

# DEHYDRATION

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Food Safety & Technology

# Dehydration

- Is one of the oldest forms of food preservation
- Was originally completed by adding salt to the food and then drying it in the sun or on stove tops
- Reduces the moisture in foods to levels which inhibit the microbial growth that causes them to rot
  - since water is removed, mold and bacteria cannot grow

# Rate of Dehydrating Food

- Is dependent upon the following:
  - water content of the food
  - sugar content of the food
  - size of the food
  - amount of air circulation when food is dried
  - level of humidity in the dehydrator
  - type of dehydrator

# Food Dehydration Temperatures

- Optimum temperature for drying foods is 140°F
  - if higher temperatures are used, food will cook instead of drying
    - case hardening can occur if temperature is too high of a temperature is used

**Case hardening:** the outermost portion of a food is dried while the interior remains moist which causes the food to spoil due to microbial growth

# Food Dehydration

- Can be completed by the following:
  - sun
  - food dehydrator
  - oven



# Sun Drying

- Can be completed if the temperature is 85°F or higher for several days with humidity below 60 percent
- Requires hot, dry, windy days
- Can be used to dry fruits because the sugar and acid content makes them safe
- Cannot be used for vegetables or meat

# Food Dehydrator

- Is a small electrical appliance for drying foods
- Contains an electric element for heat and a fan and vents for circulation
- Dry foods at 140°F
- Can either have a horizontal air flow or vertical air flow

# Horizontal Air Flow Dehydrator

- Contains a heating element and a fan located on the side
- Reduces the mixing of flavors so multiple foods can be dried at once
- Applies equal heat to each tray in the dehydrator
- Does not allow juices to drip into the heating element



# Vertical Air Flow Dehydrator

- Contains a heating element and a fan located at the base
- Can cause a mixing of flavors if multiple foods are dried due to air flow
- Allows juices to drip into the heating element

# Oven Drying

- Is slower than a food dehydrator
- Involves the oven being set to 140°F and the oven door propped open two to six inches
  - works best if a fan is placed outside of the door to add air to the oven

# Pretreatments

- Are methods used to enhance the color, texture and flavor of dried foods
- Affect enzymes, proteins which can cause foods to ripen or spoil, causing a halt in the activity of the enzymes
- Can kill microorganisms responsible for food spoilage

# Pretreatments

- Extends the shelf life and appearance of dried foods
- Can enhance the flavor of dried foods
- Are available in commercially prepared mixtures or can be made at home

# Pretreatments

- Differ based upon the type of food to be dehydrated
  - sulfuring is most commonly used on fruits, while marinating is most commonly used on meats for jerky
- Include
  - sulfating
  - sulfuring
  - blanching

# Sulfating

- Involves treating the food with sulfate
- Is most commonly accomplished by soaking food in a solution of water and sodium bisulfate or sodium metabisulfate
- Slows enzymatic browning, such as the browning of cut apples, and oxidation
- Most commonly used on fruits

# Sulfuring

- Involves treating with fumes from burning sulfur or gaseous sulfur dioxide
- Helps to preserve the color of some dried foods
- Is most commonly used in commercial dehydration
- Shortens drying time

# Blanching

- Involves scalding the food in boiling water or steam for a short time
- Denatures enzymes which cause browning
- Can be used for meats, fruits and vegetables
- Methods include:
  - water blanching
  - steam blanching
  - microwave blanching



# Water Blanching

- Involves briefly placing food in boiling water
- Can include salt or sugar in the boiling water to increase effectiveness
- Kills many microorganisms which are responsible for spoilage



# Steam Blanching

- Involves placing a food over boiling water and heating the food with the steam
- Takes one and a half times longer than water blanching
- Can change the final texture of a dehydrated food
  - apple slices which are steamed will break easier than those which are water blanched

# Microwave Blanching

- Involves adding a small amount of water to a container of food and microwaving the container
- The steam from the water blanches the food
  - best used for vegetables
- Is less effective than traditional water or steam blanching
  - some enzymes may not be inactivated
  - could result in off-flavors, loss of texture and color

# Benefits of Food Dehydration

- Saves money
  - food drying is a one-time cost
  - containers of dried foods can be repeatedly opened and closed with no ill effects
- Safe method to feed family and friends
  - individual has control over what is dried
- Control the quality of food eaten
  - dried foods are nutritious, lightweight and easy to prepare