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Upcoming Webinars

- **April 8 - Safer solutions: Natural insecticides to manage garden insects**
Janet Knodel, NDSU professor and entomologist
- **April 15 - Does soil health make a difference in producing healthy food?**
Carlos Pires, NDSU Extension soil health specialist and assistant professor

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- 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 made possible with funding from the North Dakota Department of Agriculture through the U.S. Department of Agriculture's Specialty Crop Block Grant program. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.



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April 1

Safe home canning: Start with the recipe, finish with confidence

KANSAS STATE UNIVERSITY
Extension

Karen Blakeslee, Kansas State University
Extension Associate



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



The most dangerous phrase in food preservation is
"We've always done it this way."

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Photo: K-State Extension


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Reasons for Canning/Seal Failures

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
- Adjusting screw band too tight
- Not adjusting for elevation
- The list goes on.....



NDSU EXTENSION Source: Newell Brands, 2020 Photo: Becky Reed

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Why Get Up to Date?

- Food preservation is a **science** and things have **changed!**
 - pH < 4.6 = high acid foods
 - pH > 4.6 = low acid foods
 - Supports growth of botulism!
 - Water activity
 - Heat penetration through the jar
 - Thickness of the food mixture
 - Size of food pieces
 - Size of jar
 - Raw pack or Hot pack
 - Elevation of residence
 - Time and temperature
 - Headspace

Learn more about the science behind botulism in canned foods. Dr. Scott Whiteside, Clemson University




Photo: University of Georgia

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Type of Food

- Foods that support the growth of microorganisms are usually
 - Moist
 - High protein
 - Low acid
- If handled improperly, ANY food can be hazardous.



Food



Photo: K-State Extension

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Time


The food may spoil if:

- Processing time at elevations above 1,000 feet not adjusted
- You process for fewer minutes than specified

Every canned food has its own process time.

- Follow tested recipes
- DO NOT RUSH!!

T



Time

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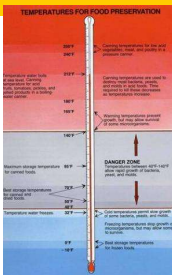
16

Temperatures for Food Preservation

212°F
High acid

Freezer storage

TEMPERATURES FOR FOOD PRESERVATION




240°F
Low acid

Must use a pressure canner!

Adjust pressure for your elevation

T



Temperature

NDSU EXTENSION
USDA Complete Guide To Home Canning


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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

O




Oxygen

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Water Activity

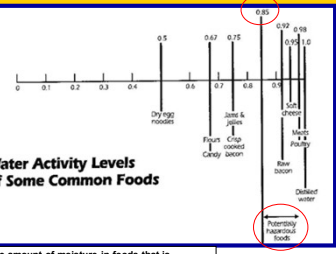
M



Moisture

Fruits & Vegetables
0.97-0.99

Dried foods
0.55-0.80



Water Activity Levels of Some Common Foods

Water activity = a measure of the amount of moisture in foods that is available for microbes to use.

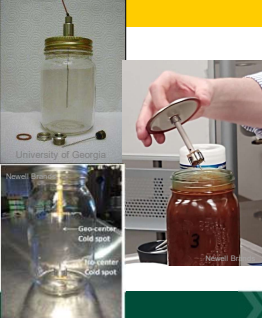
Scale: measured on a scale from 0 to 1.0, with distilled water having a value of 1.0

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Importance of Heat Penetration

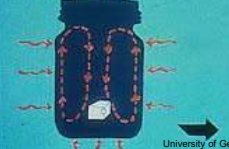
- Heat penetration studies are used to scientifically determine safe processing times.
- The “cold spot” in the food must reach the correct temperature for the correct length of time to destroy target pathogens.



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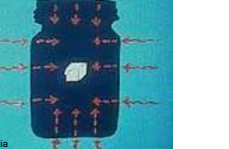
FOODS HEATING by :

CONVECTION



Isometric center – Convection heating – liquid recipes

CONDUCTION



Geometric center – Conduction heating – dense recipes

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Heat Penetration, cont.

- The following slow down heat penetration:
 - Extra sugar or fat
 - Oversized or irregular 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.**

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Heat Penetration - Lethality

- Lethality is a function of the time and temperature required to destroy microorganisms
- Is cumulative throughout the thermal process
- Foods high in acid require much less heat penetration to achieve lethality

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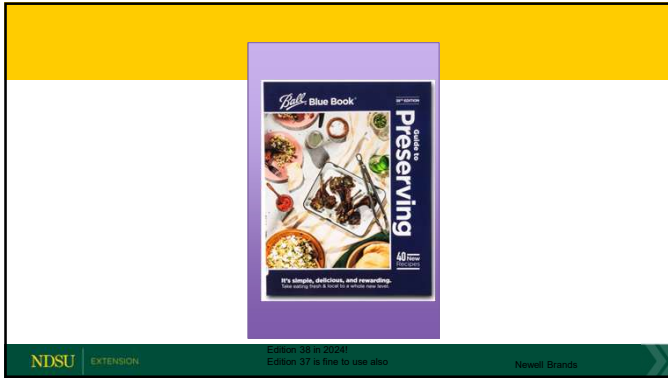
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**Tested Recipe Sources –
The Testing Has Been Done For You!**

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

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Ball Blue Book – 38th edition

- Out in stores now!**
- 40+ new recipes
- Removing unacidified elderberries and revalidation of elderberry jam recipe
- Adding acidulants to apple-based recipes
- Adding caution about white peaches to all peach recipes
- Clarify measurements and instructions
- Use bottled acidulants only
- More precise language to remove assumptions
- FAQs - <https://help.ballmasonjars.com/s/>

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Adjust for Elevation

Ball Blue Book

Read the Canning Basics Chapter

So Easy to Preserve

On the bottom of each page with recipes

Remember to Make Altitude Adjustments

Bolling-Water Method

The processing times given in this book for high-acid foods are based on canning at 1,000 feet above sea level and lower using the boiling-water method. When processing at altitudes higher than 1,000 feet above sea level, adjust the processing time according to this boiling-water canner chart.

Altitude in Feet	Increase Processing Time
0,000 to 3,000	0 Minutes
3,000 to 4,000	5 Minutes
4,000 to 5,000	10 Minutes
5,000 to 6,000	15 Minutes
6,000 to 8,000	20 Minutes

Pressure Method

The pressure method is used for low-acid foods. The pounds pressure given for low-acid foods in this book are based on using a weighted gauge canner and processing at 1,000 feet above sea level and lower. When using a dial-gauge canner or processing at altitudes higher than 1,000 feet above sea level, adjust pounds pressure according to the pressure canner chart.

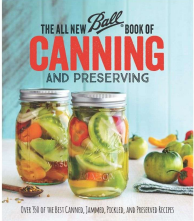
Altitude in Feet	Weighted Gauge Pounds Pressure (psi)	Dial Gauge Pounds Pressure (psi)
0 to 1,000	15	10
1,000 to 2,000	15	10
2,000 to 3,000	15	10
3,000 to 4,000	15	10
4,000 to 5,000	15	10
5,000 to 6,000	15	10
6,000 to 8,000	15	10
8,000 to 10,000	15	10

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Use Caution with....

Original cookbook from Ball® had recipes using fresh lemon juice

- Fresh lemon juice has inconsistent acidity
- Use bottled lemon juice
- Updated in 2024!



THE ALL NEW *Ball* BOOK OF **CANNING** AND PRESERVING

OVER 500 OF THE BEST CANNED, JAMMED, PICKLED, AND PRESERVED RECIPES

Newell Brands, Inc.


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Packaged mixes

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

Follow their directions and do not add extra ingredients before canning!



Mrs. Wages

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New from Mrs. Wages

- 1 Step Pickling Brines
- ONLY makes 2 pints
- Five flavors
- **REFRIGERATOR STORAGE ONLY!!**





1 STEP PICKLE

NDSU EXTENSION <https://www.mrs.wages.com/product-category/1-step/>

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Food Preservation Apps

- Oregon State University
 - <https://extension.oregonstate.edu/catalog/pub/pnw-689-canning-timer-checklist-app>
 - iOS only
- Colorado State University
 - <https://apps.chhs.colostate.edu/preservesmart/>
 - Web only





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Unsafe Recipes Sources

- Blogs **Just because a food is canned commercially doesn't mean it can be canned safely at home!!**
- Pinterest
- Old recipe books
- Recipe magazines
 - May not be adequately tested
- Unmanaged social media
- Many others...



CANNING A RECIPE YOU MADE UP YOURSELF CAN BE UNSAFE!!

Photo: K-State Extension

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Be a Smart Food Preserver!

Popular press can be misleading

- Food magazines
- Newspaper syndication



This is unsafe!!

Labor of love
 • 1 cup cider vinegar (to ensure the whole business is acidic and safe)
 Puree all vegetables to the consistency of all of the loads together, and use corn chips, adjusting salt and pepper if necessary. Heat and immediately transfer the hot salsa into warm sterile jars and screw on sterile lids. They will seal as they cool on the counter.

Photo: K-State Extension

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Safe Changes and Substitutions

- Play it Safe! Safe Changes and Substitutions to Tested Canning Recipes
- North Central Food Safety Extension Network – 12 states
- Provide universal resources
- Food entrepreneurs
- Home food preservation

Scan for website!
Sign up for newsletter

NORTH CENTRAL REGION FOOD SAFETY EXTENSION NETWORK
NCFSEN

Learn how to can, freeze, dry and ferment foods safely.
Search for "NCFSEN" or scan the QR code for resources from our 12-state region.

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Food Preservation Resources

Click on "Food Preservation"

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FIELD TO FORK

www.ag.ndsu.edu/food

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