

Drying Fruits & Vegetables



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University of California
Agriculture and Natural Resources

Drying is New Again

- Oldest method of preserving food
- Alternative to canning & freezing
- Simple, safe and easy to learn
- Drying can be done year round
- No refrigeration needed
- Takes little space



How Drying Preserves

- Removes moisture from food so bacteria, yeasts & molds can't grow and spoil food
- Slows down action of enzymes but doesn't inactivate them

Temperatures for Drying

- Optimum temperature: 140°F or less
 - Depends upon food and process
- Higher temps cook food instead of drying
- Avoid “case hardening”
 - Dried outside and moisture trapped inside
 - old results
- Drying is more effective when humidity is low & air current is moving
 - Speeds up drying, removes air around food

Ways To Dry CFO Food

- Oven
- Electric food dehydrator
- Room Drying—herbs, hot peppers, nuts
- Vine Drying – beans only



Drying Fruit as a CFO Food

- Prepare fruit – wash fruit and core, if needed
 - Fruits: halved, sliced or some left whole
 - Apples: cored and sliced, wedges, rings
 - Bananas: sliced
- Thin, uniform, peeled slices dry fastest
- If fruit dried whole, “check” or crack the skin to speed drying and prevent case hardening
 - Grapes: place in boiling then cold water to “check”



Pretreating Fruit

- Sulfite Dip – beware of allergies
- Ascorbic Acid
- Ascorbic Acid Mixtures
- Fruit Juice Dip
- Honey Dip
- Syrup Blanching
- Steam Blanching



Drying Foods Indoors

- Conventional ovens
 - Convection ovens
- Electric Food dehydrators
- Room Drying

Oven Drying

- Slower than dehydrators
 - Unless you have a convection oven
- Take 2 times longer to dry in oven than dehydrator
 - Not as efficient
 - Uses more energy



Using Your Oven

- Temperature needs to go down to 140°F
- Leave oven door propped open 2-6 inches
- Best if you place a fan outside oven door
- Oven temp varies...so need accurate oven thermometer to be sure 140°F is achieved
- Trays should clear sides of oven & 3-4" shorter front to back of oven, 2-3" between racks in oven

Food Dehydrators

- Small electrical appliance for drying foods indoors
- Electric element for heat & fan and vents for air circulation
- Dries foods fast between 85 to 140°F depending upon product
- Buy at department stores, mail-order, garden supply, internet

Costs?

- Costs vary depending on features
- Some are expandable for extra trays
- Twelve square feet of drying space dries about a half-bushel of produce
- Major disadvantage is limited capacity

Dehydrator Features

- Double wall construction of metal or high grade plastic
- Enclosed heating element
- Counter top design
- Enclosed thermostat from 85°F-160°F
- Fan or blower
- 4 to 10 open mesh trays, plastic, sturdy, washable
- UL seal
- Guarantee
- Dial for regulating temp
- A timer, auto-shut off is a good idea, not always available

Types of Dehydrators

Horizontal Air Flow: Heating element & fan located on side

- Major advantages
 - All trays get equal heat
 - Reduces flavor mixing so different foods can be dried at once
 - Juices don't drip into heating element



Vertical Air Flow: Heating element & fan at base or in lid

- Major disadvantages
 - Must rotate trays for even drying
 - If different foods dried at the same time
 - Flavors can mix and liquids can drip into heating element



Horizontal Air Flow Food Dehydrator

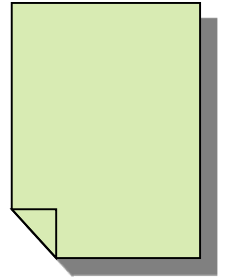


Vertical Air Flow Food Dehydrator



Drying Fruit

- Follow directions given
- Place fruit in single layer
- Follow approximate drying times given
- Monitor food; it dries much faster at end of drying period



Determining Dryness

- Most fruit should have 20% moisture content when dried
- Cut several cooled pieces in half...should be no visible moisture and should not be able to squeeze any moisture from fruit
- Not sticky or tacky – feels like soft leather
- If piece folded in half, shouldn't stick to itself

After Drying...

- Cool fruit 30-60 minutes before packaging
- Don't pack too soon or moisture buildup could occur
 - But don't wait too long or could pick up moisture



Fruit is dried correctly when it feels like ‘kid leather’

Conditioning Fruits

- Conditioning equalizes the moisture
- Pack cooled fruit in plastic or glass jars, seal and let stand for 7-10 days
- Shake jars daily to separate pieces and check for moisture condensation
- If condensation forms, return to dehydrator for more drying. If mold formed, **DISCARD!**



Fruit Leathers

- Fresh Fruit
- Canned or Frozen Fruits
- Puree fruits until smooth
- Add sweetener to taste, if desired



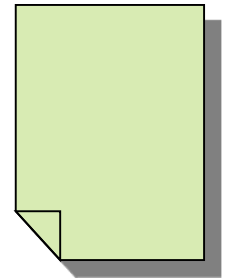
Drying Fruit Leathers

- Pour $\frac{1}{8}$ to $\frac{1}{4}$ -inch thick on drying tray
- Take 6-8 hours to dry in dehydrator, up to 18 in oven
- Dry at 140°F
- Done when no indentation in center of leather or no longer sticky to touch
- When warm, peel from plastic and roll , cool and rewrap roll in plastic
- Keep up to 1 month at room temp OR freeze up to 1 year

Drying Vegetables



- Prepare vegetables
 - Wash, trim, peel, according to directions
 - Uniform pieces
 - Pretreat
 - Dry as soon as possible after picking

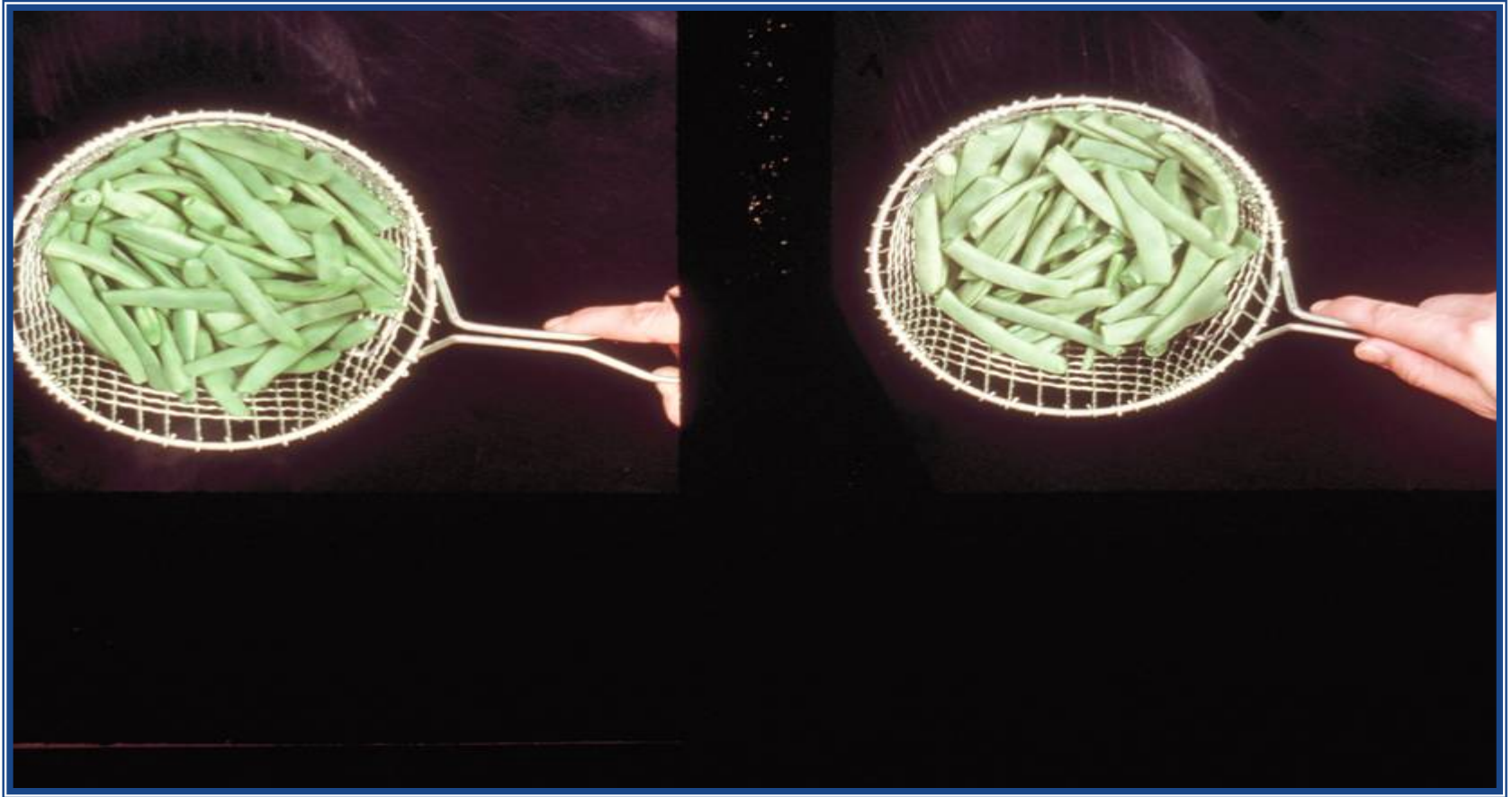


Pretreating Vegetables

- **Water blanch** – follow times given, start counting time as soon as water returns to boil. If takes more than 1 minute to return to boil, are putting in too many vegetables at a time.
- **Steam blanch** – Vegetables should be no more than 2 inches deep above boiling water. Cover and steam according to directions given for each vegetable.







Cooling Vegetables

- Dip briefly in cold water only long enough to stop cooking
- Spread out on a paper towel to cool and dry
- Cool so they feel only slightly hot to touch ... about 120°F
- Place in dehydrator and dry

Determining Dryness

- Dry vegetables until brittle or “crisp”
 - **Vegetable leathers** should be ‘crisp’ too, not pliable rolls like fruit leathers
- 10% moisture
- Don’t need conditioning like fruits because of lower moisture content
- Store in air tight and dry conditions; longer storage is best in the freezer

Room Drying

- Herbs, hot peppers, & nuts in shell are most common air dried foods
- Herbs & peppers – strung on string or tied in bundles and suspended from overhead racks in air until dry.
- Herbs can be enclosed in paper bags, with openings for air circulation
- Spread nuts in single layer on paper
- Persimmons can be slowly dried whole

Vine Drying

- Beans only
- Leave bean pods on vine until beans inside rattle
- If not dried thoroughly, can dry further in oven or dehydrator



Pasteurization

For room & vine-dried products: kills insect eggs

- **Freezer Method**

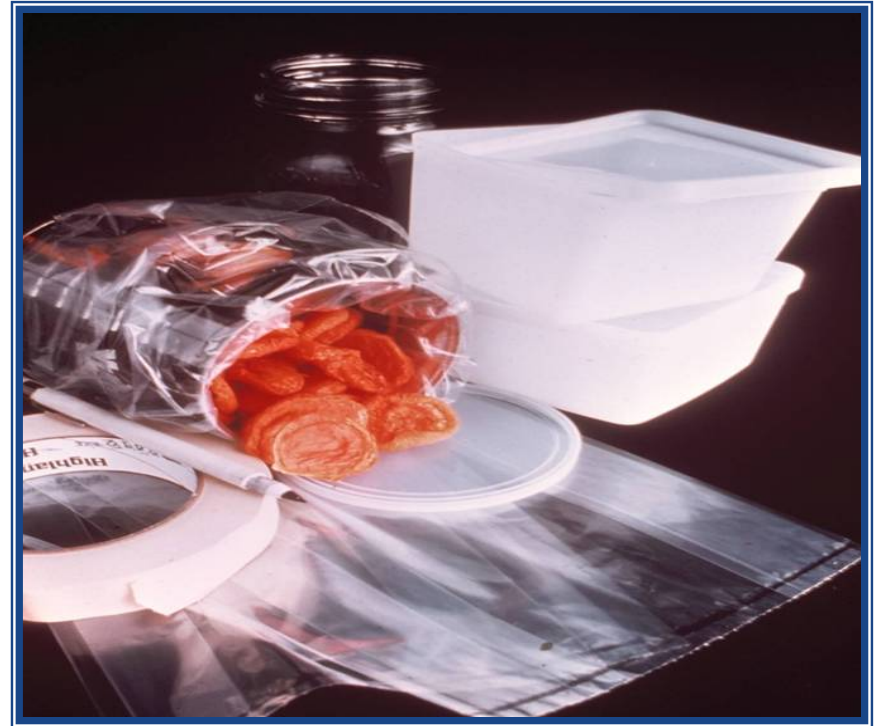
- Seal food in freezer plastic bags
- Freeze at 0°F for at least 48 hours

- **Oven Method**

- Place food in single layer on tray or in shallow pan
- Place in 160°F preheated oven for 30 minutes

Packaging Dried Foods

- Airtight containers
- Rigid or flexible
 - “Crushability”
- Vacuum sealers



Storage

- Cool, dark, dry
- Freezer
 - Packaged for freezing
- Refrigerator



Cottage Food Labels

Must Include:

- “Made in a Home Kitchen” in 12-point type.
- Name commonly used to describe the product.
- Name, city, county, state and zip code of CFO
- If CFO is not listed in a current phone directory then street address must also be declared

Cottage Food Labels

Must Include:

- Registration or permit number of CFO
- Ingredients in descending order of predominance by weight, if product contains two or more ingredients
- Net quantity (count, weight, or volume) of the food product, stated in both English (pound) units and metric units (grams)

Cottage Food Labels

Must Include:

- Declaration if food contains any of the eight major food allergens: milk, eggs, fish, shellfish, tree nuts, wheat, peanuts, & soybeans
- Two approved methods:
 - separate summary statement immediately following or adjacent to the ingredient list, or
 - within the ingredient list

Cottage Food Labels

- If nutrient content claims or health claim is made, the label must contain a “Nutrition Facts” statement on the information panel
- Labels must be legible and in English
- Labels, wrappers, inks, adhesives, paper, and packaging materials that come into contact with CFs must be food-grade

Nutrition Facts	
Serving Size 1 cup (228g)	
Servings Per Container 2	
Amount Per Serving	
Calories 260	Calories from Fat 120
% Daily Value*	
Total Fat 13g	20%
Saturated Fat 5g	25%
Trans Fat 2g	
Cholesterol 30mg	10%
Sodium 660mg	28%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A 4%	Vitamin C 2%
Calcium 15%	Iron 4%
* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g
Calories per gram:	
Fat 9	Carbohydrate 4 Protein 4

Sample Label

MADE IN A HOME KITCHEN

Registration #12345, County of Sacramento

Dried Cinnamon Apples

Susie's Samples

123 Extension Lane

Sampletown, CA 94101

Ingredients: Apples, Cinnamon

Net Wt. 3 oz (89 g)

Comply with local regulations

- Business license from local government

- Planning and zoning:

- Need approval from local city
- If selling at Certified Farmers Market or community event, Food Facility permit
- May have requirements regarding parking spaces, hours of operation
- Food Handler Card

or cost

Zoning	\$0-\$429
Registration/Permit	\$0-\$325

Food Handlers Class/Card	\$10 - \$20
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Reference:

“So Easy To Preserve”

Cooperative Extension Service

The University of Georgia, 5th Edition, 2006

Acknowledgments

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