

Preserving Your Bounty!

Maryland Master Gardeners
Karen Blakeslee, M.S.
K-State Research and Extension



Photo: KSRE

Tips for Dehydrating, Freezing, Pickling and more!

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<https://www.rrc.ksu.edu/mmg.html>

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HOME FOOD PRESERVATION



- Enjoy homegrown food year around
- Save about half the cost of commercially canned foods (excluding labor)
- Preserves food at its peak
- Great homemade taste!

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THE SCIENCE...YES, IT MATTERS!

Stops growth of microorganisms

- Spoilage microorganisms
- Pathogens
- <http://www.cdc.gov/features/homecanning/>

Inactivates enzymes

- Change color
- Affects texture
- Changes flavor
- Changes nutrition



Video: KSRE

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WHY GET UP TO DATE?

*Food preservation is a **science!***

- 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
- Altitude of residence
- Time and temperature
- Headspace



Photo: University of Georgia

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RECIPES



Updated 2020
HOME PRESERVING

Complete Guide To Home Canning

Preserving

SURE-JELL

Newell Brands
Kraft – Sure-Jell

- Ⓢ Not recommended to can homemade (your own creation!) recipes
- Ⓢ Freeze homemade recipes for long-term storage
- Ⓢ Recipes older than 1994 may be unsafe

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CANNING APPS

<https://catalog.extension.oregonstate.edu/pnw689>

<https://apps.chhs.colostate.edu/preservesmart/>



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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
Many others...

May not be adequately tested

Photo: University of Nebraska

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CANNING EQUIPMENT FOR WATER BATH

Ball FreshTech® Electric Water Bath Canner + Multi-Cooker

Water Bath Canner

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<http://www.bookstore.ksre.ksu.edu/pubs/MF3241.pdf>

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ATMOSPHERIC STEAM CANNERS

Use water bath canning recommendations

Limited to **45 total minutes of processing**

Must maintain 212°F

<https://www.rrc.k-state.edu/preservation/doc/SteamCannerGuidelinesJune2015.pdf>

Victorio Steam Canner

Photo: University of Georgia

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UNSAFE PROCESSING



Dishwasher



Oven or Microwave



Open Kettle Canning



Slow Cooker



Sun Canning



Pressure Cooker



Electric Pressure Cooker

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IN A PICKLE!

Five classes of pickles

- Brined or fermented
- Fruit pickles
- Relishes
- Fresh pack or quick process
- Refrigerator/Freezer



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PICKLING INGREDIENTS

Acid

- Use vinegar with 5% acidity
- Do not use homemade vinegar

Salt

- Use canning or pickling salt

Sugar

- Helps plump pickles

Spices

- Whole, fresh



Photo: University of Georgia



Photos: KSRE




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ABOUT VINEGAR...

- **Do not change** vinegar, vegetable/fruit or water proportions.
- **Never use a vinegar with unknown acidity.** Look for 5% acetic acid content.
- **Do not dilute vinegar unless the recipe specifies.** The vinegar prevents botulism.
- **The ratio of vinegar to water varies by the vegetable;** select a recipe for the vegetable you are pickling.
- Some vegetables such as onions, mushrooms and artichokes are pickled in straight 5% vinegar with no additional water.

K-STATE <https://extension.umn.edu/preserving-and-preparing/pickling-basics>
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PICKLING INGREDIENTS

Lime

- Failure to remove all lime can lead to botulism!
- Use food-grade lime

Alum

- Can use in fermented cucumbers
- Doesn't work with quick process pickles

Calcium Chloride

- Pickle Crisp™
- Xtra Crunch™

Water

- Soft water is best

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Mrs. Wages

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PICKLING INGREDIENTS

Produce

- Use garden fresh, tender vegetables and firm fruit
- Use recommended unwaxed pickling variety of cucumbers
 - Pickling varieties are short and blocky in shape, with a firm flesh. Spartan Dawn, Liberty, Pioneer and SMR-8 are suggested varieties.
 - Contact Extension office for varieties best for your location.
- Store produce in refrigerator or cool, well-ventilated place if not used immediately



Wash produce in cold water and remove 1/16" slice from blossom ends from cucumbers

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SPECIAL DIETS

Reduced sugar pickles

- The National Center for Home Food Preservation has developed recipes have for no-sugar added pickles using Splenda.
- Ideal for those on sugar-restricted diets.

Reduced salt pickles

- Use of reduced-sodium salt in fermented pickle recipes is **not recommended**.
- “Quick or fresh pack” pickles may be made with reduced or no salt, but quality will be reduced

https://nchfp.uga.edu/how/diet_pick.html

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RE-USING LEFTOVER PICKLING BRINE

*Hot pack or Raw packed, **soaked** – no!*

- Once vegetables are heated or soaked, pH changes
- Produce absorbs brine
- Pickling brine becomes less acidic

*Raw pack – **not soaked** - yes!*

- Produce packed into jars
- Brine poured over the produce

<https://preservingfoodathome.com/2018/06/26/that-leftover-pickling-brine/>

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PROCESSING PICKLES

Destroys organisms that cause spoilage and inactivates enzymes that can affect color, flavor, and texture.

Follow tested recipes for safest approach.



Photo: KSRE

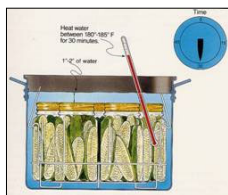
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LOW PASTEURIZATION PROCESSING

To help prevent softening in cucumber pickles, some procedures allow the following "pasteurization" process:

- Cover pickles in jars with 165°F to 180°F liquid.
- Process with water in canner at 180°F for 20 minutes.
- Must monitor canner temperature with a thermometer.



USDA Complete Guide to Home Canning

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Use only when recipe indicates

https://nchfp.uga.edu/publications/usda/GUIDE06_HomeCan_rev0715.pdf

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FERMENTATION

Quality depends on freshness of ingredients, presence of natural sugars and desired bacteria.

Prevention of undesirable yeasts and molds include:

- correct salt concentration
- keeping air off surface
- Temperature

Take a New Look at Fermented Foods

- <https://bookstore.ksre.ksu.edu/pubs/MF3491.pdf>



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Photo: University of Georgia

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FERMENTATION EQUIPMENT

- Stainless steel
- Crock or stone jar
- Unchipped enamel-lined pan
- Large food-grade plastic jars
- Large glass jars
- Weight to hold vegetables in brine (heavy plate or plastic bag filled with brine)



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FERMENTATION TEMPERATURES AND TIMES

Temperature	Time	Comments
Below 55°F	_____	Product may not ferment
55-65°F	5-6 weeks	
70-75°F	3-4 weeks	
Above 80°F	_____	Product may soften or spoil

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FOOD SAFETY CAUTION

Do not partially ferment cucumbers at room temperature prior to refrigerating the pickles

- This procedure can support the growth of *Listeria monocytogenes*

<http://nchfp.uga.edu/papers/2004/04ift-picklesabstract.pdf>

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REFRIGERATOR/FREEZER PICKLES RECIPES

Let's Preserve: Refrigerator Spring Pickles

- <http://umaine.edu/food-health/food-preservation/lets-preserve-refrigerator-spring-pickles/>

Homemade Pickles & Relishes

- <http://learningstore.uwex.edu/assets/pdfs/b2267.pdf>

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COMMON PICKLE PROBLEMS

Cloudy brine

- Used table salt
- Spoilage
- Hard water

Soft or slippery pickles

- Not using 5% acidity vinegar
- Not enough brine
- Not processed properly
- Blossom ends not removed
- Moldy spices

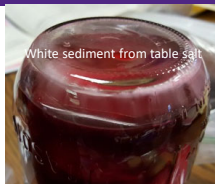


Photo: KSRE

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PICKLE PROBLEMS

Strong, bitter taste

- Spices cooked too long
- Vinegar too strong
- Dry weather
- Used salt substitutes

Shriveled pickles

- Brine too strong
- Overcooking or over processing
- Dry weather
- Old cucumbers

Hollow pickles

- Dry weather



Photos: KSRE



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PICKLE PROBLEMS

Dark or discolored

- Hard water
- Ground spices
- Brass, iron, copper or zinc utensils used
- Table salt used

Spotted, dull, faded color

- Stored in too much light
- Poor quality food

Pink liquid

- Old dill
- Yeast growth

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PICKLE PROBLEMS

Garlic is green, blue, or bluish-green

- Immature garlic
- Reaction with iron, tin, or aluminum metal
- Naturally has more blue pigment

Pink cauliflower

- Chemical reaction between pickling liquid and pigment in cauliflower

Scum on brine (fermented products)

- Yeast, mold or bacteria growth during fermentation
- Remove scum daily



Photo: KSRE

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PICKLE PROBLEMS

Lack crispness

- Poor quality cucumbers
 - Harvest-to-use should be less than 24 hours
- Did not remove blossom end of cucumbers
- Wrong variety of cucumber
 - Use pickling varieties
- Not using a crisping agent



Photo: KSRE

Wash produce in cold water and remove 1/16" slice from blossom ends from cucumbers

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STORING PRESERVED FOODS

Best used within one year

Keep canned foods in cool, dry, dark location

Label and date



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DRYING FOODS

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



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TYPES OF DRIED FOODS

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



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TYPES OF DRIED FOODS

Fruit

- Pretreat to prevent browning
 - Ascorbic acid
 - Sulfites (allergen)
 - Fruit juice
 - Honey
- Slice thin and even
- Peeled fruit dries best



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TYPES OF DRIED FOODS

Vegetables

- Keep pieces uniform for even drying
- Steam or water blanch
- Brittle or crisp



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TYPES OF DRIED FOODS

Herbs

- Dry in microwave or paper bag with holes
- Food dehydrator



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HELPFUL HINTS

- Dry strong-smelling foods separately.
- Don't mix foods with different flavors or drying times.
- To prevent food from sticking to trays, use vegetable oil, vegetable spray, or cheesecloth.
- Don't overlap pieces
- Don't overload trays. The larger the load, the longer the drying time, the more nutrients lost.
- Rotate racks, turn foods periodically.



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DRYING EQUIPMENT

Dry in dehydrator,
oven, sun

- Sun drying difficult in humid climates

Optimum drying
temperature is 140°F

Need air circulation



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WHAT MAKES A GOOD DEHYDRATOR?

Double wall construction

- Metal or plastic

Enclosed heating elements

Enclosed thermostat from 85 to 160°F

Fan or blower

Four to ten open mesh, sturdy, plastic trays for easy washing

UL seal of approval

One-year guarantee

Convenient service

Dial for regulating temperature

Timer to shut off

Vertical or horizontal



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FREEZING FOODS

Easy, convenient, takes little time

Slows microorganism growth

- Will not kill or eliminate microorganisms!

Slows chemical changes

Quality may be lower or undesirable when thawed



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TEXTURE CHANGES

Ice crystals break cell walls

- Results in softer texture
- Use partially thawed

Freeze as quickly as possible

Keep freezer as cold as possible

Don't overload the freezer

Freezer burn

- Not reversible



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FREEZING CONTAINERS



Newell Brands

Moisture-vapor resistant

Leak proof

Withstand freezing temperatures

Resist grease, oil, water

Prevents off-flavors or off-odors

Easy to seal and label

Won't crack or become brittle

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TYPES OF PACKAGING

Rigid – glass or plastic

- Safe for freezer
- Wide mouth
- Tight fitting lid

Flexible bags or wrapping

- Aluminum foil
- Plastic bags
- Freezer paper



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PACKING FRUITS

Syrup pack
 Sugar pack
 Dry or unsweetened pack
 Pectin Syrup
 Water or Unsweetened juice pack



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SUGAR SUBSTITUTES

May be used in the pectin syrup, juice or water packs.
 Add just before serving.
 These do not help with color retention or texture, like sugar does.
 Use amounts on product labels or to taste.

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PREVENT DARKENING

1 teaspoon (3000 mg) crushed ascorbic acid (Vitamin C) tablets to one gallon of cool water
 Commercial ascorbic acid mixture
 Heating the fruit

The following will not work as well:

- Citric acid solution
- Lemon juice
- Sugar syrup
- Salt/vinegar solution



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PACKING VEGETABLES

Blanch properly for each vegetable

- Water
- Steam

Dry pack or Tray pack




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OTHER FOODS

Convenience Foods

- Oregon State University
- <https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/pnw296.pdf>

Foods That Don't Freeze Well

- http://nchfp.uga.edu/how/freeze/dont_freeze_foods.html




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FREEZE DRYING

Requires freeze drying machine

Food freezes at -30°F to -50°F under vacuum

Sublimation converts ice from solid to water vapor

Removes up to 98% water

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Photo: Canva.com

<https://extension.usu.edu/preserve-the-harvest/dev/freeze-drying-faq-for-extension-professionals>
<https://extension.psu.edu/lets-preserve-freeze-drying>
<https://extension.usu.edu/preserve-the-harvest/research/buying-a-home-freeze-dryer-what-to-know-before-you-go>
<https://blogs.extension.iastate.edu/answerline/2021/07/27/freeze-drying-a-new-option-for-home-food-preservation/>

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HOW TO LEARN TO PRESERVE FOOD AT HOME

Michigan State University - online classes

- https://www.canr.msu.edu/foodpreservation/food_preservation_online_course

Penn State University - online classes

- <https://extension.psu.edu/food-safety-and-quality/home-food-safety/food-preservation>

University of Nebraska – online classes

- <https://food.unl.edu/article/home-food-preservation-series>

Kansas State University

- <https://www.rrc.k-state.edu/preservation/index.html>

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FOOD PRESERVATION RESOURCES

K-State Publications

- <http://www.rrc.k-state.edu/preservation>

National Center for Home Food Preservation

- <http://nchfp.uga.edu/>

USDA Complete Guide to Home Canning

- http://nchfp.uga.edu/publications/publications_usda.html

So Easy To Preserve

- www.uga.edu/setp

Ball® and Kerr® - Newell Brands

- www.freshpreserving.com

Farmers Markets

- <http://www.ksre.k-state.edu/foodsafety/topics/market.html>

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KVAFL Services

- Small food processors
 - KVAFL@ksu.edu 785-532-1294
- Small meat processors - Dr. Liz Boyle
 - lboyle@ksu.edu 785-532-1247
- Nutrition Facts labeling
- Product testing
 - pH, Aw, Sodium, Brix, Moisture, basic microbial
- Shelf life evaluation
- Basic sensory analysis

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Evaluation and Questions

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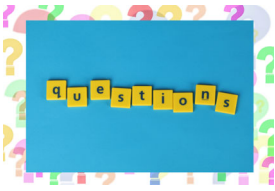


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Preserving Your Bounty!

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Thank you!

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<https://www.rrc.ksu.edu/mmg.html>

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