Freezing Food for Later Use

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I. Introduction

Today’s Objectives:
After today’s presentation you should be able to:
1. List three benefits of freezing food for later use.
2. Blanch vegetables before freezing.
3. Explain the three types of pack for freezing fruits.
4. Name three food items that do not freeze well.
5. Choose appropriate freezing containers.
6. Keep an inventory of frozen food.

Freezing is a fast and easy way to store fruits, vegetables, sauces, soups, cookies and many other food items for later use.

II. Why Freeze Food?

Fresh food has a short shelf life. Unless food is preserved in some way it will spoil. Freezing fresh fruits and vegetables yields the highest quality, flavor, texture and nutritional value than any other food preservation method.

III. Costs Related to Freezing Food

List expenses related to freezing food:

Tips to save energy:
• A full freezer uses less energy. Keep freezer at least ¾ full.
• Keep door tightly closed.
• Keep sides free from ice. Defrost freezer when ¼ inch of ice builds up on the sides. At least yearly.) Frost-free freezers don’t need defrosting but clean them at least once a year.
• An upright freezer costs more and is more expensive to operate than a chest type; however it is easier to clean and access.
• Energy-efficient freezers may cost more initially but use less energy and save money over time.
• For top quality frozen food, products need to be at 0°F or colder. Turning up the temperature of the freezer may save energy but will result in a less desirable food product.

IV. The Science of Freezing

Freezing stops the growth of microorganisms such as bacteria, yeast and molds. It does not kill them. Once brought back into the temperature danger zone (40-140°F), any bacteria present starts to grow again.
Freezing food causes the cell walls of fruits and vegetables to expand and rupture. This causes the texture to become softer than when it was unfrozen. You are actually freezing the water contained in the plant cells. Textural changes are less noticeable in high starch vegetables (peas, corn, lima beans) and cooked food products.

The quality of food is affected by temperature. For best nutritive value, color, flavor and texture retention, keep freezer temperature at 0°F or lower. Food stored for 1 year at 0°F or lower is better than food stored for 5 months at 5° F or 2 months at 10° F.

Place a freezer appliance thermometer in the warmest place (near top or door). Read freezer temperature after it has been in place for 24 hours. Adjust freezer temperature if above 0°F.

<table>
<thead>
<tr>
<th>Temperature(s)</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>32°F</td>
<td>Temperature water freezes.</td>
</tr>
<tr>
<td>32 to 40°F</td>
<td>Cold temperatures permit slow growth of some bacteria, yeasts, and molds.</td>
</tr>
<tr>
<td>-10 to 32°F</td>
<td>Freezing temperatures stop growth of microorganisms, but may allow some to survive.</td>
</tr>
<tr>
<td>0 to -10°F</td>
<td>Best storage temperatures for frozen foods.</td>
</tr>
</tbody>
</table>

V. **Food Selection**

Fruits and Vegetables:
- Once harvested, chemical compounds called enzymes continue which can cause spoilage and loss of color and nutrients, flavor and color changes in frozen produce. Inactivate these enzymes to prevent these adverse reactions.
  - Vegetables - enzymes are inactivated by the blanching process—place in boiling water or steam for a short time. See Blanching Vegetables handout.
  - Fruits - acid in most fruits, addition of antioxidant and sugar blocks enzyme action. Exposure to air causes browning and loss of vitamin C. Most fruit is served raw so blanching is not an option. Control enzymes by adding ascorbic acid (vitamin C).
- Freeze at peak of ripeness.
- Freezing does not improve quality.
- Freeze as soon as possible after harvest or store in the refrigerator until freezing.

VI. **Foods that Do Not Freeze Well**

Certain foods are not suitable for freezing because of their high moisture content. Lettuce, melons, and cucumbers are a few foods that do not freeze well.

<table>
<thead>
<tr>
<th>Food</th>
<th>Usual Use</th>
<th>Quality after Thawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooked macaroni, spaghetti, rice</td>
<td>Salads, casseroles, pasta</td>
<td>Mushy, tastes warmed over</td>
</tr>
<tr>
<td>Egg whites, cooked</td>
<td>Salads, sandwiches, sauces</td>
<td>Soft, tough rubbery, spongy</td>
</tr>
<tr>
<td>Milk based sauces</td>
<td>Casseroles</td>
<td>Curdles or separates</td>
</tr>
<tr>
<td>Sour cream</td>
<td>Toppings, salads</td>
<td>Separate, watery</td>
</tr>
<tr>
<td>Gelatin</td>
<td>Salads, desserts</td>
<td>Weeps</td>
</tr>
<tr>
<td>Fried foods</td>
<td>All except French fried potatoes and onion rings</td>
<td>Lose crispness, becomes soggy</td>
</tr>
</tbody>
</table>
Spices and Seasonings:
- Pepper, cloves, garlic, green pepper, imitation vanilla and some herbs develop stronger flavors and may become bitter when frozen.
- Onion and paprika change flavor during freezing.
- Curry develops a musty off-flavor.
- Salt loses flavor. Tends to increase rancidity of any item containing fat.
- Season lightly before freezing and add more spices when reheating or serving.

VII. Packaging Material and Containers

The goal of freezing is to keep moisture in and air out for best quality. Moisture-vapor-resistant materials are needed to hold moisture and odors in and prevent freezer burn (brownish-white spots on food because of moisture loss—produces an off-flavor and toughness). Food with freezer burn is safe to eat but may be dry and tough. Keeping air from entering the food product reduces moisture loss and freezer burn.

Use materials designed for freezing:
- Most heavy-duty aluminum foil or plastic wraps are not moisture-vapor-resistant. Use freezer aluminum foil which is thicker and is moisture-vapor-resistant.
- Plastic freezer bags not food storage bags are most commonly used.
- Rigid plastic freezer containers work well for tomatoes, juices, purees or fruits packed in syrup or juice.
- Freezer paper comes in different grades. Use the best grade. Wrap tightly to remove any air.
- Use freezer tape to tightly seal the edges of freezer paper. Other household tapes loosen during freezer storage.
- Glass jars designed for freezing.
- Coffee cans and cardboard milk containers should only be used with another freezer packaging material or container.
- Vacuum sealers remove air and can extend the storage time. Follow all food safety rules, i.e. quick freezing and proper thawing to avoid growth of anaerobic bacteria.

VIII. Head space

Headspace is the empty space between the top of the food to the rim of the container. Food and liquid expand when frozen. Proper headspace is needed so the seal doesn’t break.

<table>
<thead>
<tr>
<th>Type of Pack</th>
<th>Wide Top Opening</th>
<th>Narrow Top Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pint</td>
<td>Quart</td>
</tr>
<tr>
<td>Liquid packed in juice, sugar, syrup or water, crushed or pureed</td>
<td>½ inch</td>
<td>1 inch</td>
</tr>
<tr>
<td>Dry pack without added sugar or liquid</td>
<td>½ inch</td>
<td>½ inch</td>
</tr>
<tr>
<td>Juices</td>
<td>½ inch</td>
<td>1 inch</td>
</tr>
</tbody>
</table>
IX. Storage of Frozen Food

Freeze food quickly by placing it in the coldest part of the freezer.

Where is the coldest part in your freezer? ____________________________________________
(Use a freezer thermometer to check or check your freezer's user manual.)

- Small, instead of large ice crystals form if you freeze quickly. Small ice crystals do not break
down the cells’ structure in food which causes food to become soft and limp.
- Place unfrozen foods on or against the inside surfaces and in the coldest part of freezer.
- Space packages so cold air can circulate around each of them.
- For best quality, do not add more than 2 or 3 pounds of unfrozen food per cubic foot of
freezer space per 24 hours (about the size of a large shoe box). My freezer is
______________________ cubic-feet. (Example: 20 cubic-foot freezer—no more than 40-60
pounds or pints of unfrozen food in at a time.)
- Set freezer temperature at minus 10°F at least 24 hours ahead of freezing large quantities of
fresh food.
- It takes 12-24 hours for food to reach 0°F.
- Maintain frozen food at a temperature of 0°F or less.
- Practice the ‘first in, first out’ food storage rotation method to use food that was stored in the
freezer the longest. Store oldest food on top or in front for first use. Use a food inventory log
to keep track of food items in the freezer. See Freezer Inventory handout.
- Refreezing - You can safely refreeze frozen food if is still contains ice crystals or was kept
cold at 40°F or below for no more than 1 to 2 days.

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