

Drying Fruits & Vegetables

Drying

Drying foods is one of the oldest methods of preservation known to man. It preserves food by removing moisture to a point where growth of microorganisms cannot be supported.

Drying is one of the simplest methods of preservation, requiring little outlay of special equipment and expense. It can be done outdoors or indoors in an oven or specially built dehydrator. Most foods can be successfully dried. The quality is not improved by drying and drying does not preserve nutrients, so it is important to begin with foods at the peak of their quality.

Procedure

Moisture must be removed rapidly enough to prevent spoilage but slowly enough to allow migration of moisture from the inside of pieces of food to the outside. If drying is too rapid, a crust will form on the outside of the food, trapping moisture inside the food.

Foods

Most foods can be successfully dried. Some foods dry better than others. Those that dry best include:

apples	beans, all kinds
apricots	carrots
cherries	chile peppers
nectarines	onions
peaches	sweet corn
plums	sweet potatoes

Choose fruit that is fresh, sound and just right for eating. Vegetables should be fresh and in prime condition. Many drying methods are satisfactory.

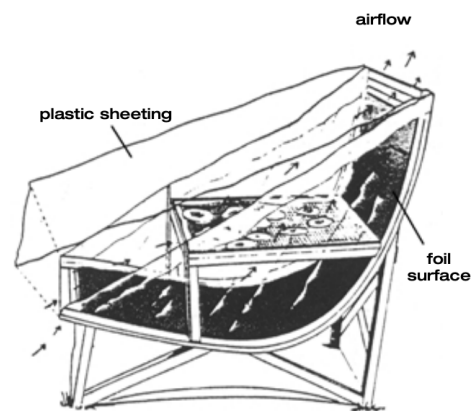
Sun Drying

In climates where the daytime temperature reaches 90° Fahrenheit, remains hot at night, and the

humidity is relatively low, sun drying can be used for fruit and vine-dried beans. A good breeze is also helpful. It may be necessary to move food inside at night to avoid condensation of dew on the partially dried foods. It takes several days to dry food outdoors.

Foods that are sun dried should be moved to the shade as soon as they are no longer sticky. This helps prevent browning that results from direct light.

Pasteurize outdoor dried food to kill any insects and their eggs that may be on it.



Homemade Solar Dryer

Courtesy University of Georgia Cooperative Extension Service

Solar Drying

The sun's rays gathered in a setting with a foil surface helps increase the drying temperature. A vented setting allows the air flow to remove moisture and helps it dry in a shorter time. Cover the trays with netting to keep bugs out. Pasteurize after drying.

Oven Drying

Oven drying can be used for small amounts of food. The oven needs to maintain a temperature of 130°F to 150°F. If the temperature is higher than

Table For Drying Fruits and Vegetables

Fruit

Food	Preparation	Treatment	Dryness Test
Apples	Peel, core, slice 1/4 inch thick	Anti-darkening solution	Pliable, springy, leathery,
Apricots	Peel, cut in half	Anti-darkening solution	Leathery, no moist area
Banana	Peel and slice 1/4 inch thick	Ascorbic acid solution dip	Pliable to crisp
Berries	Leave whole	None	No visible moisture
Blueberries	Remove stems	Scald 15 seconds, cool, drain	Shriveled, leathery
Cherries	Remove stems and pits,	None	Leathery, pliable
Grapes	Remove from stems,	Scald 15-30 seconds to	Leathery, pliable
Peaches	Halve, quarter or	Anti-darkening solution	Pliable, leathery
Pears	Peel, core, slice	Anti-darkening solution	Leathery, springy
Plums	Cut in half, remove pits	None	Pliable and leathery

Vegetables

Food	Preparation	Treatment	Dryness Test
Beets	Cook, peel, slice or dice	Steam or boil 25-30 min.	Dark, red, brittle
Cabbage	Quarter, core, shred 1/8 inch thick	Steam 2 minutes	Crisp, pale yellow to green
Carrots	Peel and slice 1/4 inch thick	Steam 3 minutes	Tough, brittle
Corn	Cut off cob	Steam 5-10 minutes on cob	Dry, brittle, translucent
Green beans	Cut 1-inch pieces	Scald 3 minutes	Brittle, dark green or brownish
Mushrooms - commercially grown	Peel and slice	None	Very dry and leathery
Onions	Peel, slice thin or chop	None	Very crisp
Peas	Shell	Steam 2 minutes	Brittle
Peppers	Remove seeds,	Steam 3 minutes	Tough, leathery
Summer squash	Slice 1/4-inch thick	None, or steam 3 minutes	Leathery to brittle.

this, a dried crust can form on the outside of the food that prevents the inner moisture from escaping. Prop the oven door open, with a fan set beside the door to provide air circulation. Oven drying takes two to three times longer than drying in a dehydrator. A convection oven uses fans to circulate air inside, but must maintain the 130-150° temperature to dry food.

Microwave ovens are not recommended for drying. Microwave ovens are not adequately vented and moist air does not escape, making drying difficult. Because they are heated rapidly, microwave dried products are not only dry, but also cooked. Burning and scorching parts of the food also tend to occur.

Dehydrators

Dehydrators especially designed for drying food are available in many types. The natural-draft dehydrator contains no fan. In order for it to do an adequate job, it must be twice as tall as it is wide. In order to have satisfactory drying in the natural-draft dehydrator, the trays must be moved around frequently to avoid uneven drying.

Forced-air dehydrators are popular and are quite effective. They contain a fan and a heat source. The air movement capacity for the fan should not be more than 700 cubic feet per minute. Greater air flow than this causes a crust to form on the outside of the food so that moisture cannot escape easily. The thermostat on such a dryer should be accurate to within 10 degrees of the set temperature.

Preparations for Drying

Gently wash produce in cold water before drying to remove dirt, bacteria and insects. Do not soak them in water. Remove fruit stems, peel, core or pit, cut into uniform halves, quarters or slices. Trim away bruises or diseased spots. Most vegetables should be peeled, trimmed, then cut, sliced or shredded into uniform pieces. Remove fibrous or woody portions and damaged areas.

Peels may be left on apples, young zucchini and well-washed carrots, for example, though they tend to be tough when dried.

Vegetables

Most vegetables must be blanched prior to drying since the same enzymes that produce an off flavor in frozen vegetables will do the same in dried vegetables. The enzymes can be active even at a moisture content too low for microorganisms to grow.

Those vegetables that need no blanching are okra, onions, parsley, peppers, pimentos, mushrooms and horseradish. Herbs need no pretreatment before drying.

Fruits

Fruits, such as apples, apricots, pears and peaches require some sort of pretreatment to prevent browning and loss of vitamin C. Placing the cut-up pieces in an ascorbic acid dip, citrus juice, honey dip, salt solution, syrup blanching or sodium bisulfate solution for 5 minutes will reduce the browning. Note, some individuals, particularly those with asthmatic conditions, are highly sensitive to sulfites. Sulfite solutions may cause severe allergic reactions in those sensitive.

The Drying Process

Times for drying vary due to differences in temperatures, air flow and size of pieces of food. Generally, fruit at ¼-inch thickness takes 6 to 12 hours to dry; fruit cut in half takes 24 to 36 hours to dry. This makes it necessary to judge dryness subjectively. When food appears dry, remove a piece. Cool completely, then test for dryness.

Vegetables are dry when brittle or leathery. Brittle vegetables such as carrots and peas, shatter when hit with a hammer. Leathery foods will be pliable and spring back if folded.

Fruits are sufficiently dry when pliable and leathery, with no pockets of moisture. Foods dry more quickly at the end of the drying period, so check frequently.

Pasteurization

Foods dried in the sun may become contaminated from the air or insects. Pasteurize these products before packaging.

Heat method: Place the dried foods loosely on a tray in an oven at 175°F, vegetables for 10 minutes or fruit for 15 minutes. This heats the surface, where the contamination is likely to be, without cooking the food.

Freezer method: Seal dried food in heavy freezer containers. Freeze at 0°F for 48 hours.

Conditioning: Though appearing to be dry, moisture may be different in pieces due to size or location in dehydrator. To distribute the moisture and reduce the risk of mold growth, place the food loosely in an airtight container; cover securely.

Shake daily for two to four days for moisture to distribute evenly among the pieces. If condensation appears on the jar, return to the dehydrator.

Packaging

The packaging material provides a barrier between the food and the air. The food can pick up enough moisture from the air to support the growth of microorganisms. The food will maintain best quality if not exposed to light. An opaque material shields out the light; if a clear plastic wrap is used, store in a dark place. Metal containers with plastic lids are satisfactory only if the food does not come in contact with the metal of the can. If dried food is stored in glass jars with metal lids, two layers of plastic should be placed between the lid and the jar.

Label each package with type of food, pretreatment step and date. This prevents opening it just to find out what it is and letting air or moisture in.

Keeping Quality

Most dried foods will maintain satisfactory quality

for one year. The stronger flavored vegetables, such as onions and cabbage, maintain top quality for only six months. Store in a cool, dry, dark location.

Use of Dried Foods

Dried fruit may be eaten as is or rehydrated for eating. Dried vegetables are generally added to appetizers, soups or stews. Rehydration generally takes 1½ to 2 hours in enough water to cover the food. Once the food is rehydrated, it is perishable and must be treated accordingly.

References

So Easy to Preserve. University of Georgia Cooperative Extension Service: www.uga.edu/setp.

Drying Fruits and Vegetables, PNW 397, <https://www.extension.uidaho.edu/publishing/pdf/PNW/PNW0397.pdf>

Ball Blue Book. Ball Corporation, Consumer Products Division, Consumer Affairs, 345 S. High, Muncie, IN 47305-2326.

Fruit Leather, FNH-00228. University of Alaska Fairbanks Cooperative Extension Service.

www.uaf.edu/ces or 1-877-520-5211

Julie Cascio, Extension Faculty, Health, Home and Family Development. Originally written by Roxie Rodgers Dinstel, former Extension Faculty, Health, Home and Family Development.

In accordance with Federal law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, disability, and reprisal or retaliation for prior civil rights activity. (Not all prohibited bases apply to all programs.) Program information may be made available in languages other than English. Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotope, and American Sign Language) should contact the responsible State or local Agency that administers the program or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. To file a program discrimination complaint, a complainant should complete a Form AD-3027, USDA Program Discrimination Complaint Form, which can be obtained online at <https://www.ocio.usda.gov/document/ad-3027>, from any USDA office, by calling (866) 632-9992, or by writing a letter addressed to USDA. The letter must contain the complainant's name, address, telephone number, and a written description of the alleged discriminatory action in sufficient detail to inform the Assistant Secretary for Civil Rights (ASCR) about the nature and date of an alleged civil rights violation. The completed AD-3027 form or letter must be submitted to USDA by: (1) Mail: U.S. Department of Agriculture Office of the Assistant Secretary for Civil Rights 1400 Independence Avenue, SW Washington, D.C. 20250-9410; or (2) Fax: (833) 256-1665 or (202) 690-7442; or (3) Email: program.intake@usda.gov. This institution is an equal opportunity provider.



Published by the University of Alaska Fairbanks Cooperative Extension Service in cooperation with the United States Department of Agriculture. The University of Alaska is an Affirmative Action/Equal Opportunity employer, educational institution and provider and prohibits illegal discrimination against any individual: www.alaska.edu/nondiscrimination.

©2023 University of Alaska Fairbanks.

09-05/RD/03-23

Revised October 2021