Master Food Preservers of Amador/Calaveras Counties

Food Preservation Basics
Pressure Canning

Welcome!

Enjoy the music while you wait, we start at 6:00 p.m.

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Agenda

Basic Food Safety

How Canning Preserves

USDA Recommended Canning Methods

Basic Ingredients

Equipment & Tools

Basic Information

Processes

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Basic Food Safety

Core Canning Techniques, Pages 2-3

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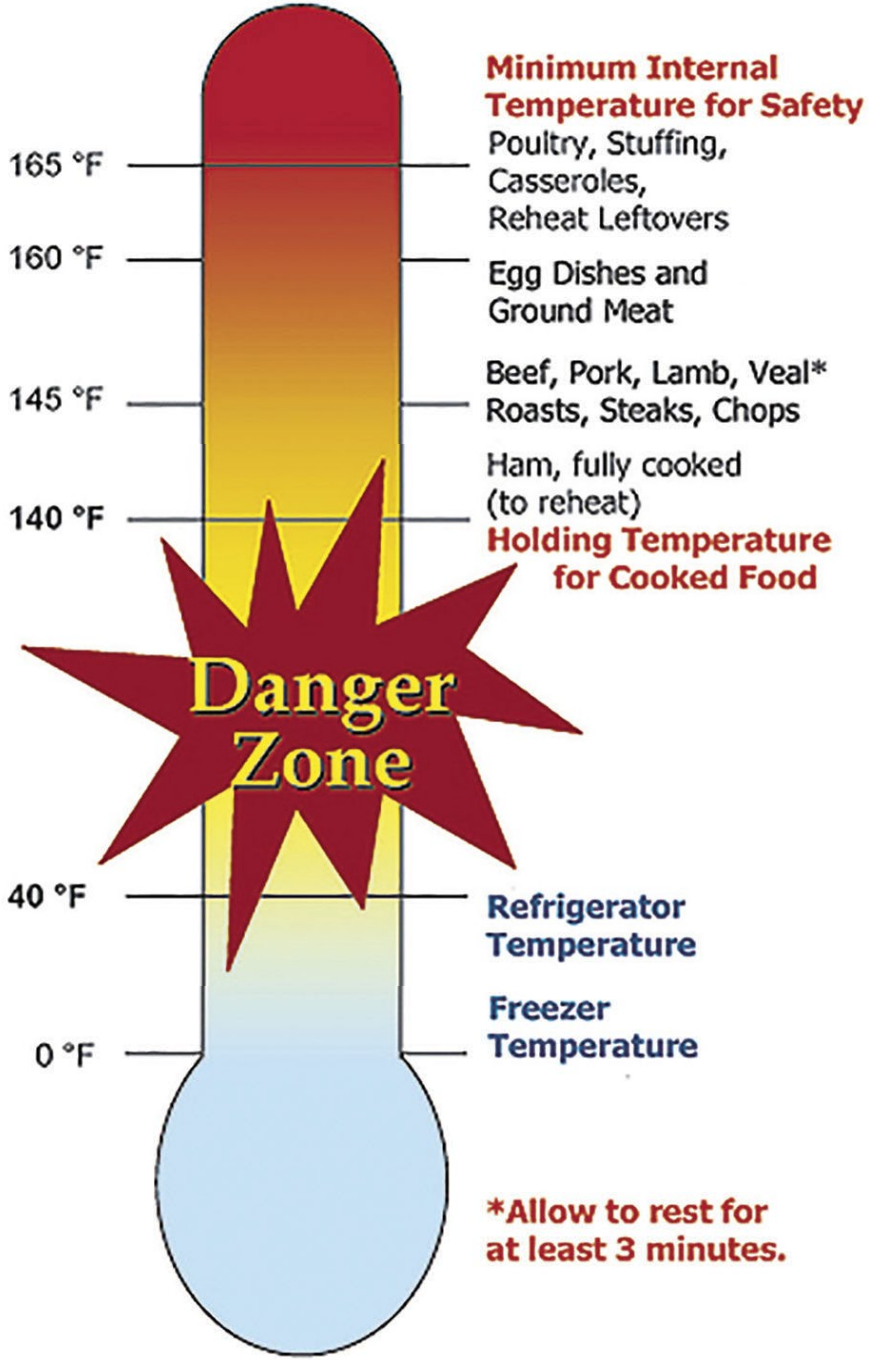
Factors that Affect Growth of Microorganisms

- Temperature
- Acidity or Alkalinity (pH)
- Moisture
- Oxygen
- Time
- Food
- Inhibitors


Minimum Internal Temperature for Safety
165 °F
Poultry, Stuffing, Casseroles, Reheat Leftovers
160 °F
Egg Dishes and Ground Meat
145 °F
Beef, Pork, Lamb, Veal* Roasts, Steaks, Chops
140 °F
Ham, fully cooked (to reheat)
Holding Temperature for Cooked Food
Danger Zone
40 °F
Refrigerator Temperature
Freezer Temperature
0 °F
*Allow to rest for at least 3 minutes.

Factors that Affect Growth of Microorganisms

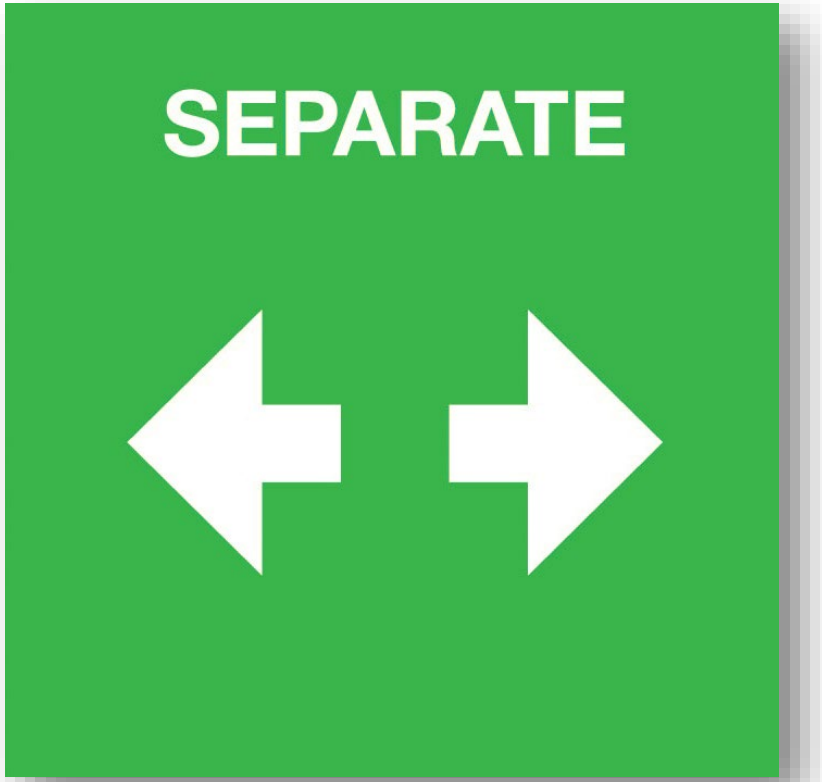
- Temperature
- Acidity or Alkalinity (pH)
- Moisture
- Oxygen
- Time
- Food
- Inhibitors

Preventing Foodborne Illness

Preventing Foodborne Illness: Clean

- Wash Hands Frequently
- 20-seconds
- Bandage/Gloves
- Wash Cleaning Items
- Use Disposable Towels
- Use Disinfectant

Preventing Foodborne Illness: Separate



- Avoid Cross Contamination
- Separate Cutting Boards
- Rinse Fruits and Vegetables
- Clean Plates for Cooked Meat
- Avoid Ice Contamination
- Raw Meat Storage

Preventing Foodborne Illness: Cook

- Internal Temperature
- Use Thermometer
- Use Reputable Recipe

Preventing Foodborne Illness: Chill

- Refrigerator 40°F or below
- Refrigerate Perishable Foods
- Thaw in Refrigerator/Microwave or under running ***COLD*** water
- Refrigerator After 2-Hours
- Divide Leftovers
- Temperature Affect Spoilage

Food Safety Golden Rule

When In Doubt - Throw It Out!

Never taste food that looks or smells strange.

Just discard it.

Foods containing bacteria will look, smell, and taste normal.

Most bacteria that cause foodborne illness are odorless, colorless and tasteless.

How Canning Preserves

Core Canning Techniques, Page 4

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How Canning Preserves: Vacuum Seal

Vacuum Seal:

- Air is driven from the jar during heating. As the jar cools, a vacuum seal is formed.
- Holds the lid on the jar.
- Prevents recontamination of the food.
- Prevents air from drying out the food.

A vacuum seal doesn't guarantee safe food.

How Canning Preserves: Heat

Heat:

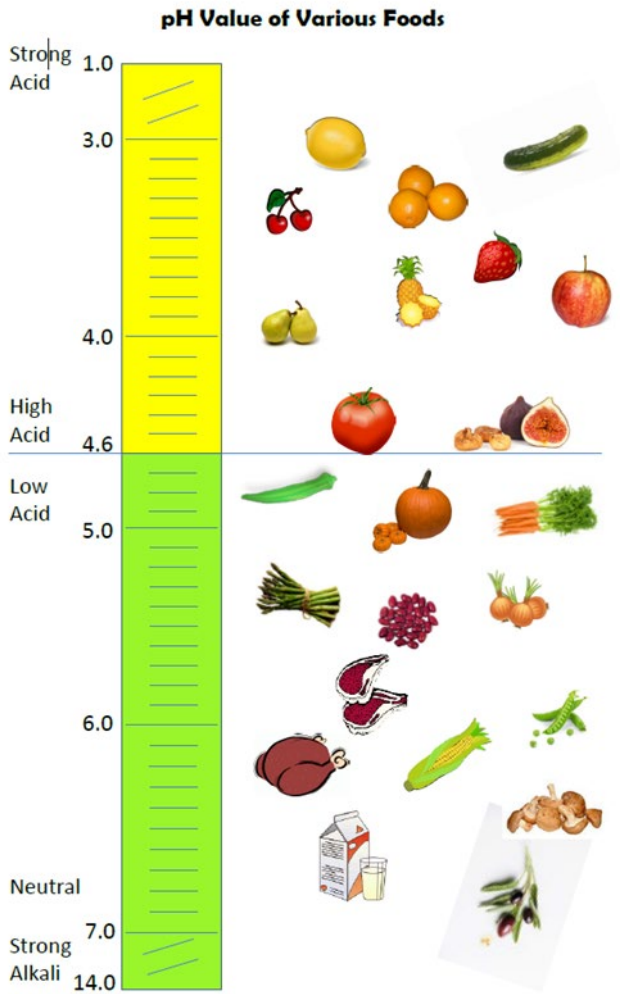
- Heat destroys most heat-resistant microorganisms capable of growing in food stored at room temperature.

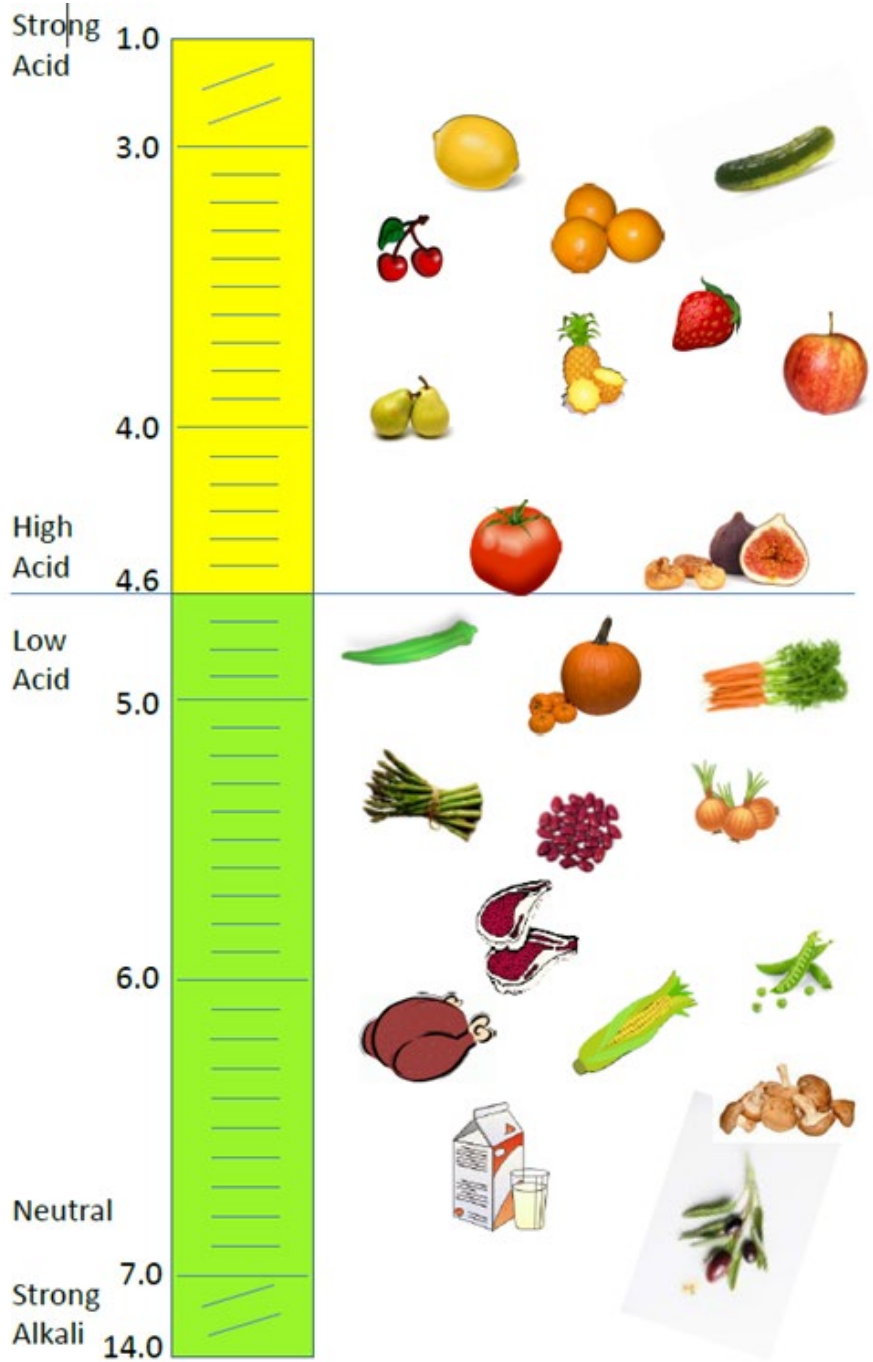
How Canning Preserves: Acid

Food is divided into two main categories:

- High Acid Foods
  (contain acid)
- Low Acid Foods
  (contain little or no acid)

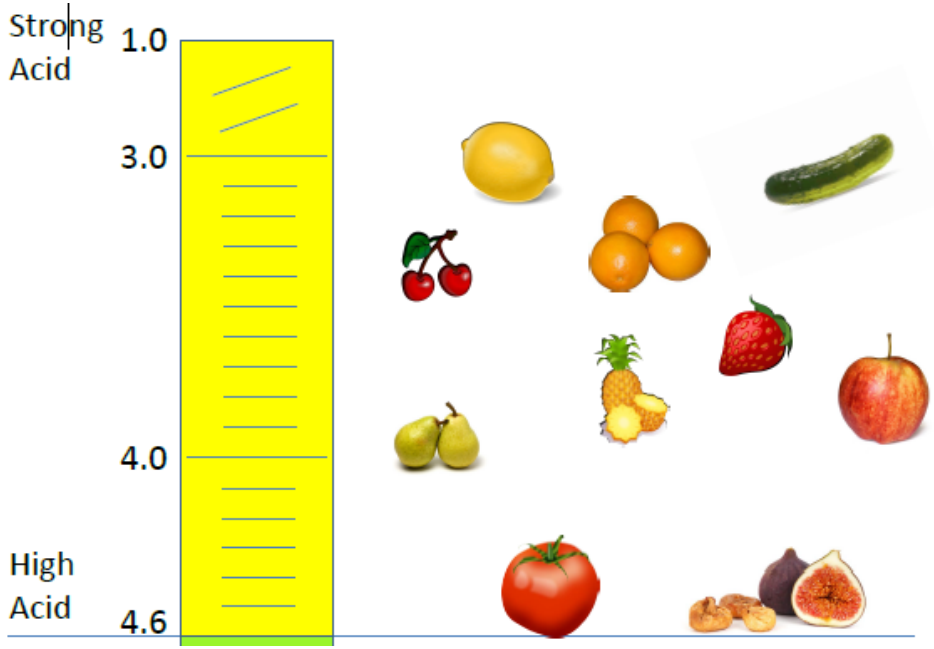
pH: The measure of acidity/alkalinity




Strong Acid
1.0
3.0
4.0
High Acid
4.6
Low Acid
5.0
6.0
Neutral
7.0
Strong Alkali
14.0

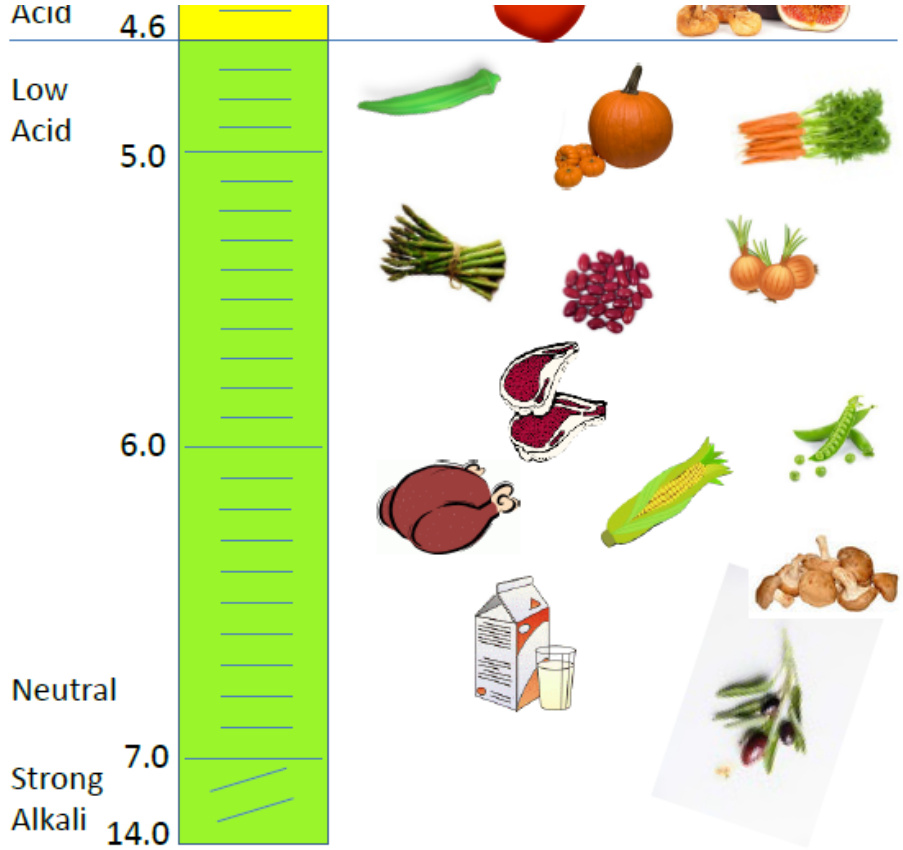
How Canning Preserves: High Acid Foods (pH <4.6)

- Generally all fruits
- Tomatoes and figs are borderline
  - specific amounts of citric acid or lemon juice must be added to acidy for canning.
- Sauerkraut
- Foods with large amount of added acid (pickles)



How Canning Preserves: Low Acid Foods: pH >4.6

- Generally all vegetables
- Meats (including poultry)
- Seafood
- Fish
- Soup
- Mixtures of acid and low acid foods (spaghetti sauce – meat, vegetables, tomatoes)



USDA Recommended Home Canning Methods

Core Canning Techniques, Pages 4-5

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USDA Recommended Home Canning Methods

High Acid Canning:

- Boiling Water Canning
- Atmospheric Steam Canning

212˚F at sea level

Used for: fruits, pickles, fermented products, and jams and jellies.

Low Acid Canning:

- Pressure Canning

240˚F at sea level

Used for: meats, vegetables, and mixtures of high and low acid foods.

USDA Recommended Home Canning Methods: Why?

Clostridium Botulinum!!!

C. Botulinum forms protective spores that are heat-resistant.

***C. Botulinum* Spores:**

- Won't germinate in acid environments.
- Are destroyed at 240˚F or above at sea level.
  - Boiling water & steam canners reach no higher than 212F˚.
  - Pressure canners reaches 240˚F and higher.

What CAN Happen!

When low acid foods are not pressure canned conditions become favorable for *C. Botulinum* Spores.

- 40˚F-140˚F
- High moisture
- No/very little air
- Low acid environment

C. Botulinum Spores germinate and form toxin producing cells.

Botulism

What CAN Happen: Botulism

- Food can contain toxin without showing signs.
- Symptoms usually appear within 12-72 hours:
  - Digestive upset (in some cases)
  - Blurred, double vision
  - Difficulty swallowing, speaking, and breathing
  - Death

USE and FOLLOW the PROPER PROCEDURE!!!


UC Master Food Perservers
How Does it
CAN

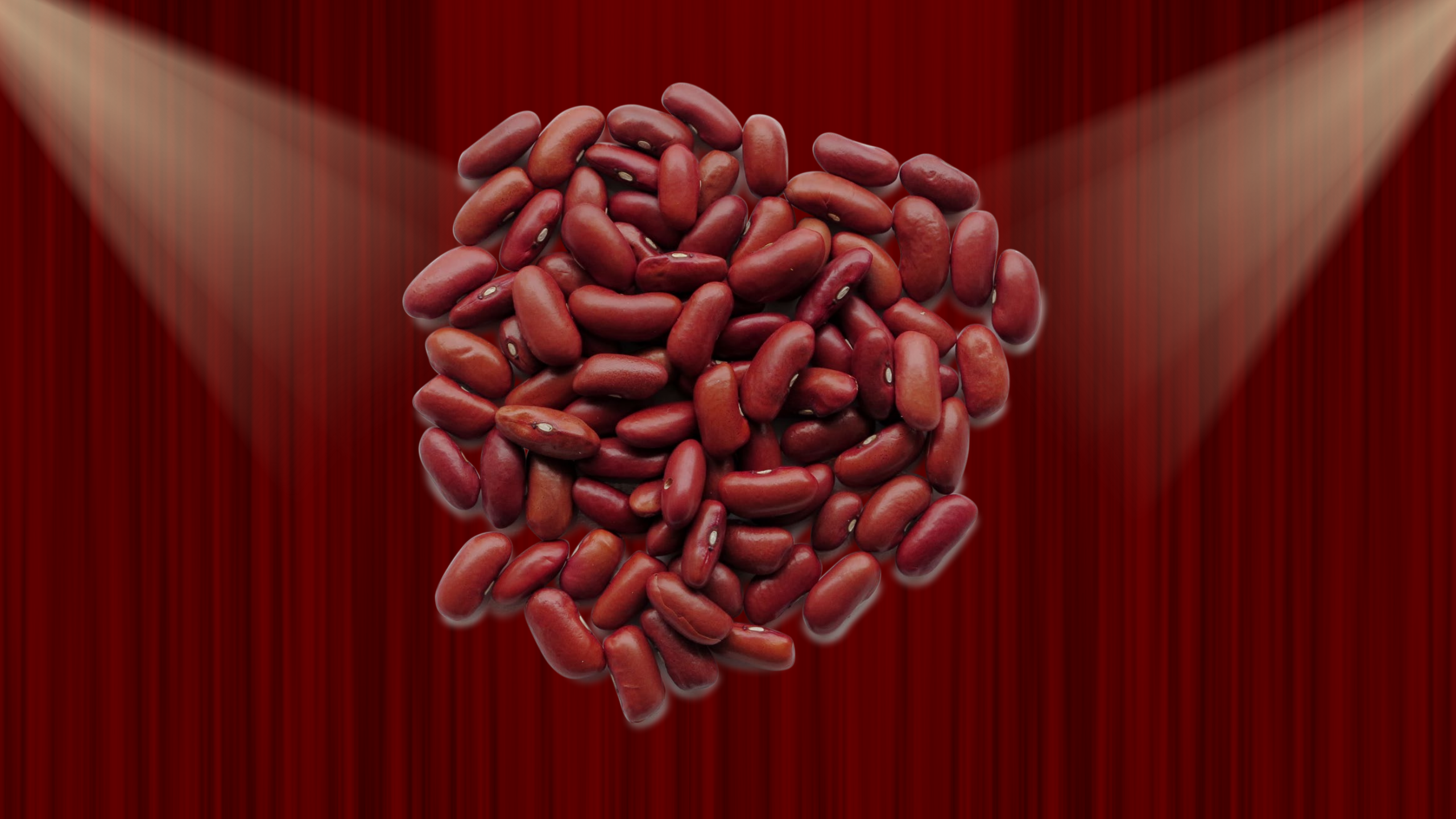
Are you ready?!

Round 1

Meats

Round 2

Fruits and Veggies




THANK
YOU
Hope you had fun!

Basic Ingredients

Core Canning Techniques, Page 5

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Basic Ingredients: Food

Equipment & Tools

Core Canning Techniques, Page 9 &13-14

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Equipment & Tools: Pressure Canners

Equipment & Tools: Pressure Canners

All American

Mirro

Old style

Current style

Granite Ware

T-Fal

Fagor / Zavor

Presto

(induction compatible model available)

Equipment & Tools: Pressure Canner Features

Rack

Lid gasket (on most)

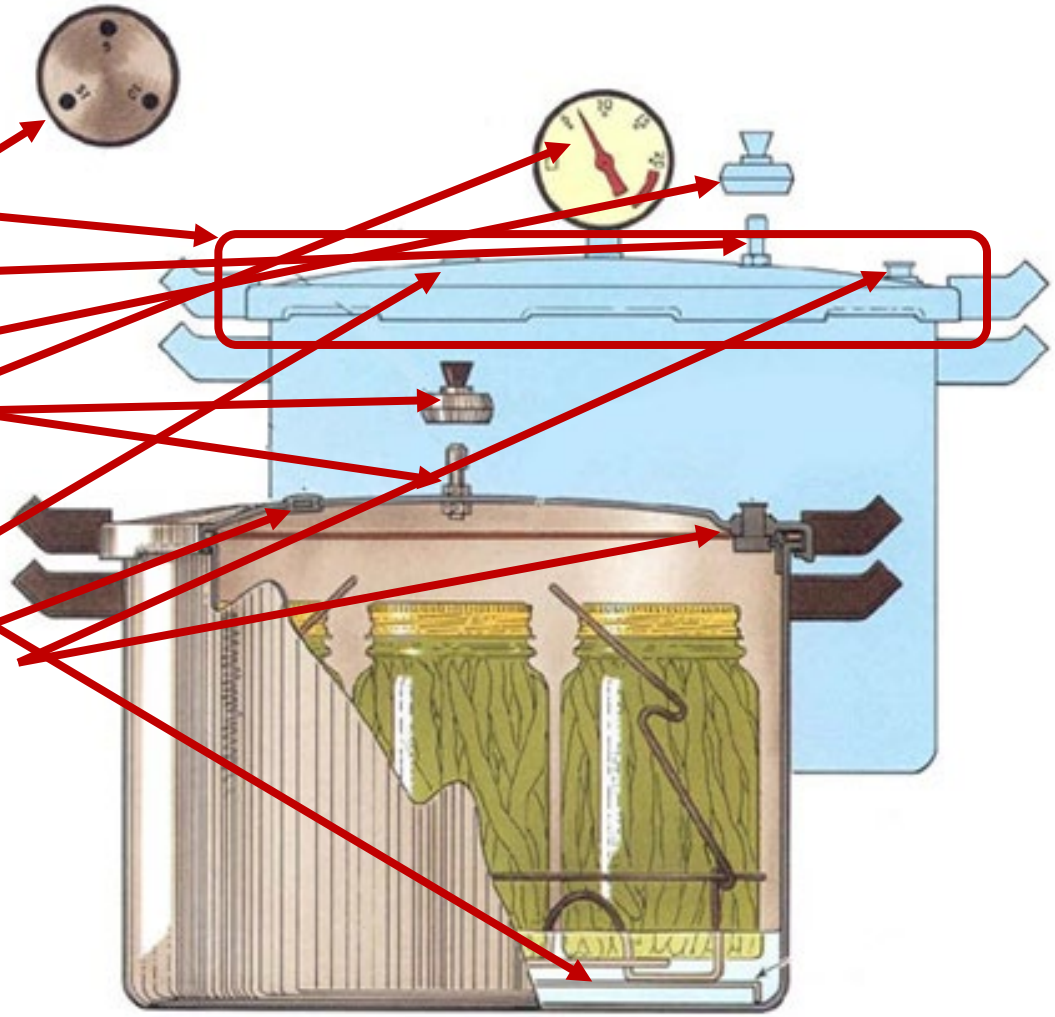
Vent port

Pressure regulator

Pressure indicator

Safety locks when pressurized

Overpressure plug



gram

Equipment & Tools: Pressure Canners

All American

Mirro

Old style

Current style

Granite Ware

T-Fal

Fagor / Zavor

Presto

(induction compatible model available)

Equipment & Tools: Presto Canner

Just because it has a dial doesn't mean it's a dial-gauge pressure canner

- Only 1 true dial-gauge pressure canner: ***Presto***
  - Others are considered weighted-gauge canners with a dial-gauge for reference
  - Per manuals

Equipment & Tools: Presto Dial-Gauge

- **Indicates** pressure inside the canner.
- More flexibility in altitude adjustments.
  - Small psi increments
- Increase / decrease pressure by adjusting heat.
- Check annually for accuracy.

Equipment & Tools: Presto Dial-Gauge Weight

- Standard model comes with a 15 psi weight
  - Can’t get dial gauge tested?
  - Treat as a weighted gauge canner and can at 15 psi

- Optional 3-piece weighted gauge
  - Converts to a full weighted gauge canner with 5, 10, 15 psi weight

Equipment & Tools: Pressure Canners

All American

Mirro

Old style

Current style

Granite Ware

T-Fal

Fagor / Zavor

(induction compatible model available)

Dial-Gauge vs Weighted-Gauge

Just because it has a dial doesn't mean it's a dial-gauge pressure canner

- Weighted-gauge canners have a dial-gauge for reference only
- Per manuals

Pressure Canners: Weighted

- All American: Dial & Weighted Gauge on top
  - Use as a weighted gauge canner (per manual)
  - Lube metal-to-metal contact

- Gauge
  - Accurate +/- 2 lbs
  - Use to tell when to remove lid; no pressure lock indicator

Pressure Canners: Weighted Gauge

- Weighted Gauge
  - ***Regulates*** pressure inside the canner
  - Releases pressure from canner during processing to maintain correct setting
  - Altitude adjustment requires increase of 5 psi pressure





Pressure Canners: Weighted Gauge

- Selective: One piece
  - Fitting for 5, 10 or 15 psi
  - Movement at correct pressure:
    - Read the manual
    - AA & old Mirro: “jiggles” 1 to 4 times per minute
  - Increase/decrease pressure by adjusting heat.

Pressure Canners: Weighted Gauge

Adjustable 3-piece

- Fitting for 5, 10 or 15 psi
- Do not use 1-piece weight from dial gauge canner or pressure cooker
- Movement at correct pressure: *Read the manual*
  - Presto & Graniteware: rocks gently throughout entire process
- Increase / decrease pressure by adjusting heat

Presto

Granite ware

Pressure Canners: Weighted Gauge

Singular: Three piece set

- Which piece used determines 5, 10 or 15 psi
- New Mirro: spins and steams
- Increase / decrease pressure by adjusting burner heat

Pressure Canners: Weighted Gauge

- Built-in adjustments
  - Open vent port
  - Setting 1 = 5 psi
  - Setting 2 = 10 psi
  - Setting 3 = 15 psi
- Steady gently release of steam and soft hissing: it's at pressure
- Gauge is a reference only

Pressure Canners: Weighted Gauge

- Zavor (& Fagor, not sold or supported in US anymore)
- Holds 4 quart jars
- Only can at 15 psi
  - Setting 2 = 15 psi
  - Setting 1 = 8 psi (cooking only)

Equipment & Tools: Pressure Canner Keep it Current

Equipment & Tools: Specific

Specific Canning Tools

- Rack (for canner bottom)
- Jar lifter
- Headspace measurer/de-bubbler
- Canning ladle
- Canning funnel
- Canning jars
- Rings and NEW lids

Equipment & Tools: Basics

General

- Measuring cups and spoons
- Bowls
- Tray(s)
- Hand towels
- Ladle
- Paper towels
- Marker
- Blue tape

Equipment & Tools: Pro-tip

Using vinegar to wipe rims…

Equipment & Tools: Recipe

A reputable recipe that follows the USDA recommended canning procedures.

Canning Basic Information

Boiling Water and Steam Canning Basics, Page 6-7

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Canning Basic Information: Altitude Adjustment

Sea Level: 212˚F water boils

- All recipes use sea level as the criteria for process times.
- Higher altitude equals a lower boiling temperature.
- Adjust processing time above 1000 ft.

Pressure Processing		
Altitude	**Dial Gauge (lbs. pressure)**	**Weighted Gauge (lbs. pressure)**
1,001 – 2,000 feet	11	15
2,001 – 4,000 feet	12	15
4,001 – 6,000 feet	13	15
6,001 – 8,000 feet	14	15
8,001 – 10,000 feet	15	15

Core Canning Techniques, Pg. 7

Canning Basic Information: Raw Pack

- For foods that lose shape when cooked.
- Place raw food directly in jars.
  - Boiling hot liquid is then poured over the food.
- Pack firmly, don’t crush.

Core Canning Techniques, Pg. 7

Canning Basic Information: Hot Pack

- Preferred method for most foods.
- Food is cooked in liquid before packing.
  - Cooking liquid poured over food in jar.
- Fewer jars needed.
- Less floating.
- Better color and flavor.
- Easier to pack, foods pliable.

Core Canning Techniques, Pg. 7

Canning Basic Information: Non-Standard Jars

Do NOT use re-use Atlas-Mason jars used to package Classico Sauces or any other jar used in commercial canning.

A coating is applied at the glass plant to reduce scratching and scuffing, this weakens the jar, causing it to break more easily.

Also the lighter weight of the jar could make it unsafe for home canning.

Canning Basic Information: Canning Jars

Preparing Jars

- Check jars for nicks, scratches, bubbles, or other imperfections.
- Wash jars and lids on hot, soapy water.
- Keep jars hot until ready for use.
- If the process time is under ten (10) minutes sterilize jars.
  - Sterilize by boiling in water for 10 minutes, adding 1 minute per 1,000 ft. above sea level.

Canning Basic Information: Canning Lids

Preparing Lids

- Use two-piece lids.
- Follow instructions on package.
- Use single use lids.
  - Do not re-use lids!
- Check bands for rust.

Canning Basic Information: Headspace

Space between inside lid and top of food.

Always follow the directions for correct headspace.

Too little:

- Food may bubble out during processing, which may prevent proper seal.

Too much:

- Food may discolor on top.
- Jar may not seal properly
  - Air may not be all forced out during processing.

Canning Basic Information: Process Time

- Each food has its own processing time.
  - Follow directions carefully.
- Time differs with size of the jar.
- Adjust for altitude.
- Too little time will possibly lead to spoilage.

Canning Basic Information: Heat Penetration

Heat penetration is slowed by:

- Adding extra sugar or fat.
- Having food piece larger than called for in directions.
- Adding thickeners, like flour or corn starch.

FOLLOW THE RECIPE!

Five-Minute Break

Processing

Core Canning Techniques, Pages 17-18

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Processing: Pressure Canner

1. Prep food & jars, ensure canner is clean
2. Heat water (not boiling)
   - Hot pack: 180˚F
   - Raw pack: 140˚F
3. Place jars in canner
4. Cover fastening securely
   - Leave vent/petcock open
5. Steady column of steam
   - Vent for 10 min
6. Place counterweight/weighted gauge or close petcock
7. Process
8. Remove from heat and wait until cool (0 pressure)
9. Remove lid
10. Remove jars

Processing: Prep Food

- Reputable recipe – be very selective
- Prep work area
- Check jars & canner integrity

Processing: Filling Jars

- Check headspace.
- Remove air bubbles.
- Check headspace again.
- Wipe rims, with wet paper towel.
  - Meat recipes: wipe with vinegar
- Adjust 2-piece lids.
  - Tighten finger-tight.
    - Allows air to escape during processing.

Processing: Placing Jars in the Pressure Canner

- Canner should be filled with hot water.
  - Simmering, not boiling
- Use jar lifter to place jars in canner.
  - Keep jars straight up.
- 2” to 3” of water in canner
  - Longer processing time = more water; see owner’s manual
- Place lid on canner
- Vent 10 Minutes
- Weight on
- Pressurize

Core Canning Techniques, Pg. 15-16

Processing: Venting

- Process times intended for pure steam environment
  - Canner's empty space: mixture of steam & air
  - Lower temperature than pure steam
  - Venting eliminates air; creates pure steam environment

- USDA: vent ALL pressure canners for 10 minutes.
  - Without proper venting, up to 30% of the sterilizing value of a 20-minute process may be lost at 10 psig

Processing: Cooling Down

- Heat off, walk away
- Time to cool down
  - Pints: ***30 minutes***
  - Quarts: ***45 minutes***
- Pressure at 0?
  - Weight off
  - Wait 10 more minutes
- Lid off, jars out

After Processing

- Cool jars away from drafts
- DO NOT DISTURB or move jars.
  - 12-24 hours

The USDA and University of California DO NOT recommend inverting jars.

Testing for Seal

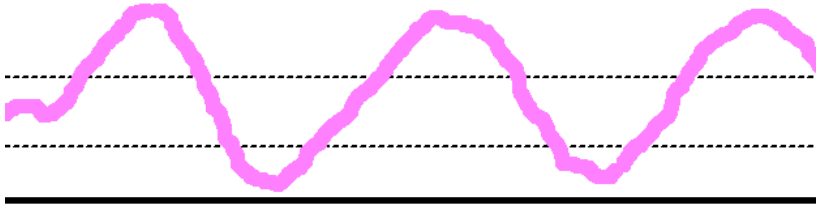
- Listen for “pop”
- Lid curved inward
- Lid won’t move when pressed.
- Clear ringing sound when tapped.

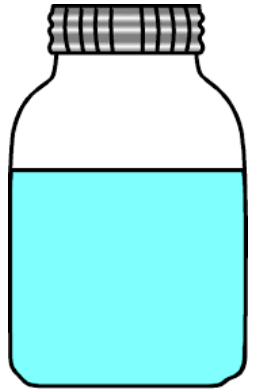
Storage

- Check Seal.
  - Store unsealed jars in the refrigerator.
  - OR reprocess.
- Remove bands; clean
- Gently wash lid and jar thread, and dry
- Label
- Store in a cool, dark place.
- Avoid temperature extremes.
- Use within one (1) year for best quality.

Fluctuating Pressure

- Large and/or quick variations in pressure during processing may cause loss of liquid from jars.

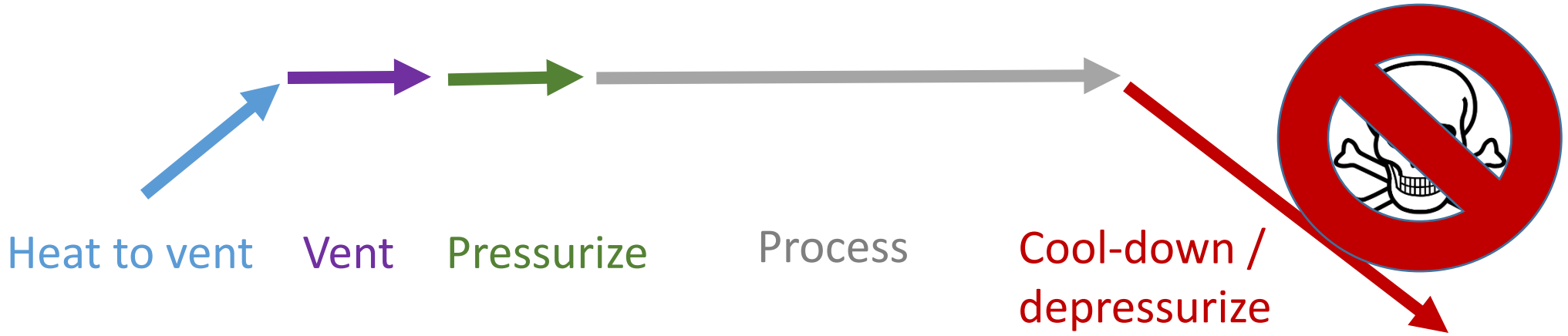




- Tip to find your stove's "sweet spot"
  - Practice canning jars of water
- Pressure drops?
  - Return to pressure; **restart** timing

Processing: Prevent Botulism with Timing

- Follow recipe exactly.
- Timing is everything
  - Heat-up and cool-down times count toward sterilizing value of the process
  - Don’t rush it; entire time needed



Resources

National Center for Home Food Preservation
(www.nchfp.uga.edu)

So Easy to Preserve

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Questions?

Don’t forget to fill out the survey after the class!

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