag. Any leaves and seeds that fall off will be caught in the bottom of the bags.

When herb leaves or seeds are dry, clean by separating them from stems

and other foreign matter. Pack in suitable containers to prevent loss of the essential oils that give the herbs their delicate flavor. Storage in glass, metal, or plastic freezer bags in paper boxes will preserve the odor and flavor. Glass jars make satisfactory containers but should be stored in the dark to prevent bleaching of the green leaves. This is easily accomplished by placing jars in paper sacks or boxes.

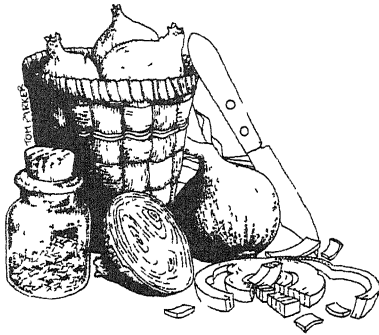
Another method, especially nice for mint, sage, or bay leaf, is to dry the leaves separately. Remove the best leaves from the stems. Lay each leaf on a paper towel and, without allowing leaves to touch, cover with another towel and layer of leaves. Five layers may be dried at one time using this method. Dry in a very cool oven. The oven light of an electric range or the pilot light of a gas range furnishes enough heat for overnight drying. Leaves dry flat and retain a good color. Package promptly in moisture vapor-proof containers. Protect from light to retain color. To preserve the fresh taste, extra herbs may be frozen.

## Drying Herbs in a Microwave Oven

Drying herbs in a home microwave oven has been questioned because the effect of such a very small food load on the magnetron tube is not known. In theory the light load and limited moisture of the herbs would not provide enough moisture for correct function of the oven. Follow directions for your particular make. Small, occasional harvests should present few problems if a small container of water is placed in the appliance when the drying is done. Do not use the home microwave for drying commercial amounts of herbs or seeds.

**Dill.** The dill plant is popular for the seeded flower, gathered and used for dill pickle recipes. The tender leaf and stem are also excellent to use, dried, as a flavor for dips and salad dressings or in cream sauces on meat. This is the "dill weed" referred to in many gourmet recipes.





## Using Dried Vegetables and Fruits

Dried vegetables and fruits provide quick and tasty additions to family meals. They can be used alone or in combination. They can serve simply to accent flavor. Most uses require that the food be rehydrated, usually referred to as “refreshing.”

## How to Refresh Dried Food

Refreshing is accomplished by soaking or cooking (or a combination of both) the dried food in water until the desired volume is restored. Table 4 lists the appropriate amounts of water needed to refresh 1 cup of some dried foods and the suggested minimum soaking times.

Dried vegetables, if they were properly pretreated with steam or water blanching before drying, require a minimum of refreshing. Vegetables such as spinach, kale, cabbage, chard, or tomatoes are refreshed by covering with hot water and simmering to desired tenderness. Root, stem, and seed vegetables are soaked 1/2 to 1 1/2 hours in sufficient cold water to keep them covered. After soaking, they are simmered until tender, and excess water is allowed to evaporate. If dried vegetables are added to boiling water, the time needed for refreshing is much shorter.

Dried fruits are soaked in hot water and then cooked, if appropriate, in the same water. Extra water needed for preparation may be added after the soaking period. Do not add sugar until fruit is tender; sugar will toughen the product.

## How to Cook Dried Food

Refreshed dried vegetables require less time to cook than fresh vegetables. Simply simmer to the desired degree of firmness. Taste can be improved by the addition of butter, basil, garlic, onion, chili, cheese sauce, or other favorite flavorings.

Dehydrated vegetables are best when used as ingredients for soups, casseroles, sauces, stuffings, and stews. Various combinations of dried vegetables may be used, but caution should be exercised not to add too much dried onion or garlic.

Dried fruits are refreshed and simmered until tender. The spices or flavorings appropriate for the fresh fruits, such as cinnamon, ginger, and nutmeg, are also suitable for use with the dried product. Dried fruits are excellent used in cobblers, breads, pies, or puddings. Packaged dry, they are suitable for trail food and for outdoor cooking.

Fresh vegetables and fruits provide calories, fiber, minerals, and vitamins. Changes that can be expected in home-dried food are listed below.

- **Calories:** No change. The calorie content of the dried food, however, will be higher per unit of weight because nutrients become more concentrated as water is removed.
- **Fiber:** No change.
- **Minerals:** Some may be lost in soaking, but no data are available.
- **Vitamins:** Those most often found in fruits and vegetables are A, C, and the B vitamins. Significant amounts of C and A are retained. Sulfuring helps protect vitamins C and A but destroys B<sub>1</sub>. The foods recommended for sulfuring are very low in B<sub>1</sub>; consequently, such loss need not be of major concern.

Detailed research-based data on the nutritional value of home dried food is, unfortunately, not available.

Table 4. Refreshing dried food

Product	Amount of water to add to 1 cup dried food	Minimum soaking time (hours)
Asparagus	2¼	1½
Beans, lima	2½	1½
Beans, green snap	2½	1
Beets	2¾	1½
Carrots	2¼	1
Cabbage	3	1
Corn	2¼	½
Okra	3	½
Onions	2	¾
Peas, green	2½	½
Pumpkin	3	1
Squash	1¾	1
Spinach	1	½
Sweet potatoes	1½	½
Turnip greens and other greens	1	¾
Apples	1½	½
Pears	1¾	1
Peaches	2	1¼

Note: For vegetables, use boiling water; for fruits, use water at room temperature.

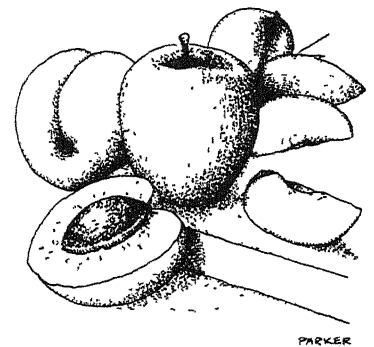


Table 2. A guide to home drying of fruits

Fruit	Preparation	Pretreatment			Dryer/Drying Time (hours)	Test for Dryness (cool before testing)
		Sulfur (hours)	Blanch			
			Steam (minutes)	Water (minutes)		
<b>Apples</b>	Peel and core, cut into slices or rings about 1/8 inch thick.	3/4	3-5 minutes, depending on texture		6-12	Soft, pliable, no moist area in center when cut.
<b>Apricots</b>	Pit and halve for steam blanch or sulfuring. Leave whole for water blanch. Pit and halve after blanch.	2	3-4	4-5	24-36	Same as for apples.
<b>Bananas</b>	Use solid yellow or slightly brown-flecked bananas. Avoid bruised or overripe bananas. Peel and slice 1/4" to 3/8" thick, crosswise or lengthwise.				8-10	Pliable to crisp.
<b>Berries</b>	Wash and drain berries with waxy coating (blueberries, cranberries, currants, gooseberries, huckleberries).				24-36	Leathery and pliable with no moisture.
<b>Firm:</b> Suitable for snacks or cooking						
<b>Soft:</b> (Not a superior product)	(Blackberries, dewberries, boysenberries, loganberries, raspberries, strawberries, youngberries.) Sort and wash carefully. If seeds are too numerous, make into purée, sieve out seeds, and use for fruit leathers. Or dry, make into powder in blender or food processor, and use for fruit-flavored beverages.				24-36	Dry and leathery or crisp.
<b>Cherries, sweet</b>	Royal Ann or black variety is best. Stem, wash, drain, and pit fully ripe cherries. Cut in half, chop, or leave whole.				24-36	Shriveled, leathery, dry, no pockets of moisture.

Table 2. A guide to home drying of fruits (continued)

Fruit	Preparation	Pretreatment			Dehydrator Drying Time (hours)	Test for Dryness (cool before testing)	
		Sulfur (hours)	Blanch				Other
			Steam (minutes)	Water (minutes)			
<b>Citrus peel</b>	Peels of citron, grapefruit, kumquat, lime, lemon, tangelo, and tangerine can be dried. Thick-skinned navel orange peel dries better than thin-skinned Valencia peel. Wash thoroughly.				No pretreatment. Remove outer 1/16 to 1/8 inch of peel. Avoid white bitter pith.	8-12 Crisp.	
<b>Grapes:</b> Muscat, Tokay, or any seedless grape	Leave whole.	No treatment necessary.				12-20 Raisinlike texture, no moist center.	
<b>Nectarines and peaches</b>	When sulfuring, pit and halve; if desired, remove skins. For steam and water blanching, leave whole, then pit and halve.	2-3	8	8		36-48 Same as for apples.	
<b>Pears</b>	Cut in half and core. Peeling preferred.	5	6 minutes (will be soft if peeled)			24-36 Same as for apples.	
<b>Pineapple</b>	Use fully ripe, fresh pineapple. Wash, peel, and remove thorny eyes. Slice lengthwise and remove core. Cut in 1/2-inch slices, crosswise.	No treatment necessary				24-36 Leathery but not sticky.	
<b>Plums (Prunes)</b>	For oven-drying or dehydrator, rinse in hot tap water. Leave whole. If sulfuring, pit and halve.	No treatment necessary. Sulfuring for one hour will preserve good flavor and color				24-36 Leathery; pit should not slip when squeezed if prune is not cut.	

A dehydrator is suggested rather than an oven because of time needed to dry fruits (especially those in large pieces). Range ovens can be used, but time and fuel expenditure will be great for the amount dried. Apples are the only fruit practical to dry in large pieces in the home oven.

Table 3. A guide to home drying of vegetables  
 For oven and portable dehydrators, set temperature at 140° F.

Vegetable	Preparation	Blanching Time (minutes)		Drying Time (hours)		Characteristics
		Steam	Water	Dehydrator	Oven	
Beans, green	Wash thoroughly. Cut in short pieces or lengthwise	2-2½	2	8-14	3-6	Leathery, brittle
Beets	Cook as usual. Cool, peel. Cut into shoe-string strips ½ inch thick	Already cooked, no further blanching required		10-12	3-5	Brittle
Broccoli	Trim, cut as for serving. Wash thoroughly. Quarter stalks lengthwise	3-3½	2*	12-15	3-4½	Crisp
Brussels sprouts	Cut in half lengthwise through stem	6-7	4½-5½	12-18	4-5	Tough to brittle
Cabbage	Remove outer leaves; quarter and core. Cut into strips ½ inch thick	2½-3**	1½-2	10-12	1-3	Brittle
Carrots	Use only crisp, tender carrots. Wash thoroughly. Cut off roots and tops; preferably peel, cut in slices or strips ½ inch thick	3-3½	3½	10-12	3½-5	Tough to brittle
Cauliflower	Prepare as for serving.	4-5	3-4*	12-15	4-6	Crisp
Celery	Trim stalks. Wash stalks and leaves thoroughly. Slice stalks.	2	2	10-16	3-4	Very brittle
Corn on the cob	Husk, trim	2-2½***	1½	12-15	4-6	Brittle
Corn, cut	Prepare in the same manner as corn on the cob, except cut the kernels from the cob after blanching.			6-10	2-3	Dry, brittle
Eggplant	Use the same directions as for summer squash	3½	3	12-14	3½-5	Leathery
Horseradish	Wash; remove small rootlets and stubs. Peel or scrape roots. Grate.	None		4-10	3-4	Brittle
Mushrooms (WARNING, see below)‡	Scrub thoroughly. Discard any tough, woody stalks. Cut tender stalks into short sections. Do not peel small mushrooms or "buttons." Peel large mushrooms, slice.	None		8-10	3-5	Leathery

**Table 3. A guide to home drying of vegetables (continued)**  
 For oven and portable dehydrators, set temperature at 140°F.

Vegetable	Preparation	Blanching Time (minutes)		Drying Time (hours)		Characteristics
		Steam	Water	Dehydrator	Oven	
<b>Okra</b>	Wash, trim, slice crosswise in 1/8-1/4 inch disks.	None		8-10	4-6	Very brittle
<b>Onions</b>	Wash, remove outer "paper shells." Remove tops and root ends, slice 1/8-1/4 inch thick.	None		3-9	3-6	Brittle
<b>Parsley</b>	Wash thoroughly. Separate clusters. Discard long or tough stems.	None		1-2	2-4	Brittle, hard
<b>Peas</b>	Shell.	3	2	8-10	3	Wrinkled, green
<b>Peppers and pimientos</b>	Wash, stem, core. Remove "partitions." Cut into disks about 3/8 by 3/8 inch.	None		8-12	2 1/2-5	Leathery to brittle
<b>Potatoes</b>	Wash, peel. Cut into shoestring strips 1/4 inch thick, or cut in slices 1/8 inch thick.	6-8	5-6	8-12	4-6	Brittle
<b>Spinach and other greens (kale, chard, mustard)</b>	Trim, wash very thoroughly.	2-2 1/2§	1 1/2	8-10	2 1/2-3 1/2	Crisp
<b>Squash:</b>						
Banana	Wash, peel, slice in strips about 1/4 inch thick.	2 1/2-3	1	10-16	4-5	Tough to brittle
Hubbard	Cut or break into pieces. Remove seeds and cavity pulp. Cut into 1-inch-wide strips. Peel rind. Cut strips crosswise into pieces about 1/8 inch thick.	2 1/2-3	1	10-16	4-5	Tough to brittle
Summer	Wash, trim, cut into 1/4-inch slices.	2 1/2-3	1 1/2	10-12	4-6	Leathery to brittle
<b>Tomatoes, for stewing</b>	Steam or dip in boiling water to loosen skins. Chill in cold water. Peel. Cut into sections about 3/4 inch wide, or slice. Cut small pear or plum tomatoes in half.	3	1	10-18	6-8	Leathery

\*Preferred method.

\*\*Steam until wilted.

\*\*\*Steam until milk does not exude from kernel when cut.

§Steam until thoroughly wilted.

‡WARNING: The toxins of poisonous varieties of mushrooms are *not* destroyed by drying or by cooking. Only an expert can differentiate between poisonous and edible varieties.

# Recipes

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## Campfire Corn Chowder

4-6 generous servings

1/2 cup dried corn  
1 1/2 cups 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  
1/8 teaspoon pepper

1. Rehydrate corn in 1 1/2 cups of water. Allow to stand for at least 30 minutes.
2. Brown bacon in soup pot until crisp. Remove and drain. Brown onion in bacon fat until tender. Add onion to bacon.
3. Discard all fat except for 2 tablespoons.
4. Place undrained rehydrated corn into soup pot. Add 2 more cups of water. Boil for 45 minutes. If necessary, add more water to maintain volume.
5. Add diced potato and cook until tender.
6. Combine premeasured milk, flour, salt, and pepper mixture with 2 1/2 cups water and mix well.
7. Add milk mixture to the pot and bring to a simmer, stirring occasionally.
8. Add onions and crumbled bacon. Stir well. Serve with crackers or homemade bread.

Backpackers: Save trouble by mixing dry milk, flour, salt, and pepper before leaving home.

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## Creamed Corn

Serves 6

1 cup dried corn  
4 cups boiling water  
1 teaspoon sugar  
1/2 cup cream  
1 tablespoon butter  
1/2 teaspoon salt  
1/4 teaspoon pepper

1. Add dried corn to boiling water. Allow to stand for 20 minutes.
2. Simmer corn until tender, approximately 1 hour. Drain off excess water (save for soup or gravy).
3. Add sugar, cream, butter, salt, and pepper to the drained corn.
4. Bring to a simmer, stirring frequently. Reheat and serve.

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## Corn Fritters

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

1. Rehydrate corn by adding to boiling water and allow to stand for 20 minutes.
2. Simmer corn until tender, approximately 1 hour. Drain off excess water (save for soup or gravy).
3. Sift flour, baking powder, and salt into a bowl.
4. Combine the beaten eggs and milk, mixing well.
5. Add the liquid to the flour mixture all at once and stir the mixture until smooth.
6. Fold in the corn.
7. Drop batter from a teaspoon into a well-greased frying pan and cook until brown on all sides.
8. Remove and drain on absorbent paper. Serve hot.

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## Pork and Apple

Rehydrate dried apple rings by soaking 1 hour or until soft in boiling water (just enough to cover). Brown pork chops, season, and pour off grease. If done in an iron kettle, this may be put in the oven; otherwise, transfer chops to a casserole large enough to make them one layer deep. Cover chops with apple slices, add water in which apples were soaked and enough more to barely cover chops. Bake at 350° F for 35-40 minutes.

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## Winter Corn Pudding

Serves 6

3/4 cup dried corn  
3 cups boiling water  
2 eggs, slightly beaten  
2 tablespoons butter,  
melted and slightly cooled  
2 cups light cream  
2 tablespoons onion, chopped  
1 tablespoon sugar  
1 teaspoon salt  
1/8 teaspoon pepper

1. Rehydrate corn by adding to boiling water and allow to stand for 20 minutes.
2. Simmer corn until tender, approximately 1 hour. Drain off excess water (save for soup or gravy).
3. Preheat the oven to 325° F and grease a 1 quart casserole.
4. In a large bowl, combine corn, eggs, melted butter, light cream, onion, sugar, salt, and pepper.
5. Pour into the greased casserole and bake for 35 minutes or until knife inserted in the center comes out clean.

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## Green Bean Casserole

Serves 4

2 cups water  
1 cup cut green beans, dried  
1 can mushroom soup  
1/4 teaspoon onion powder

1. Bring water to a boil.
  2. Add beans and cook to desired degree of firmness.
  3. Add soup as is, do *not* reconstitute first.
  4. Add onion powder.
  5. Simmer in saucepan until heated through and serve.\*
- \*Variation—Place in 1 quart casserole. Top with bread crumbs or french fried onion rings. Bake in 325° F oven for 30-35 minutes.

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## Vegetable Soup

Serves 4

4 cups water  
3/4 to 1 cup dried vegetables  
(green beans, corn, peas, tomatoes,  
onions, etc.)  
2 pkg. beef bouillon granules  
or 4 cubes  
Seasonings to taste such as herbs,  
soy sauce, or curry

1. Bring water to a boil. Add dried vegetables, bouillon, and seasonings.\*
2. Simmer about 20 minutes or until vegetables are tender though chewy. (Freshly dried vegetables will not take as long to reconstitute as those that have been stored for a long time.)

\*As a variation, add 1/2 cup rice, noodles, or barley with the other ingredients, or add 1/4 to 1/2 cup dried jerky, cut in bite-size pieces.  
Using low-sodium soup granules or bouillon cubes will allow those on low-sodium diets to enjoy this versatile recipe.

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## Beef Vegetable Soup

1 soup bone (with some meat)  
1 cup assorted dried vegetables  
(corn, peas, beans)  
If not among dried vegetables:  
1 large piece celery  
2 carrots  
1 medium onion  
1 tablespoon dried parsley  
1 tablespoon salt  
1/4 teaspoon pepper

1. Cover soup bone with water. Cook 1 hour over medium heat.
2. Pour boiling water over dried vegetables just to cover. Soak 1 hour.
3. Dice celery, carrots, and onion; add these, dried soaked vegetables with their water, dried parsley, and seasoning to beef bone. Simmer 1 to 1 1/2 hours.
4. Remove bone, dice meat, and return to pot. Season to taste and serve hot.

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## Instant Soup Cup

1 tablespoon powder  
from dried vegetables (such as peas)  
1/4 cup dried milk  
6 oz. (teacup) boiling water

1. Pulverize dried vegetables into powder in a blender or food processor at the highest speed.
2. Mix powder with dried milk. Place in cup and add boiling water. Stir. For better flavor, soup may be simmered. Dried potato flakes may be added, if desired, to thicken soup.

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## Apple Pie

One 9-inch pie  
1/4 lb. dried apple slices\* (3 1/2 cups)  
2 cups water  
1/3 to 1/2 cup sugar  
1/2 teaspoon cinnamon

### Crumb Topping

1/2 cup flour  
1/4 cup brown sugar  
2 1/2 tablespoons butter or margarine

1. Cook dried apples in water until soft, about 1 hour. Add additional water, but not an excessive amount. Do not drain.
2. Add sugar and cinnamon.
3. Pour into prepared pie shell.
4. Mix topping until crumbly and sprinkle over pie.

\*Note: Either sweet or sour apples may be used in drying. Sweet apples such as Red Delicious are used for sweet schnitz (dried apples), and the peel is left on to ensure a rich flavor. If a tart flavor is preferred, use late fall or early winter fully matured apples. Varieties recommended include old favorites such as Northern Spy, Spitzenberger, Winesap, and Baldwin. No research is available on the suitability of current commercial varieties of apples. Dry a small amount of a variety and test by using it in one of your favorite recipes before drying large amounts of that variety.

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## Apple Coffee Cake

Serves 18

2 cups dried apples  
1 teaspoon lemon juice  
1/2 cup margarine  
3/4 cup sugar  
2 eggs  
1 1/2 cups flour  
1/2 teaspoon salt  
2 teaspoons baking powder  
1/2 cup milk  
1 teaspoon vanilla

1. Place dried apples and lemon juice in a bowl. Add enough water to cover and soak for 1 hour.
2. Cream margarine and sugar.
3. Add eggs and beat well.
4. Sift together flour, salt, and baking powder. Add to creamed mixture.
5. Add milk and vanilla. Beat well.
6. Pour into two 9-inch greased and floured cake pans.
7. Top with drained, rehydrated apple slices.
8. Combine sugar and cinnamon. Sprinkle evenly over apples.
9. Bake at 375° F for 35-40 minutes.

### Topping

1/2 cup sugar  
2 teaspoons cinnamon