Preserving what you produce: keeping it safe short & long term

Mary Keith, PhD, LD Extension Agent IV
Univ of Florida IFAS/Hillsborough County Extension
OBJECTIVES:

- Participants will understand:
  - How to keep produce safe from garden to table.
  - The factors affecting the safety of home canning procedures.
  - Critical steps in home canning procedures
  - The importance of using reliable home processing methods and recommendations
  - What can or cannot be changed in a procedure without affecting the safety of the food.
Basic Handling

- Wash, wash, wash!
- Humid but not damp
- Refrigerate
- Perfection is over-rated
- Preservation options
WHAT TO WASH

- Hands! Your 10 fingers are all carriers.

- Harvesting and work equipment
  - Knives and shears
  - Baskets and trugs
WHAT TO WASH

- Produce – WASH JUST BEFORE YOU USE IT
  - Brush off visible dirt.
  - But keep it dry until use.
  - Water promotes bacterial and mold growth.

- Use Potable Water - water from hoses can be stagnant, stale, contaminated...
HUMID BUT NOT DAMP

- Keep it crisp.
  - Make it hard for bacteria to get in.
  - Use the crisper drawer.
- Drops of water allow bacterial and mold growth.
- Do not seal bags.
  - Build-up of ripening gases speeds internal spoilage.
REFRIGERATE

- Keep the refrigerator between 34° and 40°F.

- Cold enough to slow bacterial and mold growth.

- Not cold enough to cause ‘cold chill injury’.
PERFECTION IS OVER-RATED!

- Shape doesn’t indicate flavor or nutrition.

- Mold or decay can be trimmed from FIRM produce.

- Soft produce with decay or mold should be discarded.
  - Toxins can migrate further.
**Preservation Options**

**Freezing**
- Blanching stops flavor changes.
- Blanching holds color better.

- **As long as the freezer stays on the food is SAFE.**
- But quality can suffer.
  - Time
  - Packaging
  - Temperature variations
**Preservation Options**

Canning

- Boiling Water Canning is safe for
  - Fruits
  - Pickles, quick or fermented
  - Jams, jellies, sweet preserves
  - Tomatoes – WITH added acid

- Pressure Canning is **ABSOLUTELY NECESSARY** for Vegetables, meats and seafood.
CLOSTRIDIUM BOTULINUM

- Produces a neurotoxin.
- Only grows in an AIR-FREE environment – as inside a sealed jar.
- Will not grow in the presence of acid pH less than 4.6.
- Produces heat-resistant spores.
QUALITY IN HOME CANNED FOODS

- Color
- Texture
- Flavor
- Nutrition

- Can be safe but bad quality.
- Can be unsafe but look or smell good.

- We want both safety and quality!
THE STEPS OF HOME CANNING

Food is
○ Prepared
○ Packed into glass canning jars
○ Closed with 2-piece canning lids
○ Processed
  ● Boiling water bath
  ● Pressure canner
○ Cooled, labeled, stored
PROCESSING

- Method depends on the food
- Must be hot enough
- Long enough
- To remove air from jar (maintain quality)
- To inactivate enzymes (maintain quality)
- To kill spoilage bacteria
- To kill pathogens (C. bot)
WHAT AFFECTS PROCESSING?

- How the food was packed
  - Raw – put in jar raw
  - Hot – cooked before put in jar
- Size of pieces
- Tightness of packing
- Acid
- Fat, bones
- Starch, thickeners
- Amount and type of liquid
PACKING

Raw Pack
- Sliced, diced, etc
- Put in jar
- Hot liquid added
- Faster
- Easier
- More air left in tissues
- May get poorer quality long term

Hot Pack
- Sliced, diced, etc
- Pre-cooked
- Put in jar, add liquid
- Softer
- Get more in jar
- Hot all ready
- Less air left in tissues
- Often better quality
**Packing**

Softer pieces will pack more tightly.

Smaller pieces will pack more tightly.

Distribute food into specified number of jars.

Because *if it’s packed too tightly* HEAT WON’T PENETRATE AS FAST.

FOLLOW PACKING DIRECTIONS!!
ACID

- Affects whether bacteria can grow.
- Affects how fast heat will kill bacteria.

**DO NOT REDUCE OR OMIT ACID.**

**DO NOT CHANGE PROPORTIONS** of acid to low-acid ingredients.

**DO NOT CHANGE ACIDS** unless recipe offers options.

- Lemon juice, vinegar, ascorbic acid are not equal.
FLAVORS

- If it’s too sour, add *a little* sugar.
- Okay to change seasonings.
- Okay to add spices (eg. cinnamon to blueberries).
- Okay to omit spices (eg. no mustard seed).
- Okay to change the herbs in tomato sauce.

- But do NOT change the vegetable:tomato balance, or amount of vinegar or salt in pickles.
TOMATOES

- On the line between acid and low acid
- Acidity can vary depending on
  - Variety
  - Soil, moisture
  - Sun, temperature when picked
  - Ripeness
  - If frosted.

ADD LEMON JUICE

- 1 Tbsp per pint, 2 Tbsp per quart
THICKENERS

- Starch will slow heat penetration.
- Don’t thicken with starch or flour.
- Don’t add rice or pasta to soups.
- Some products such as pumpkin pie filling recipes have been removed from directions because they’re too thick.

EXCEPTION: ClearJel® for some pie fillings.
STANDARD CANNING JARS

- Made for multiple uses.
- Made for multiple heating and cooling cycles.
- Have standard thread angle.

- Non-canning jars may crack.
- Wider jars might not give correct heat penetration.
- Lids might not fit exactly.
PREPARING JARS

- Jars for jams, jellies, sweet preserves or anything that only needs 5 minutes processing in boiling water must be PRESTERILIZED.

- This is by boiling empty jars, upright, in water to cover, for 10 minutes.

- All other products only need clean, warm jars. They will be sterilized during processing.

- Prepare lids according to package directions.
2-PIECE CANNING LIDS

- History of reliable use.
- Easy to tell if sealed.
- **Can only be used once.**

- Non-standard lids are more difficult to see seal.
- “Re-usables” may have more failures.
HEADSPACE

- Space between food/liquid and lid.
- Depends on the food and process method, how much food will expand in jar during process.

In general:
- Jams, jellies, preserves: $\frac{1}{4}''$
- Fruits, pickles, tomatoes: $\frac{1}{2}''$
- Vegetables: $1''$
- Meats, seafood: 1 to $1\frac{1}{4}''$
HEADSPACE

- Pack food in jar.
- Add liquid.
- Remove bubbles.
- Add/remove liquid to adjust.
- Tighten lids just finger-tight.

- Too little space – jar may not seal.
- Too much space – food may darken.
BOILING WATER CANNER

- Any kettle
- Deep enough for jars
- With 2 inches of water above jars
- And rack under jars
- Plus room to boil.

Rack protects jars from heat shock against metal pot.
FILLING THE CANNER

- Don’t let jars or food cool before going into canner.
- Water in canner should be approximately the temperature of jars of food.
  - Jelly boils at 220°F, so water should be boiling.
  - Hot pack water can be simmering.
  - Raw pack water should be warm.
- Jars should not touch each other or canner.
- When canner is full, turn up the heat!
PROCESSING

- Process time starts when WATER REACHES A FULL ROLLING BOIL.
- Process for specified time for your product.
- If boil stops for more than 1 minute – START TIMING OVER AGAIN when back to boil.
- Adjust times for higher elevations.
AFTER PROCESSING

NEW – CHANGE!

- When time is up, remove canner from heat.
  ALLOW JARS TO SIT IN CANNER FOR 5 MINUTES.
- Remove jars from canner to towel or tray.
- Allow to cool overnight.
- REMOVE RINGS/SCREW BANDS.
- Label and date.
- Store cool, dark for best quality.
PRESSURE CANNERS

- Properly operated will reach 240°F at 10 psi.
- Must be able to hold at least 4 qt jars.
- Too small will heat and cool too quickly.
TYPES OF PRESSURE CANNERS

- **DIAL GAUGES**
  - Pressure Indicators
  - Operator is regulator
  - Check yearly for accuracy.

- **WEIGHTS**
  - Pressure Regulators
  - 1 or 3 piece models
  - May rock, rattle, hiss
  - Not interchangeable
  - Know how your canner operates!
PRESSURE CANNING

- Only need 3 inches of water.
- MUST EXHAUST OR VENT THE CANNER.
  - Close lid, but not vent
  - Allow to blow steam
  - When feel steady stream
  - Time for **10 minutes**
  - Then close vent or place weight
  - **Start timing when at 10 psi**

Air insulates. **Must remove all air to reach 240°F.**
PRESSURE CANNING

- Adjust time or pressure for elevation.
- Must maintain pressure for full time.
- START TIMING OVER if drops for >1 minute.
- When time is complete remove from heat.
- ALLOW TO COOL NATURALLY!
- Shortened cooling time allows bacteria to survive.
- Quick cooling can break jars or prevent sealing.
AFTER PROCESSING

NEW – CHANGES!

- When time is up, remove canner from heat.
- **WAIT 2 MINUTES.**
- Open vent or petcock.

**ALLOW JARS TO SIT IN CANNER FOR 10 MINUTES.**

- Remove jars from canner to towel or tray.
- Allow to cool overnight.
- **REMOVE RINGS/SCREW BANDS.**
PRESSURE CANNING

- The 10 minute waiting -
  - Reduces chances of jars breaking
  - Improves seals
  - Helps equalize processing between light/heavy, old/new, small/large canners.
PECTIN-THICKENED PRODUCTS

- Regular pectin requires both acid and sugar, can not reduce either one and get good texture.
- “Long cook” method concentrates natural sugar and pectin, yields about same calories.
- Specially purified pectins can use less sugar.
- But sugar is preservative -
  - For color – may darken faster
  - Might have shorter shelf life
- Follow the recipe!
### SUMMARY - ALL THESE AFFECT SAFETY

- Preparation
- Packing
- Jar type, size
- Processing
  - Boiling or Pressure
- Elevation
- Cooling/holding
- Storing

- Raw or Hot pack
- Piece size
- Acid
  - Acid/low acid balance
- Thickeners, viscosity
- Sugar
- Fat
- Bones

Don’t risk botulism or wasted food by altering them.
SUMMARY - THESE CAN BE ADJUSTED

- Spices
- Seasonings
- Herbs
- Sugar – slightly, except with pectin
- Salt – except in pickles
RELIABLE RESOURCES

- USDA Guide to Home Canning, 2009
  - Available on-line
  - For Sale by Purdue University: The Education Store
    [http://mdc.itap.purdue.edu](http://mdc.itap.purdue.edu)

- University of Georgia National Center for Home Food Preservation website [http://nchfp.uga.edu](http://nchfp.uga.edu)
  - Fact sheets
  - Videos
  - So Easy to Preserve – includes canning, freezing and drying

- Check with your local Extension office.
- [http://edis.ifas.ufl.edu](http://edis.ifas.ufl.edu)
- Hillsborough County website: [http://hillsboroughnutrition.ifas.ufl.edu/CanningFreezing](http://hillsboroughnutrition.ifas.ufl.edu/CanningFreezing)
THANK YOU VERY MUCH!

Mary Keith, PhD, LD
Extension Agent IV, Foods, Nutrition & Health
University of Florida IFAS/Hillsborough County Extension
mkeith@ufl.edu