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Preserving Green Chile Peppers:
Freezing, Drying, Freeze Drying, and Canning

Presented By NMSU Master Food Preservers

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FUN FACT Session 3 Winner

Thank you for participating in our October 15th Session on Freeze Drying Green Chile.

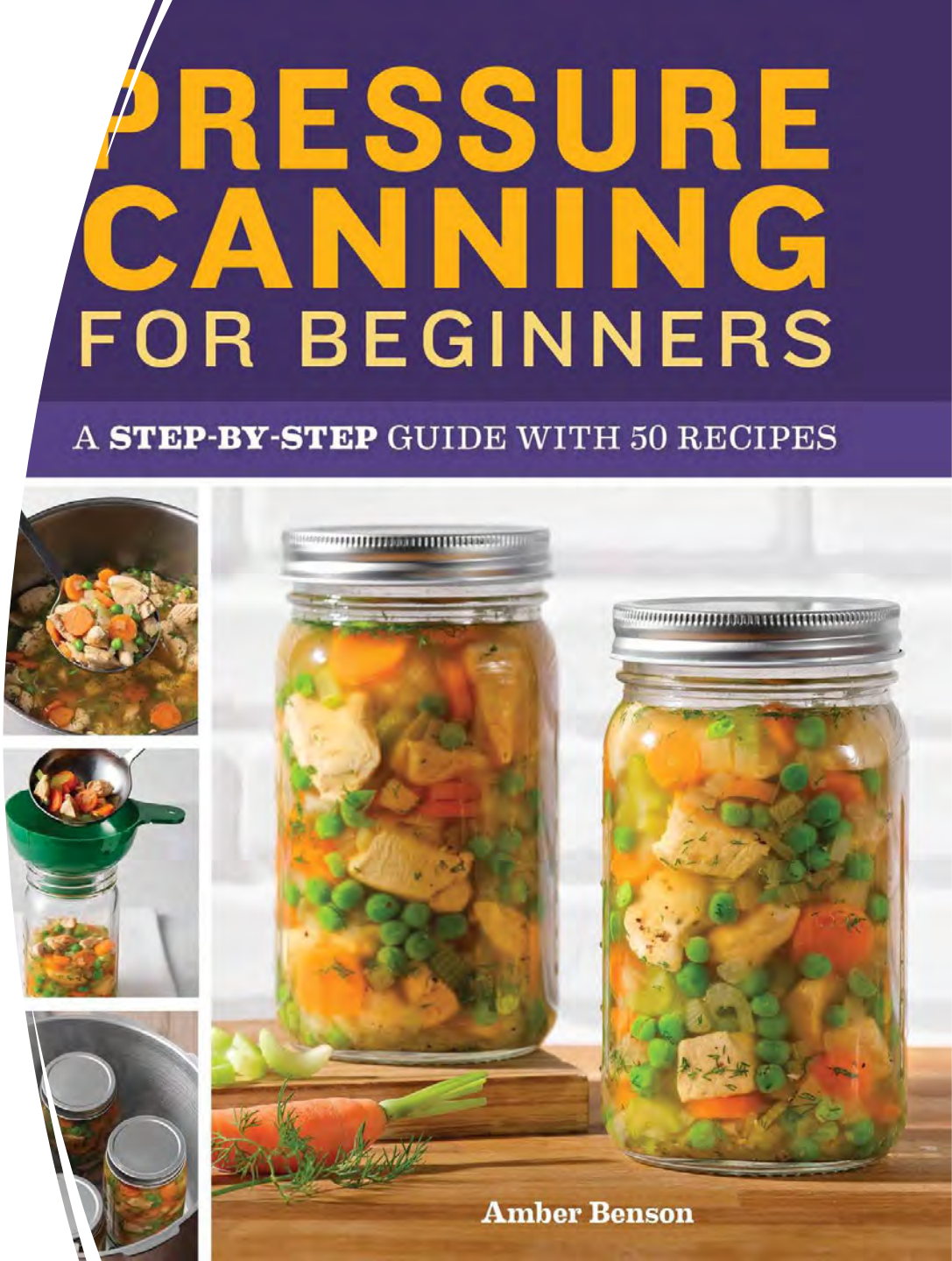
We are delighted to announce our winner of the session:

David Gwaltney

Photo Source: The Chile Pepper Institute

Pressure Canning for Beginners

- A drawing will be held for everyone who has registered to win our own Bernalillo FCS Agent Amber Benson's book: Pressure Canning for Beginners.



WELCOME!

- Four- part Green Chile presentation by Master Food Preservers.
- Participants are joining from New Mexico, Arizona, Colorado, and California.
- Use the chat for questions and to answer questions.
- Recording and slides will be available on our county Extension websites at the end of October.

Quick Review on Freezing

- *After roasting, skins may be removed before freezing.*
- *Chile can remain whole or chopped.*
- *Cool chile to 70°F within 2 hours and below 40°F within 4 hours of roasting. Freezing should happen within 3 days.*
- *Air is not our friend use freezer bags, vacuum sealed bags, or freezer-safe containers no more than 2" deep.*
- *Keep frozen food at or below 0°F.*
- *LABEL.*
- *For best quality eat frozen chile within a year, just in time for the new season.*

Photo Source: The Chile Pepper Institute

Quick Review on Drying

- *When drying foods, the key is to remove moisture as quickly as possible at a temperature that does not seriously affect flavor, texture and color of the food.*
- *When choosing a chile for drying purposes, start with a mild to medium heat pod. The smaller the pods of chile, the higher the degree of pungency.*
- *Remember Green Chile that has only been roasted and peeled is RAW FOOD.*

Fun Fact Time: Answer in the chat!

- What is your Favorite way to enjoy Green Chile?
- What is your experience with Canning?

Photo credit: Patricia Largo

Safe canning methods

Determine which canning method is the acceptable and safe way to preserve a variety of foods

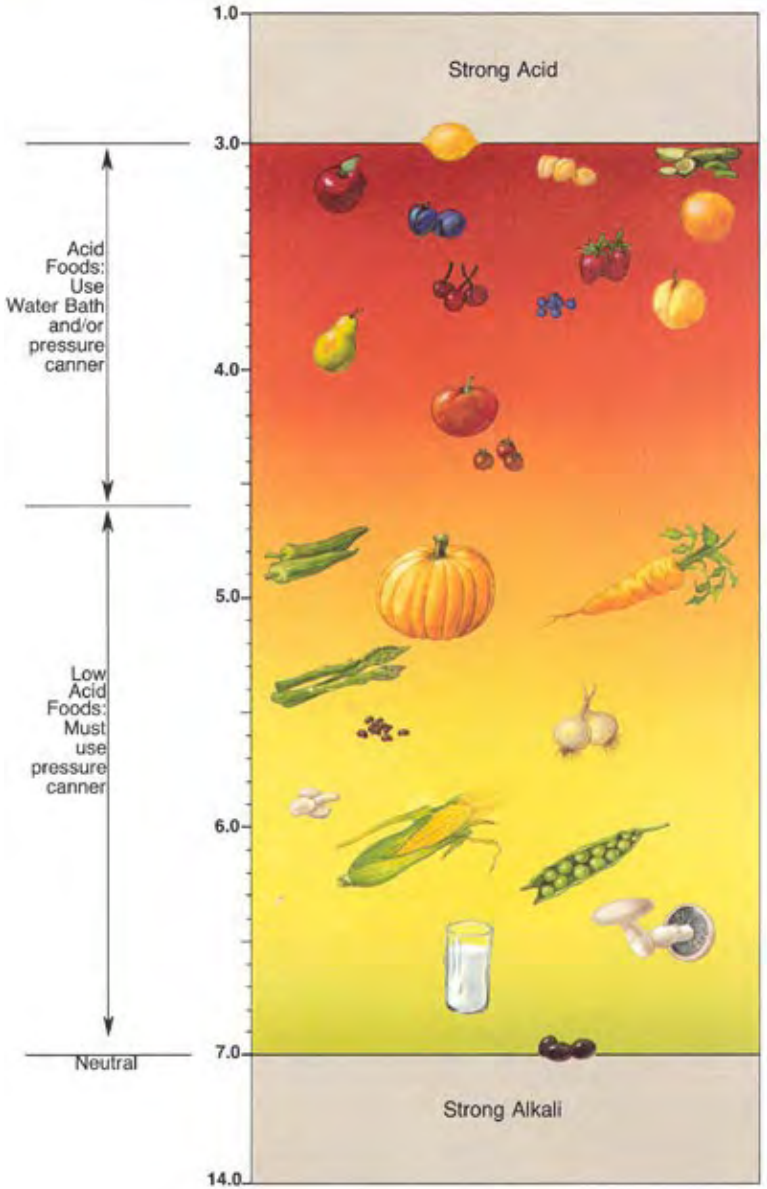
Photo credit: Patricia Largo

Photo credit: Patricia Largo

Photo credit: Patricia Largo

What is pH?

- The term “pH” is a measurement of the acid level in a food
- pH is measured on a scale from 1 to 14
- The closer the pH value is to 1, the more acid the food contains
- A pH of 7 is neutral



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

There is a difference!

Photo credit: Patricia Largo

Water Bath Canning

Used for canning "high acid" or “acidified” foods with a pH of 4.6 or lower

versus

Pressure Canning

Photo credit: Patricia Largo

Used for canning "low acid" foods with a pH of 4.6 or higher

Clostridium Botulinum

- Can't see it, can't smell it
- Anaerobic, loves low-acid foods, high moisture environments, and temperatures in the danger zone 40°F to 140°F
- Canning procedures must prevent the growth of microorganisms
- Some bacteria cause food spoilage, while others produce toxins that cause illness or death
- For example, *Clostridium botulinum* is a harmless bacterium in air.
    - However, in the environment inside a canning jar with little or no acid (pH greater than 4.6), no oxygen, and temperatures between 40 and 120°F, this bacteria grows and produces a deadly toxin that can cause serious damage to the central nervous system or death when eaten in very small amounts (botulism).
- Pressure processing is the only safe way to can vegetables without adding any acid
- Boiling water produces steam. The temperature of steam under pressure is much higher than it normally would be without pressure.
- To prevent botulism, the internal temperature of canned vegetables and other non-acid foods must reach **240°F**.

Red vs. Green

- Primary differences
  - Maturity
  - Spiciness
- Green chilies
  - Left to mature, will turn red
- Red chilies
  - Sweet
  - Increased heat/more capsaicin
  - More mature

https://cpi.nmsu.edu/

Red vs. Green

- Not every green chile will mature into a red one
- Not all chiles transform into same variety of red chile

- In New Mexico
  - “green chile”
    - Harvested in Hatch
    - Southern NM
  - “red chile”
    - Cultivated in Chimayó
    - Northern NM

https://cpi.nmsu.edu/

If you can’t decide between red or green,
choose Christmas:
a combo of the two

https://belaya.info/wp-content/uploads/2023/11/387197391_1669143430242927_5828673493554449728_n-1380x1536.jpg

CANNING CHILE: Water Bath

Green chile:

- naturally low in acidity
- should be **pressure processed when canned alone**

~~However:~~

- ~~combine green chile with acidic ingredients (fruits and juices)~~
- ~~May be safe for water bath canning~~

CANNING CHILE

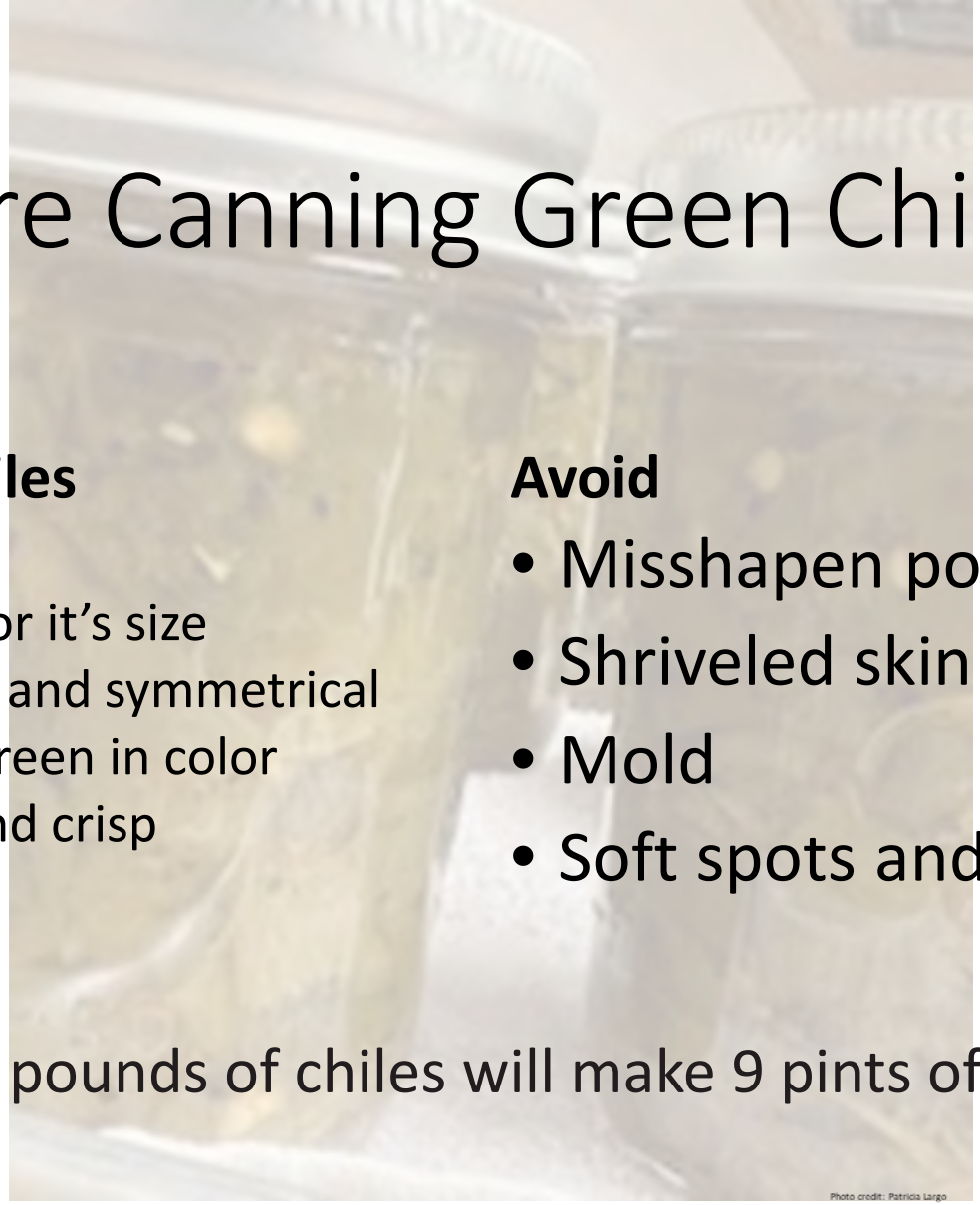
Because chiles are naturally low in acid, canning them requires special precautions that differ from those for canning high-acid foods.

Photo credit: Patricia Largo

Pressure processing is the only safe way to can chiles without adding any acid.

Photo credit: Patricia Largo

Pressure Canning Green Chile



Selecting chiles

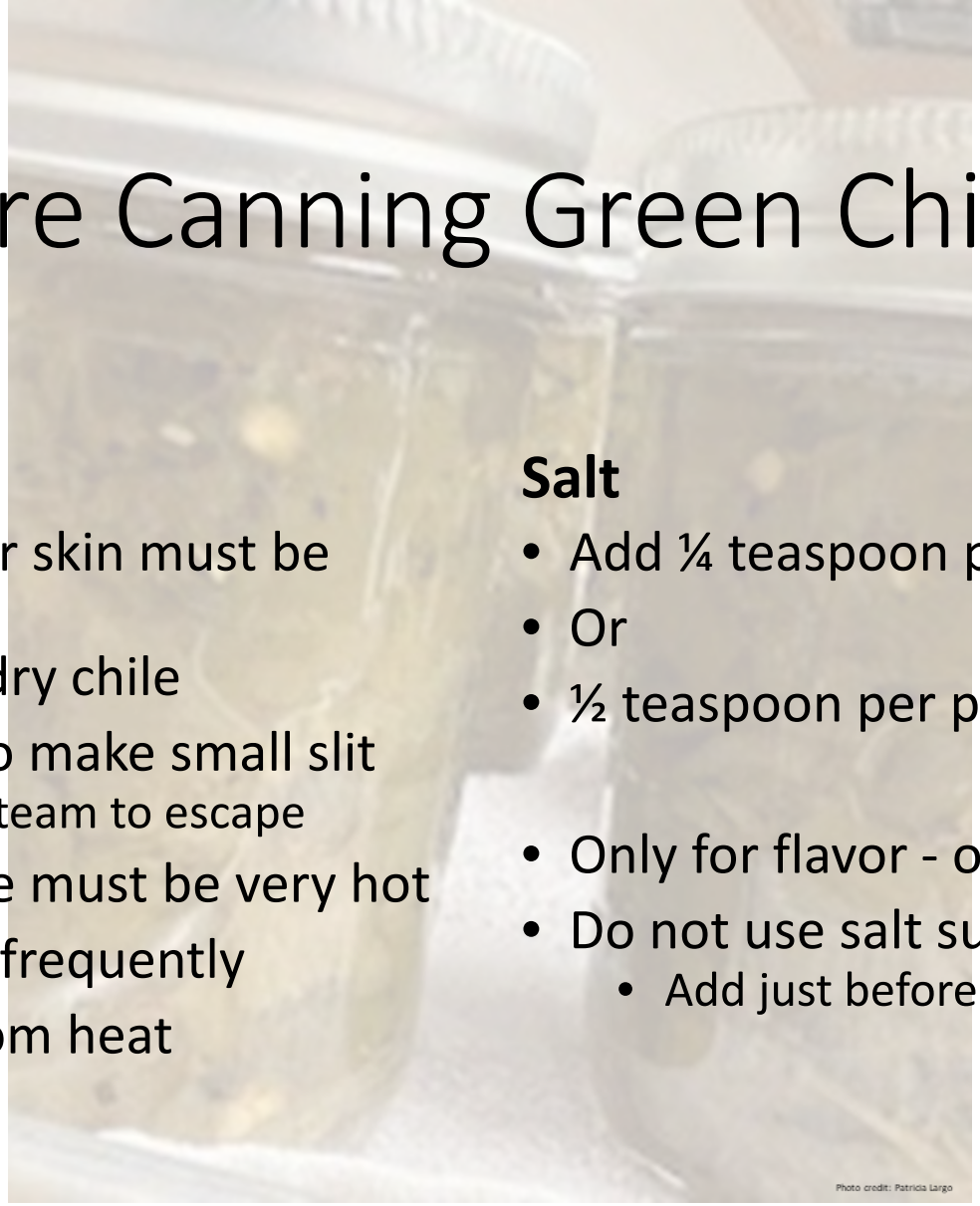
- Mature
- Heavy for it's size
- Smooth and symmetrical
- Bright green in color
- Fresh and crisp

Avoid

- Misshapen pods
- Shriveled skin
- Mold
- Soft spots and bruises

Approximately 9 pounds of chiles will make 9 pints of canned chiles.

Pressure Canning Green Chile



Blistering

- Tough outer skin must be removed
- Wash and dry chile
- Use knife to make small slit
  - Allows steam to escape
- Heat source must be very hot
- Turn chiles frequently
- Remove from heat
- Let cool

Salt

- Add ¼ teaspoon per half pint
- Or
- ½ teaspoon per pint

- Only for flavor - optional
- Do not use salt substitutes
  - Add just before serving

Basic Information

- Remove skins, stems, and seeds from chiles.
- Chiles can be cut in pieces or left whole.
- Pack chiles loosely and add boiling water to completely cover chiles.
- Leave a 1-inch headspace.
- Using a rubber or plastic spatula or knife that won't nick or scratch the jar, slice between the chiles and the jar to ease out trapped air bubbles.

Pressure Canning

To start with..

Pressure Canning…

takes a long,

long,

long,

long,

time!

Photo credit: Patricia Largo

Follow These Steps for Successful Pressure Canning

1. Put 2 to 3 inches of hot water in the canner. [In areas with hard water, add 1 tablespoon of vinegar to reduce mineral deposits on jars.] Some specific products in this Guide require that you start with even more water in the canner. Always follow the directions with USDA processes for specific foods if they require more water added to the canner. Place filled jars on the rack, using a jar lifter. When using a jar lifter, make sure it is securely positioned below the neck of the jar (below the screw band of the lid). Keep the jar upright at all times. Tilting the jar could cause food to spill into the sealing area of the lid. Fasten canner lid securely.

2. Leave weight off vent port or open petcock. Heat at the highest setting until steam flows freely from the open petcock or vent port.

3. While maintaining the high heat setting, let the steam flow (exhaust) continuously for 10 minutes, and then place the weight on the vent port or close the petcock. The canner will pressurize during the next 3 to 5 minutes.

4. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock as the canner manufacturer describes (Table 2).

5. Regulate heat under the canner to maintain a steady pressure at or slightly above the correct gauge pressure. Quick and large pressure variations during processing may cause unnecessary liquid losses from jars. Follow the canner manufacturer's directions for how a weighted gauge should indicate it is maintaining the desired pressure. **IMPORTANT:** If at any time pressure goes below the recommended amount, bring the canner back to pressure and begin the timing of the process over, from the beginning (using the total original process time). This is important for the safety of the food.

6. When the timed process is completed, turn off the heat, remove the canner from heat if possible, and let the canner depressurize. **Do not force-cool the canner**. Forced cooling may result in unsafe food or food spoilage. Cooling the canner with cold running water or opening the vent port before the canner is fully depressurized will cause loss of liquid from jars and seal failures. Force-cooling may also warp the canner lid of older model canners, causing steam leaks. Depressurization of older models without dial gauges should be timed. Standard-size heavy-walled canners require about 30 minutes when loaded with pints and 45 minutes with quarts. Newer thin-walled canners cool more rapidly and are equipped with vent locks. These canners are depressurized when their vent lock piston drops to a normal position.

7. After the canner is depressurized, remove the weight from the vent port or open the petcock. Wait 10 minutes, unfasten the lid, and remove it carefully. Lift the lid away from you so that the steam does not burn your face.

8. Remove jars with a jar lifter, and place them on a towel, leaving at least 1-inch spaces between the jars during cooling. Let jars sit undisturbed to cool at room temperature for 12 to 24 hours." (pp. I-21–22, USDA [2009])

- Do not touch jars, lids, or rings until they are completely cooled.

See what I mean?!?

Pressure Canning

- There is a lot more to it than that, actually
  - ✓ Selecting the product
  - ✓ Understanding pH level
  - ✓ Water Bath or Pressure Can
    - ✓ Safety
    - ✓ To can or not to can
  - ✓ Equipment
  - ✓ Elevation
  - ✓ General canning procedures
    - ✓ Approved recipe
    - ✓ Processing times

Equipment Needed for Pressure Canning

- Pressure canner (dial or weighted gauge)
- Jars & Lids
- Canning rack
- Jar lifter
- Current safe canning recommendations
- **Approved** recipe
- Heating element

Photo credit: Patricia Largo

Pressure Canner Parts

- Lid, Gasket, Jiggler
- Flat rack in bottom
- Pressure regulator or indicator
- Dial gauge or weighted gauge
- Vent pipe for pressurizing
- Safety valves or overpressure plugs
- Safety locks when pressurized
- Flexible gasket in lid or metal-to-metal seal
- Test annually and routine maintenance

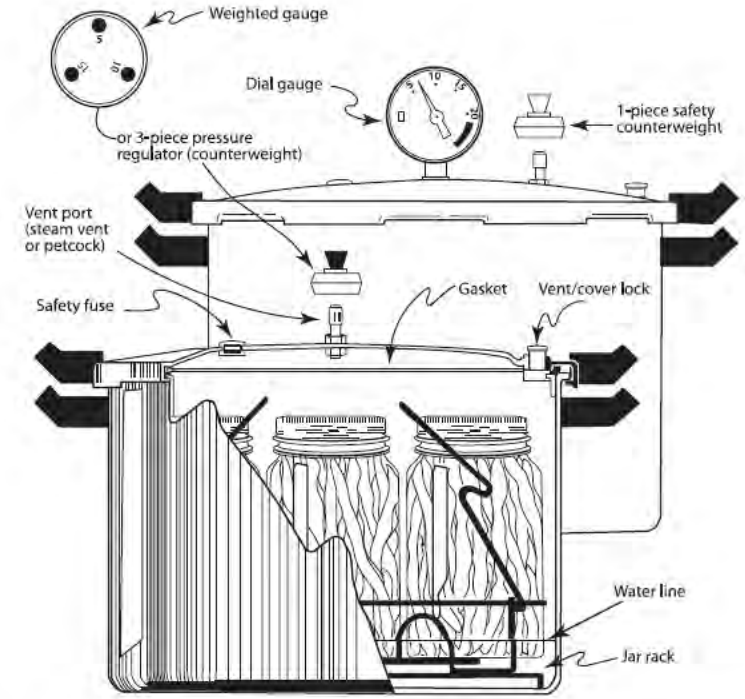


Figure 4. Parts of a pressure canner (Illustration adapted from USDA, 2009, for New Mexico State University by Susan B. Portillo).

Pressure Canners vs. Multi-Cookers vs. Pressure Cookers

- There is limited 3rd-party testing of many multi-cookers when it comes to using them for canning. USDA does not “certify” private sector devices/equipment
- To be considered a pressure canner for USDA processes, the canner must be big enough to hold at least 4 quart-size jars
- **Pressure cookers/saucepans** with smaller volume capacities are not recommended for use in canning
- Enough heat may not be delivered during pressurizing & cool-down period in smaller pressure cookers/saucepans
- The device must have a vent to release air from inside the canner while pressuring
- The device must have a pressure reading available throughout the canning process to assure that the pressure remains at target during the entire processing time

A Few Words about Electric Digital Canners

- As for multi-cookers, at this time there is limited 3rd-party testing of many multi-cookers when it comes to using them for canning.
- USDA does not “certify” private sector devices/equipment
- Manufacturers often do not share their research methods with USDA or Extension
- The consumer must rely on the manufacturer claims of safety-choose reputable company with good customer service
- Follow canning instructions included for that particular unit
- Digital canners may be safely used as water bath canners if tested recipes/procedures are followed
- Canners used for pressure canning have more processing considerations as discussed for multi-cookers

PSI – what is it and why is it important?

- Pound-force per square inch
- **Approved** recipes will require specific pounds of pressure
  - Indicates pounds of pressure inside the canner
- Number will vary based on
  - Weighted Gauge
  - Dial Gauge

Photo credit: Patricia Largo

Adjusting for Altitude

- All communities in New Mexico are above sea level, varying from 3,000 to 10,000 feet in elevation, with differences even within a county.
- Use an approved elevation table to determine the elevation of your community, and then select safe processing times for canning your vegetables.
- The boiling temperature of liquids is lower at higher elevations, and therefore food must be processed longer or at a higher pressure at high elevations.

Table 4. Elevation Adjustments for Pressure Canning	
Elevation	**Pounds of Pressure**
2,001–4,000 ft	12
4,001–6,000 ft	13
6,001–8,000 ft	14
8,001–10,000 ft	15

Processing Time

Table 2. Processing Times for Chiles					
		Pounds of pressure for elevation of			
Jar size	Processing time (minutes)	2,001- 4,000 ft	4,001- 6,000 ft	6,001- 8,000 ft	8,001- 10,000 ft
Half pint	35	12	13	14	15
Pint	35	12	13	14	15
Note: These instructions are for dial-gauge pressure canners. When using a pressure canner with a weighted gauge in New Mexico, use the 15-pound weight and the time periods given.					

Timer icons created by Freepik - Flaticon

How to get started?!?

- Choose an approved recipe!
  - Read thoroughly
- Check equipment
- Get the headspace right
- Clean the rim thoroughly
- Make sure your jars have sealed

- Did I say, use an approved recipe?!?

Trouble icons created by Freepik - Flaticon

Procedure for filling canning jars before processing

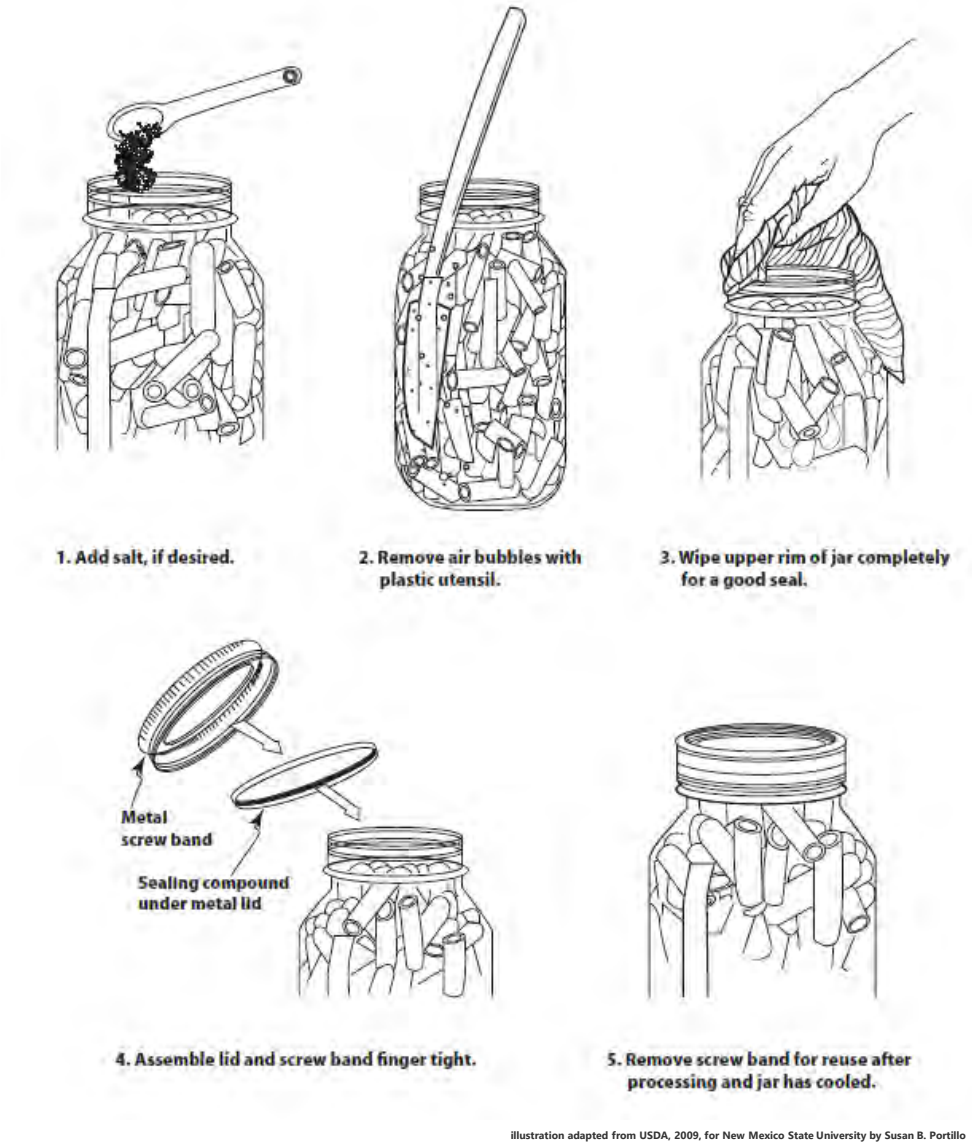
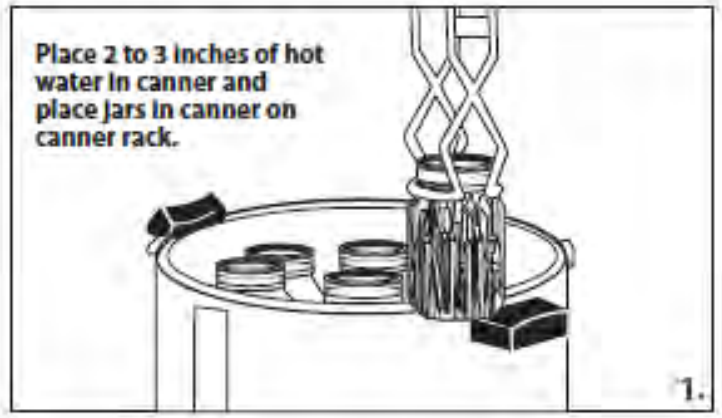


illustration adapted from USDA, 2009, for New Mexico State University by Susan B. Portillo

Pressure Canning Process

1.Put 2 to 3 inches of hot water in the canner

- In areas with hard water, add 1 tablespoon of vinegar to reduce mineral deposits on jars
- Place filled jars on the rack, using a jar lifter
- Keep the jar upright at all times.
- Tilting the jar could cause food to spill into the sealing area of the lid
- Fasten canner lid securely



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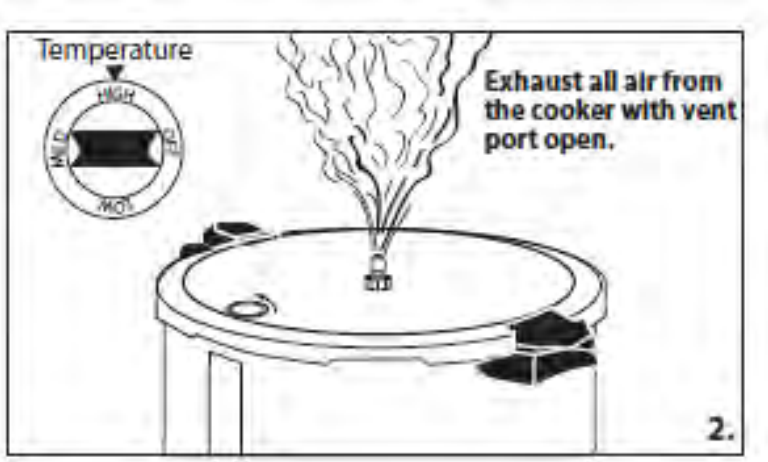
Pressure Canning Process

2. Leave weight off vent port or open petcock

- Heat at the highest setting until steam flows freely from the open petcock or vent port
- While maintaining the high heat setting, let the steam flow (exhaust) continuously for 10 minutes



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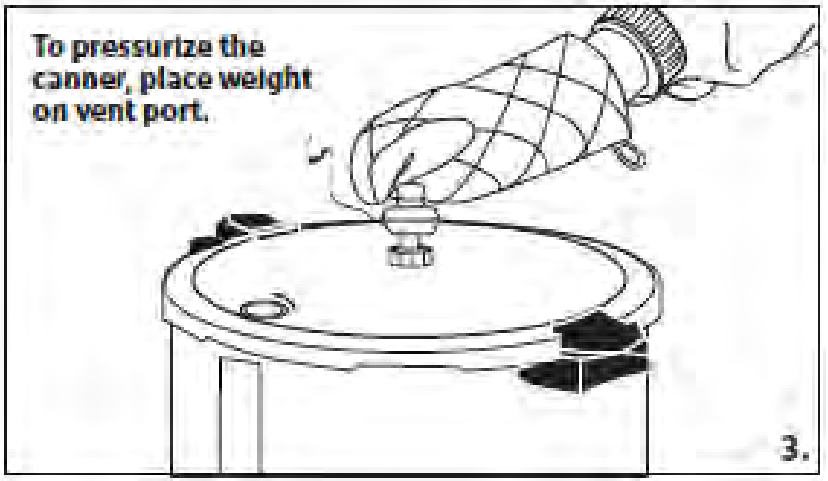
Pressure Canning Process

3. Place the weight on the vent port or close the petcock.

- The canner will pressurize during the next 3 to 5 minutes.



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Pressure Canning Processing

4. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached,

or

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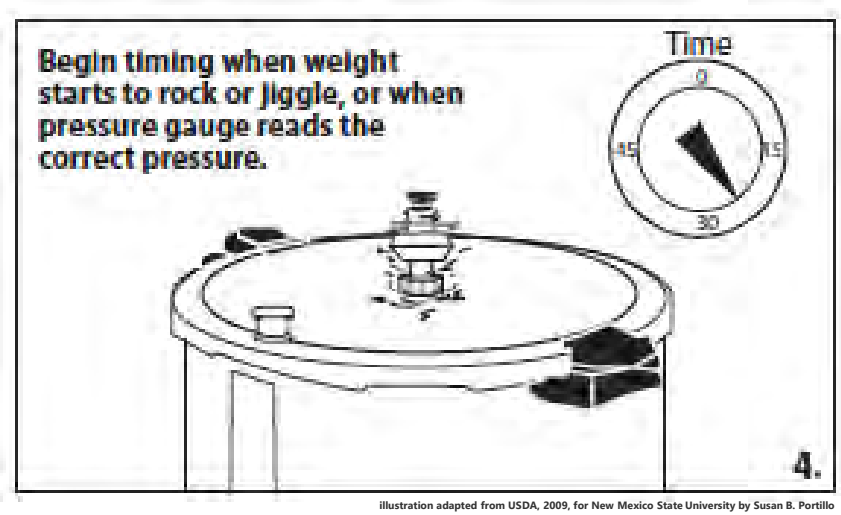

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Pressure Canning Processing

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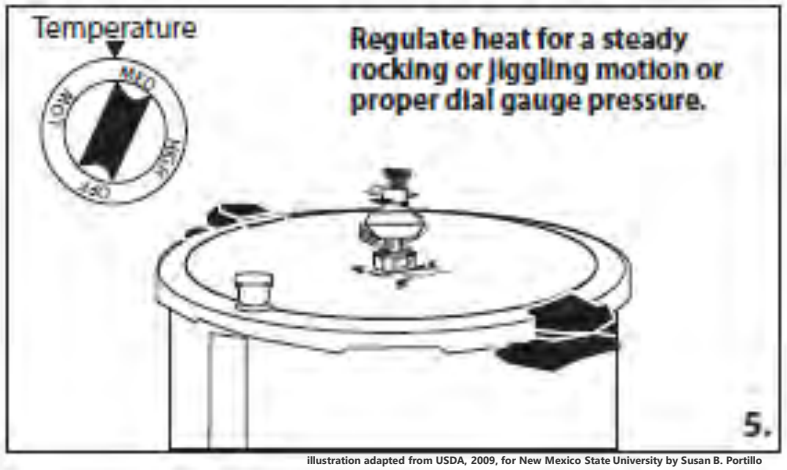

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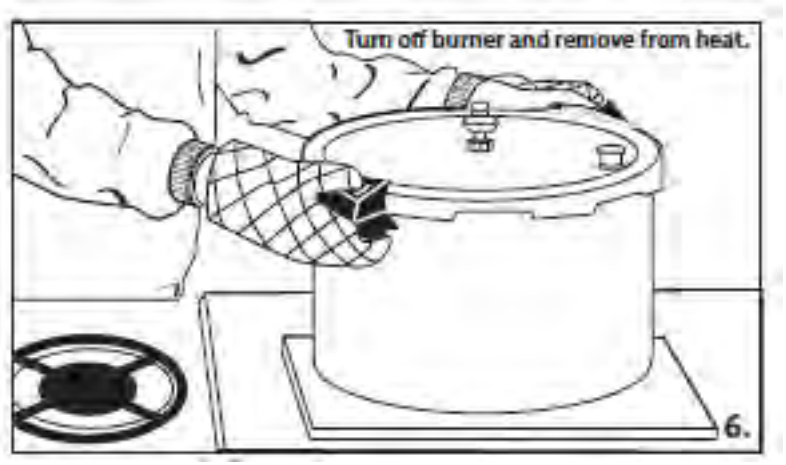
Pressure Canning Processing

6. When the timed process is completed, turn off the heat, remove the canner from heat if possible, and let the canner depressurize.

- **Do not force-cool the canner**.



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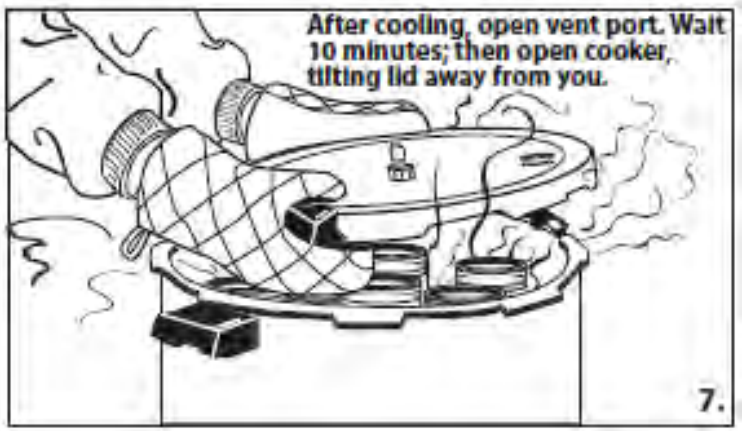
Pressure Canning Processing

7. After the canner is depressurized, remove the weight from the vent port or open the petcock

- Wait 10 minutes, unfasten the lid, and remove it carefully
- Lift the lid away from you so that the steam does not burn your face



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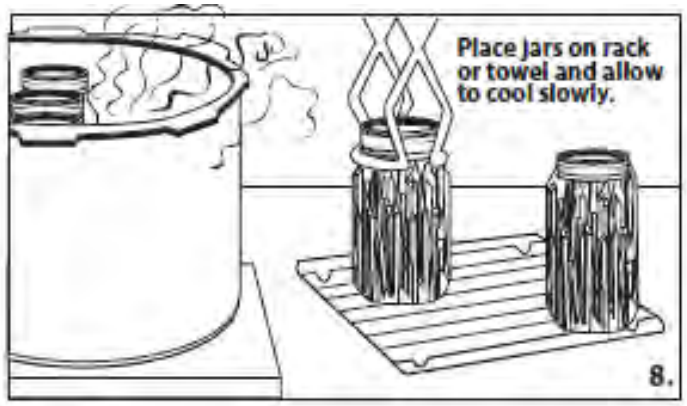
Pressure Canning Processing

8. Remove jars with a jar lifter, and place them on a towel, leaving at least 1-inch spaces between the jars during cooling

- Let jars sit undisturbed to cool at room temperature for 12 to 24 hours”
- Do not touch jars, lids, or rings until they are completely cooled



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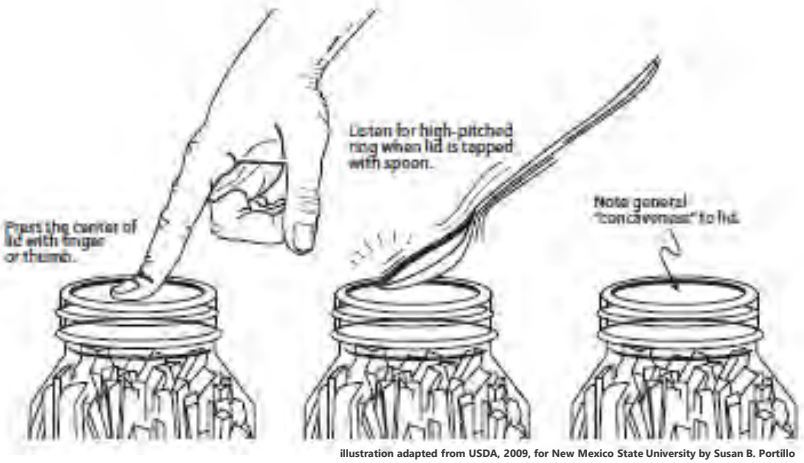
Pressure Canning Processing

Testing Jar Seals

- After cooling jars for 12 to 24 hours, remove the screw bands and test seals with one of the following options:
- **Option 1.** Press the middle of the lid with a finger or thumb. If the lid springs up when you release your finger, the lid is unsealed
- **Option 2.** Tap the lid with the bottom of a teaspoon. If it makes a dull sound, the lid is not sealed. If food is in contact with the underside of the lid, it will also cause a dull sound. If the jar is sealed correctly, it will make a ringing, high-pitched sound.
- **Option 3.** Hold the jar at eye level and look across the lid. The lid should be concave (curved down slightly in the center). If center of the lid is either flat or bulging, it may not be sealed." (p. I-25, USDA [2009]) See Figure 3 illustrating these steps for testing jar seals.



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Pressure Canning Processing

MAY CANNED FOOD BE REPROCESSED IF THE LID DOES NOT SEAL?

- Sometimes a jar in a canner load fails to seal upon cooling.
  - a cracked or nicked jar
  - food is fouling the jar rim where the lid sits

National Center for Home Food Preservation
University of Georgia
Canning
FAQs/Canning

Due to loss of quality, reprocessing of jars is *not recommended*

If you do reprocess, follow these steps for a safe product:

- **Must have followed an up-to-date research-tested recipe on your first attempt, and you must reprocess within 24 hours**
- Remove the lid
- Empty the contents
- Heat to boiling
- Fill a clean jar with the heated food
- Remove air bubbles
- Top with a new lid
- Reprocess using a tested recipe for a **hot-pack product**
  - If there is no tested hot-pack recipe, the product may not be safely reprocessed
- **If you did not follow a tested recipe on the first try, all jars, sealed or unsealed, may be unsafe and should be discarded**

- To preserve quality of food where jars failed to seal (and discovered within 24 hours of initial canning), refrigerate the jars and consume contents within one week.
  - Unsealed jars may also be frozen for up to one year, be sure to adjust headspace to 1" before freezing.

Pressure Canning Processing

Storing Canned Food

- Clean the outside of sealed, cooled jars with a damp towel dipped in a vinegar and water solution.
- Replace screw bands once they are completely dry, otherwise the bands will rust onto the lid and damage the lid and seal.
- Label with date and contents, including ingredients, and store in a cool (50–70°F), dark, dry place away from sun, light, or dampness.

Pressure Canning Processing

Accidental Freezing

- Freezing may cause food in jars to spoil if the seal is broken.
- Freezing and thawing can cause food to soften and lose eating quality.
- Protect jars from freezing by wrapping them with layers of newspapers.

If Canned Food Spoils

- Examine jars carefully before consuming.
- Check lids for a vacuum seal.
- **NEVER** taste food from an unsealed jar.
- Signs of food spoilage are streaks and dried food at the top of the jar, swollen lids, broken jar seals, rising air bubbles, and any unnatural color. Other indicators include bad or unnatural odor; spurting liquid; white, blue, green, or black mold; or foaming.
- Dispose of any food you suspect of being spoiled.
- For safety, spoiled canned food and containers may need to be detoxified before disposal.
- Contact your county Extension office (http://aces.nmsu.edu/county) for detoxification instructions

FAQ’s

- Label and date all jars
- Store in a cool, dry, dark place
- Use within 1 year for best quality
- Stacking is fine in storage
- Follow manufacturer guidelines
- Only use lids once

Photo credit: Patricia Largo

Pressure Canner Care

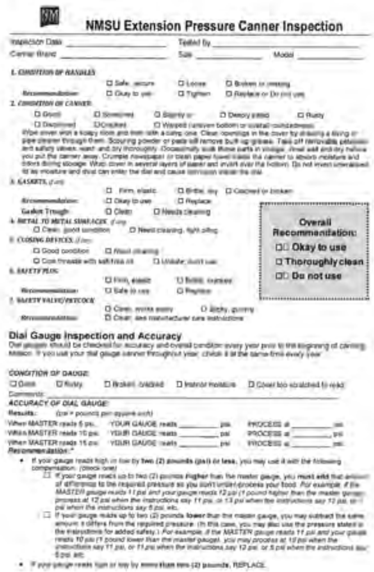
- **Dial gauges** on pressure canners should be *checked annually* to make sure they are accurate.
- **Weighted gauges** on pressure canners are not accurate for elevations above 10,000 feet. Follow manufacturer instructions for proper use.
- **Rubber gasket** must be pliable and in good condition to maintain seal of pressure canner.

https://extension.wsu.edu/ferry/2018/04/pressure-canner-gauge-testing/

Pressure Canner Dial Gauges

- Most all extension offices can check for you!
  - Search (name of county) Extension office
  - Call to make an appointment

Photo credit: Patricia Largo



NMSU Extension Pressure Canner Inspection

Inspection Date ______ Tested by ______
Canner Brand ______ Size ______ Model ______

Overall Recommendation:
☐ Okay to use
☐ Thoroughly clean
☐ Do not use

Dial Gauge Inspection and Accuracy

CONDITION OF GAUGE:

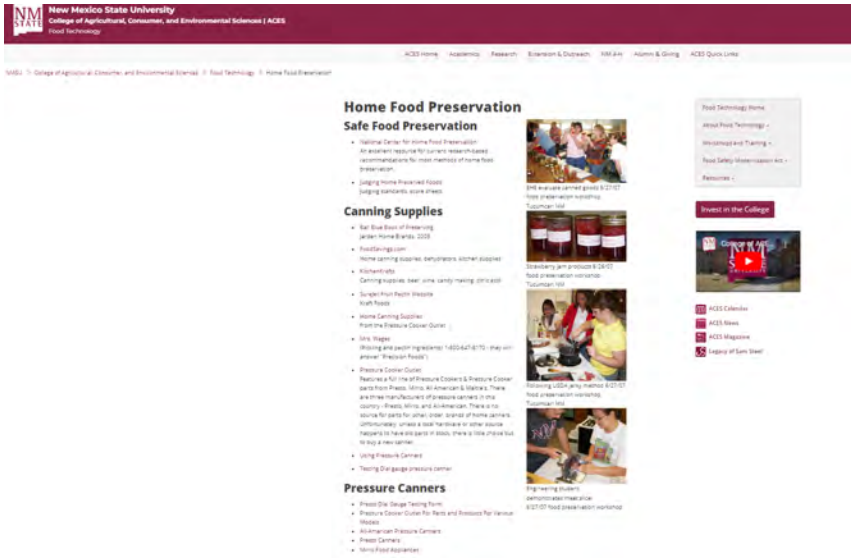
ACCURACY OF DIAL GAUGE:

When MASTER reads 5 psi, YOUR GAUGE reads ______ psi PROCESS at ______ psi
When MASTER reads 10 psi, YOUR GAUGE reads ______ psi PROCESS at ______ psi
When MASTER reads 15 psi, YOUR GAUGE reads ______ psi PROCESS at ______ psi

Pressure Canner Dial Gauge Check available at most County Extension offices. Call to make an appointment!

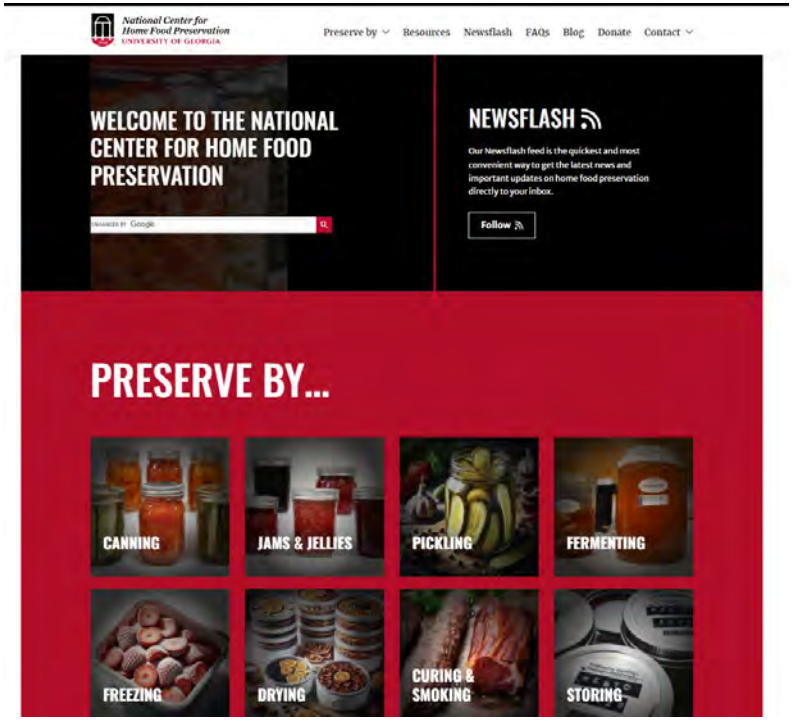
Where to find resources!

- NMSU Home Food Preservation



Cooperative Extension offices around the country

- National Center for Home Food Preservation



Registration opened October 15, 2024

https://ezregister.com/events/41025/

QUESTIONS?

The recordings, PowerPoints, and any resources will be available on the participating county websites by beginning of November.

Evaluation

- YOUR feedback help us build programs that serve the needs of our community:
  - Help us understand the impact of the program
  - Support new opportunities for future programming
  - Provide valuable feedback on the delivery of programs
  - Highlight areas for improvement
  - Help us continue offering programs you enjoy

THANK YOU!

Please take a few minutes to scan the QR code and fill out our survey.

https://acesnmsu.az1.qualtrics.com/jfe/form/SV_bHMjlF4g35W8l2C

Resources

- 2024 Master Food Preserver Training Program-Pressure Canning: Low Acid Foods, Amber Benson, Associate Professor, FCS Agent, 2024
- Safe Home Canning Basics, University of Missouri Extension; https://extension.missouri.edu/publications/gh1451#:~:text=The%20term%20%E2%80%9CpH%E2%80%9D%20is%20a%20measurement%20of%20the,acidic%20foods%20%28those%20with%20a%20pH%20under%204.6%29, July 2024
- NMSU Canning Green Chile; Guide E-308, https://pubs.nmsu.edu/_e/E308/, November 2015
- National Center for Home Food Preservation, https://nchfp.uga.edu/
- Home Food Preservation Lessons, https://food.unl.edu/home-food-preservation-lessons
- Pressure Canning for Beginners, Amber Benson, 2023
- Red vs Green Chiles – The Distinctive Factors; https://albuquerque.com/red-or-green-a-profile-of-2-chiles/