

## Drying of Fruits and Vegetables

Drying is the oldest method of preserving food. Throughout history, the sun, the wind and a smoky fire were used to remove water from fruits, meats, grains and herbs. By definition, food dehydration is the process of removing water from food by circulating hot air through it, which prohibits the growth of enzymes and bacteria.



### Nutritional Benefits of Dried Food

- Dried foods are tasty, nutritious, lightweight, easy to prepare and easy to store and use.
- The energy input is less than what is needed to freeze or can, and the storage space is minimal compared with that needed for canning jars and freezer containers.
- The nutritional value of food is only minimally affected by drying. Vitamin A is retained during drying; however, because vitamin A is light sensitive, food containing it should be stored in dark places.
- Yellow and dark green vegetables such as peppers, carrots, winter squash and sweet potatoes have high vitamin A content. Vitamin C is destroyed by exposure to heat, although pretreating foods with lemon, orange or pineapple juice increases vitamin C content.
- Dried fruits and vegetables are high in fiber and carbohydrates and low in fat, making them healthy food choices.
- Dried fruit has a higher concentration of carbohydrate than fresh fruit; therefore, serving sizes tend to be smaller.

## Equipment Needed for Drying

To be certain of the final quality and consistent drying of foods, a dehydrator is recommended, especially with unpredictable Ohio weather. Sharp knives and a food processor or blender will also make the drying task easier.

Many guidelines call for blanching, steaming or pretreating foods. Equipment for these processes includes a deep kettle with a lid and a wire basket, a colander, or an open mesh cloth bag to hold produce. A nonmetal bowl is best for pretreating fruits and vegetables to prevent discoloring.

## Preparing Food for Drying

- Select ripe fruit for drying. For best results, use fresh produce, free from blemish and mold.
- Even slicing of food allows the dry air to circulate and dry the surface area of the food first. Cut foods into ¼-inch to ½-inch slices.
- The higher the water content, the larger you should make the slice size. Small slices of high-moisture foods such as watermelon would disappear when all the moisture has evaporated.
- Peel fruits and vegetables, including bananas, melons, winter squash, and other fruits and vegetables. Some foods such as apples or tomatoes may be dried with the peel on, but realize that unpeeled fruit takes longer to dry.
- Whole fruits and vegetables can be dried, but time and attention will be required for a successful product.
- Before drying, place them in boiling water and then in cold water to crack the skin. This process is referred to as "checking" the product and will hasten the drying process.



## Pretreatment for Fruits

Pretreatments are recommended techniques used to make quality products. Pretreatments not only prevent darkening and improve quality.

Dipping prevents oxidation or color changes in fruits and vegetables. Dipping fruits in ascorbic acid (vitamin C) is one of the safest ways to prevent fruit from turning brown, but its effects may not last as long as sulfuring. Ascorbic acid can be purchased from drug or grocery stores, in powder or tablet form. One teaspoon is equal to 3,000 milligrams in tablet form. Mix 1 teaspoon in 2 cups of water. Allow the fruit to soak for 3–5 minutes, then drain well and place on dryer trays. After two "dips" with produce, add more acid to continue the effectiveness.

Commercial fresh fruit stabilizers or mixtures can also be used, but they might not be as effective and most are more costly. Dilute 1½ tablespoons of stabilizer in 1 quart water. Again, soak for 3–5 minutes, then drain and place on dryer trays. Refresh the solution after two times of soaking produce.

Fruit juices can also be used. Dip fruits in pineapple or orange juice or other high vitamin C fruit. Remember each fruit will also lend its flavor as fruits soak for 3–5 minutes. Drain well and place on dryer trays. Use twice before placing, and the juice is still safe to use in other drinks or recipes.

Sodium sulfite is another commercial product for pretreating foods. Sodium metabisulfite is available at many wine supply shops or some pharmacies. Stir 1 tablespoon of sodium metabisulfite into 1 quart of cold water. Allow fruit to soak 10–15 minutes, then drain and place on dryer trays. This solution is only good for one dip; remake for more than one use.

Steam blanching can be used, but the flavor and texture of the fruit might change. This process is the same as for vegetables. Bring water to a boil. Place produce in a basket not over 2 inches deep, over the boiling water. Cover tightly with a lid and blanch.

## Preparation for Vegetables

Generally speaking, vegetables are great to dry because they contain less acid than fruits and can be dried until they are brittle. When properly dried, vegetables contain only 10 percent moisture, and no known microorganisms can grow at that level. Wash, peel and trim produce; then, cut into pieces for drying (could be slices, sticks, cubes or shredded), taking care to remove any tough or "woody" part of the item. Even pieces are one secret to successful drying, as all will dry at the same rate. Only prepare what can be dried at one time.

Blanching is recommended for vegetables, as it stops the enzyme action that controls the color and flavor during storage. It also helps to decrease the drying time and cooking time at the other end because the tissue walls of the produce have been relaxed and moisture can escape and re-enter more easily. Boiling water blanching or steam blanching are both effective, but steam blanching is more time consuming.

Water blanch vegetables by submerging them in a wire basket into a pot of boiling water for the designated time (see Table 1).

Steam blanch vegetables as above, but do not submerge; the water should not come into contact with the product. Cover and steam according to Table 1. Only steam blanch small amounts at a time.

After blanching, cool quickly in an ice water bath; then, drain and place in a single layer on the drying tray. It's OK if the vegetables are still warm; that will hasten the drying process. As with fruits, pay attention to the end of the drying time so the product does not scorch.

### Test for Dryness

Dried fruits are generally done when they reach about 20 percent moisture content. Because fruit will be more pliable when warm, cool several pieces and test by folding the fruit upon itself; it should not stick together. Berries should rattle when stored in a container. When drying is complete, cool the fruit before storing, but don't leave out to gather additional moisture from the air. The product is then ready to be conditioned.

Dried vegetables should be crisp when dried and should "snap" when broken in two. At this stage of moisture, no conditioning is needed.

### Pasteurization

If food was dried outdoors, which is not recommended in the Ohio climate, there could be eggs on the food from insects that touched the food during drying. To pasteurize and kill the eggs post-drying, either place food in a freezer bag and freeze for 48 hours or heat the dried food at 150°F for 30 minutes or 175°F for 15 minutes. Be careful not to scorch the food.

### Conditioning

After drying or pasteurizing, conditioning of dried foods is the last step before final storage.

For fruit, place the cooled product in a tightly sealed glass jar, shaking daily for 7–10 days. If condensation develops, return to the dehydrator for more drying. Package dried food for long-term storage after conditioning for 10 days. Remember to keep food with high vitamin A or C out of direct sunlight during storage.

## Different Kinds of Dehydrated Fruits and Vegetables

