



SOUTH CAROLINA FAMILY AND COMMUNITY LEADERS
Affiliated with National Volunteer Outreach Network, Country Women's Council, U.S.A., Associated
Country Women of the World and in partnership with Clemson University Cooperative Extension Service
SCFCL website: <http://www.scfcl.com>

Leader Training Guide

Drying Foods: Why and How it Works

Objectives: Members will be able to describe safe methods for drying fruit, vegetables and meats.

Lesson Overview/Introduction: Drying food is a low cost, energy efficient, space saving method of long term food preservation. It is an excellent choice for storing vegetables from home gardens and seasonal fruits.

Lesson:

Part 1: Why drying works

Any type of food preservation depends on controlling microbe growth. Some microbes spoil food. Other microbes cause illness. Microbe growth rate in foods can be altered when some or several of these factors are manipulated:

F- Food (carbohydrate and protein support microbe growth best)

A- Acid (microbes grow best in low acid environments—fruits are naturally higher in acid; meats and vegetables are naturally lower in acid)

T- Time (approximately 4 hours is required under perfect conditions for microbes to flourish)

T- Temperature (microbes survive and grow from 41-135°F; they grow quickest at 70-125°F)

O- Oxygen (most microbes prefer an environment with oxygen; very few prefer an oxygen free environment)

M- Moisture (microbes must have moisture available for them to grow)

Dehydrating foods focuses on manipulating moisture (the M in FATTOM.) Warm air with low humidity is circulated around food until the moisture level is reduced to approximately 20%. This amount of moisture is not adequate to support rapid microbe growth. This allows dried fruits, vegetables and meats to be stored at room temperature for much longer periods of time than non-dried foods.

Part 2: What techniques are used to dry foods?

Electric Dehydrators are designed to gently warm and rapidly circulate air through perforated racks holding thinly sliced food. Entry level dehydrators are available starting at \$35-45. Larger tabletop dehydrators with more racks increase the price. Floor model size, large scale dehydrators cost several hundred dollars or more.



Electric dehydrators have a fan located either on top/bottom or side of the unit. Side mounted fans typically are preferred as they often have the more even heat distribution. The racks which hold the prepared foods are mesh or perforated plastic. This type rack allows the warm air to freely circulate and reach all surfaces of the food. Most thin sliced foods require 8-12 hours drying time in an electric dehydrator. The larger the pieces of food, the more drying time is required.

If you have no electric dehydrator, ovens can be used to dry food. Check your oven to see if the temperature setting can be set at 140°F. If your oven temperature is higher than 140°F, your food will cook rather than dehydrate. For air circulation, prop the oven door slightly open and place a fan nearby. Cake racks placed on cookie sheets work well as a drying rack for most foods. Leave room around all sides of each pan in the oven to allow for good air circulation. Oven drying requires almost twice as much time as electric dehydrators and is less energy efficient.

Sun Drying For generations, fruits have been dried in the sun (peaches and apples are commonly dried this way.) Sun drying is a good choice if you plan on drying large amounts of fruit at one time.

Equipment needed for sun drying includes mesh racks or screens (avoid galvanized metal screens) plus cinder blocks/bricks or some other method to elevate the screens off the ground.



It is good practice to use one screen as a shelf to hold the fruit and one screen (or cheesecloth) as a cover to protect the fruit from birds and insects. Sun drying can take 3 days or more.

Check the weather forecast daily when planning to sun dry fruits. Optimum weather conditions for sun drying are sunny, breezy and low humidity. Each evening, plan on covering the racks with a sheet or bring them under shelter to prevent the fruit from reabsorbing moisture as dew falls. Fruit is sufficiently dry when a piece can be folded over on itself and not break or stick together.

Indoor Drying The easiest form of drying food is indoor drying. This is a great choice for fresh herbs, hot peppers, seeds, and nuts.

Drying food inside requires simply placing the food at an inside location with good ventilation until the moisture evaporates. Helpful hints when drying specific foods inside include:

- Herbs- Tie a small bundle of stalks together and suspend in doorway, overhead rack or rafter. It is common to enclose the herb bundle in a paper bag to protect the food from contamination. Punch holes in the paper bag to allow for good ventilation.
- Nuts- Lay nuts (in shell or shelled) in a single layer on newspaper or butcher paper. Allow whole nuts to dry until shells are brittle. For shelled nuts, a properly dried nutmeat should produce an obvious snap when it is bent. There should be no flexibility to the nutmeat. Nuts should be tender but not shriveled. Continue drying if the nut bends rather than snaps.
- Hot peppers- String peppers on length of cord and hang in well ventilated area until completely dry. Flesh of pepper should be brittle. It is common to hear seeds rattle inside once pepper is sufficiently dried.

Part 3: Storage of Dried Foods

Dried food should be packaged in a moisture-vapor proof container that is not prone to insects or rodents. Glass jars are a great choice. Freezer bags are excellent (but more susceptible to rodents.)

Pack dried and cooled food into container in recipe-sized portions. This will allow you to open one package and use it completely. Packaging dried foods into only one very large container requires opening many times. Each time the food is exposed to moist air, the quality of the dried food decreases.

Place packaged dried foods in a cool, dry, dark location. Generally, the cooler the storage location, the longer the dried food stays in premium condition.

Expect dried vegetables to maintain top quality at least 6 months when stored properly. Dried fruits will last up to a year.

Many who dry bulk amounts of food opt to store their dried food in the freezer to further prolong quality.

Part 4: Using Dried Foods

Many families find that dried fruits and vegetables make excellent snacks since they are lightweight, portable, and intensely flavored. Other families use their dried food to prepare meals.

It is often necessary to re-hydrate dried foods to use them in recipes. To rehydrate, cover the dried food in liquid of your choice (water, broth, juice) and allow to stand 1-2 hours. Once re-hydrated, simmer gently until the desired consistency is reached.

Another option is to simply add the dried food directly to the recipe and allow for extra liquid to re-hydrate and cook in one step (this is a great option for making soup, stews and sauces.)

Is it worth it? Costs will be affected by the type of food being dried plus the amount of time/effort required. Financially, inputs are minimal to dehydrate foods.

Costs include:

- Expenses for growing (or purchasing food)- growing yourself is obviously the least financial cost
- Your effort to wash and slice food into uniform portions and load onto trays/screens.
- Energy to run the dehydrator. Electric dehydrators run off 110v outlet and typically require 6 hours to properly dry food. Sun drying and indoor drying require no electricity.
- Your effort to package the dried foods.
- Moisture vapor proof packaging—zero cost if you already have glass jars with tight fitting lids. Minimal cost if you opt for freezer bags.

Lesson Summary: Drying foods is an inexpensive technique to create shelf stable foods for the family. Drying reduces the natural moisture content of food so microbes are hampered from growing. Different methods can be used to dry foods including electric dehydrators, sun drying, and indoor drying. When dried foods are packaged in a moisture-vapor proof container in a dark, dry location, shelf life is 6 months – 1 year.

Suggested Activities:

Dehydrate fruits or vegetables ahead of time for showing/sampling at meeting. Story swap (or recipe swap) your favorite recipe using dried food as the main ingredient. Check with your closest Food Safety and Nutrition Agent for possibility of borrowing a small food dehydrator.

Comparison and discussion: Choose one or more from this list:

- Home dried beef jerky vs. store bought jerky (Taste? Appearance? Cost? Nutrition?)
- Home dried fruit vs. store purchased dried fruit (Taste? Appearance? Cost? Nutrition?)
- Home dried herbs vs. store purchased herbs (Taste? Appearance? Cost? Nutrition?)

Suggested Materials: Home and Garden Fact Sheets 3080, 3084, 3085, 3086. Available for free download at <http://www.clemson.edu/hgic>.

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