$5.00

University of California Cooperative Extension Master Food Preserver

"Preserve today, Relish tomorrow"

Dehydrating Basics:

Produce

Drying Fruits, Vegetables, Herbs (and more)

Photo credit: Maria Nadeau

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Food Safety / Preserving Basics

Food preservation starts with food safety. Cleaning and sanitizing your work area, washing hands frequently, properly handling produce and meat, and avoiding cross-contamination are all part of the process in avoiding food-borne illness. Following recipes from trusted resources is the next step in ensuring safety when preserving food. Key things to keep in mind include:

Clean Work Area ◆ Wash Hands ◆ No Cross-Contamination ◆ Prepare Food Properly

For further details on cleaning and sanitizing, food safety, and information on a variety of food preservation topics, visit our Food Safety website, where you'll find free, downloadable publications and posters: https://ucanr.edu/sites/mfp_of_cs/Food_Safety/.
You can also access the site by scanning this QR code with your smartphone or tablet.

Introduction to Dehydrating

Dehydration is one of the oldest known methods of food preservation. It works by removing a sufficient amount of moisture from food such that microorganisms that cause spoilage cannot grow. Drying also slows down the activity of enzymes that cause food spoilage. Food that is properly dried and packaged can be safely stored at room temperature. The amount of time food will remain of good quality is dependent on the food itself as well as storage conditions; see Storing Dried Food on pg. 15 for further details.

There are several methods for dehydrating produce. Specialized equipment is not strictly necessary; however, several factors can impact which method is most appropriate for your circumstances, including the climate and the types and amounts of food to be dried. Ideal drying conditions include the ability to control temperature within a specific range; low humidity levels; and good air circulation.

The optimal temperature for dehydrating most produce is about 140°F; for herbs the optimal temperature is 95°F-115°F. Drying at too high a temperature will cook, rather than dry, the food. It can also cause **case hardening**, where food develops a hard outer crust that prevents moisture from escaping, resulting in spoilage or a safety hazard. Drying food too slowly may result in mold or other spoilage to occur before dehydration can be completed.

High humidity can make it difficult to dehydrate food, as the water content in food needs to be able to escape into the surrounding air. For those who live in areas with high humidity, sun or air drying may not be practical (nor would those methods likely be feasible in most areas of the U.S. in the wintertime). Good air flow is also required so that the moisture from the drying food moves away and does not get re-introduced into the food.

In summary, the ideal conditions for successful dehydrating are:

- the right temperature range (not too hot, not too cold)
- low humidity
- good air circulation

Methods of Dehydrating

The following are the various methods that food may be dehydrated at home.

- **Dehydrator:** These electric appliances are considered to provide the highest quality dried food. They heat evenly and quickly, and can be set to ideal temperatures for the product being dehydrated. There are a few styles to choose from; in all cases, we recommend a device with a thermostat and a fan that provides for good air circulation.

  Rotating trays in vertical dehydrators (where the heat source and fan are at the top or the bottom of the device) can help ensure even drying. Horizontal dehydrators (with the heat source and fan at the back of the device) have the benefit of providing equal heat treatment to all trays; reducing the mixture of flavors if multiple foods are dried at once; and preventing juices or liquids from dripping down onto a heating element as can happen with vertical dehydrators.

- **Oven:** Home ovens can be used to dehydrate food, however, they must be able to be set to a low temperature (about 140°F, depending on the food). For ovens that can't be set this low, propping the oven door open several inches can help reduce the temperature.

  For traditional ovens that do not have a built-in fan, placing a fan outside the propped-open oven door can help provide air circulation. Because the temperature of an oven with a propped-open door can vary, it's recommended to place a thermometer near the food, and adjust the oven's temperature dial as necessary to achieve the needed temp of ~140°F. Food is more susceptible to scorching at the end of the drying time in an oven, so it's important to monitor it closely.

OVEN VS. DEHYDRATOR DRYING

Ovens consume more energy and can take 2 to 3 times longer than dehydrators to dry food. Oven-dried food is generally darker, more brittle, and less flavorful than that dried in an electric dehydrator.

- **Microwave:** Because of the lack of air circulation, fruit and vegetables should not be dried in microwave ovens. These devices are suitable only for small batches of herbs and some leaf vegetables. Microwaves wattages of ≥1,000 may heat too fast for drying; check the manual for specific operating instructions for drying herbs.

- **Sun Drying:** In this method, produce is exposed to constant direct sunlight over the course of several days. Hot, breezy days are best; to ensure sufficient drying, a minimum temperature of 85°F and humidity less than 60% are needed. Fruits, because of their high acid and sugar content, are safe to dry in the sun. Vegetables are not recommended for sun drying because they are low in acid and sugar, increasing the risk of spoilage.

  To dry fruit in the sun, place the fruit on trays made with food-safe screens (such as stainless steel, Teflon-coated fiberglass, or plastic). Do not use "hardware cloth" or copper or aluminum screening. Wood may also be used to make drying trays, however avoid green wood, pine, cedar, oak or redwood, as these woods can warp, stain food, or cause off-flavors. Cover the drying trays with cheesecloth to protect the food from insects and birds. It is best to raise the trays off the ground to improve air flow.

Methods of Dehydrating (cont.)

- **Solar Drying:** Similar to air drying, this method uses vented drying boxes that have a reflective surface that increases the temperature and shortens the drying time.
- **Air Drying:** Some produce can be dried in indoor areas that are well-ventilated, have low light, are sufficiently warm, and have low humidity (such as an attic or screened-in porch). Herbs, hot peppers, mushrooms, and shelled nuts are common air-dried items. Enclosing the food in paper bags poked with holes can help protect it from dust while still allowing for air circulation. Produce may also be air-dried outdoors in mesh hanging racks. As with indoor air drying, there should be good heat, low humidity, and good airflow.

OUTDOOR DEHYDRATING

It can take at least 3 to 4 days to sufficiently dry food outdoors, so check the weather forecast! The hotter the temperature and the lower the humidity, the better.

Cool night air condenses and can re-introduce moisture into food, prolonging the time it takes to dry. Protect food dried outdoors by covering or bringing it indoors at night, then return it outdoors when the heat and humidity have reached appropriate levels.

- **Vine Drying:** Beans and peas may be dried by simply leaving them on the vine until the beans rattle in their pods. The vines and pods will shrivel when dry. Harvest and shell the beans. Moisture indicates incomplete drying; further drying will be required to prevent mold, which can be done in a dehydrator, oven, or with the sun.

  Some herbs and seeds, such as coriander, dill, caraway, mustard, fennel, and sunflower may also be vine dried. When the vines, stems, leaves or seeds are dry and shriveled, harvest them and remove from the stem. If moisture is evident, they are not sufficiently dried. Complete drying by using the process for beans noted above.

TREATING PRODUCE THAT HAS BEEN DRIED OUTDOORS

Produce that has been dried outdoors, or that otherwise could have been exposed to insect infestation (either before or during drying) should be treated after conditioning and before storage to kill insects and/or insect eggs that could survive the dehydration process.

This treatment, known as **pasteurization**, can be done by one of these methods:

Freezing: Freeze dehydrated food at 0°F or lower for at least 48 hours.

Heating: Heat dehydrated produce in an oven at 160°F for 30 minutes, or for at 175°F for 15 minutes. Use care to avoid scorching the food.

Methods of Dehydrating (cont.)

- **Dehydrofreezing:** Combining both drying and freezing techniques (and not to be confused with freeze drying), this method has several benefits over conventionally dehydrated produce: the product has better flavor and color; it takes less time to dry (produce is dried to 30% residual moisture, whereas conventionally dried fruits are dried to 20% and vegetables to 10% residual moisture, respectively); less room is taken up in the freezer because of the partial dehydration; and the products reconstitute in about one-half the time of conventionally dehydrated produce.
- **Freeze Drying:** Using special freeze-drying machines, food is dehydrated using a 3-step method that involves deep freezing, sublimation, and final heating. Home freeze dryers can be relatively expensive and are more expensive to operate compared to typical home dehydrators. However, the benefits of freeze drying (technically known as lyophilization) include the best quality compared to other types of dehydrating; comparable nutrition compared to raw food; less shrinkage; and a significantly longer shelf life. Further information on the freeze drying process can be found at various Cooperative Extension websites, including the following:

  https://extension.usu.edu/preserve-the-harvest/freeze-drying
  https://extension.psu.edu/lets-preserve-freeze-drying
  https://extension.usu.edu/preserve-the-harvest/research/buying-a-home-freeze-dryer-what-to-know-before-you-go

HOW LONG DOES DEHYDRATING TAKE?

The length of time it takes to dehydrate produce depends on many factors, including the moisture content of the food that is being dried; its form (whole, sliced, diced; peeled or unpeeled, etc.); whether it is pre-treated (such as by blanching); the type of drying method or the particular dehydrator being used; and the ambient temperature and humidity.

In a standard dehydrator, fruits can take anywhere from 6 to 48 hours to dry, and vegetables from 3 to 18 hours. Herbs can dry in as little as 1 to 2 hours in a dehydrator.

Produce dried in the sun or air can take 3 to 4 days (or more).

Nutrition of Dehydrated Foods

Dehydration results in minimal loss of nutritional value. Vitamin C can be destroyed by heat, but pretreating with citrus juice can help increase the Vitamin C content. Nutrients are best retained in dried food by storing them in a cool, dry, dark place and using them within a year.

Because dried produce is concentrated, it has more calories on a weight-for-weight basis. Generally, ½ cup of dried fruit is the equivalent of 1 cup of fresh fruit. Because of this, portion sizes of dried fruit should be taken into consideration, especially by those on restricted diets.

Selecting Produce for Dehydrating

Produce should be fresh and of good quality, as the dehydrating process will not improve on it. Select fruit that is fully ripe (but not overripe), firm, and heavy for its size. Vegetables should be ripe, young, and tender. Immature vegetables tend to have poor color and flavor.

Drying overmature produce can result in products that are tough and woody, or soft and mushy. There are some exceptions to the best maturity levels of produce to be dried. For example, fruit intended for fruit leather can be slightly overripe as long as it is not spoiled. Sweet corn and green peas will retain their sweet flavor if they are slightly immature. Be sure to check for the appropriate selection and preparation criteria for each type of produce item you wish to dehydrate.

Discard produce that is decayed or moldy; it can contaminate the entire batch of food being dehydrated. Remove any damaged, bruised, or soft spots before peeling, slicing, or otherwise preparing the food to be dried.

Herbs are at their best when their flower buds first appear and before they fully open. Pick herbs early in the day, after dew evaporates and before the sun gets hot.

It's best to dry produce right after harvesting. Once vegetables are picked, enzymes are activated that can cause flavor, texture, nutrient, and other changes.

Not all produce items are suitable for dehydration; for example, vegetables that are typically eaten raw, such as radishes, can have off flavors and textures when dried. Fruits with high fat (such as avocado) or many seeds (such as pomegranate) are not recommended for drying. Except for the peel, citrus (as well as other fruits with high water contents) are also generally not recommended for drying, however some people have had some success, so you may wish to experiment (as examples, dehydrated lemon slices are great in tea, honey-dipped melon is delicious, and thinly sliced cucumbers make great snacking chips!).

For examples of produce items that are best suited for dehydrating, see the Suitability for Drying Chart on pg. 18.

Washing Produce

All fresh produce should be washed before preparing it for preservation, cooking, or fresh consumption – even if the skin or rinds won't be eaten. Produce should not be cleaned before storage: rather, clean produce right before using it.

To wash produce, rinse it under cool running water in a clean sink – do not soak. Specific produce handling tips include:

- Gently rub soft fruits and vegetables (such as tomatoes) with your hands under running water to remove dirt.
- Scrub firm fruits and vegetables (such as potatoes, carrots, and melons) with a vegetable brush (then clean the brush!).
- Remove the outer leaves of lettuce and cabbage before washing.
- Rinse herbs and sprouts, then shake them to remove excess water.
- Use a kitchen sink sprayer to rinse berries in a colander, gently turning and shaking the colander to remove direct and excess water.

Pre-Treating Fruit

Pretreating fruit before drying has several benefits. Depending on the method used, nutrients, flavor, and color (especially in light-colored fruits such as apples and bananas) can be retained; enzymatic activity can be reduced, thus lengthening shelf life; the drying time for fruit with tough skins can be reduced; and potentially harmful bacteria can be killed. Which pretreatment method you choose is largely dependent on the specific fruit being dehydrated and your needs and preferences.

- **Acidic Dips:** Dipping fruit in acidic solutions helps to prevent oxidation and can help to destroy harmful bacteria. Ascorbic acid is the most effective at preventing browning of light-colored fruits, but citric acid powder and lemon or other fruit juices may be used.
  - **Ascorbic Acid (Vitamin C):** Ascorbic acid is the chemical name for vitamin C. It is available in pure powdered or crystalline form online, in pharmacies, and in some grocery stores or where preserving supplies are sold. The fineness of the powder may vary by manufacturer; check the label for milligrams of ascorbic acid per teaspoon, or weigh the powder/crystals for the best accuracy. Be sure to use only food grade ascorbic acid. Erythorbic acid is chemically identical to ascorbic acid but structurally different (it has no vitamin C activity). It can be used for color retention in the same manner as ascorbic acid.

    Vitamin C tablets may also be used. Choose tablets without added flavors or time-release formulas, and crush them thoroughly to a powder before mixing with water. Fillers in these tablets may make the solution cloudy, but this is not harmful.

    For basic color retention and quality, mix 6000 mg (about 1½ tsp) ascorbic acid powder/crystals (or 12 crushed 500mg vitamin C tablets) in 1 quart cold water; soak 5 minutes, drain well. Use the solution twice before discarding.

    For enhanced pathogen destruction, make a concentrated solution by mixing 22500mg (about 5¾ tsp) ascorbic acid powder/crystals in 1 quart cold water; soak 10 minutes, then drain well. Use the solution twice before discarding.
  - **Citric Acid:** Compared to ascorbic acid, citric acid is less effective in preventing browning, but it is more effective in killing harmful bacteria. Its flavor is more sour than ascorbic acid. Be sure to use food-grade citric acid.

    Mix 1 tsp citric acid powder to 1 quart cold water; soak 10 minutes, drain well. Use the solution twice before replacing.
  - **Commercial Anti-Browning Mixtures:** These mixtures, sometimes referred to as fresh fruit stabilizers, are readily available in grocery stores or where canning supplies are sold. Their active ingredients include combinations of ascorbic citric acids, and they may contain other ingredients including sugar. They are not as effective as ascorbic or citric acids. Use according to the package directions.
  - **Fruit Juices:** Fruit juices that are naturally high in vitamin C, such as lemon, lime, orange, pineapple, grape, and cranberry can be used to help reduce browning. Each juice will add its own flavor and color to the fruit being treated.

    Cover fruit with juice; soak 3-5 minutes, drain well. Use the juice twice before replacing (consume or discard leftover juice).
  - **Bottled Lemon Juice:** Use a solution of 1 part bottled lemon juice to 1 part of water; soak 3-5 minutes, then drain well.

Pre-Treating Fruit (cont.)

- **Honey Dip**: Fruits treated with honey have higher calories and after drying may have a slight honey taste. Honey treatments can minimize browning and softening in light-colored fruits.

  Honey Dip #1: Mix ½ cup sugar with 1½ cups boiling water. Cool to lukewarm and add ½ cup honey. Soak fruit for 3-5 minutes, then drain well.

  Honey Dip #2: Mix 1 part honey to 4 parts water. Soak fruit for about 5 minutes, then drain well.

- **Honey Lemon Dip**: Similar to the honey dips described above, this dip adds lemon for additional flavor and has no additional sugar.

  Mix the juice of 1 lemon with ½ cup water and ½ cup of honey. Slightly heat, stirring until honey is dissolved. Soak fruit for 3-5 minutes, then drain well.

- **Syrup Blanching**: Fruit that is blanched in a sugar syrup results in a product that is sweeter and stickier, similar to candied fruit. Syrup blanching can also help to retain color during dehydrating and storage. Good candidates for syrup blanching include apples, apricots, figs, nectarines, peaches, pears, plums, and prunes.

  Syrup #1: Combine 1 cup sugar, 1 cup light corn syrup, and 2 cups water in a pot and bring to a boil. Add 1 pound of prepared fruit and simmer 10 minutes. Remove from the heat and allow the fruit to stand in the hot syrup for 30 minutes. Lift the fruit out of the syrup, rinse lightly in cold water, then drain on paper towels.

  Syrup #2: Combine 1 part sugar and 2 parts water (less sugar can be used if desired). Bring to a boil, add fruit, and simmer 5 minutes. Drain well.

- **Steam Blanching:** Blanching fruit with steam prior to dehydration can help retain color, however it will change the flavor and texture of the fruit. Refer to instructions for dehydrating specific fruits for blanching times.

  In a large pot with a tight-fitting lid, bring several inches of water to boiling. Add fruit loosely in a layer 1 to 2 inches deep to a steamer basket, then place the basket over the water. Cover the pot tightly and begin timing immediately. Halfway through the blanching time, check for even blanching, stirring the fruit if necessary. When done, use paper towels to blot excess moisture from the fruit.

- **Water Blanching:** Water blanching can give fruit a cooked flavor, so it is generally not recommended. However, some fruits with tough or waxy skins, such as plums, prunes, figs, grapes, blueberries, and cranberries, should be dipped in boiling water very briefly – just long enough for disruptions, or a checkered appearance, in the skin of the fruit to appear. This process is known as **checking, cracking, or crazing**. If the fruit is heated to the point that the skins split, the fruit may not hold its shape when dried. The checking process allows moisture to escape and reduces the drying time.

  Dip fruit in rapidly boiling water just long enough for small cracks to appear (generally about 10 to 60 seconds, depending on the toughness of the skins), remove the fruit to an ice bath to cool, then drain on towels.

Pre-Treating Fruit (cont.)

- **Sulfuring/Sulfiting:** Sulfur compounds have long been used to treat fruit prior to dehydrating. They are effective at preventing darkening, they may improve flavor and storage life, and they can reduce spoilage by preventing microbial growth. Use only food grade (U.S.P.) or Reagent Grade compounds. **NOTE: Many individuals are sensitive to sulfites, and these compounds may cause asthmatic reactions. Use sulfites with caution.**
  - **Sulfuring:** In this process, cans of sulfur powder are placed in a sulfur box or compartment along with trays of fruit to be dried. The sulfur is ignited and the burning fumes permeate the fruit. Sulfuring must be done outdoors. For instructions on how to pretreat fruit with sulfuring, see this publication: https://extension.usu.edu/preserve-the-harvest/research/drying-pretreatment
  - **Sulfite Dips:** Dipping fruit in sulfite compounds is easy and can be done indoors. As noted above, purchase only food or Reagent grade products. Mix a solution per the amounts below, soak fruit for 5 to 15 minutes depending on size, drain and rinse the fruit with clean water, and blot the fruit to remove excess moisture.

    Sodium bisulfite: Mix ¾ tsp per quart of water.
    Sodium sulfite: Mix 1½ tsp per quart of water.
    Sodium metabisulfite: Mix 2 tbsp per quart of water.

Drying Fruit

Fruit may be dehydrated whole or in slices or pieces. Peeling is optional, but unpeeled fruit will take longer to dry. Some peels, such as apple or peach, may become tough, bitter, or discolor when dehydrated. Thinly sliced fruit will dry faster.

Canned fruit may also be dehydrated, although drying times will be longer because of the syrup absorbed by the fruit in the canning process. Dried canned fruit will be similar to candied fruit. To dehydrate, drain the syrup and cut the fruit into ½ inch slices if desired, then dry following normal dehydrating procedures.

Prepare, pretreat, and dry fruit as directed (see the Guidelines for Dehydrating Fruit chart on pgs. 19-20). When placing prepared fruit on dehydrator trays, arrange them in a single layer without the pieces touching or overlapping.

Fruit is dried until 20% moisture remains. To test for doneness, cool a few pieces and cut them in half. There should be no visible signs of moisture. Some fruit may still be pliable, but not sticky or tacky. When folded in half, the fruit should not stick to itself.

Once dry, allow the fruit to cool for about 30 to 60 minutes before proceeding with the final steps. If the fruit is still too warm, sweating and moisture buildup can occur, while waiting too long can allow moisture to be re-introduced into the fruit. When the fruit is cool, any remaining moisture needs to be distributed equally throughout all pieces to reduce the risk of mold growth. This process is known as **conditioning**. Place fruit loosely in glass or plastic jars to about two thirds full. Seal the jars and let them stand for 7 to 10 days, shaking the jars daily to separate the fruit pieces. If condensation appears in the jar, the fruit was not dried sufficiently. It should be returned to the dehydrator to finish drying (or refrigerated for short-term consumption, or frozen for longer-term storage). Once the fruit is conditioned, **pasteurize** it if necessary (see pg. 4), then package and store (see pg. 15).

Pre-Treating Vegetables

Most vegetables require blanching in boiling water or steam prior to dehydrating (exceptions include onions, peppers, mushrooms, sliced tomatoes, garlic, and okra). The blanching process destroys enzymes that cause deterioration, such as loss of flavor and color during drying and storage; softens vegetables making them dry faster and easier to rehydrate later; and helps to destroy harmful bacteria.

Water blanching is generally preferred as it heats vegetables more quickly and evenly and is better at destroying harmful bacteria than steam blanching, but the vegetables will lose more nutrients. See the Dehydrating Guidelines for Vegetables chart on pgs. 21-23 for preparation instructions.

When blanching, the vegetables should not be cooked, but just heated all the way through. They should feel and taste firm, but tender. Taste the vegetables frequently during blanching to avoid under- or over-blanching, which could impact the quality of the dried vegetables.

To **water blanch** vegetables:

- Bring a large pot of water to a full rolling boil; maintain high heat.
  - Lower vegetables into the water in a basket and cover.
  - Start timing when the water returns to a full boil (this should occur within 1 minute; if not, you've added too many vegetables – generally add no more than 1 pound of prepared vegetables to 1 gallon of water).
  - When the blanching time is up* (or when the vegetables test ready), remove the vegetables and place them in an ice bath or very cold water briefly – just long enough to stop the cooking action but not so long as to bring them to room temperature (they should still feel slightly hot to the touch).
  - Drain the vegetables by pouring them directly onto the dehydrator trays placed over the sink or, if you wish to reuse the water, over a large pan. Blot the bottom of the tray to remove excess water, then place the tray in the dehydrator while the vegetables are still warm.

To **steam blanch** vegetables:

- Use a large pot with a tight fitting lid that can accommate a steamer basket or colander that will sit above the water level. Bring water to a full rolling boil.
- Put the vegetables loosely in the basket no more than 2 inches deep. Place the basket over the boiling water and close the lid tightly.
- When the blanching time is up* (or when the vegetables test ready), remove the vegetables and place them in an ice bath or very cold water briefly – just long enough to stop the cooking action but not so long as to bring them to room temperature (they should still feel slightly hot to the touch).
- Drain the vegetables by pouring them directly onto the dehydrator trays placed over the sink or, if you wish to reuse the water, over a large pan. Blot the bottom of the tray to remove excess water, then place the tray in the dehydrator while the vegetables are still warm.

**Note: At altitudes of 5,000 feet or more, add 1 minute to the blanching time.*

Drying Vegetables

Prepare and pretreat vegetables as directed for each specific food (see the Guidelines for Dehydrating Vegetables chart on pgs. 21-23). Citric acid can be added to the blanching water to help preserve color and quality. It will also help destroy harmful bacteria. A **citric acid blanch** is particularly recommended for potato slices for better quality. Dried green vegetables treated in a citric acid blanch may take on an olive-green color. If using a citric acid water blanch, add ¼ teaspoon of citric acid to each quart of water.

Vegetables are generally sliced in ⅛" to ½" slices, although some, such as onions, are often chopped. The higher the water content, the thicker the slices should be. **Vegetable chips** for snacking can be made by slicing vegetables very thinly (the thinner the slice, the crisper they will be). A mandoline or food processor may be helpful for obtaining thin, even slices. Common vegetables used for making chips include cucumber, tomato, zucchini, squash, beet, carrot, parsnip and turnip. Veggie chips can also be seasoned with dried herbs or seasonings. Brushing a light touch of vegetable oil on the chips can help seasonings adhere, and topping them with other flavorings such as Parmesan cheese or nutritional yeast can make for fun snacking chips; however, these types of chips will not be shelf stable (if not consumed immediately after drying, store these types of chips short-term in the refrigerator).

Place the prepared vegetables on dehydrator trays, arranging them in a single layer without the pieces touching or overlapping. Dry at the temperature and for the duration indicated in the Guidelines for Dehydrating Vegetables chart on pgs. 21-23. Flavor can be lost if it takes too long of a time to dry vegetables, thus some recommend that vegetables be cut into small pieces to reduce the drying time. Vegetables dry more quickly towards the end, so watch carefully to avoid scorching.

Vegetables are dried until 10% moisture remains. Most will be crisp or brittle when dry; some vegetables, such as mushrooms, are dried until they are leathery. Because so little moisture remains after dehydrating vegetables, they do not need to be conditioned as does fruit.

Once dry, allow the vegetables to cool for about 30 to 60 minutes. If the vegetables are still too warm when packaged, sweating and moisture buildup can occur, while waiting too long can allow moisture to be re-introduced into the food.

If the vegetables have been dried outdoors (or that otherwise may have been exposed to insects, either before or during drying), they should be **pasteurized** before storing (see box on the bottom of pg. 4).

Finally, package the dried vegetables and store (see pg. 15).

VEGETABLE POWDERS AND FLAKES

Powders, such as onion, garlic, celery, and tomato can be made by grinding dried vegetables using a spice mill, food processor, or blender.

Flakes, such as chili pepper flakes, are not as fine as powders and can be made by crushing the dried vegetables with a mallet or rolling pin, or by encasing the vegetables in a plastic bag or clean towel and hand crushing.

Making Fruit and Vegetable Leathers

Leathers are made from puréed fruit or vegetables that are dried in very thin layers. Fruit leathers are dried until they are pliable, whereas vegetable leathers generally are crisp or brittle when dried.

Fruit Leathers: Most fruits can be made into fruit leathers, and multiple fruits can be combined to mix flavors. Applesauce can be dried on its own or added to other fruit purees as an extender (especially good for thin purées such as berry); it also makes the leather smoother and more pliable. Grapefruit and lemon are not recommended for fruit leathers because they can turn bitter when dry.

Fruit leather may be made from fresh, frozen, or canned fruit. Because of recent concerns that bacteria such as E. coli can survive the drying process, it is now recommended that fruit (except for canned fruit, which has already been heat processed) be heated to 160°F before drying. Preheating has the added benefits of helping the fruit to retain color and to speed the drying process.

To make fruit leather from fresh fruit, choose ripe or slightly overripe fruit. After washing, peel tough-skinned fruit (oranges, peaches, pears, and similar fruits), remove pits, cores and seeds, and then cut the fruit into chunks. Place the fruit in the top of a double boiler, cover, and steam over boiling water for 15-20 minutes, or until the fruit is soft and registers 160°F on a calibrated thermometer. Fruit can also be heated in a microwave. Transfer the fruit to a blender or similar device and purée. For light-colored fruits, add 2 tsp of lemon juice or ⅛ tsp of powdered ascorbic acid for each 2 cups of fruit to prevent darkening. If using canned fruit, drain it before puréeing.

Because the flavor of fruit leather is so concentrated, sweetening is generally not necessary, however corn syrup, honey, or sugar can be added. Corn syrup and honey prevent crystal formation so are best for long-term storage; sugar works well for immediate use or short-term storage. Use ¼ to ½ cup of corn syrup, honey or sugar to each 2 cups of fruit.

Spices may also be used to flavor fruit leathers. Because spice flavors intensify during drying, start small, using ⅛ to ¼ tsp of dried spice per 2 cups of puréed fruit. Other flavorings such as extracts, citrus juice, or citrus peel can be added to the purée (add sparingly). Chopped nuts, shredded coconut, chopped dried fruits such as dates, granola, mini marshmallows, and seeds can be sprinkled on the leather to garnish your fruit leather.

Spread the fruit purée evenly about ⅛" to ¼" thick on rimmed fruit leather dehydrator trays, or fashion your own leather tray by lining regular dehydrator trays with silicone mats, plastic wrap, or non-stick foil (fruit leather will stick to wax paper or regular aluminum foil), forming raised edges so the fruit purée does not drip over the edge. Dry at 140°F until the fruit leather shows no wet spots and no indentations are evident when the leather is touched in the center (leather dries from the outside edges towards the center). It may be slightly tacky (not sticky) but should peel away easily from the tray. It will take 6 to 8 hours to dry, however the moisture content of the fruit and other factors such as humidity, the dryer being used, and the size of the leather can extend the drying time significantly.

Fruit leather may also be dehydrated in an oven. Spray a rimmed cookie sheet with nonstick cooking spray or line it with plastic wrap or non-stick foil. Dry in an oven at 140°F to 145°F cracking the door open and using a fan if necessary (see Oven Drying on pg. 3). It can take up to 18 hours to dry fruit leather in an oven.

Making Fruit and Vegetable Leathers (cont.)

Roll the fruit leather while still warm, allow to cool, and then loosely roll the leather in plastic or waxed paper. The roll can be stored in one piece or cut into 1" strips. Fruit leather can also be cut into shapes with a sharp knife or cookie cutters. Store the fruit leather in a cool, dry, and dark place for 1 to 2 months at room temperature. Fruit leather may also be stored for several months in the refrigerator, or in the freezer tightly wrapped in foil for up to a year.

Vegetable Leathers: Vegetable leathers are made in a similar manner to fruit leathers. Typical vegetables made into leathers include tomato, pumpkin, or mixed vegetable, although other vegetable purées may also be used. Because vegetable leathers tend to be hard and brittle when dry, they are often ground into powders or flakes, or added to soups and stews.

To make vegetable leathers, purée cooked vegetables and then cook until thickened. Spices can be added to the strained purée. Pumpkin leather can be made with freshly cooked and puréed pumpkin or canned pumpkin. Add spices and honey (½ cup honey for each 2 cups of pumpkin purée); no further cooking is required. Dry at 140°F as for fruit leather.

Drying Herbs

Drying is the easiest method for preserving herbs (and their flowers and seeds): all that is needed is warm, dry air. Drying at too high a temperature can cause flavor loss. Herbs can be dried in a dehydrator, an oven, a microwave, or by air drying. Drying herbs in the sun is not recommended due to flavor and color loss. Pretreatment is not required.

Herbs are best harvested when they are in the bursting bud stage, just before the flowers open. Flowering herbs can tend to be somewhat bitter. New leaves at the top of the herb plant will be more concentrated in flavor. Seeds should be harvested when mature. Gather herbs early in the morning after the dew has evaporated, and avoid leaving them in the sun.

Rinse herbs under cool water, then shake off excess water and remove as much remaining moisture as possible by blotting gently with clean towels or using a salad spinner. Discard bruised, soiled, or poor quality leaves and stems.

Herbs are dry when they crumble easily and the stems break when bent. Once dry, pasteurize herbs that may have been subject to insect infestation (see box on pg. 4). Store in airtight containers in a cool, dry, dark place for up to a year.

An herb's strength can be judged by its aroma. Herbs can be stored whole or in crushed or ground form, however whole herbs will hold their oils and retain their flavor longer. Whole leaves and seeds also have the longest shelf life (ground leaves and seeds have the shortest). For best flavor and aroma, crush or grind herbs right before using.

- **DEHYDRATOR:** Place herbs on trays in a single layer. Dry at 95°F - 110°F. If it is humid, dry at up to 125°F. Drying time is 1 to 4 hours; check periodically for doneness.
- **OVEN:** Mint, sage, and bay leaf are good candidates for oven drying. Separate herb leaves from stems and place the leaves on a paper towel in a single layer without allowing them to touch each other. Cover with another paper towel. Stack up to 5 layers. Dry in a very cool oven (overnight drying can be accomplished with just the oven light in an electric oven or the pilot light of a gas oven).

Drying Herbs (cont.)

- **MICROWAVE:** Microwave ovens are convenient when only a small amount of herbs are to be dried. Generally no more than 1 to 2 cups should be dried at one time. Dry herbs in a singe layer between clean paper towels (note that recycled paper towels can contain metal that can arc and catch on fire; do not use them in a microwave oven). Follow the manufacturer's instructions for your oven for recommended settings and drying times.
- **AIR DRYING:** While air drying outdoors is possible, better color and flavor retention results from indoor drying. Successful air drying requires low humidity and good air circulation. At room temperature, herbs will take 1-2 weeks to dry.
  - *Tender-Leaf Herbs:* Herbs with high moisture contents, such as basil, oregano, tarragon, lemon balm, and mint will mold if not dried quickly. It is helpful to dry these types of herbs in paper bags. Tie small bunches (large bunches will mold) inside a bag, with the stems sticking out of the top of the bag and securing them with a rubber band. Punch holes in the side of the bag and hang where air currents can circulate through the bag.
  - *Sturdy Herbs:* Rosemary, sage, thyme, summer savory, parsley, and other sturdy herbs can be tied into small bundles and simply hung to dry. Suspending them in paper bags poked with holes can help protect the herbs from dust.

  Herbs can also be dried on fine-meshed food-safe screens or paper towels. Small-leaf herbs can be laid out whole and the leaves stripped from the stems when dry. Large-leaf herbs should be separated from the stems and laid out without the leaves touching each other. Up to 5 layers may be stacked; change the paper towels as necessary if they absorb moisture.

Drying Seeds, Nuts, and Popcorn

Many seeds can be dried on the vine (see Vine Drying on pg. 4) or dried using the same methods as herbs.

Sunflower seeds may be sun dried or dried in a dehydrator at 100°F (higher temperatures will affect the flavor). Once dry, sunflower seeds can be roasted in a shallow pan at 300°F for 10 to 15 minutes.

To dry **pumpkin seeds**, first wash them to remove the surrounding fibrous tissue. Dry in the sun, in a dehydrator at 115°F to 120°F for 1 to 2 hours, or in a warm oven for 3 to 4 hours. Stir the pumpkin seeds frequently to avoid scorching. After drying, pumpkin seeds can be roasted by tossing them with oil and/or salt and roasted in a preheated 250°F for 10 to 15 minutes.

Peanuts (which are actually a legume) can be dried shelled or unshelled. Spread them in a single layer and dehydrate at 130°F until the shells have hardened to a brittle state and the nut meat is tender but not shriveled. To roast peanuts in the shell, place them in a shallow pan and roast at 300°F for 30 to 40 minutes, stirring several times. To roast shelled peanuts, place them in a shallow pan and roast at 300°F for 20 to 25 minutes, stirring frequently to prevent scorching.

To dry **almonds, walnuts, pecans, pistachios, and chestnuts**, see this online publication: https://anrcatalog.ucanr.edu/pdf/8005.pdf.

Drying Seeds, Nuts, and Popcorn (cont.)

Popcorn may be dried at home; varieties that work well include Japanese Hull-less, Hybrid South American Mushroom, Crème Puff Hybrid, White Cloud, and Dynamite. Leave the ears on the stalks until the kernels are well dried, or air-dry harvested ears below 130°F. Once the kernels are dry (about 2-3 weeks), remove them from the ears. The moisture content of popcorn affects its popping quality; ideally the content is 13 to 14.5%. Pop a few kernels to test. Too much moisture will result in popped corn that is small, rough, and chewy; dry for another week. Once dry, package in airtight containers. For further details on harvesting, curing, and storing popcorn, see these online publications:

https://yardandgarden.extension.iastate.edu/faq/what-proper-way-harvest-and-store-popcorn

https://hles.unl.edu/harvesting-curing-and-storing-home-grown-popcorn#:~:text=Pick%20the%20ears%20after%20the,dry%20and%20the%20kernels%20hard.&text=Remove%20the%20husks%20from%20the,from%20nylon%20net%20or%20cheesecloth.

Storing Dried Food

After produce has been dried and cooled (and conditioned and/or pasteurized, if applicable), package it in airtight containers, such as glass jars or plastic containers, plastic freezer (not regular storage) bags, or by vacuum sealing. Note that plastic bags are not insect- or rodent-proof, so consider storing plastic bags inside other containers. Metal cans may also be used to store dried food, however fruit that has been sulfured should not touch the cans (place the fruit in a plastic bag before putting it in the can). Metal cans should be stored off of floors, especially if the floors are bare concrete, as moisture can be wicked up to the cans and encourage rusting. Oxygen absorbers can be placed in the storage containers to remove oxygen and help extend shelf life.

Label and date the packages, then store in a cool, dark, dry place. Storing dried produce in a dark place, in addition to helping with shelf life, can help retain the vitamin content of the food. Properly dried fruit is shelf stable for about 6 to 12 months, depending on storage conditions (for example, fruit stored at 60°F can last up to a year, whereas fruit stored at 80°F will last about 6 months). Properly dried vegetables have about half the shelf life compared to fruits.

For increased shelf life, store dried and packaged food in the refrigerator or freezer. Note, however, that containers taken from a cold area into a warm kitchen can cause condensation to form, potentially allowing the food to absorb enough moisture to cause spoilage, so consider packaging dried food in small containers (see the storage tip in the box below).

Check dried food frequently to ensure that moisture has not been reintroduced and the food is still dry. If signs of moisture are evident but the food shows no signs of spoilage, the food should be used immediately or re-dried. If mold is present, discard the food.

> ***STORAGE TIP:*** Opening storage containers can re-introduce air and moisture to dried foods. Consider packaging dried food in smaller containers, in amounts that can be consumed in a short period of time.

Rehydrating and Using Your Dried Food

Dried fruit is generally eaten as is, although it can be reconstituted. To rehydrate fruit, soak it in room temperature water. Oversoaking fruit can result in a loss of flavor and sometimes a mushy texture. To cook reconstituted fruit, simmer it in the soaking water in a covered pan. If using sugar, add it at the end of cooking time so as not to interfere with the fruit absorbing water. Adding a few grains of salt can help bring out the natural sweetness of most fruits.

Dehydrated vegetables, unless dried as snacking chips or ground into powders, must be first reconstituted. To rehydrate vegetables, soak in room temperature water, or use boiling water to speed up the rehydrating time. They may also be reconstituted in bouillon or vegetable juice. Vegetables can also be added directly to soups and stews without pre-soaking. Leafy greens, cabbage, and tomatoes can be covered with water and simmered until tender without pre-soaking.

See the rehydrating chart below for soaking water amounts and times. When the soaking times are longer than 2 hours, soak the produce in the refrigerator to prevent spoilage.

REHYDRATING DRIED FOODS		
Product	**Water per Cup of Produce**	**Minimum Soaking Time**
FRUIT (soaked in room temperature water)		
Apples	1½ cups	½ hour
Pears	1¾ cups	1¼ hours
Peaches	2 cups	1¼ hours
VEGETABLES (soaked in boiling water)		
Asparagus	2¼ cups	1½ hours
Beans, Lima	2½ cups	1½ hours
Beans, Snap	2½ cups	1 hour
Beets	2¾ cups	1½ hours
Carrots	2¼ cups	1 hour
Cabbage	3 cups	1 hours
Corn	2¼ cups	½ hour
Okra	3 cups	½ hour
Onions	2 cups	¾ hour
Peas	2½ cups	½ hour
Pumpkin	3 cups	1 hour
Squash	1¾ cups	1 hour
Spinach	1 cup	½ hour
Sweet Potatoes	1½ cups	½ hour
Turnip & Other Greens	1 cup	¾ hour

Source: Univ. of Georgia Cooperative Extension, Preserving Food: Drying Fruits and Vegetables

Dehydrating Math

Food can shrink significantly when dehydrated, which can be a benefit if storage space is a consideration, or for backpackers and campers who need lightweight, portable food. In general, 25 pounds of fresh fruit will yield 4 to 8 pounds of dried fruit; 25 pounds of fresh vegetables will yield 3 to 6 pounds of dried vegetables.

One cup of dried fruit will reconstitute to about 1½ cups; one cup of dried vegetables will reconstitute to about 2 cups.

Some the charts below for examples of the dry yields and equivalents of fresh produce.

DRIED VEGETABLE YIELDS		
Produce	**Fresh Amount**	**Dried Amount**
Beans (snap)	6 lbs	½ lb
Beets	15 lbs	1½ lbs
Carrots	15 lbs	1¼ lbs
Celery	12 lbs	¾ lb
Corn	18 lbs	2½ lbs
Onions	12 lbs	1½ lbs
Peas	8 lbs	¾ lb
Pumpkin	11 lbs	¾ lb
Squash	10 lbs	¾ lb
Tomatoes	14 lbs	2½ to 3 lbs

Source: Colorado State Univ. Cooperative Extension, Drying Vegetables (9.308)

DRIED VEGETABLE EQUIVALENTS	
Fresh Produce	**Dry Equivalents**
1 onion	1½ tbsp onion powder ¼ cup dried minced onion
1 green pepper	¼ cup green pepper flakes
1 cup carrots	4 tbsp powdered carrots ½ cup (heaped) dried carrots
1 cup spinach	2 to 3 tbsp powdered spinach
1 medium tomato	1 tbsp powdered tomato
½ cup tomato purée	1 tbsp powdered tomato

Source: University of Georgia Cooperative Extension, So Easy to Preserve

Suitability for Dehydrating Chart

FRUIT	
Excellent	Apples; Apricots; Cherries; Citrus Peel; Coconuts; Dates; Figs; Grapes; Nectarines; Peaches; Pears; Pineapples; Prune Plums
Good	Bananas; Currants; Papayas; Plums; Rhubarb[9]
Fair to Good	Strawberries
Fair	Blueberries; Persimmons
Poor	Cranberries; Melons
Not Recommended	Avocado[1]; Berries with Seeds[2]; Citrus[3]; Crabapples[4]; Guavas[5]; Olives[6]; Pomegranates[7]; Quince[8]

[1]Fat content too high
[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 leather
[5]Grainy flesh full of seeds; can be combined with other fruit for leather
[6]High oil content and bitter flavor removable only by long processing
[7]Pulp is full of seeds
[8]Hard flesh and strongly acidic flavor; can be combined with other fruit for leather
[9]Stalks only (the leaves are toxic)

VEGETABLES	
Excellent	Chili Peppers
Good to Excellent	Onions
Good	Carrots; Sweet Corn; Garlic; Horseradish[1]; Mushrooms; Parsley; Parsnips; Peppers; Popcorn; Potatoes
Fair to Good	Green Beans; Beets; Okra; Peas; Pumpkins; Rutabagas; Tomatoes[2]; Turnips
Fair	Artichokes; Lima Beans; Cabbage[3]; Kohlrabi; Sweet Potatoes; Yams
Poor to Fair	Asparagus; Eggplant; Summer Squash; Zucchini
Poor	Brussels Sprouts[4]; Cauliflower; Celery; Collard Greens; Cucumbers; Kale; Mustard Greens; Spinach; Swiss Chard; Turnip Greens
Not Recommended	Broccoli; Lettuce[5]; Radishes[6]; Winter Squash

[1]Odor is extremely strong during processing; use adequate ventilation
[2]Package tightly because dried tomatoes re-absorb moisture readily which causes undesirable color/flavor changes and shortens life; black color can develop because of oxidation
[3]Cabbage readily absorbs moisture from the air and will keep well only if stored at extremely cold temperature
[4]Difficult to dry because of small size and layered leaves; strong flavor
[5]High water content resulting in dried product undesirable for use
[6]Low quality product

Source: Adapted from University of Georgia Cooperative Extension, So Easy to Preserve

Guidelines for Dehydrating Fruit in an Electric Dehydrator

Fruit	Selection, Preparation, and Pretreatment Options *Note: Wash all fruit before preparing and drying (see pg. 6). Drying times are based on* 140°F *unless otherwise noted.*	Drying Time / Doneness Test
Apples	*Preparation:* Peel if desired and core. Cut into slices or rings about ⅛" to ¼" thick. *Pretreatment options:* None; steam blanch 3-5 minutes; syrup blanch 10 minutes; acidic dip; honey dip; fruit juice dip; sulfite dip.	6-12 hours Leathery to Crisp
Apricots	*Preparation:* Pit and halve; slice if desired. *Pretreatment options:* Steam blanch 3-4 minutes; syrup blanch 10 minutes; acidic dip; fruit juice dip; sulfiting.	24-36 hours Springy
Bananas	*Selection:* Choose solid yellow to slightly brown-flecked bananas. Avoid bruised or overripe bananas. *Preparation:* Peel and slice ¼" to ½" thick, crosswise or lengthwise. *Pretreatment options:* None; honey dip; acidic dip; fruit juice dip; sulfite dip.	8-10 hours Pliable to Crisp
Berries	*Pretreatment:* Remove stems. Check berries with waxy coatings (see pg. 8). No pretreatment necessary for soft berries.	24-36 hours Shriveled; Leathery
Cherries	*Preparation:* Remove steam and pit; cut in half, chop, or leave whole. *Pretreatment options:* Syrup blanch 10 minutes (for sour cherries); check whole cherries; no pretreatment required for cut cherries.	24-36 hours Pliable; Leathery
Citrus Peel	*Selection note:* Thick-skinned naval orange peel dries better than thin-skinned Valencia peel. *Preparation:* Wash thoroughly; remove outer ⅙" to ⅛" of peel, avoiding the bitter white pith. *Pretreatment:* None necessary.	8-12 hours Crisp
Coconuts	*Preparation:* Drain milk; steam 1 minute to loosen meat or pry meat out with a knife. Trim dark outer skin; grate meat or slice in chunks. *Pretreatment:* None necessary.	Dry at 110°F Leathery to Crisp
Cranberries	*Preparation:* Remove stems. *Pretreatment:* Check (see pg. 8) or syrup blanch.	24-36 hours Shriveled
Figs	*Selection:* Choose fully ripe fruit as immature figs may sour before drying. *Preparation:* Leave small figs whole; cut large figs in half. *Pretreatment:* Check whole figs (see pg. 8); syrup blanch.	6-12 hours Pliable; Leathery; Slightly Sticky
Grapes	*Preparation:* Leave seedless grapes whole; cut grapes with seeds in half and remove seeds. *Pretreatment:* Check whole grapes (see pg. 8); no pretreatment necessary for halved grapes.	12-20 hours Pliable; Leathery
Kiwi	*Preparation:* Remove outer skin; slice ¼" thick. *Pretreatment:* None; syrup blanch; acidic dip; lemon juice dip.	8-10 hours Pliable; Leathery

Guidelines for Dehydrating Fruit in an Electric Dehydrator (cont.)

Fruit	Selection, Preparation, and Pretreatment Options *Note: Wash all fruit before preparing and drying (see pg. 6). Drying times are based on* 140°F *unless otherwise noted.*	Drying Time / Doness Test
Melon	*Selection:* Choose firm fruit, heavy for its size. Cantaloupe will dry better than watermelon. *Preparation:* Remove outer skin and inner fibrous tissue. Slice ¼" to ½" thick. *Pretreatment:* None required.	12-18 hours Leathery; Pliable
Nectarines and Peaches	*Preparation:* Remove skins if desired. If steam or syrup blanching, leave whole then pit and halve, quarter or slice; if sulfiting, pit and halve. *Pretreatment:* Sulfiting; steam blanch 8 minutes or syrup blanch 10 minutes; acidic dip; fruit juice dip.	36-48 hours Pliable; Leathery
Papayas	*Preparation: Cut in half, remove seeds, peel and slice ¼".* *Pretreatment: None; syrup blanch.*	12-14 hours Pliable; Leathery
Pears	*Preparation:* Peeling is preferred. Cut in half and core; may also slice or quarter. *Pretreatment:* None; steam blanch halves 6 minutes; syrup blanch 10 minutes; acidic dip; fruit juice dip; sulfiting.	24-36 hours Pliable; Leathery
Persimmons	*Selection:* Use firm fruit of long, soft varieties; use fully ripe fruit of round drier varieties. *Preparation:* Peel and slice. *Pretreatment:* None; syrup blanch.	12-15 hours Leathery
Pineapples	*Selection:* Choose fully ripe, fresh pineapple. *Preparation:* Wash, peel, and remove thorny eyes. Slice crosswise ¼" to ½" thick. *Pretreatment:* None; syrup blanch.	24-36 hours Leathery but not sticky
Plums	*Preparation:* Cut in half and pit; quarter or slice if desired. May also be left whole for prunes (if sulfiting prunes, cut fruit in half). *Pretreatment:* None; sulfiting; check whole fruit if sun drying.	24-36 hours Pliable; Leathery
Rhubarb	*Preparation:* Cut into 1" lengths. *Pretreatment:* None; blanch 1-2 minutes.	8-12 hours Very brittle; Tough
Strawberries	*Preparation:* Remove stems; cut in half or slice about ¼" thick. *Pretreatment:* None necessary. *Other:* Dry skin-side down.	7-16 hours Pliable; Leathery

Sources: Adapted from Univ. of Georgia Cooperative Extension, Preserving Food: Drying Fruits and Vegetable*s; and Pacific Northwest Extension,* Drying Fruits and Vegetables (PNW 397)

"POP THE BACKS"!

Turn fruits such as apricots, peaches, and plums inside out to help shorten the drying time. With your thumbs press the rounded side of the fruit inward and the cavity side up. If drying the fruit with the skin on, place it on the dehydrator trays skin side down.

Guidelines for Dehydrating Vegetables in an Electric Dehydrator

Vegetable	Selection, Preparation, and Pretreatment Options *Note: Wash all vegetables before preparing and drying (see pg. 6). Drying times are based on* 140°F *unless otherwise noted.*	Drying Time / Doneness Test
Artichokes (Globe)	*Preparation:* Cut hearts into ⅛" strips. *Pretreatment:* Heat in boiling solution of ¾ cup water and 1 tbsp lemon juice for 6-8 minutes.	4-6 hours Completely dry
Asparagus	*Preparation:* Cut large tips in half. *Blanch:* Water 3½-4½ minutes or steam 4-5 minutes.	4-6 hours Leathery to brittle
Beans (green or yellow)	*Preparation:* Cut in short pieces or lengthwise. *Blanch:* Water 2 minutes or steam 2-2½ minutes. *Other:* Freeze blanched beans for 30-40 beans to improve texture.	8-14 hours Brittle
Beets	*Preparation:* Cook as usual, cool, and peel. Cut into shoestring strips ⅛" thick or slices about ¼" thick. *Blanch:* None required as the beets are precooked.	10-12 hours Tough; Brittle
Broccoli	*Preparation:* Trim and cut as for serving; quarter stalks lengthwise. *Blanch:* Water 2 minutes or steam 3-3 ½ minutes.	12-15 hours Crisp
Brussels Sprouts	*Preparation:* Cut in half lengthwise through stem. *Blanch:* Water 4½-5½ minutes or steam 6-7 minutes.	12-18 hours Tough to brittle
Cabbage	*Preparation:* Remove outer leaves, quarter, and core. Cut into strips ⅛" thick. *Blanch:* Water 1½-2 minutes or steam until wilted 2½-3 minutes.	10-12 hours Crisp
Carrots	*Selection:* Use only crisp, tender carrots. *Preparation:* Cut off roots and tips. Preferably peel, and cut into slices or strips ⅛" thick. *Blanch:* Water 3½ minutes or steam 3-3½ minutes.	10-12 hours Tough; Brittle
Cauliflower	*Preparation:* Separate into florets, cut large ones in half. *Blanch:* Water 3-4 minutes or steam 4-5 minutes.	12-15 hours Tough; Brittle
Celery	*Preparation:* Trim stalks and slice. *Blanch:* Water or steam 2 minutes. *Other:* Stir occasionally during drying.	10-16 hours Crisp
Corn (cut)	*Preparation:* Husk, trim and blanch until milk does not exude from the kernels when cut. Cut kernels from the cob after blanching. *Blanch:* Water 1½ minutes or steam 2-2½ minutes.	6-10 hours Crisp; Brittle
Eggplant	*Preparation:* Trim and cut into ¼" slices. *Blanch:* Water 1½ minutes or steam 2½ - 3 minutes.	12-14 hours Leathery to brittle
Garlic	*Preparation:* Peel and finely chop. *Pretreatment:* None required.	6-8 hours Crisp

Guidelines for Dehydrating Vegetables in an Electric Dehydrator (cont.)

Vegetable	Selection, Preparation, and Pretreatment Options *Note: Wash all vegetables before preparing and drying (see pg. 6). Drying times are based on* 140°F *unless otherwise noted.*	Drying Time / Doneness Test
Greens (chard, kale, turnip, spinach)	*Selection:* Use only young, tender leaves. *Preparation:* Trim thoroughly. Cut large leaves crosswise into pieces. *Blanch:* Water 1½ minutes or steam 2-2½ minutes. *Other:* Make sure leaves do not form wads when laying on trays.	8-10 hours Brittle
Horseradish	*Preparation:* Remove small rootlets and stubs. Peel or scrap roots, then grate. *Pretreatment:* None required.	4-10 hours Brittle; Powdery
Mushrooms	*Preparation:* Discard tough, woody stems. Cut tender stems into short sections. Peel large mushrooms. Slice, or dry small mushrooms whole. *Pretreatment:* None required. *Other:* Use only commercially grown mushrooms, as only an expert can differentiate between poisonous and edible varieties. The toxins in poisonous mushrooms are not destroyed by drying or cooking.	Dry at 120°F 8-10 hours Crisp; Brittle
Okra	*Selection:* Choose only young, tender pods. *Preparation:* Slice crosswise into ⅛" to ¼" disks, or split lengthwise. *Pretreatment:* None required; can water blanch 2-3 minutes.	8-10 hours Tough; Brittle
Onions	*Preparation:* Remove tops and root ends, outer papery skin, and any discolored layers. Slice ⅛" to ¼" thick. *Pretreatment:* None required.	3-9 hours Brittle; light colored
Parsnips	*Selection:* Use crisp, tender parsnips free from woodiness. *Preparation:* Trim roots and tops. Cut into slices or strips ⅛" thick. *Blanch:* Water 2-3 minutes or steam 3-5 minutes.	Tough; Brittle
Peas (green)	*Selection:* Choose young, tender peas of a sweet variety. *Preparation:* Shell. *Blanch:* Blanch quickly after shelling. Water blanch 2 minutes or steam blanch 3 minutes. *Other:* Stir frequently when drying.	8-10 hours Hard; Wrinkled; Shatter when hit with a hammer
Peppers, Pimientos	*Preparation:* Stem and remove core, seeds and "partitions." Cut into strips or rings ⅜" to ½" thick. *Pretreatment:* None required, but can be blanched in water 2-3 minutes or steam 3-5 minutes.	8-12 hours Tough; Brittle

DRYING VEGETABLES WITH STRONG ODORS

Vegetables such as garlic, onions, and horseradish are best dried individually so that their strong odors don't contaminate other produce items. They should also be dehydrated in an area with adequate ventilation.

Guidelines for Dehydrating Vegetables in an Electric Dehydrator (cont.)

Vegetable	Selection, Preparation, and Pretreatment Options *Note: Wash all vegetables before preparing and drying (see pg. 6). Drying times are based on* 140°F *unless otherwise noted.*	Drying Time / Doneness Test
Peppers, Chile (green)	*Preparation:* Loosen skin by cutting a slit in the skin, then rotate over flame 6-8 minutes or scald in boiling water. Peel and split pods, remove seeds and stem (wear gloves if necessary). *Pretreatment:* None required.	4-8 hours Crisp; Brittle; Medium Green
Potatoes	*Preparation:* Peel and cut into shoestring strips ¼" thick or slices ⅛" to ¼" thick. Rinse in cold water before blanching. *Blanch:* Water 5-6 minutes or steam 6-8 minutes, then rinse well.	8-12 hours Crisp
Pumpkin / Winter Squash	*Preparation:* Cut into 1" wide strips, remove pulp and seeds, and peel. Cut peeled strips into pieces about ⅛" thick. *Blanch:* Water 1 minute or steam 2½-3 minutes.	10-16 hours Tough to brittle
Summer Squash	*Preparation:* Trim and cut into ¼" slices. *Blanch:* None required, but can be blanched in water 1½ minutes or steam 2½-3 minutes.	10-12 hours Leathery to brittle
Tomatoes (paste or plum)	*Preparation:* Steam or dip in boiling water to loosen skins, then chill in cold water. Remove skins. Cut into sections no more than ¾" wide, or slice. Small pear or plum tomatoes may be cut in half. *Pretreatment:* None required. *Other:* If drying slicing/salad varieties, they will take longer to dry.	10-18 hours Leathery to crisp
Tomatoes (cherry or grape)	*Preparation:* Cut in half. *Pretreatment:* None required. *Other:* Place skin side down on dehydrator tray.	10-18 hours Leathery

Sources: Adapted from Univ. of Georgia Cooperative Extension, Preserving Food: Drying Fruits and Vegetables*; Pacific Northwest Extension,* Drying Fruits and Vegetables (PNW 397); *and New Mexico State University,* Drying Foods (Guide E-322).

TIP: Treating dehydrator trays with a thin layer of neutral vegetable oil or nonstick cooking spray can help prevent produce from sticking to the tray.

Other References:

So Easy to Preserve https://setp.uga.edu/
Clemson Cooperative Extension, *Drying Foods (HGIC 3080)* https://hgic.clemson.edu/factsheet/drying-foods/
Penn State Extension, *Let's Preserve: Drying Fruits and Vegetables* https://extension.psu.edu/lets-preserve-drying-fruits-and-vegetables-dehydration
Colorado State Univ. Extension, Preserve Smart website https://apps.chhs.colostate.edu/preservesmart/
Texas A&M Extension, *Drying Fruits and Vegetables* https://jasper.agrilife.org/files/2014/06/drying-fruits-vegetables-home.pdf
Cornell Cooperative Extension, *Handy Reference for Drying Fruits* https://bpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/b/2712/files/2009/04/2011_handy_ref_dry_fruit.pdf
Cornell Cooperative Extension, *Handy Reference for Drying Vegetables & Herbs* https://bpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/b/2712/files/2009/04/2011_handy_ref_dry_veg.pdf
Penn State Extension, *Let's Preserve: Drying Herbs* https://extension.psu.edu/lets-preserve-drying-herbs
Univ. of Minnesota Extension, *Preserving Herbs by Freezing or Drying* https://extension.umn.edu/preserving-and-preparing/preserving-herbs-freezing-or-drying#:~:text=Store%20in%20airtight%20containers,-Place%20them%20in&text=Herbs%20must%20be%20completely%20dry,year%20in%20refrigerators%20or%20freezers.
Clemson Cooperative Extension, *Drying Herbs, Seeds & Nuts* https://hgic.clemson.edu/factsheet/drying-herbs-seeds-nuts/#:~:text=Pre%2Dheat%20dehydrator%20with%20the,from%20one%20to%20four%20hours.
Colorado State Univ. Extension, *Leathers and Jerkies (9.311)* https://extension.colostate.edu/topic-areas/nutrition-food-safety-health/leathers-and-jerkies-9-311/
Utah State Univ. Extension, *A Guide to Food Storage For Emergencies* https://extension.usu.edu/preserve-the-harvest/files/Food-Storage-Booklet.pdf

Additional Resources:

UC Master Food Preservers of Central Sierra https://ucanr.edu/sites/mfp_of_cs/
UC Master Food Preserver Program https://mfp.ucanr.edu/
National Center for Home Food Processing https://nchfp.uga.edu/
USDA Complete Guide to Home Canning https://nchfp.uga.edu/publications/publications_usda.html#gsc.tab=0
So Easy to Preserve https://setp.uga.edu/
Ball Blue Book Guide to Preserving. 2024. Jarden Home Brands.
Ball Complete Book of Home Preserving. 2020. Jarden Home Brands.