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### Why Preserve Food

- Enjoy produce all year
- Fresh food flavor
- Food on hand
- Control salt/sugar
- Sense of satisfaction






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### Handle Food Safely!

**Prevent pathogens from spreading:**


1. Wash hands for 20 seconds
2. Clean and sanitize work surfaces and equipment  
\* 1 teaspoon unscented chlorine bleach per gallon of water
3. Wash all produce

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### Successful Preserving

1. Use good equipment made for home preservation.
2. Use research-tested recipes published *after* 2014!
3. Follow guidelines for preparation, jar size, preserving method, and processing time.

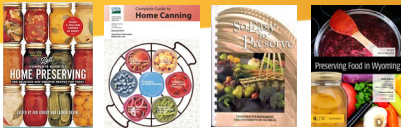


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### Preservation Resources

**Books:**

- Ball®
  - Ball Blue Book Guide to Preserving, 37th edition, 2020.
  - Ball Canning Back to Basics, 2017.
  - The All New Ball Book of Canning and Preserving, 2016.
- Complete Guide to Home Canning, 2015 revision, USDA Bulletin No. 539.
  - Download PDF at <http://nchfp.uga.edu/index.html>
- So Easy to Preserve, 6th Edition, 2020. University of Georgia Cooperative Extension.
- Preserving Food in Wyoming, 2018. University of Wyoming Extension.



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### Preservation Resources Continued

**Websites:**


- Ball at <http://www.freshpreserving.com>
- National Center for Home Food Preservation at <http://www.uga.edu/nchfp>
- University of Wyoming Extension Nutrition & Food Safety Website at <https://uwyoextension.org/uwnutrition/category/food-preservation>
- University of Wyoming Extension Nutrition & Food Safety Facebook page videos at <https://www.facebook.com/UWEnutrition>

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### Advantages of Freezing



- Many foods can be frozen
- Simple procedures
- Not time consuming
- Quantity for your needs
- Retention of color, flavor, nutritive value

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### Disadvantages of Freezing

- Investment cost of freezer and maintenance

- Space limited by capacity of freezer

- Texture of some food may be undesirable

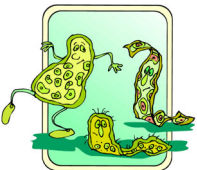
- Produce softer when frozen and thawed

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### Freezing Tips

Freezing only **slows** enzyme activity (chemical reactions lead to food deterioration)



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### Freezing Containers



1. Rigid plastic or glass
2. Flexible freezer bags
3. Moisture-vapor resistant wrapping
  - Plastic freezer wrap
  - Freezer paper
  - Heavy-weight aluminum foil

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### Headspace

Allow for expansion during freezing in containers.

Type of Pack	Container with wide top opening		Container with narrow top opening	
	Pint	Quart	Pint	Quart
Liquid Pack*	½ inch	1 inch	¾ inch	1 ½ inch
Dry Pack**	½ inch	½ inch	½ inch	½ inch
Juices	½ inch	1 inch	1½ inch	1½ inch

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## Do Not Freeze

FOOD	CONDITION AFTER THAWING
Cabbage*, celery, cress, cucumbers*, endive, lettuce, parsley, radishes	limp, water-logged, quickly develops oxidized color, aroma and flavor
raw potatoes, baked or boiled	Soft, crumbly, water-logged, mealy
Cooked macaroni, spaghetti or rice	Mushy, tastes warmed over
Egg whites, cooked	Soft, tough, rubbery, spongy
Meringue	Soft, tough, rubbery, spongy
Knigs made from egg whites	Fruity, weeps
Cream or custard fillings	Separates, watery, lumpy
Milk sauces	May curdle or separate
Sour cream	Separates, watery
Cheese or cream toppings	Soggy
Mayonnaise or salad dressing on sandwich	Separates
Gelatin	Weeps
Fruit jelly on sandwich	May soak bread
Fried foods	Loose crispness, become soggy

\* Cucumbers and cabbage can be frozen as marinated products such as "freezer slaw" or "freezer pickles". These do not have the same texture as regular slaw or pickles.



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## Freezing Effect on Spices and Seasonings

- **Pepper, clove, garlic, green pepper, some herbs get strong and bitter**
- **Onion and paprika change flavor**
- **Celery seasonings become stronger**
- **Salt loses flavor; may increase rancidity if fat is present in item**
- **Add additional seasoning when reheat/serve**

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## Freezing Tips

- **Most vegetables blanched**
  - \* scalding vegetables in boiling water or steam for a short time
  - \* Time: 10 seconds to 11 min
- **Underblanching stimulates the activity of enzymes and is worse than no blanching!**
- **Stop cooking with ice water bath**

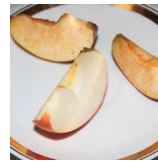


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## Freezing Tips Continued

Prevent discoloration



- **Treat fruits with**
  - ascorbic acid (vit C),
  - citric acid powder, or
  - lemon juice

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## Freezing Tips Continued



- **Choose high quality produce**
- **Freeze promptly**
  - \* In advance, set freezer to -10°F
- **Follow procedures of research-tested recipes**

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## Freezing Tips Continued

- **Use freezer packaging**
  - \* Keep air out!
- **Do not overload freezer**
  - \* 2-3 lbs. food per cubic foot
- **Spread out packages, then stack**
- **Allow for headspace**
- **Label containers: name, date, quantity amount**



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### Length of Storage



Food	Approximate months of storage at 0°F
Fruits and Vegetables	8 - 12
Poultry	6 - 9
Fish	3 - 6
Ground Meat	3 - 4
Cured or Processed Meat	1 - 2

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## Drying Produce

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### Advantages of Drying

- Many foods can be dried
- Store more food in less space
- Better flavor and retains nutritional quality
- Simple and easy
- Use dehydrator, oven, microwave, or air



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### Disadvantages of Drying

- Investment cost of equipment
- Food is darker, more brittle, and less flavorful
- Hours required to dry foods



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### How Drying Preserves

**HEAT:** removes moisture, doesn't cook  
**DRY AIR:** absorbs moisture  
**AIR CIRCULATION:** carries away moisture

- Inhibits bacteria, yeast, and mold growth
- Prevents food spoilage
- SLOWS down enzyme activity - doesn't inactivate

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### Factors of Successful Drying



#### Surface Area

- \* Larger surface = more rapid drying

#### Temperature

- \* Hotter temp = shorter drying time

#### Air Movement

- \* Moving air = faster drying

#### Humidity

- \* Dry air = quick drying

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### Preparing Food

- Use high-quality, firm, ripe produce
- Wash produce
- Pre-treat, if necessary
- Thin, uniform slices



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### Drying Methods

Indoor Air

Microwave

Oven

Dehydrator

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### Indoor Air Drying

- Hot peppers and nuts
- Best for herbs
  - \* Bud bursting stage
  - \* Wash and dry
- Hang herbs in small bundles
  - \* Use paper bags (with holes) to catch leaves that may drop



lavender, rosemary, sage, thyme

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### Microwave Drying



- Only herbs
  - \* Ineffective air circulation
  - \* Food cooks before dries
  - \* High temps cause flavor loss

celery leaves, parsley, sage, thyme

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### Oven Drying

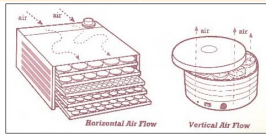


- Best for fruits, herbs, seeds, tomatoes
- Place food in single layer on cookie sheets
- Oven temp range is 120 - 150°F
  - \* Higher temps cook not dry!
  - \* New ovens won't go low
- Can take twice as long as a dehydrator if no oven fan

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### Dehydrator Drying

Horizontal Air Flow Heat and fan on side or back	Vertical Air Flow Heat and fan in base or lid
<ul style="list-style-type: none"> <li>Reduces flavor mixing</li> <li>Equal heat dispersal</li> <li>No drips onto heating unit</li> <li>Less limit on height of food</li> </ul>	<ul style="list-style-type: none"> <li>Flavors can mix</li> <li>Uneven heat dispersal</li> <li>Dripping onto heating unit</li> <li>Removing cover may stop heating</li> </ul>



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### Dehydrator Drying Continued

Do	Don't
<ul style="list-style-type: none"> <li>High wattage heater</li> <li>Strong fan</li> <li>Enclosed thermostat</li> <li>Temperature dial from 85-160°F</li> <li>Auto shut-off timer</li> <li>UL seal of approval</li> <li>Guarantee</li> <li>Jerky: Excalibur and Gardenmaster</li> </ul>	<ul style="list-style-type: none"> <li>Single wall construction</li> <li>Exposed heating element</li> <li>Clear plastic lids or trays</li> <li>Overload</li> </ul>

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### Drying Temperatures



- Herbs, nuts, seeds: 90-100°F
- Fruits/Vegetables: 130-140°F
- Meat/Fish: 160°F
- Avoid **"case hardening"** – dry outside and moisture inside = mold

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### Preparing Fruit



- Read and follow recipe directions!
- Wash and dry fruit
- Peel and core
- Whole, halved, sliced
  - \*Thin, uniform slices
- If drying whole fruit, crack the skin to speed drying
  - \*cranberries

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### Pre-treating Fruit



- Pre-treat fruits to prevent darkening:
  - ascorbic acid (vit C)
  - citric acid powder mix
  - 100 % fruit juice - lemon, orange, pineapple
  - honey dip (higher in calories)
  - syrup blanching (candied fruit)
  - food grade sulfuring or sulfite dip (check allergies)

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### Drying Fruit

- Similar thickness in single layer (no touching) on trays
- Drying times are approximate
- Watch food since dries much faster at end of drying period



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### Determine Fruit Dryness

- Dry until **SOFT/PLIABLE**, not sticky/tacky (20% moisture)
- Test for dryness by cutting several cooled pieces in half
  - \* No visible moisture
  - \* No moisture squeezed from fruit
  - \* A piece folded in half *doesn't* stick together
  - \* Berries rattle when shaken



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### Cool and Package Fruit



- After drying, cool 30-60 minutes and before packaging
  - \* Packaging warm food = sweating/moisture buildup
  - \* Packaging delays = moisture absorption
- Use canning jars, vacuum sealed containers, or aluminum containers



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### Dried Fruit Pasteurization

**Sun dried fruits and vine dried beans: kill insects and their eggs**

#### **FREEZER METHOD:**

Freeze food in freezer containers at 0°F for at least 48 hours.

#### **OVEN METHOD:**

Place food in single layer on tray. Place in 160°F preheated oven for 30 minutes.

**After either of these treatments, the dried fruits are ready to be conditioned and stored**



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### Condition Fruits

- **CONDITION** fruits to distribute and equalize moisture to reduce risk of mold growth
  - \* Pack fruit loose in plastic or glass jar, seal, and let stand 1 week or up to 10 days
  - \* Shake jars daily to separate pieces
  - \* If condensation appears, place fruit back in the dehydrator



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### Drying Vegetables



- Dry veggies immediately after harvesting
- Only prepare as much as can be dried at one time
  - \* Holding after prepared = loss of quality/nutrients
- Read and follow recipe directions!
- Wash and dry veggies
- Trim, core, peel, cut, slice, or shred as directed
- Small, uniform pieces



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### Blanching Vegetables

- Most veggies should be blanched before drying
  - \* Heating veggies to destroy enzyme action
    - loss of color and flavor
  - \* Don't blanch, green peppers, mushrooms, onions

#### **WATER METHOD:**

Veggies submerged in water  
Less time to blanch  
Time once water returns to boil  
More nutrient loss

#### **STEAM METHOD:**

Veggies above 2" water  
More time to blanch  
Heated – not cooked  
Less nutrient loss



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### Cooling Vegetables



- Dip veggies in cold water to stop cooking
- Drain water
- Similar thickness in single layer on drying trays
- Wipe off excess water
- Place in dehydrator or oven

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### Determine Vegetable Dryness



- Dry until **BRITTLE/CRISP** or **LEATHERY** (10% moisture)
  - \* It is better to over-dry than under-dry
- Cool 30-60 minutes and package
  - \* canning jars, vacuum sealed containers, aluminum containers
- Do not need to condition vegetables – low moisture

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### Leathers/Rolls

- Puree produce
- Pour 1/8-inch thick on tray
- Dry when no indentation in center of leather
- When warm, peel up and roll, cool, wrap in plastic
- Keep one month or freeze

Try vegetable leathers (pumpkin, tomato, mixed veggie, etc.)



Add spices, flavorings, and other additions (coconut, nuts, granola, seeds, etc.)

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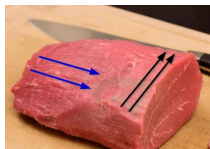
### Drying Meat for Jerky

- Lean meat
  - \* Beef, fish, lamb, pork, smoked poultry – not raw, venison, wild game
- Treat wild game to kill trichinella parasite
  - \* Freeze a portion 6 inches or less thick at 0°F or below for at least 30 days
  - \* Will not eliminate bacteria from meat

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### Meat Prep

- Partially freeze meat for easier slicing
- Slice meat no thicker than 1/4 inch
  - \* Chewy – slice **with** grain
  - \* Tender – slice **across** grain
- Trim and discard all fat



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### Drying Jerky

- Dry until **CRACKS** (not break) when bent
- Pat off oil/fat
- Cool



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### 3 Jerky Options



1. **Vinegar Marinade**
  - \* Soak meat in vinegar
  - \* Destroys Salmonella and E. Coli, *not* Trichinella parasites
2. **Hot Pickle Cure**
  - \* Pre-cook meat dipped in hot brine
3. **Post-Drying Heating**
  - \* Cook dried meat at 275°F 10 min

**Internal temp of jerky reached 160°F!**



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### Storing Jerky

- **Room temp for 2 weeks in sealed container**
- **Check for weeping – discard if evident**
  - \* Moisture or fat on surface of jerky
- **Increase shelf life by:**
  - \* Refrigeration
  - \* Freezing



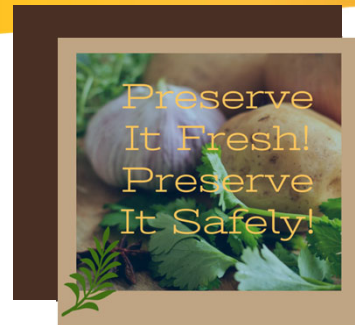
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### Drying Tips

- **Very light oil spray on tray to prevent sticking**
- **Uniform size pieces in single layer**
- **Use proper temp and time**
- **Follow directions for drying method**
- **Test for dryness**
- **Pack and store as recommended – cool, dark spot**
- **For best quality use within 6 month to 1 year**
- **If mold, discard food!**



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