



4-H FOODS PRESERVATION FACT SHEET

Drying Fruits

Dried fruits are unique, tasty and nutritious. They have been called nature's candy. Dried fruit tastes sweeter because the water has been removed thus concentrating the fruit's flavor. Dried fruit can be eaten as a snack or added to cereals, muffins and other baked items, or ice cream.

For diabetics or dieters, dried fruits satisfy that craving for sweets. However diabetics should be careful to consume only the amount equal to the fresh fruit exchange. Drying removes water, not calories.

HOW DRYING PRESERVES FRUIT

Drying removes the moisture from the fruit so that bacteria, yeasts and molds cannot grow and spoil the fruit. It also slows down the action of enzymes, but does not inactivate them. Because drying removes moisture, the fruit becomes smaller and lighter in weight. The optimum temperature for drying food is 140° F. If higher temperatures are used the fruit may "case harden"; that is cook and harden on the outside while trapping moisture on the inside. The food will eventually mold when the moisture equilibrates during storage. Thus, the drying process should never be hurried by raising the drying temperature.

PREPARING FRUITS

"Fruits at a Glance" (Table 1) lists fruits that are suitable for drying. Begin by washing the fruit and coring it, if needed. For drying, fruits can be cut in half or sliced. Some can be left whole. Thin, uniform, peeled slices dry the fastest. The peel can be left on the fruit, but unpeeled fruit takes longer to dry. Apples can be cored and sliced in rings, wedges or chips. Bananas can be sliced in coins or sticks.

Fruits dried whole take the longest to dry. Before drying, the skins of some fruits need to be "checked" or cracked to speed drying. To "check" the fruit, place it in boiling water and then in cold water.

Because fruits contain sugar and are sticky, spray the drying trays with non-stick cooking spray before placing the fruit on the trays. After the fruit dries for 1 to 2 hours, lift each piece gently with a metal spatula and turn.

PRETREATING FRUITS

Pretreatment prevents fruits from darkening. Many light-colored fruits, such as apples, darken rapidly when cut and exposed to air. If not pretreated, these fruits will continue to darken after they are dried. Pretreat fruit by dipping it in an ascorbic acid solution or a fruit juice dip or by syrup blanching or steam blanching. Directions for each of these methods follow.

Ascorbic Acid Drying Pretreatment

Pure ascorbic acid (vitamin C) is an antioxidant that helps keep fruit from darkening as it is being prepared for drying.

Directions - Dissolve two tablespoons of ascorbic acid crystals, two tablespoons of ascorbic acid powder, or five 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 mixtures such as "Fruit Fresh" and "Ever-Fresh" are other possibilities and often easier to purchase. Follow package directions for use.

Fruit Juice Dip

A fruit juice that is high in vitamin C can also be used as a pretreatment, though it is not as effective as pure ascorbic acid. Juices high in vitamin C include orange and lemon. Each juice adds its own color and flavor to the fruit.

Directions - Place enough juice to cover the fruit in a bowl. Add cut fruit. Soak three to five minutes, remove fruit, drain well and place on dryer trays. This solution may be used twice, before being replaced. (The used juice can be consumed.)

Syrup Blanching

Blanching fruit in syrup helps it retain color fairly well during drying and storage. Syrup blanching will hold natural fruit color fairly well during drying and storage, but it will produce softer textured and sweeter flavored fruit than other methods. Fruits that can be syrup blanched include: apples, apricots, cherries, nectarines, peaches, and pears.

Directions - Combine one cup sugar, one cup light corn syrup and two cups water in a pot. Bring to a boil. Add one pound of prepared fruit and simmer 10 minutes. Remove from heat and let fruit stand in hot syrup for 30 minutes. Lift fruit out of syrup, rinse lightly in cold water, drain on paper towels and place on dryer trays.

Steam Blanching

Steam blanching also helps retain color and slow oxidation. However, the flavor and texture of the fruit is changed, making this one of the least effective ways for pretreating fruits for drying.

Directions - Place several inches of water in a large kettle with a tight-fitting lid. Heat to boiling. Place fruit not more than two inches deep, in a steamer pan or wire basket over boiling water. Cover tightly with lid and **begin timing immediately**. (See Table 2 for blanching times.) Check for even blanching, halfway through the blanching time. Some fruit may need to be stirred. When done, remove excess moisture using paper towels and place on dryer trays.

Drying Fruits in the Dehydrator

An electric dehydrator will provide you with the most successful results since the high moisture content of most fruits makes oven drying impractical. Here are some general directions for using your dehydrator. For best results follow the directions that came with your dehydrator.

1. Distribute fruits on trays in a single layer. Different kinds of fruits may be dried at the same time. Dry fruit of similar size on the same tray. Avoid overlapping. Do not add fresh fruits to partially dried fruits.
2. Preheat the dehydrator to 140° F.
3. After the trays are placed in the dehydrator, the temperature will drop. Watch your dehydrator to assure that it returns to 140° F to complete the drying. Temperature plays a key role in the drying process.

If the temperature is too high, fruit may "case harden", that is cook and harden on the outside while trapping moisture on the inside.

4. Examine the fruits from time-to-time, 1 ½ - 2 hour intervals, depending on the fruits.
5. At the start of the drying process there is little danger of scorching, but when nearly dry, the fruits scorch easily. Even slight scorching destroys the flavor and may lower the nutritive value, so be careful not to allow the temperature to rise above 140° F, especially during the latter stage of drying.
6. Be sure to place the dehydrator in a well-ventilated room, so that the water vapor will be carried away.
7. The time for drying varies according to type of fruits, size of pieces and load on the tray. The time at 140° F usually ranges from 6 to 16 hours. (See Table 2 for approximate drying times.)
8. Be sure to cool the food before testing for dryness. Refer to the following section for how to determine dryness.
9. After fruit has finished drying, and the dehydrator has cooled, trays may be cleaned with hot, soapy water, rinsed, and dried.

Drying Fruits in the Oven

An oven can be used for occasional drying of fruit leathers, banana chips, or for preserving excess produce like celery or mushrooms. Because the oven may also be needed for everyday cooking, it may not be satisfactory for preserving abundant garden produce. As stated previously, the high moisture content of most fruits makes oven drying impractical.

Oven drying is slower than dehydrators because the oven does not have a built-in fan for the air movement. (However, some convection ovens do have a fan.) It takes two to three times longer to dry food in an oven than in a dehydrator. Thus, the oven is not as efficient as a dehydrator and uses more energy. Here are some general directions for using your oven for drying fruits.

1. First, check your oven dial and see if it has a reading as low as 140° F. Use an oven thermometer to check oven temperature at the "warm" setting. If your oven does not go this low, then your food will cook instead of dry.
2. Trays should be narrow enough to clear the sides of the oven and should be three or four inches shorter than the oven from front to back. Cake cooling racks placed on top of cookie

sheets work well for some foods. The oven racks, holding the trays, should be 2 ½ to 3 inches apart for air circulation with three inches of space at the top of the oven.

3. Load two to four trays with no more than four to six pounds of prepared fruits distributed among them. Fruit pieces should be in a single layer. More than one kind of fruit can be dried at the same time.

Dry fruits of similar size on the same tray. Avoid overlapping. Do not add fresh fruits to partially dried fruits.

4. Place an accurate and easy-to-read oven thermometer on the top tray toward the back.
5. Preheat the oven to 140° F and then add the loaded trays.
6. Low humidity aids the drying process. Fruit contains a lot of water. To dry fruit, the water must move from the fruit to the surrounding air. If the surrounding air is humid, then drying will be slowed down.

Increasing the air current speeds up drying by moving the surrounding moist air away from the fruit. To speed the drying time, increase the air flow. For air circulation, leave the oven door propped open about four inches.

Circulation can be improved by placing a fan outside the oven near the door. Change the position of the fan frequently during drying to vary the circulation of the air.

Because the door is left open, the temperature will vary. Adjust the temperature dial to achieve the needed 140° F.

7. Maintain the temperature at 140° F. It takes less heat to keep the temperature at 140° F as drying progresses, so watch the temperature carefully toward the end of drying.
8. Examine the fruits often, and turn the trays frequently. At the start of the drying process, there is little danger of scorching, but when nearly dry, the product may scorch easily. Even slight scorching destroys the flavor and may lower the nutritive value, so be careful not to allow the temperature to rise above 140° F, especially during the latter stage of drying.
9. Because of variations in air circulation, drying times in conventional ovens could be up to two to three times as long as those given for dehydrator drying in Table 2. See section following for how to determine dryness.

DETERMINING DRYNESS OF FRUIT

Since dried fruits are generally eaten without being rehydrated, they should not be dehydrated to the point of brittleness. Fruits contain natural sugars and do not dry to brittleness. Most dried fruit products remain pliable, but not sticky.

Judging when fruit is dry requires experience. Check fruit 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. Allow the product to cool before testing.

To test for dryness, cut several cooled pieces in half. There should be no visible moisture and you should not be able to squeeze any moisture from the fruit. Some fruits may remain pliable, but they should not be sticky or tacky. If a piece is folded in half, it should not stick to itself. Small berries should be dried until they rattle when shaken.

After drying, cool fruit 30 to 60 minutes before packaging. Avoid packaging warm fruit that could lead to sweating and moisture buildup. However, excessive delays in packaging could allow moisture to re-enter fruit.

CONDITIONING FRUITS

When the fruit is taken from the dehydrator or oven, the remaining moisture may not be distributed equally among the pieces because of their size or their location in the dehydrator. Conditioning is the process used to equalize the moisture. It reduces the risk of mold growth.

To condition the fruit, take the dried fruit that has cooled and pack it loosely in plastic or glass jars to about 2/3 full. Seal the containers and let them stand for seven to 10 days. The excess moisture in some pieces will be absorbed by the drier pieces. Shake the jars daily to separate the pieces and check the moisture condensation. If condensation develops in the jar, return the fruit to the dehydrator for more drying. After conditioning, package and store the fruit.

PACKAGING AND STORING DRIED FRUITS

Dried fruits are susceptible to insect contamination and moisture reabsorption. Cool fruits, package and store fruit immediately. Warm fruit picks up moisture from the atmosphere which could provide enough moisture for mold to grow. Pack foods into clean, dry, insect-proof containers as tightly as possible without crushing.

Glass jars or moisture-vapor resistant freezer containers make good containers for storing dried fruits. Heavy-duty plastic bags are acceptable, but are not insect and rodent proof. Plastic bags with a 3/8-inch seal are best to keep out moisture.

Pack fruit in amounts that will be used in a recipe or within a few days. Every time a package is re-opened, the fruit is exposed to air and moisture that lower the quality of the food.

Dried fruits should be stored in cool, dry, dark areas. Recommended storage times for dried fruits range from four months to one year. For best quality, keep dried fruits at room temperature only about one to two months; they should last six to 12 months in the refrigerator. (Source: Keeping Food Fresh, 1989.) Because fruit quality is affected by heat, lower storage temperatures extend storage time; higher storage temperatures shorten the storage time.

Fruits that are packaged seemingly "bone dry" can spoil if moisture is reabsorbed during storage. Check dried fruits frequently during storage to see if they are still dry. Glass containers are excellent for storage because any moisture that collects on the inside can be seen easily. Fruits affected by moisture, but not spoiled, should be used immediately or re-dried and repackaged. Moldy fruits should be discarded.

**TABLE 1
FRUITS AT A GLANCE**

| Fruit | Suitability for Drying | Fruit | Suitability for Drying |
|--------------------|-------------------------------|--------------|-------------------------------|
| Apples | Excellent | Cranberries | Poor |
| Apricots | Excellent | Grapes | Excellent |
| Avocados | Not recommended ¹ | Guavas | Not recommended ⁵ |
| Bananas | Good | Melons | Poor |
| Berries with seeds | Not recommended ² | Nectarines | Excellent |
| Blueberries | Fair | Peaches | Excellent |
| Cherries | Excellent | Pears | Excellent |
| Citrus fruits | Not recommended ³ | Pineapples | Excellent |
| Citrus peel | Excellent | Plums | Good |
| Crabapples | Not recommended ⁴ | Strawberries | Fair to good |

¹ High fat content.

² High seed content and slow rate of drying.

³ Too juicy and pulp lacks firm texture.

⁴ Too small and tart; can be combined with other fruit for fruit leather.

⁵ Grainy flesh full of seeds; combine with other fruit for fruit leather.

**TABLE 2
DRYING FRUITS AT HOME**

| Fruit | Preparation | Pretreatment (choose one) | | | Drying time dehydrator (hours) |
|--------------|---|----------------------------------|-------------------------------|------------------------------------|---------------------------------------|
| | | Steam Blanch (Minutes) | Syrup Blanch (Minutes) | Other | |
| Apples | Peel & core, cut into slices or rings about 1/8 inch thick | 3 - 5 depending on texture | 10 | -ascorbic acid -fruit juice dip | 6 - 12 |
| Apricots | Pit and halve. May slice if desired. | 3 - 4 | 10 | -ascorbic acid -fruit juice dip | 24 - 36* |
| Bananas | Use solid yellow or slightly brown-flecked bananas. Avoid bruised or overripe bananas. Peel and slice 1/4" to 3/8" thick, cross-wise or lengthwise. | --- | --- | -ascorbic acid -fruit juice dip | 8 - 10 |

| Fruit | Preparation | Pretreatment (choose one) | | | Drying time dehydrator (hours) |
|------------------|--|---------------------------|------------------------|--|--------------------------------|
| | | Steam Blanch (Minutes) | Syrup Blanch (Minutes) | Other | |
| Berries Firm: | Wash & drain berries with waxy coating - blue- berries, and cran- berries. | --- | --- | -plunge into boiling water 15 - 30 seconds to "check" skins. Stop cooking action by placing fruit in ice water. Drain on paper towels. | 24 - 36 |
| Soft: | Strawberries | | | -no treatment necessary. | 24 - 36 |
| Cherries | Stem, wash, drain & pit fully ripe cherries. Cut in half, chop or leave whole. | --- | 10 (for sour cherries) | -whole: dip in boiling water 30 seconds or more to check skins. -cut & pitted: no treatment necessary. | 24 - 36 |
| Citrus peel | Peels of citron, grapefruit, kumquat, lime, lemon, tangelo & tangerine can be dried. Thick-skinned navel orange peel dries better than thin-skinned Valencia peel. Wash thoroughly. Remove outer 1/6 to 1/8" of peel. Avoid white bitter pith. | --- | --- | -no pretreatment | 8 - 12 |

| Fruit | Preparation | Pretreatment (choose one) | | | Drying time dehydrator (hours) |
|----------------------|---|---------------------------|------------------------|---|--------------------------------|
| | | Steam Blanch (Minutes) | Syrup Blanch (Minutes) | Other | |
| Grapes Seedless: | Leave whole | --- | --- | -whole: dip in boiling water 30 seconds or more to check skins. Plunge in ice water to stop further cooking. Drain on paper towels. | 12 - 20 |
| With seeds: | Cut in half & remove seeds | | | -halves: no treatment necessary. | |
| Nectarines & Peaches | For steam & syrup blanching, leave whole, then pit & halve. May also be sliced or quartered. | 8 | 10 | -ascorbic acid -fruit juice dip | 36 - 48* |
| Pears | Cut in half & core. Peeling preferred. May also slice or quarter. | 6 (halves) | 10 | -ascorbic acid -fruit juice dip | 24 - 36* |
| Pineapple | Use fully ripe, fresh pineapple. Wash, peel & remove thorny eyes. Slice lengthwise & remove core. Cut in 1/2" slices, crosswise | --- | --- | -no treatment necessary | 24 - 36 |
| Plums | Leave whole. | --- | --- | -rinse in hot tap water | 24 - 36* |

* Drying times are shorter for slices and other cuts of fruit.

Source: Adapted from So Easy to Preserve, Cooperative Extension, The University of Georgia, 1993, and Michigan Cooperative Extension Food Preservation Handbook.

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