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# *Drying Fruits and Vegetables*

By

Susan Z. Wilder

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Every opportunity should be taken to preserve all surplus food since its use later will reduce the cost of the total budget, provide a ready supply and add variety to the dietary. The following preservation program should be successful: Use fresh or store as much of the available fruits and vegetables as possible. Can the rest of the supply, following directions in Farmers Bulletin 1471, processing with the water bath only the acid fruits and vegetables and always using the steam pressure cooker for the non acid vegetables and meats. Dry only those products which cannot be taken care of by the above methods, with the possible exception of corn which is excellent dried.

If storage facilities are available for the surplus root vegetables in the fall there is no advantage in canning or drying them. If there is an early crop of beets, turnips and carrots they may need to be canned or dried if they are to be preserved. The root vegetables that begin to deteriorate late in the winter may be cared for in the same manner.

Not all fruits and vegetables are dried successfully at home. Drying is one of the preservation methods which is done by removing the moisture from the food so that bacteria will not grow in it, and the natural flavor will be preserved in so far as possible.

Drying has advantages. It reduces the volume of the food by the removal of moisture and waste. Properly dried and stored food will keep indefinitely.

Fruits and vegetables are living things. As soon as their surfaces are cut chemical changes begin, as evidenced by discoloration, loss of characteristic flavors and development of new and undesirable flavors. Bacteria begin their action and decomposition sets in.

Blanching, sulphuring and dipping in salt water solution are methods used preceding drying to aid in preventing these actions. High temperature will stop the decay but it will break down the plant tissue. If moisture is left on the product during drying the food will cook instead of dry. A moderate temperature with the moisture removed as fast as it is given off from the inside of the product is necessary for successful drying. A thermometer is essential in order to control the heat. It is

possible to secure fairly good dried products without it if constant attention is given.

### Preparation of Products for Drying

Select only first quality products.

Prepare them as for cooking.

Give preliminary treatment depending upon the product.

a. **Blanching.**

Some products are blanched in steam or hot water. This shrinks the product, shortens the drying, helps to hold the color and improves the flavor. Remove excess moisture with a cloth.

b. **Salt water solution**—3 to 5 teaspoons of salt to 1 gallon of water. Allow products to stand about 20 minutes in this solution.

c. **Sulphuring:** Used for apples.

Wrap 1 teaspoon of sulphur in paper and place it in a pan in a barrel. Hang fruit in a basket from a cross-piece. Light the paper. Cover barrel tightly. Leave fruit about 20 minutes. There is some objection to sulphuring fruit, but no proof has been secured that it is injurious to human beings in the small quantity used in the fruit drying process. Products so treated should be thoroughly washed before cooking.

After the preliminary treatment, immediately place products in the dryer which has already been heated to the proper temperature—120° to 140°F.

### Methods of Drying

For the average family it is not necessary to build a drier. Sun-drying can be used for starchy products such as corn and the oven for most other products. However, to meet the needs of those who have a large amount of products to dry, suggestions for building a number of types of driers are given in this bulletin.

**Sun Drying.**—A hot sun and free circulation of air with frequent stirring dries products very well if they have a high percentage of sugar or starch. Corn, pumpkin, squash and berries are successfully dried in the sun and have an excellent flavor. Most other products common to South Dakota are better if dried with artificial heat.

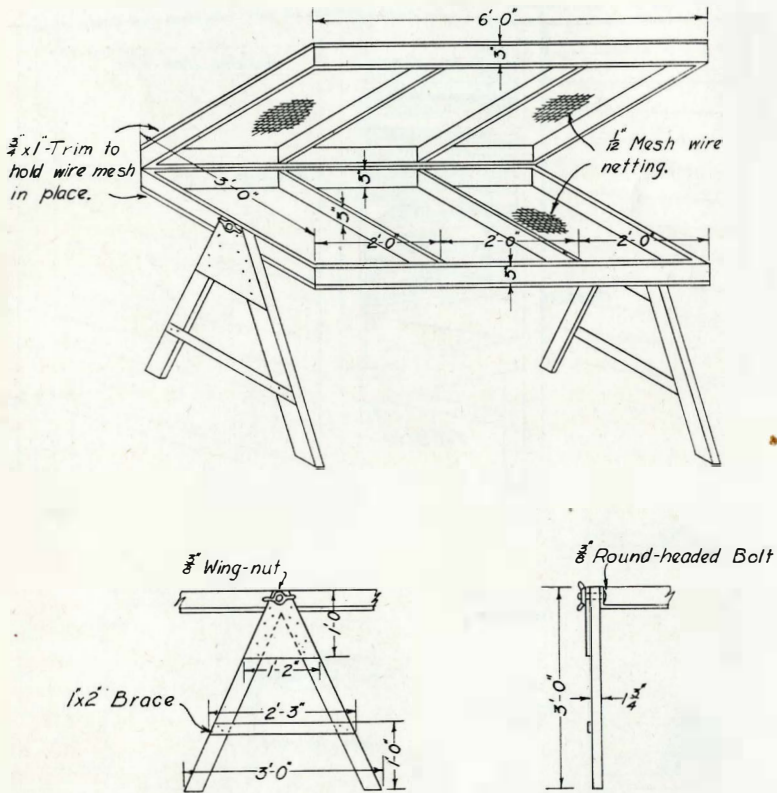
The food is prepared and placed in the trays or on cloths, in a south-slanting position so that it receives the direct rays of the sun. It is protected from insects by mosquito netting and from dust by glass. The food is kept out-of-doors only during the hottest part of the day. If a tray with glass top is used, about one inch must be left open at the ends the width of the box, and covered with very fine netting to allow the circulation of air to hasten evaporation.

Before storing sun dried products they should be conditioned and heated 20 minutes at a temperature of 160°F. in order to remove all moisture and kill any micro-organisms that may be present.

**Artificial Drying.**—The prepared products are placed in trays and subjected to moderate heat. At the same time some arrangement is made so that there is a circulation of air. The combination of the two hastens drying.

Products such as string beans and greens deteriorate very rapidly and are generally dried with artificial heat.

DRYING SCREEN TRAYS



Leg Details

FIG. 1.

## Types of Driers

**Oven Drying.**—Fruit and vegetables may be dried in the oven. The door is left open. There is great danger of burning unless a thermometer is used and a careful watch kept. The drying can be done without a thermometer if one wishes to run the risk of burning. Very little fire is required to dry the product.

In drying vegetables in an oven over a kerosene flame, spread the heat by using a piece of sheet asbestos cut to fit the bottom and extending to the sides of the oven and one inch from the front and back. The

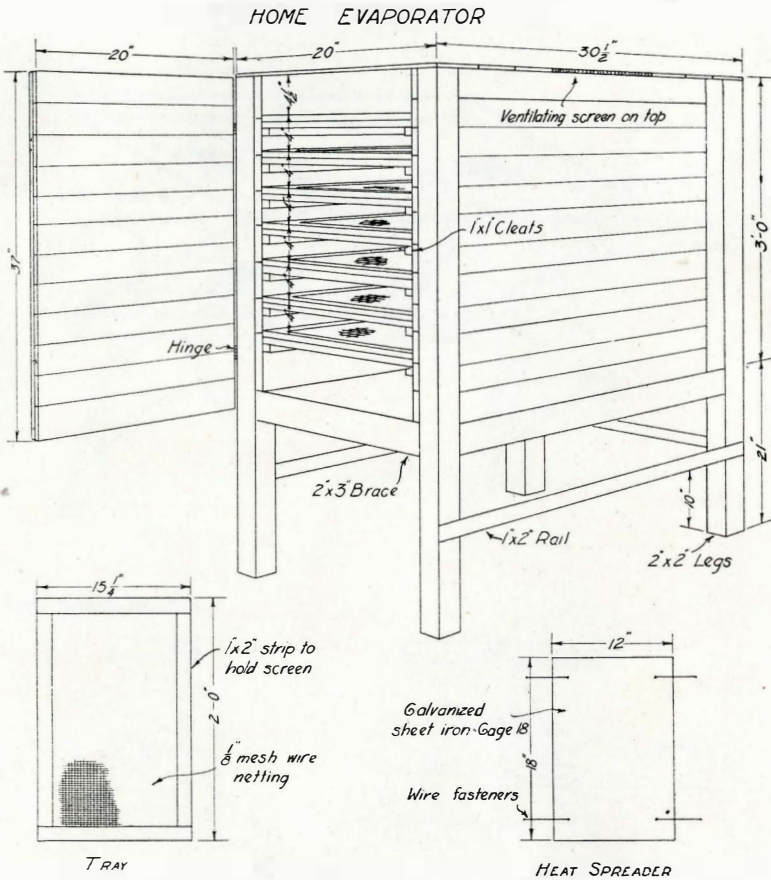


FIG. 2

products are dried in pans or on trays made of wire netting which will allow for the free circulation of air.

**Tunnel Drier.**—Trays of the products may be set one above another with an electric fan placed at one end so that there is a free circulation of air lengthwise to cause rapid evaporation.

**Drying Screen Tray.**—The drying screen trays are made so that they may be tilted or adjusted to the proper angle of the sun. The screens are very light and may be easily moved. The dimensions of the standard size drying screen are given in Figure 1.

In figure 1 the top screen cover is hinged to the bottom screen tray

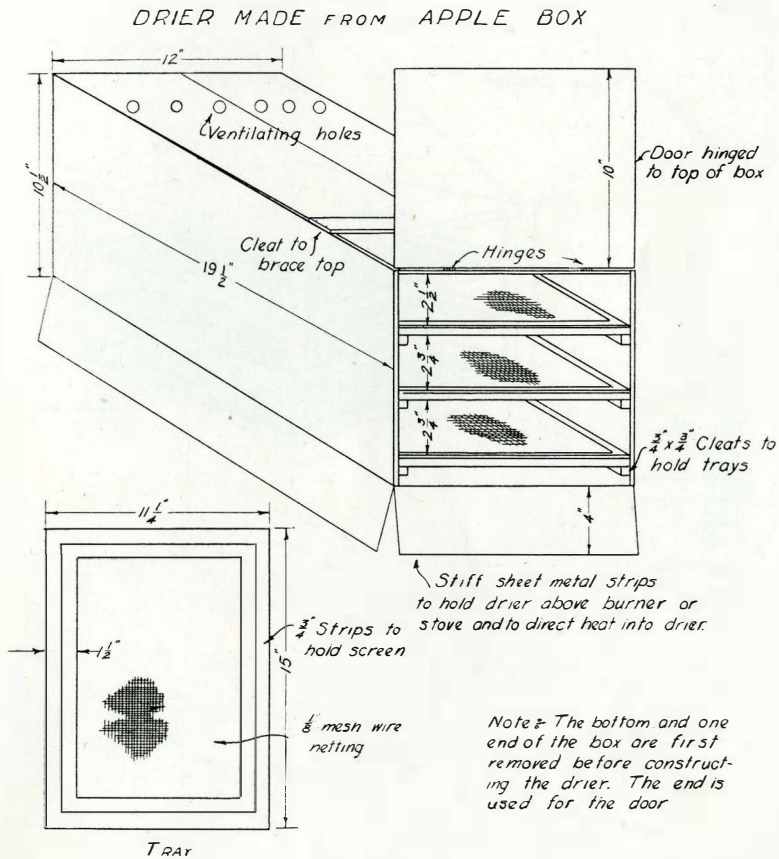


FIG. 3

with two hinges. Any method of hooking the two screens together may be used, but the one shown in the picture is preferred.

**Home Evaporator.**—The home evaporator may be built in either one or two sections as desired. If the standard or base is built separately, the upper part may be used as a drier on any range or kitchen stove by placing it on tin cans or fire bricks. By building the evaporator in two sections it is much more easily transported.

If an oil stove is to be used for a source of heat, it is more economical

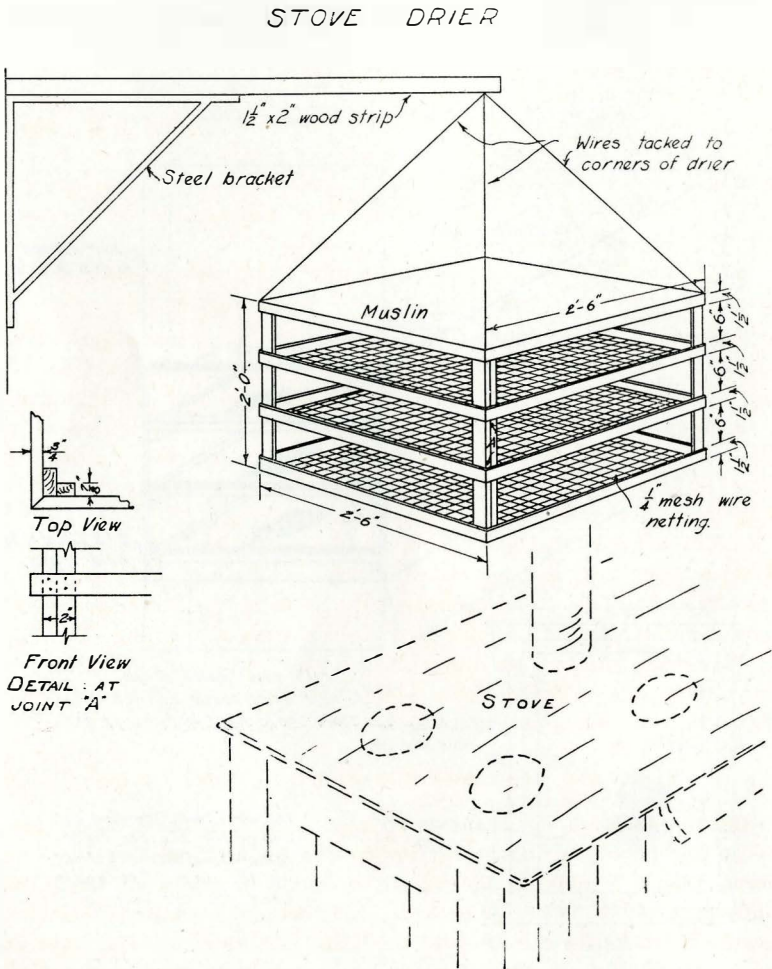


FIG. 4

and easier to build the evaporator in one piece as shown in Figure 2.

The heat spreader is hung about 6 inches below the bottom tray, suspended by wires as shown in the detail in Figure 2. Hooks are placed on the inside of the evaporator so that the wires on the spreader may be easily fastened.

The screen ventilator in the top is placed to the best advantage in the middle. This ventilator is necessary for the proper circulation of heat for drying.

**Drier From An Apple Box.**—A small drier may be made from any small packing box, preferably an apple box. Any wood used for constructing driers must be non-resinous. Resinous wood will impart its flavor to the dried products.

In building a small drier from an apple box, first remove the bottom and one end. Three trays as shown in the detail of Figure 3, are needed. Nail cleats for supporting the trays on the inside of the box. The end is hinged to the box for a door. Place strips of galvanized sheet metal at the bottom for a base and also to direct the heat from the stove or burner into the drier.

Fix a small cleat across the top to give additional strength and rigidity. Six holes are bored in the top for ventilating.

**Suspended Stove Drier.**—The suspended stove drier is one of the simplest and least expensive to build. It is made of three trays of  $\frac{1}{4}$  inch mesh wire netting edged with wood suspended in an upright frame.

A light rope or wire is drawn from each corner at the top of the drier. Those four suspension cords are fastened to the end of a long arm attached to a wall bracket. Thus this drier can be swung over the stove. It is lowered and raised by a rope over a pulley.

Additional muslin may be thumtacked around the cage to protect the products from dust and insects while drying. The products may absorb odors from the food being cooked on the stove unless the homemaker is careful not to cook strong flavored foods during the drying.

This drier has the advantage that it can be pulled out of the way above the heads of the workers. Light material is used for construction of the joints as shown in Figure 4.

### Fruits and Vegetables Best Suited to Home Drying

**Beans.**—Both string beans and lima beans are dried successfully. Select fine quality string beans. Prepare as for cooking. Cut into small pieces. Blanch 5 minutes. Spread on trays. Begin drying at 130°F. and continue to 160°F. Select green lima beans and shell. Omit the blanching because it cracks the skin. Spread the beans very thin over the trays and dry at 150°F. To cook dried green lima beans soak them overnight in



cold water; cook very slowly in the same water in which they were soaked. Certain varieties of string beans make a better dried product than others.

**Cabbage.**—Cabbage is best stored or made into kraut. For drying, remove core, cut cabbage into  $\frac{1}{2}$  inch slices. Blanch 4 minutes in hot water. Spread evenly on trays to 1 inch depth. Begin drying at 115°F. and increase gradually to 140°F. Cabbage scorches easily. It is dry when no water can be squeezed from it.

**Carrots, Turnips, Parsnips, Beets.**—These root vegetables are generally stored. Those of good quality can be dried but the young, tender vegetables of early growth are best for drying. Prepare as for the table. Slice thin or shred. Blanch 5 minutes. Spread in a thin layer on trays. Start the drying at 120°F. and increase to 150°F. for 1 hour.

Blanch beets before removing the stem, root and skin. Dried root vegetables require 10 to 12 hours soaking in cold water. They are then cooked slowly until tender.

**Celery.**—Cut the prepared celery in half-inch pieces. Blanch two minutes in hot water. Spread  $\frac{1}{2}$  inch deep in trays. Dry at 135°F.

**Corn.**—Use only freshly gathered corn in prime condition. Prepare the corn as for cooking. Blanch 10 minutes in hot water or steam. Dip in cold water for ease of handling. Cut the kernels as deep as possible. The scrapings from the cob may be added to the kernels if one is not particular about the appearance, otherwise they may be dried separately.

Spread the corn a half inch deep in the drier. It shrinks rapidly so that a number of trays can be combined when the drying is about half done. Stir the corn frequently so that it will dry evenly and quickly throughout.

In the artificial drier corn is started drying at 130°F. and increased to 145°F. Corn scorches very easily in artificial drying and therefore must be closely watched so as to keep an even low temperature.

**Outdoor Drying of Corn.**—Place corn in a thin layer in pans of wire netting, parafined or cheesecloth covered, slanted to the direct sun. Cover with glass or mosquito netting to protect from dirt and flies. Corn may be sun dried on canvas or non-resinous boards on a slanting roof.

Sun dried corn must be watched so that it doesn't sour. If drying is done during hot sunny days, the corn stirred frequently and brought in at night, the product will be of the finest. Complete the drying in the oven.

Corn is conditioned two or three weeks in muslin or paper bags. If it is then reheated there is little question of its keeping. Dried corn may become infested with weevils. This can be prevented by heating for an

hour at drying temperature in the open oven two or three times during the storage season.

### Special Dried Sweet Corn Recipes

Field corn can be made into most delicious dried corn by adding 1 c. of milk, 2 T. sugar and  $\frac{3}{4}$  t. salt to 4 c. of corn. One-fourth cup of cream used in place of the milk gives excellent results. Combine and cook down the corn with frequent stirring until all the liquid has evaporated. Place in the drier. Store in a cool dry place, otherwise the fat may become rancid.

To each 12 cups of corn add 1 cup of sweet milk and 1 cup of sugar. Stir well. Evaporate in a very moderate oven  $\frac{1}{2}$  hour each of three days, stirring frequently at each oven period, and at least three times a day in addition. The corn should be completely dry at the end of the third day.

**Dried Corn Cookery.**—Soak the corn overnight. Cook until tender in the same water. Season. Cooked dried corn can be substituted in any recipe for canned corn. It makes excellent scalloped dishes, fritters and soups and combines well with other vegetables in chowders and meat pies.

**Onions.**—Slice thin. Do not blanch. Spread immediately in a thin layer on trays. Dry throughout at 140°F. Stir frequently to prevent scorching. When dry the pieces are crisp.

**Peas.**—Shell the green, fresh peas. Blanch two minutes in hot water. Spread to  $\frac{1}{2}$  inch on trays. Begin drying at 115°F. and continue to 140°F. Stir frequently. Certain varieties are better for drying than others.

**Pumpkin and Squash.**—Prepare as for cooking. Cut into  $\frac{1}{2}$  inch thick slices. Blanch 3 to 6 minutes until semi-transparent. Begin drying at 135°F. and continue to 160°F. Dry until leathery and cut surface shows no moisture.

**Soup Mixtures.**—Dry the vegetables separately or together for soup mixtures. Use any combination desired. Shred the vegetables and spread in thin layers on trays. Dry.

**Dried Leaves for Seasoning.**—Dried green leaves such as celery, parsley, chives and sage are ground and stored in small cardboard boxes for soup and meat seasonings. It is time-saving to prepare a large supply at once. However, the leaves may be stored whole and crushed fine with the fingers as needed.

**Spinach and Other Greens.**—Clean spinach. Blanch three minutes in hot steam. Remove excess moisture on cloths. Arrange in thin layer on trays on cloth, since leaves stick to trays easily. Start drying at 120°F., and

continue to 140°F. Stir the spinach carefully from time to time so that it will dry quickly throughout. The drying requires 3 to 5 hours.

To prepare, soak the spinach in cold water and when of the original size, cook in the same water. Use dried spinach in recipes the same as fresh. Greens are likely to be of inferior quality if not carefully dried and stored. They deteriorate after long storage.

**Tomato Paste.**—Slice the tomatoes; cook until broken down. Sieve the pulp and cook slowly as long as possible without burning. Place in pans one inch deep; place pans in evaporator and heat to 150°F. Stir frequently. Combine pans as the drying reduces the volume. Total time for drying to a thick paste is 6 to 8 hours. When dried to this consistency, bring to a boil and immediately place in half-pint sterilized glass jars. Seal with sterilized rubbers and covers.

Apple paste may be made the same way.

### Storage and Care of Dried Products

Dried products are conditioned before storage. The products will be moist when they come from the drier. They need to be piled together in a darkened room for a week or ten days and stirred frequently, so that any moisture which is present will be distributed evenly. The product is then returned to the drier and reheated to 180°F., after which it is cooled and permanently stored. This second drying will remove the excess moisture and destroy any insect life. Many dried products lose color if exposed to the light. Some lose flavor after long storage.

Store products in small containers that are nearly or quite air-tight and readily resealed after opening. Tin cans are good—glass jars do not protect from light.

Dried products must be stored where they are always dry, such as in an attic or furnace room, or pantry if it does not receive moisture from the kitchen.

Dried products must be examined frequently and if there is any sign of moisture they must be reheated and stored in fresh containers.

**Cooking of Dried Foods.**—Soak the products in cold water. Those that are very thick such as corn and carrots need to be soaked a long time—overnight.

Cook until tender in the same water in which soaked. Use in any recipe the same as a fresh product.

### References

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Mechanical drawings and descriptions by Dale Ryman.

Suggestions for drawings from Minnesota, North Dakota and California Extension Services.

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