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FOOD PRESERVATION

Drying Vegetables

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Drying is a long-standing, fairly easy method of food preservation. Whenever you preserve foods, choose the best-quality fruits and vegetables. As with other food preservation methods, drying does not improve food quality. Proper and successful drying produces safe food with good flavor, texture, color and nutritional properties.

The following vegetables were rated as "excellent" or "good" by the University of Georgia for their quality after drying: **carrots, sweet corn, garlic, mushrooms, onions, parsley, parsnips, peppers (all types) and potatoes.** Many other vegetables may be dried, but the quality of the end product may not be as good as those listed. Tomatoes, for example, tend to absorb moisture easily, which can lead to color and flavor changes.

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Preparing Vegetables for Dehydration

Prepare vegetables for preservation immediately after picking to prevent color, flavor, texture, sugar content and nutrient changes. Sort and discard any food with decay, bruises or mold. Thoroughly rinse vegetables with running water, using a produce brush if necessary, then drain the vegetables well. Cut foods into ⅛-inch to ½-inch slices. The higher the water content, the larger the slice size should be. Small slices of high-moisture foods would nearly disappear when all the moisture has evaporated.

To preserve quality and color, blanch prepared vegetables in boiling water or a citric acid solution for the times listed in Table 1. Blanching is a heating process that destroys enzymes, which can cause color and flavor issues. Water blanching achieves a more even heat penetration than steam blanching or microwave blanching. Citric acid acts as an anti-darkening and anti-microbial agent.

Procedure

If using citric acid (available in the canning section of the supermarket), stir ¼ teaspoon of citric acid into 1 quart of water. Citric acid helps prevent discoloration and acts as an anti-microbial agent.

1. Fill a large kettle one-half to two-thirds full of water. Bring the water to a rolling boil.
2. Place the vegetables in a wire basket, colander or mesh bag. You can blanch up to 1 quart of vegetables at a time.
3. Submerge the vegetables in the boiling water, making sure the water covers the vegetables.
4. As soon as the water reboils, start timing. Adjust the heat to ensure continuous boiling.
5. Heat according to the time listed in Table 1.
6. Submerge the container with the vegetables in cold water for the same amount of time as the blanching time).
7. Drain the vegetables on paper towels.

Drying Vegetables

Drying is not a precise method of food preservation, and the amount of drying time will vary depending on the equipment, moisture content of the vegetables and the humidity in the air.

Spray a cookie sheet or similar flat tray with vegetable spray, or line the tray with plastic wrap or parchment paper and spray with vegetable spray. Another option is to use the specially designed plastic sheets for electric dehydrators, and follow the manufacturer's directions.

Oven drying: Test your oven to be sure it can maintain a low enough temperature; otherwise, "case hardening" may occur. This is the formation of a "crust" on the food, which prevents the interior from drying properly.

To test your oven, set it to the lowest setting. Place an oven-safe thermometer on the rack where food will be placed. Leave the oven door open 2 to 6 inches. Place a fan near the open door to circulate air. Check the temperature. If your oven can maintain a low enough temperature (140 to 145 F), it may be used for food dehydration. Racks should be 2 inches apart, with at least 3 inches of clearance from the top or bottom to the rack. See Table 1 for approximate drying times.

Note: Oven drying is not a safe procedure to follow if young children are present.

Food dehydrator drying: Follow the manufacturer's directions.

Testing for Dryness

Allow vegetables to cool prior to testing for dryness. Fully dried vegetables should be brittle or "crisp."

Table 1: Steps for Drying Vegetables.

Vegetable	Preparation	Blanching Time (boiling water) (minutes)	Drying Time* (hours)	Dryness Test
Asparagus	Wash thoroughly. Halve large tips.	3½-4½	4-6	Leathery to brittle
Beans, green	Wash. Cut in pieces or strips.	2	8-14	Very dry, brittle
Beets	Cook as usual. Cool, peel. Cut into shoestring strips ⅛ inch thick.	None	10-12	Brittle, dark red
Broccoli	Wash. Trim, cut as for serving. Quarter stalks lengthwise.	2	12-15	Crisp, brittle
Brussels sprouts	Wash. Cut in half lengthwise through stem.	4½-5½	12-18	Tough to brittle
Cabbage	Wash. Remove outer leaves, quarter and core. Cut into strips ⅛ inch thick.	1½-2	10-12	Crisp, brittle
Carrots	Use only crisp, tender vegetables. Wash. Cut off roots and tops; peel. Cut in slices or strips ⅛ inch thick.	3½	10-12	Tough to brittle
Cauliflower	Wash. Trim, cut into small pieces.	3-4	12-15	Tough to brittle
Celery	Trim stalks. Wash stalks and leaves thoroughly. Slice stalks.	2	10-16	Very brittle
Chili peppers, pimentos	Wash, stem, core. Remove "partitions." Cut into disks about ⅜ by ⅜ inch. (Wear gloves if necessary.)	None	8-12	Crisp, brittle, medium green
Corn, cut	Husk, trim. Wash well. Blanch until milk in corn is set. Cut the kernels from the cob.	1½	6-10	Crisp, brittle
Eggplant	Wash, trim, cut into ¼-inch slices.	3	12-14	Leathery to brittle
Garlic	Peel and finely chop garlic bulbs. No other pretreatment is needed. Odor is pungent.	None	6-8	Brittle
Horseradish	Wash, remove small rootlets and stubs. Peel or scrape roots. Grate.	None	4-10	Brittle, powdery
Mushrooms**	Scrub. Discard tough, woody stalks. Slice tender stalks ¼ inch thick. Peel large mushrooms, slice. Leave small mushrooms whole. Dip in solution of 1 teaspoon citric acid per quart of water for 10 minutes. Drain.	None	8-10	Dry and leathery
Okra	Wash thoroughly. Cut into ½-inch pieces or split lengthwise.	None	8-10	Tough, brittle
Onions	Wash, remove outer paper skin. Remove tops and root ends, slice to ¼ inch thick.	None	3-9	Very brittle
Parsley, other herbs	Wash thoroughly. Separate clusters. Discard long or tough stems.	None	1-2	Flaky
Peas	Shell and wash.	2	8-10	Hard, wrinkled, green
Peppers, pimentos	Wash, stem. Remove core and seeds. Cut into ¼- to ½-inch strips or rings.	None	8-12	Tough to brittle
Potatoes	Wash, peel. Cut into ¼-inch shoestring strips or ½-inch-thick slices.	5-6	8-12	Brittle
Squash, summer or banana	Wash, trim, cut into ¼-inch slices.	1½	10-12	Leathery to brittle
Squash, winter and pumpkin	Wash rind. Cut into pieces. Remove seeds and cavity pulp. Cut into 1-inch-wide strips. Peel rind. Cut strips crosswise into pieces about ¼ inch thick.	1	10-16	Tough to brittle
Tomatoes, for stewing	Steam or dip in boiling water to loosen skins. Chill in cold water. Peel. Slice ½ inch thick or cut into ¾-inch sections. Dip in solution of 1 teaspoon citric acid/quart water for 10 minutes.	1	10-18	Crisp

****WARNING:** Drying or cooking does ***not*** destroy the toxins in poisonous varieties of mushrooms. Only an expert can differentiate between poisonous and edible varieties.

*Drying times will vary depending on the moisture content of the food and the dehydrator being used. Oven-drying time may be twice as long.
Source: Table adapted from Colorado State University Extension, using University of Georgia blanching and drying times.

Packaging and Storing

Pack cooled dried vegetables in small amounts in dry glass jars (preferably with dark glass) or in moisture- and vapor-proof freezer containers, boxes or bags. Metal cans may be used if food is placed in a freezer bag first. Properly stored, dried vegetables keep well for six to 12 months. Discard all foods that develop off-odors or flavors or show signs of mold.

Using Dried Vegetables

Dried vegetables can be used in soups, dips, stews and sauces. When reconstituted, 1 cup of dried vegetables becomes 2 cups. When reconstituting leafy greens (kale, spinach), cover the dried vegetables with hot water and simmer to desired tenderness. When reconstituting root or seed vegetables (beans, corn, carrots), cover with cold water and soak for about an hour, then simmer until tender and use as desired.

For more information about growing, preserving and preparing fruits and vegetables, visit the NDSU Extension website at

www.ag.ndsu.edu/food

Sources

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