Spring Webinar Series
2 P.M. CST

EXTENDING KNOWLEDGE ➤ CHANGING LIVES

NDSU EXTENSION
Upcoming Webinars

• March 11 – Staying Safe in the Sun: Insight from a Skin Cancer Survivor
  – Brian Halvorson, Teacher, Grand Forks Public Schools

• March 18 – Growing a Butterfly Garden
  – Janet Knodel, Professor & Extension Entomologist, NDSU Extension Entomology
Zoom Controls
Please Complete the Survey

• Please complete the short online survey that will be emailed to you after today’s webinar. It will take just a couple minutes!

• Be sure to sign up for an opportunity to win a prize in the drawing. After submitting the survey, a form to fill out with your name/address will appear.

• Acknowledgement: This project was supported by the U.S. Department of Agriculture’s (USDA) Agricultural Marketing Service through grant 14-SCBGP-ND-0038.
Pressure Canning and Cooking: New and Old Ways to Cook and Preserve Vegetables

Julie Garden-Robinson Ph.D., R.D., L.R.D.
Professor, North Dakota State University
Outline

• Canning basics
• Pressure cooking
• Where do I find information
• Your questions
Questions

• Name two foods that can be canned in a water-bath canner.

• Name two foods that must be pressure canned.
Food Characteristics

According to the FDA, foods fit into three classes:

1. Acid
2. Low acid
3. Acidified

Acidity is measured based on the pH scale.
• **Low-acid** foods have a pH above 4.6.
• **Acidic** foods have a pH of 4.6 or lower.*
• **Acidified foods** are low-acid foods that have an acid or acid ingredients added to them to create a final **equilibrium pH** of 4.6 or lower.
Food Characteristics

**Acid Foods**
- Fruits
- Pickles
- Sauerkraut
- Tomatoes and figs
  - Lemon juice, citric acid or vinegar
- (Water-bath)

**Low-acid Foods**
- Meat
- Seafood
- Poultry
- Milk
- All fresh vegetables except most tomatoes
- (Pressure can)
USDA Guidelines for Canning Acid and Low Acid Foods

http://nchfp.uga.edu/how/general/ensuring_safe_canned_foods.html
Processing Methods

1) Boiling Water Canning (212°F at sea level)
   • Used for acid foods and acidified foods

2) Pressure Canning (at least 240°F)
   • Used for low acid foods (and mixtures of acid and low acid foods)
     • Home produced low-acid foods cannot be sold to the public.
WHY ALL THE CONCERN ABOUT PROCESSING METHOD?
**Clostridium botulinum**

- Obligate anaerobe (must be Oxygen-free or low-Oxygen environment)

- Toxin Producer
  - The botulinum toxin, one of deadliest known, causes botulism food poisoning.
  - Antidote exists if properly administered.

- Food can contain toxin without showing signs

- Symptoms: double vision, nausea, eventually takes ability to breathe

- Spores are heat resistant.
Clostridium botulinum

- *C. botulinum* to germinate and produce toxin, the spores need the following conditions:
  - Anaerobic
  - Low acid (pH > 4.6)
  - 40°F to 120°F
  - Relatively high moisture

Source: CDC
Clostridium botulinum

• Preventing Botulism:
  – Inhibit spore germination or promote spore destruction
  – High acid (pH ≤ 4.6)
  – Aerobic environment
What does the previous information mean to me?

Provides direction for processing requirements.
Common Steps in High and Low Acid Canning

Preparation of Jars and Lids

- Make sure there are no nicks or cracks anywhere.
- Select jar rings that display no rust or bending, and new flat lids.
- Wash jars and jar rings in warm, soapy water. Rinse well.
- Use only *new* flat lids and follow manufacturer’s directions. Some may require heating while others do not.
- Keep the jars in warm water while you are preparing the product.
Common Steps in High and Low Acid Canning

- **Food Preparation & Packing**
  - **Cold Pack**
    - Placement of cold food in cold or warm jars.
    - Add hot liquid before air removal and sealing.
    - Advantages:
      - less time consuming for preparation and packing
      - easier to handle food and jars
      - some food retain firmness
  - **Hot Pack**
    - Food is cooked in liquid before packing.
    - Cooking liquid poured over food in jar. Air removal and sealing.
    - Advantages:
      - Fewer jars needed
      - Less floating of product during/after canning
      - Better color and flavor
      - Easier to pack, foods pliable
      - Faster heating to target canning temperature
Common Steps in High and Low Acid Canning

• Headspace in jars
  • **Definition**
    • Space in the jar between the inside of the lid and the top of the food or its liquid. Check directions for the correct headspace.
  • Add hot liquid before air removal and sealing.

• How much headspace should I leave in the jar?
  • 1/4” jellied fruit products
  • 1/2” fruits, tomatoes and pickles
  • 1” to 1-1/4” low acid foods
High Acid or Acidified Foods

• Water Bath Canner
  • The temperature of the water in the canner should be about 180 F (simmering) when it is time to add your filled jars.
  
  • Racks for boiling water canners will have divided spaces for holding jars. If using a flat rack, fill empty jars with water and place in the empty space around your filled jars.
Low Acid Foods

- Pressure Canner
  - The water should not cover jars

- Stacking of jars is permissible
Low Acid Foods

- Pressure Canner
  - Bring the water in the canner to a simmer or add hot water. Add jars of product.
  - Replace canner lid and allow canner to vent
Low Acid Foods

- Pressure Canner
  - After venting, place weight on vent port.
  - Allow pressure to increase to target pressure. Start timer. *(adjust pressure by adjusting burner temperature)*
  - The pressure must drop below 11 psi.
Low Acid Foods

• Processing and Cooling
  • Each food has its own processing time
  • Follow directions as approved
    • Key: pressure
      ➢ 1001-2000 ft: 11 psig
      ➢ 2001-4000 ft: 12 psig
      ➢ 4001-6000 ft: 13 psig
      ➢ 6001-8000 ft: 14 psig
      ➢ 1001 ft and above: 15 psig

    • Wait about 1-2 minutes after pressure drops to 0 psig to make sure all pressure is gone. (do not force cool)
    • Remove jars and place on padded surface.
    • Check seal 12-24 hrs after canning.
Example 1: Low Acid Foods

- USDA - USDA Complete Guide to Home Canning

- Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.
Example 2: Low Acid Foods

- **USDA - USDA Complete Guide to Home Canning**

**BEANS, SNAP AND ITALIAN—PIECES**

Green and wax

**Quantity:** An average of 14 pounds is needed per canner load of 7 quarts; an average of 9 pounds is needed per canner load of 9 pints. A bushel weighs 30 pounds and yields 12 to 20 quarts—an average of 2 pounds per quart.

**Quality:** Select filled but tender, crisp pods. Remove and discard diseased and rusty pods.

**Procedure:** Wash beans and trim ends. Leave whole or cut or snap into 1-inch pieces.

- Hot pack—Cover with boiling water; boil 5 minutes. Fill hot jars, loosely leaving 1-inch headspace.
- Raw pack—Fill hot jars tightly with raw beans, leaving 1-inch headspace.

Add 1 teaspoon of canning salt per quart to the jar, if desired. Add boiling water, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.
Beware of Internet Canning Info!

• What is Internet Canning?
  • Canning of food using unproven methods (usually posted on the internet)

• What are some of the unsafe methods promoted on the internet?
  • Boiling Water Bath Canning (low acid food)
    • Commenters indicate that old family recipes, older family members/friends, or old cookbooks have been canning this way for decades
    • 25 minutes to 3 hours are often reported
Internet Canning

• What are some of the unsafe methods promoted on the internet?
  • **Oven Canning**
    • 25 minutes to 3 hours are often reported
    • USDA approved method from 1931 to 1942 (after this time not approved)
    • Comment on blog: people may use this method because it’s tradition and it’s more of an emotional connection
    • Comment from Internet: “My thoughts are this - the boiling point is 212 degrees F. 250 degrees F. 4 hours allows plenty of time for the center of those jars to be, not only hot enough, but fully (fully!) cooked”
      • Demonstrates lack of knowledge regarding food safety
Internet Canning

• What are some of the unsafe methods promoted on the internet?
  • Dishwasher Canning
    • Sterilize jars then put hot food in the jars and flip.
    • Comment on internet stated “It's SO much easier than the boiling water processing” and only 5-10% of the jars don’t seal. “we just put these in fridge and eat them first”
    • Other methods indicate food actually placed in jars and run through heavy wash cycle
  • Bathtub canning has been reported…
Tips and Tricks for Your Multifunction Cooker (using Instant Pot as example)

Adapted from a presentation by Sabrina Riggins and Cindy Brison of Douglas-Sarpy Country Extension, University of Nebraska-Lincoln
1. Name 3 advantages of using a pressure cooker/ “Instant Pot.”

2. Can dry beans be cooked in an Instant Pot?

3. What is a food safety issue associated with Instant Pots?
Why Use Pressure Cooking?

• Food cooks faster
• Can cook more than one food at a time
• Does the job of a:
  – Slow cooker
  – Electric pressure cooker
  – Rice cooker
  – Steamer
  – Yogurt maker
  – Sauté/browning pan
  – Warming pot

https://instantpot.com/portfolio-item/duo-8-quart/
Read About Functions Before Use

✓ Safety is key
✓ Never try to deep fat fry in the IP
✓ Don’t leave the house while using
✓ Wash carefully
✓ Learn the function of each button
✓ Know the time each setting takes
✓ Different brands differ!
## Buttons (vary by manufacture)

<table>
<thead>
<tr>
<th>Function</th>
<th>Meaning</th>
<th>Cook time</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANUAL</td>
<td>An all-purpose button. Change the time by pressing + or – buttons next to the time.</td>
<td>Can be set to any time</td>
</tr>
<tr>
<td>KEEP WARM/CANCEL</td>
<td>Once finished cooking, want to keep food warm. Default setting after MANUAL.</td>
<td>Can be set to any time</td>
</tr>
<tr>
<td>TIMER</td>
<td>For delayed cooking, add or subtract time by pressing the + or – buttons.</td>
<td>Choose any time in the future to begin pressure cooking</td>
</tr>
<tr>
<td>SAUTÉ</td>
<td>Used like a skillet or saucepan on the stove. Brown meat, sauté onions, etc.</td>
<td>Automatically set to 30 minutes</td>
</tr>
<tr>
<td>PRESSURE</td>
<td>Alternates between low and high pressure</td>
<td>Can be set to any time</td>
</tr>
<tr>
<td>Function</td>
<td>Meaning</td>
<td>Cook time</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>SLOW COOKER</td>
<td>Slow cook that can be adjusted to low, normal, or high temps</td>
<td>Four hours (240 minutes)</td>
</tr>
<tr>
<td>SOUP</td>
<td>High pressure cooking</td>
<td>30 minutes</td>
</tr>
<tr>
<td>MEAT/STEW</td>
<td>High pressure cooking</td>
<td>35 minutes</td>
</tr>
<tr>
<td>YOGURT</td>
<td>Low pressure cooking</td>
<td>Can be set to any time</td>
</tr>
<tr>
<td>BEAN/CHILI</td>
<td>High pressure cooking</td>
<td>30 minutes</td>
</tr>
<tr>
<td>POULTRY</td>
<td>High pressure cooking</td>
<td>15 minutes</td>
</tr>
<tr>
<td>MULTIGRAIN</td>
<td>High pressure cooking</td>
<td>40 minutes</td>
</tr>
<tr>
<td>PORRIDGE</td>
<td>High pressure cooking</td>
<td>20 minutes</td>
</tr>
<tr>
<td>STEAM</td>
<td>High pressure cooking</td>
<td>10 minutes</td>
</tr>
<tr>
<td>RICE</td>
<td>Low pressure cooking</td>
<td>Can be set to any time</td>
</tr>
</tbody>
</table>
Timing

• Much faster than a slow cooker
• Takes 10-15 minutes to get pressure
  – Include natural release time into recipe if called for
• If cooking from frozen, add more cooking time
• Sauté function heats up faster
Timing

- Each model is different
- Don’t be afraid to put lid back on to cook longer

  – Make note on recipes
Pressurize/Depressurize

• Never open the pot while in the manual/pressure mode
• Shut it off first
• Use natural release, quick release, or 10 minute natural release
• Open lid away from you
Set Venting Knob Before Setting Pot

• **Natural Release**
  – Wait 10-20 minutes
  – Use on meat and chicken for tenderness

• **Quick Release**
  – 1-2 minutes
  – Wear a glove
  – For steamed veggies, not for liquids or starchy foods
Liquid

• Some, but not too much!
  – No moisture = no cooking/burnt food
• Need at least 1 cup
• Keep under the fill line
• Watch items that swell
Filling the Pot

• Max Line printed on Inner Pot is not intended for pressure cooking

• For pressure cooking
  – Maximum 2/3 full

• For pressure cooking food that expands
  – Grains, beans, dried vegetables
  – Maximum 1/2 full
Rings

• Used for sealing the pot
• May take on the scent of something strong
• Many people have 2 rings
  – One sweet
  – One savory
  – May even want two inside pots
• Make sure they are installed correctly
Size of Items

- Smaller is better
- Small pieces cook faster
  - Foods cook faster with more surface area rather than volume
- Can add items once the pot has started
Multifunction Cooker vs. Stove Top Pressure Cooker

- Instant pot operates at 11.5 psi compared to a standard 15 psi stovetop model

- Add 20% to the cooking time
  - 10 minutes stove top = 12 minutes electric
  - 20 minutes stove top = 24 minutes electric
  - 30 minutes stove top = 36 minutes electric
Electricity

• Consumes very little electricity
  – Due to air-insulated housing
  – IP uses **less than half** electricity compared with a stove-top on an electric range when cooked for the same amount of time
Cleaning the Pot

• Clean edges of IP with a foam brush
• Remove the silicone seal
• Don’t forget the steam release handle, anti-block shield, or float valve
  – Residue or food particles lodges in these may affect their function & alter the pressure level
  – If using quick release regularly, unscrew the anti-block shield for cleaning
  – Dirty float valve prone to sticking
Inside of the Pot

- Water stains the pot
- Use non-abrasive scouring cleanser made especially for cooking pots
- Can clean with 1 cup of white vinegar in inner pot, rest for 5 minutes, pour out vinegar, rinse
Storing Instant Pot

- Refer to manufacturer’s directions.
Converting a Slow Cooker Recipe

• Converting meat from slow cooker to Instant Pot recipe:

8 hours on low or 4 hours on high in the slow cooker = 25-30 minutes in the Instant Pot
Dry Beans/Grains

• Add enough water/not too much
• Can cook without soaking
• Rinse well first
• Use the natural release
• Spray liner of the Instant Pot
  – Prevents grains from foaming
  – They don’t spray out when the release valve is opened
Beans have a tendency to froth and foam during cooking.

- Never fill the pressure cooker more than the half full line. This includes beans, ingredients and water.

- Pressure cookers must contain a minimum amount of liquid to operate correctly. See manufacturer’s directions.

- You may add 1 to 4 tablespoons of vegetable oil and up to 1 tablespoon of salt to 1 pound of beans during soaking or cooking.

- Tests have shown that when oil and salt are added, dry beans keep their shape and exterior skin intact, and froth and foam less during pressure cooking.

- **Yield:** 1 pound (2 cups) of dry beans makes about 6 cups of cooked beans. One 15-ounce can of beans is about 1 ¾ cups of beans drained.

Note: Vegetable publication coming in summer 2020
Food Safety

• Botulism is not a concern.
• Delayed cooking (timed cooking) can be a safety issue.
• Potentially hazardous foods cannot sit at room temp for more than 2 hours, including:
  - Raw protein
  - Legumes, beans, lentils
  - Frozen foods
Canning in the Instant Pot?

• Can you pressure-can in the Instant Pot?
  – NO! (even if you see it on TV)
  – USDA has not tested instant pots for food safety in pressure-canning

• Boiling-water canning is OK
  – Great for pickles and jams
Additional Info

- Cook once and freeze
  - Large amounts protein
  - Soups/stews
- Read recipe twice
- Add dairy after cooking

- Timer keeps food warm for up to 10 hours after cooking
Questions?
www.ag.ndsu.edu/fieldtofork