FAIR EXHIBITS: WHAT IS APPROPRIATE AND WHY?

Funding
- College of Human Sciences Heddleson Grant
- "Equipping Iowa State University Families Extension specialist with food safety knowledge to impact Iowans lives"

What Microorganisms Need to Grow
- Acronym – FAT TOM
  - F – Food
  - A – Acidity
  - T – Temperature
  - T – Time
  - O – Oxygen
  - M – Moisture

Acidity: pH
- Designates the level of acidity of a food product
- pH ranges from 0 to 14
  - Acid: 0 to 7
    - High acid foods have a pH at or below 4.6
    - Slows the rate of bacterial growth
    - Disease-causing bacteria grow best at a pH between 4.6 to 7
    - Alkaline: 7 to 14

Temperature
- Time and temperature control for bacterial growth
- Temperature Danger Zone
  - Hold hot food above 135°F
  - Hold cold food below 41°
- Temperature Abuse
  - Foods not heated to a safe temperature or kept at a safe temperature

Available Oxygen
- Oxygen availability affects bacterial growth
  - Aerobic: bacteria require oxygen in order to grow
  - Anaerobic: bacteria cannot survive in oxygen
Water Activity

• Measure of the amount of water not bound to a food and available for bacterial growth
• Water Activity ranges from 0 to 1
  – Pure water has a water activity of 1
  – Disease causing bacteria grown in foods that have a water activity of 0.85
  – Yeasts & molds can grow on food products that have a water activity as low as 0.75

Example: Water Activity

<table>
<thead>
<tr>
<th>Food</th>
<th>Moisture Level</th>
<th>Water Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Salmon, apples, milk, bread</td>
<td>Moist Foods</td>
<td>Above 0.85</td>
</tr>
<tr>
<td>Flour, jams, molasses, dried fruit</td>
<td>Intermediate-moisture foods</td>
<td>Between 0.60-0.85</td>
</tr>
<tr>
<td>Dried noodles, crackers</td>
<td>Low Moisture Foods</td>
<td>Below 0.60</td>
</tr>
</tbody>
</table>

Water activity: measure of the free moisture in a product

Source: Food Microbiology Control Manual, FDA, 1998

Breads: Acceptable

• Breads and other baked products that do not contain refrigerated ingredients
• Muffins or biscuits
• Yeast breads (example: pita bread, limpa bread)
• Sourdough Breads that contain starters from yogurt or cultured buttermilk
• Example: pumpkin, banana, zucchini, nut, fruit nut

Breads: Not Acceptable

• Any breads containing ingredients that must be refrigerated
  (examples: cheese, chopped vegetables)
• Any breads baked in a container not intended for food (jars, paper bags)
• Sourdough friendship bread
• Extended rise no-knead bread

Desserts: Acceptable*

• Pecan/Walnut Pies
• Carmel Rolls
• Cream cheese mints
• Pineapple upside down cake
• Cakes (example: carrot, chocolate, pound, spice, sponge)
• Bar cookies and other cookies (example: Brownie, date, lemon square, oatmeal)

Importance*

• No added water or milk or raw eggs
• High Sugar Content
• Bake out the free water (only bound water)
• Low pH
**Desserts: Not Acceptable**

- Dessert with added water or milk or raw eggs
- Cottage Cheese/Egg toppings
- Pies baked in paper grocery bag, jars, or not intended food container
- Meat filled pastries
- Custard and cream filled pies
- Cheesecake

**Salsa, Canned, Pickled, Jams, and Jellies**

- Only Acceptable Recipes from:
  - So Easy to Preserve
  - Ball Blue Book 2009

**Canning Guides for Home Canning**

- Preserve the Taste of Summer is an Iowa State University Extension and Outreach program that includes both online lessons and hands-on workshops: [http://www.extension.iastate.edu/families/preserve-taste-summer](http://www.extension.iastate.edu/families/preserve-taste-summer)
- Other reputable resources on home food preservation include:
  - National Center for Home Food Preservation: [http://nchfp.uga.edu/](http://nchfp.uga.edu/)
  - So Easy to Preserve: [http://setp.uga.edu/](http://setp.uga.edu/)
  - Ball: [http://www.homecanning.com/usa/](http://www.homecanning.com/usa/)

**Jams and Jellies**

- Every recipe is unique
- Title 21 PART 150--Fruit Butters, Jellies, Preserves, and Related Products - FDA
  - The is the U.S. standard of identity for fruit butters, jellies, preserves, and related products
  - Title 21 of the Code of Federal Regulations Section 150

**Jam and Jellies, cont.**

- Fruit
  - Source, Selection and Ripeness are critical
- Pectin
  - Substance that causes the fruit to gel
  - Natural pectin or commercial available
- Acid
  - Needed for gel formation and flavor
  - Ripeness matter
- Sugar
  - Preservation for the product and prevents microbial growth

**Groups**

<table>
<thead>
<tr>
<th>Group I: If not overripe, have enough natural pectin and acid for gel formation with only added sugar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, sour</td>
</tr>
<tr>
<td>Blackberries, sour</td>
</tr>
<tr>
<td>Cranberries</td>
</tr>
<tr>
<td>Currants</td>
</tr>
<tr>
<td>Gooseberries</td>
</tr>
<tr>
<td>Grapes (eastern concord)</td>
</tr>
<tr>
<td>Lemons</td>
</tr>
<tr>
<td>Loganberries</td>
</tr>
<tr>
<td>Plums (not Italian)</td>
</tr>
<tr>
<td>Quinces</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group II: Low in natural acid or pectin, and may need addition of either acid or pectin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples, ripe</td>
</tr>
<tr>
<td>Blackberries, ripe</td>
</tr>
<tr>
<td>Cherries, sour</td>
</tr>
<tr>
<td>Chokecherries</td>
</tr>
<tr>
<td>Elderberries</td>
</tr>
<tr>
<td>Grapefruit</td>
</tr>
<tr>
<td>Grape Juice, bottled (eastern concord)</td>
</tr>
<tr>
<td>Grapes (California)</td>
</tr>
<tr>
<td>Loquats</td>
</tr>
<tr>
<td>Oranges</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Always needs added acid, pectin, or both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apricots</td>
</tr>
<tr>
<td>Blueberries</td>
</tr>
<tr>
<td>Figs</td>
</tr>
<tr>
<td>Grapes (western concord)</td>
</tr>
<tr>
<td>Guavas</td>
</tr>
<tr>
<td>Peaches</td>
</tr>
<tr>
<td>Pears</td>
</tr>
<tr>
<td>Plums (Italian)</td>
</tr>
<tr>
<td>Raspberries</td>
</tr>
<tr>
<td>Strawberries</td>
</tr>
</tbody>
</table>
Salsa

- Combination of low-acid foods and acid foods
  - Onions, peppers with tomatoes
- Use vinegar that is at least 5% acetic acid or use bottled lemon or lime juice
- Use research-tested recipes carefully
- Same principle of canning applies

Meats

- Acceptable
- Not Acceptable
  - Jerky of any kind

Others: Acceptable

- Fruit flavored vinegars
- Carmel corn baked on stove top, in oven, or microwave

Others: Not Acceptable

- Flavored Oils
- Vegetable marinated in oils and Herbs
- Carmel corn baked in a paper grocery bag
- Any items that contain alcohol products
- Raw egg in any uncooked product
- Homemade egg noodles