Welcome!
April 11- 4-H Project Exhibit Judging
April 18- Foods & Nutrition
April 25- Foods Preservation

To help with tonight’s webinar, please mute your mic.
Thank you!
This video will be recorded.

Meet the Team!

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  Extension Agent
  Wild West District

Follow Along!
Refer to the handout
And the Winner is…
A Guide to Judging Food Preservation
All handouts are at
https://www.rrc.k-state.edu/judging/index.html
Just Because It Seals, Doesn’t Mean It’s Safe!

The Science...Yes, it matters!

For the Fair AND Home!

• This is not JUST for the Fair!!
• All foods need to be canned safely for any use!
• Be Smart!
• Be Safe!
Underprocessed Salsa Gone BAD!!

Photos: Becky Reid

99% due to user error!

Most common reasons:
- Using old/unsafe recipes
- Using untested recipes or untested guidelines
- Using old/unsafe methods passed down in family
- Using wrong jar size
- Using improper processing methods
- Storing in the wrong type of location
- Not adjusting for altitude
- The list goes on...............

Source: Newell Brands, 2020

Reasons for Canning/Seal Failures

99% due to user error!

Most common reasons:
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Source: Newell Brands, 2020

Conditions for Growth

<table>
<thead>
<tr>
<th>F</th>
<th>A</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Acid</td>
<td>Time</td>
</tr>
<tr>
<td>T</td>
<td>D</td>
<td>M</td>
</tr>
<tr>
<td>Temperature</td>
<td>Oxygen</td>
<td>Moisture</td>
</tr>
</tbody>
</table>

Source: K-State Research and Extension
3 Conditions that affect Food Preservation

- A (Acid)
- O (Oxygen)
- M (Moisture)

Acidity of Foods

- Acid foods – pH < 4.6
- Acidified foods – Start above 4.60 but lowered with added acid
- After processing – pH must equilibrate in 12-24 hours

Water Activity

- Water activity is a measure of the amount of moisture in foods that is available for microbes to use.
- Scale: measured on a scale from 0 to 1.0, with distilled water having a value of 0.8.

Water Activity Levels of Some Common Foods

- Fruits & Vegetables (0.97-0.99)
- Dried foods (0.55-0.80)
Oxygen Requirements

Microorganisms have different oxygen needs for growth.
- Aerobic - need oxygen to grow
- Anaerobic - grow only when oxygen is absent
- Facultative - can grow with or without oxygen

Importance of Heat Penetration

- Process time is affected by whether food heats by convection, conduction, or a combination of both.
- Heat penetration studies scientifically determine safe processing times.
- The “cold spot” must reach the correct temperature for the correct length of time to destroy target pathogens.
  - Geocentric – conduction – dense recipes
  - Isocentric – convection – liquid recipes

FOODS HEATING by:
- Convection
- Conduction
Heat Penetration, cont.

- Follow recipe exactly
- The following slow down heat penetration:
  - Extra sugar or fat
  - Oversize food pieces
  - Added thickeners
- Use recommended canners
  - Heat-up and cool-down times in pressure canners are counted toward sterilizing value of the process.
  - Don't rush them.
- Science of Canning: Recipe Development (Newell Brands)
  - [https://youtu.be/01lTxSgXlys](https://youtu.be/01lTxSgXlys)

Just Wait!

Importance of 5-minute wait

- After processing and removing canner lid
- Allows temperature in jars to continue to rise
- Gives extra chance for lids to seal
- Allows steam to escape from canner
- Written into Ball Blue Book recipes, KSRE recipes, in "Preserving Food" chapter of So Easy to Preserve

How-to Guides to...

- Water Bath and Steam Canning
  - Also in Spanish!
- Pressure Canning
  - Also in Spanish!
Question #1

Which of these can be processed safely in a water bath canner?
A. Halved or sliced peaches
B. Corn relish
C. Vegetable soup mix
D. Barbecue sauce
E. A, B, and D

What Makes YOU a Food Preservation Judge?

- You love to educate!
- Know basic food science
- You understand the importance of preserving food safely
- Show them…
  You enjoy preserving food!
Tools to Take

• Towels
• Washcloths
• Flashlight
• Ruler
• Water bottle
• Disinfectant wipes
• Resources
• Scorecards

READ THE RULES!

FAIR BOOK

https://www.rc.k-state.edu/judging/index.html
Labels for Jars

Class No.________ Product____________________
Name___________________________
County/District_____________________
Altitude where processed_______ Process Time_______
Canning Method: Water Bath OR Pressure
Dial Gauge (psi)_______ Weighted Gauge (psi)_______
Date processed (month/year)_______________________

http://www.kansas4-h.org/events-activities/fairs/kansas-state-fair/
Scroll down to “Food Preservation”
2 size options

Also on https://www.rrc.k-state.edu/judging/index.html

Other Required Information

• Must have recipe
• Recipe source
• Processing adjustment for elevation, if needed
• Date of recipe source
  – If using Ball or Mrs. Wage’s mix or pectin inserts, indicate date purchased
• Clear jars
• Jerky must list heat treatment
Judging Standards
https://www.rrc.k-state.edu/judging/index.html

- Judging Scorecards
  - Canned Fruits
  - Canned Tomato Products
  - Canned Meats
  - Canned Pickled Products
  - Canned Vegetables
  - Canned Fruit Preserves
  - Dried Fruits and Leathers
  - Dried Vegetables
  - Dried Herbs
  - Dried Meat Jerky

Judge Visually

- We do not recommend opening or tasting any jars of food!
  - For safety of you, the judge
  - For safety of the food product at the fair and return home
- Safety is the #1 consideration in awarding food preservation entries
  - Unsafe methods should not be rewarded!
- Why? Not all spoilage can be seen by normal human senses.

Problems and Solutions
https://www.rrc.k-state.edu/judging/index.html
Judging Resource

• Judging Home Preserved Foods
• Great tips on judging visually

What Judges Consider

Disqualification
• Jar unsealed
• No recipe
• No label, missing information
• Wrong processing method
• Underprocessing
• Jerky not heated to 160°F
• Jar bigger than recipe states
• Added thickeners, rice, pasta
• Moving bubbles
• Not acidifying tomatoes
• Method or pureed pumpkins/winter squash
• Recipe was on sweet spreads
• Untested recipe source
• Contains alcohol

Lowering a Ribbon Placing
• Not following fair book rules
• Different color rings/bands
• Messy jars, rusted rings
• Not enough liquid
• Improper headspace
• Wrong color (artificial color added if not in recipe)
• Food over-mature
• Uneven sized food pieces
• Using colored jars
• Brands of jars/lids not the same
• Food above liquid
• Fancy packs, if not stated in recipe
• Foreign material
• Abnormal sediment in jars
• Using iodized salt

Showmanship Tips

While not critical for food safety or quality, these can affect final ribbon placing.
• Use same color rings and lids
• Using the same brand of jars and lids
• Hard water residue present on jar surface should be removed
• Sticky label residue on the reused jars should be removed
• Rings should be free of rust
• Remove rings, check for sticky residue
• No fabric lid covers or other décor
Recipe Source List

https://www.kansas4-h.org/events-activities/fairs/kansas-state-fair/index.html

2023 Kansas State Fair
4-H Exhibitor Handbook

You cannot take your own recipe and apply processing recommendations from tested sources!!

Recipes

- Not recommended to can homemade (your own creation!) recipes
- Freeze homemade recipes for long-term storage

4-H Curriculum

- https://shop4-h.org/collections/home-food-preservation
Packaged mixes

- For quick and easy canning
- Pickles
- Salsa
- Sauces
- Many more!

Follow their directions and do not add extra ingredients!

Food Preservation Apps

- Oregon State University
  - https://catalog.extension.oregonstate.edu/pnw689
- Colorado State University
  - https://apps.chhs.colostate.edu/preservesmart/
Other Recipe Sources

Unsafe Recipes Sources
Just because a food is canned commercially doesn't mean it can be canned safely at home!!

- Blogs
- Pinterest
- Old recipe books
- Recipe magazines
  - May not be adequately tested
- Many others…

Untested Recipe Example
How much processing is that?
Untested Recipe Example

New from Mrs. Wages

• 1 Step Pickling Brines
• ONLY makes 1 pint
• REFRIGERATOR STORAGE ONLY!!

New from Heinz

• Ready to use
• Already diluted with water
• Has sugar and salt included
• ONLY for REFRIGERATOR PICKLES!!!!
• Pickling vinegar strength ONLY 2.5%
Question #2

Which of these recipes is NOT from a reliable source?

A. Bread and Butter pickles – USDA
B. Pumpkin Butter – The Frugal Navy Wife
C. Reduced Sugar Peach Pineapple Spread – Preserve Smart app
D. Strawberry Jelly – Sure Jell website

Types of Jars

- Use regular or wide-mouth canning jars
  - ½-pint up to 1-quart sizes only
  - Do not use jar larger than stated in recipe
- Clean, not damaged
- No colored jars
- No Mayonnaise jars
- Ball, Kerr, Golden Harvest
Types of Lids

- Use two-pieced metal lid/ring
- Always use new lids – wash them!
- **Current lids don’t need preheating**

Preheated Lids Evaluation - 2023

- Newell Brands tested regular and wide mouth lids in water bath and pressure canning
- After canning and cooling overnight, internal vacuum pressure was measured
- 30% of pressure canned regular mouth preheated lids buckled
- 17% of pressure canned wide mouth preheated lids buckled
- DO NOT PREHEAT LIDS!
  - No definitive advantage compared to just hand-washing in warm water
  - Can result in less vacuum pressure with preheated lids which can lead to seal failure and buckling

Type of Pack

- **Hot pack**:
  - Fill jar or cup with food and hot liquid
  - Screw lid on tight

- **Raw pack**:
  - Fill jar or cup with food and room temperature liquid
  - Screw lid on tight

USBDA Complete Guide To Home Canning
Headspace

- Space in jar between bottom of lid and top of food/liquid
- Varies by type of food
- Proper headspace creates vacuum seal
- In general:
  - 1/4" jellied fruit products
  - 1/2" fruits, tomatoes and pickles
  - 1" to 1-1/4" low acid foods

- Follow guidelines on the scorecards!

Adjusting for Elevation

Examples of Altitude Adjustments

From Ball Blue Book

From USDA recipes
Canning Equipment

Pressure Canner – Dial or Weighted Gauge
Water Bath Canner

Steam Canners

- Use water bath canning recommendations
- Limited to **45 total minutes** of processing
- Must maintain 212°F

Presto Digital Pressure Canner

- Also a water bath canner
- Not tested by USDA!
  - Only meets USDA guidelines for processing
- Presto must stand behind their product

*NOT FOR COOKING!

*The USDA and the National Center for Home Preservation provide guidelines for home canning. Neither agency certifies or approves home canning equipment. Source: National Center for Home Food Preservation*
Unsafe Processing

- Dishwasher
- Oven or Microwave
- Open Kettle Canning
- Sun Canning
- Pressure Cooker
- Slow Cooker
- Electric Multi-Cooker

Fancy Packs

From Univ. of Georgia

- Many types of fancy packs produce potentially unsafe products.
- The adequacy of process times is dependent on using specified preparation procedures.
- Fancy packs may not have received adequate heat penetration to kill harmful microorganisms.

https://nchfp.uga.edu/publications/nchfp_tech_bull/1_Judging_Preserved.pdf

Allowed Fancy Packs

- Cucumber spears for pickles
- Asparagus spears
- Pickled asparagus spears
- Pickled okra
- Whole green beans
- Pickled green beans
- Pickled baby carrots

USDA recipes are available for these
Question #3

I live in SE Kansas, where the altitude is 900 feet. But I went to my Grandma’s house in NW Kansas, where the altitude is 2,750 feet, to can food. Which altitude should be listed on the entry label for the fair in SE Kansas?

A. 900 feet
B. 2,750 feet
C. 1,000 feet
D. None

Tomatoes Need Acid

- Tomatoes have pH ~ 4.0 – 5.2
  - Borderline for safe boiling water canning
  - This includes all colors of tomatoes!
  - Must acidify for BW and pressure canning
- For Pints
  - 1 Tablespoon bottled lemon juice
  - ¼ teaspoon citric acid
- For Quarts
  - 2 Tablespoons bottled lemon juice
  - ½ teaspoon citric acid
More on Tomatoes

- Vinegar may be used, but….
  - 4 Tablespoons vinegar per quart or 2 Tablespoons per pint
  - Flavor may be objectionable
- Add acid directly to jar before filling
- If too acidic, add sugar to taste
  - Example: 1 tablespoon per quart

About Tomatoes...

- They may taste acidic, but many are low acid
  - Sugar content in tomatoes masks the acidity
  - Climate, soil, variety, maturity make a difference
- Univ. of Illinois tested 55 heirloom varieties
  - Average pH was 4.18-4.92
- NDSU results for salsa

Question #4

Which of these IS safely canned?
A. Salsa in a quart jar
B. Green beans processed in a boiling water bath canner
C. Strawberry jam inverted to seal (open kettle canning)
D. Acidified whole tomatoes in a pressure canner
Judging Steps

• Review recipe and label information
• Check lid seal
• Examine jar appearance
• Remove ring, check for residue
• Measure headspace
• Examine contents with flashlight
  – Look for defects
  – Refer to judging scorecards for details
• Provide comments, how to improve
• Award ribbon placing

Judging Tomatoes

Italian Tomatoes
12 cups halved cored peeled tomatoes (about 24 medium or 8 lb)
Water
Spice blend, see below
Ball® Citric Acid or bottled lemon juice
Salt, optional

Italian Spice Blend
4 tsp basil
2 tsp oregano
2-1/2 tsp oregano
1 tsp garlic powder
1 tsp hot pepper flakes, optional
Add 2-1/4 tsp of spice blend to each pint jar. If omitting hot pepper flakes, use only 2 tsp.

Processed 40 + 5 minutes for altitude
Source: https://www.ballmasonjars.com/blog/herbed-tomatoes
Choose the ribbon!

Sensational Salsa!

Please do not experiment with canning your own recipe that mixes low-acid vegetables together, even with "some" acid like vinegar or lime juice. If done improperly, you put yourself at risk for botulism, a potentially fatal foodborne illness.

http://nchfp.uga.edu/publications/nchfp/factsheet/salsa.html
http://www.kansas.edu/bookstore/pub/MF3171.pdf
http://www.bookstore.kansas.edu/pub/MF3171S.pdf
Used a 24 oz (1 ½ pint) jar
No recommendations for jars bigger than a pint

Judging Salsa

Mrs. Wages Salsa
6 pounds tomatoes
1 pouch Mrs. Wages Salsa mix
½ cup 5% vinegar

Processed 40 + 5 minutes for altitude
Mrs. Wages Salsa mix, purchased August 2019
Choose the ribbon!

Fruit Pie Filling
- Don’t use cornstarch!
- Use Clear Jel – cook type
  - Do not use instant!

Judging Pie Filling

<table>
<thead>
<tr>
<th>Cherry Pie Filling</th>
<th>Quantities of Ingredients Needed for 1 Quart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh or thawed cherries</td>
<td>6-7 cups</td>
</tr>
<tr>
<td>Granulated sugar</td>
<td>1 cup</td>
</tr>
<tr>
<td>Clear Jel</td>
<td>1-1/3 cups</td>
</tr>
<tr>
<td>Cold water</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Bottled Lemon Juice</td>
<td>1 tsp</td>
</tr>
<tr>
<td>Cinnamon (optional)</td>
<td>1/4 tsp</td>
</tr>
<tr>
<td>Almond extract (optional)</td>
<td>6 drops</td>
</tr>
<tr>
<td>Red food coloring (optional)</td>
<td>3 drops</td>
</tr>
</tbody>
</table>

Processed 30 + 5 minutes for altitude.
Source: Preserving Cherries, KSRE, 2015
Choose the ribbon!

Judging Fruit

Peaches-Halved or Sliced
Choose ripe, mature, yellow-flesh peaches of ideal quality for eating fresh or cooking.
Dip fruit in boiling water for 30 to 60 seconds until skins loosen. Dip quickly in cold water and slip off skins. Cut in half, remove pits and slice if desired. To prevent darkening, keep peeled fruit in ascorbic acid solution. Prepare and boil a very light, light, or medium syrup or pack peaches in water, apple juice, or white grape juice. Raw packs make poor quality peaches.

Hot pack or Raw pack
Processed 20 + 5 minutes for altitude
Source: Preserving Peaches, KSRE, 2015
Choose the ribbon!

Jam and Jelly...Do Not...

- Use Paraffin wax
  - Can cause mold growth
  - Heat processing prevents mold growth
- Invert jars to seal
  - Not recommended by USDA
- Alter sugar or pectin
  - Exception - If using low- or no-sugar pectin, sugar can be altered
- Double recipes
  - Product will not set
Judging Jelly

Cherry Jelly with liquid pectin

3 cups sour cherry juice (about 3 pounds or 2 quart boxes sour cherries and ½ cup water)
7 cups sugar
2 pouches liquid pectin

Processed 5 + 5 minutes for altitude
https://nchfp.uga.edu/how/007/cherry_jelly_liquid.html
June 2005

Choose the ribbon!
Judging Jam

Spiced Plum Jam
3 1/2 cups finely chopped fresh red plums (about 2 pounds plums)
1-2 Tablespoons water if needed to prevent sticking
2 teaspoons cinnamon
1/4 teaspoon ground cloves
1/4 teaspoon ground allspice
3 Tablespoons powdered pectin
4 cups sugar

Processed 10 + 5 minutes for altitude
Sure Jell pectin insert
2019

Choose the ribbon!
Summer Squash Relish
4 pounds fresh, firm yellow and/or zucchini summer squash (as purchased)
½ cup diced sweet onion (about 2.4 ounces prepared)
2 cups cider vinegar (5%)
2¼ cups white sugar
2 teaspoons celery seed
2 teaspoons turmeric
4 teaspoons mustard seed

Processed 15 + 5 minutes for altitude
https://nchfp.uga.edu/how/can_06/summer_squash_relish.html
April 2015
Judging Vegetables

Carrots - Sliced or Diced
Select small carrots, preferably 1 to 1-1/4 inches in diameter. Larger carrots are often too fibrous.

Hot pack or Raw pack
1 teaspoon of salt per quart to the jar, if desired. Add hot cooking liquid or water, leaving 1-inch headspace.

Processed at 15# pressure, weighted gauge canner
https://nchfp.uga.edu/how/can_04/carrots_sliced.html
USDA, 2015

Choose the ribbon!
Judging Meat

Strips, Cubes or Chunks of Meat

Choose high quality chilled meat. Remove excess fat. Soak strong-flavored wild meats for 1 hour in brine water containing 1 tablespoon of salt per quart. Rinse. Remove large bones. The hot pack is preferred for best liquid cover and quality during storage. The natural amount of fat and juices in today's leaner meat cuts are usually not enough to cover most of the meat in raw packs.

Hot pack or Raw pack

Add 1 teaspoon of salt per quart to the jar, if desired.

Processed at 15# pressure, weighted gauge canner

https://nchfp.uga.edu/how/can_05/strips_cubes_chunks.html

USDA, 2009
Choose the ribbon!

Drying Foods

• Convenient
• Lightweight
• Uses minimal space
• No refrigeration needed
• Prevents growth of microorganisms
• Slows enzyme activity
• Long shelf life
Types of Dried Foods

• Leather
  – Fruit Leather
  – Vegetable Leather
• No visible moisture
• Dry but pliable

Types of Dried Foods

• Fruit
  – Pretreat to prevent browning
    • Ascorbic acid
    • Sulfites
    • Fruit juice
    • Honey
  – Slice thin and even
  – Peeled fruit dries best

Types of Dried Foods

• Vegetables
  – Keep pieces uniform for even drying
  – Steam or water blanch
  – Brittle or crisp
Types of Dried Foods

- Herbs
  - Food dehydrator
  - Microwave
  - Paper bag with holes

Types of Dried Foods

- Jerky
  - Must be heated to 160°F
  - This is not the drying temp!
  - Heat in marinade prior to drying
  - Heat in 275°F oven for 10 minutes after drying
  - Strips should be ¼-inch thick or less


Dried Foods Scorecards
Get Educated!

http://nchfp.uga.edu/putitup.html

10 Tips for Safe Home-Canned Foods

https://www.rrc.k-state.edu/preservation/

https://www.rrc.k-state.edu/judging/index.html

Just Because It Seals, Doesn’t Mean It’s Safe!

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Thank You!!

Brand names appearing in this presentation are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

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