



CANNING: MEAT, POULTRY, WILD GAME, and FISH

A jar of home preserved meat is a delicious and convenient way to start a quick and easy meal. Meat, poultry, wild game, and fish are low-acid foods and must be processed for the correct time and at the correct temperature in a pressure canner to assure their safety.

SAFETY OVERVIEW

Canning low-acid foods, such as meats, in boiling-water canners is unsafe because the *Clostridium botulinum* bacteria can survive this process. If *C. botulinum* survive and grow inside a sealed jar of food, they can produce a poisonous toxin that causes botulism. **Even a taste of food containing this toxin can be fatal.**

The recommendations made in this handout are United States Department of Agriculture (USDA) approved home preservation guidelines. These guidelines are based on extensive research to prevent botulism, a potentially deadly foodborne illness caused by a toxin of the bacteria *C. botulinum*, which produces one of the most deadly poisons. To destroy *C. botulinum* spores, low acid foods must be processed at temperatures higher than the boiling point of water. This can be done only under pressure, using a canner with at least a 16- to 22-quart capacity.

The guidelines presented here will help prevent foodborne illnesses caused by bacteria, molds, and yeast, and will help prevent food spoilage in home-processed foods.

Never use a boiling water canner for canning meat, poultry, or fish. Open-kettle canning and the processing of freshly filled jars in conventional ovens, steam canners, pressure cookers, microwave ovens, crockpots, and dishwashers are **not** recommended because they will not prevent growth of botulism. Jars with wire bails and glass caps, one-piece zinc porcelain-lined caps, and pressure sauce pans are no longer recommended.

If you think your canned foods have spoiled, discard them in a place where they will not be eaten by humans or pets. As a safety precaution, boil canned meats for 10 minutes before tasting or serving (add 1 minute for each 1,000 feet above sea level). If the food looks spoiled, foams, or has an off-odor during heating, discard it.

PROCEDURE OVERVIEW

Equipment

- Jar lifters
- Canning funnels
- Non-metallic spatulas
- Mason canning jars
- Two-piece canning lids
 - New flat metal lids
 - Metal screw bands
- Magnetic wand to lift jar lids
- Pressure canner – a specially made heavy pot with tightly fitted lid. The lid is fitted with a vent and dial or weighted pressure gauge. A dial gauge needs to be tested yearly for accuracy. Check with your local Extension and Outreach office.

Packing: Raw-packing is the practice of filling jars with freshly prepared, but unheated foods. Hot-packing is the practice of heating freshly prepared food to boiling, simmering it 2 to 5 minutes, and promptly filling jars with boiled food. Many fresh foods contain 10 to 30 percent air. Hot-packed foods will remove more air from the foods than raw packing, prevent floating of food, and yield a higher quantity of product.

Jars and Lids: Use only jars and two-piece lids made especially for canning. Check jars and lids for cracks, chips, dents, and rust; these defects cause sealing failures. Commercial jars such as those for mayonnaise are NOT recommended for home canning because the glass has not been heat tempered and is more likely to break during processing. Wash jars in hot, soapy water; rinse well, and keep hot. Prepare lids and bands according to manufacturer's directions. Use only new lids. The gasket material works well for at least 5 years from the date of manufacture. Mineral deposits or hard water film on jars can be removed by soaking the empty jars for several hours or overnight in a solution of 1 cup vinegar per gallon of water.

Head space: The space between the packed food and liquid and the top of jar is called headspace. When pressure canning, you need to allow at least 1-inch headspace for low acid foods like meats and vegetables. Be sure to follow

the headspace directions for the recipe you are using. Too much or too little headspace will affect jar seals. Slide a non-metallic spatula between food and side of jar to remove any air bubbles. Wipe jar rims to remove food particles that might interfere with sealing. Adjust lids. Screw on the band fingertip tight.

CHECK ALTITUDE

As altitude increases, water boils at a lower temperature (below 212° F). Lower temperatures are not as effective for destroying organisms. Therefore, when using a pressure canner, the pressure must be increased as altitude increases. Refer to the map to check the altitude of your county, and then follow the altitude adjustments in Table 1.

PROCESS IN A PRESSURE CANNER

Partially fill canner with 2 to 3 inches of water. There are some products that may state 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. Using a jar lifter, place filled jars on the rack immediately after they are filled. Fasten the canner lid securely, but leave the weight off the vent pipe or open the petcock.

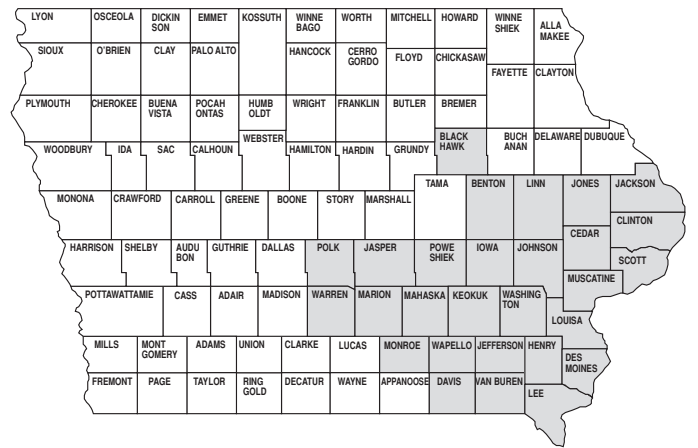
Heat on high. After steam exhausts for 10 minutes, add weighted gauge or close petcock. Allow canner to reach designated pressure. Start timing when designated pressure is reached or when the weighted gauge begins to jiggle or rock. Regulate heat to maintain a constant pressure.

Process for the time recommended in Table 1. Do not reduce the processing time. When processing is complete, turn off heat, remove canner from the burner, if you are able to do so safely. Allow the canner to cool at room temperature until it is fully depressurized. This will take 30 to 60 minutes depending on the type of canner. Do not rush the cooling by setting the canner in water or by running cold water over the canner. Do not open the vent or lift the weight to quicken the reduction of pressure. When the pressure has dropped to zero, carefully open the petcock or remove the weighted gauge. Wait 10 minutes, then slowly release and remove the canner lid, tilting the lid away from you to avoid a steam burn.

REMOVE AND STORE JARS

Using a jar lifter, take jars from canner, being careful not to tilt the jars. Set the jars upright and place on a rack or folded cloth away from drafts. Do not tighten the screw bands. Allow jars to cool undisturbed for 12 to 24 hours, then check for sealing failures. To test jar, press center of lid. If lid is down and will not move, jar is sealed. Remove screw bands carefully. Wash, dry, label, and store jars in a cool, dark place. If any jars have not sealed, place in refrigerator and use within two days.

Altitudes of Iowa Counties
Shaded areas are less than 1,000 feet
Unshaded areas are 1,000 to 2,000 feet



If you are uncertain about the safety of home-canned foods, follow the advice "When in doubt, throw it out." Botulism and other deadly foodborne illness causes are not detected in food by sight, smell, and taste. Foods may show no sign of spoilage. If a canned food looks spoiled, foams, or even has an "off" odor, dispose of it.

Helpful Hints:

- Can only high-quality meat, poultry, wild game, and fish. Do not can meat from diseased or unhealthy animals.
- Remove guts immediately after catching fish, put on ice, and can within two days.
- Chill (at 40°F or lower) and can fresh, home-slaughtered meats and poultry without delay. If meat must be held for longer than a few days before canning, freeze it at 0°F or lower until canning time.
- Keep all work areas clean and sanitary.
- Trim meat of gristle, bruised spots, and fat before canning. Too much fat left on meat can lead to sealing failures.
- Follow processing times. (Tables 1 and 3)

CHICKEN OR RABBIT

Procedure: Choose freshly killed and dressed healthy animals. Large chickens are more flavorful than fryers. Dressed chicken should be chilled at 40° or lower for 6 to 12 hours before canning. Dressed rabbits should be soaked one hour in water containing 1 tablespoon of salt per quart, and then rinsed. Since you are soaking dressed rabbits in brine, you do not need to add salt when filling the jars if you choose. Remove excess fat. Cut the chicken or rabbit into suitable sizes (about 1-inch cubes) for canning. Can with or without bones.

Hot pack: Boil, steam, or bake meat until about medium done (150-155°F); when cut, the center should show almost no pink. Add ½ teaspoon salt to pints; add 1 teaspoon salt per quart to each jar, if desired. Fill hot jars with meat

pieces and hot broth, leaving 1 ¼-inch headspace. Remove air bubbles and adjust headspace, if needed. Wipe rims of jars with a damp, clean paper towel. Adjust lids and process as directed (Table 1).

Raw pack: Add ½ teaspoon salt to pints; add 1 teaspoon salt per quart to each jar, if desired. Fill hot jars loosely with raw meat pieces, leaving 1 ¼-inch headspace. Do not add liquid. Wipe rims of jars with a damp, clean paper towel. Adjust lids and process as shown in Table 1.

MEATS AND WILD GAME

(Bear, beef, lamb, pork, sausage, veal, venison)

Ground or finely chopped

Procedure: Choose fresh, high quality chilled meat (stored at 40°F or lower for 6 to 12 hours). With venison, add one part high-quality pork fat to three or four parts venison before grinding. Use freshly made sausage, seasoned with salt and cayenne pepper (sage may cause a bitter off-flavor). Shape chopped meat into patties, balls, or cut cased sausage into 3- to 4-inch links. Cook until lightly browned (about three minutes). Ground meat may be browned without shaping by sautéing it. Remove excess fat by placing the meat on a paper towel. Add ½ teaspoon salt to pints; add 1 teaspoon salt per quart to each jar, if desired. Fill hot jars with meat pieces. Add boiling meat broth, tomato juice, or water, leaving 1-inch headspace.

Wipe rims of jars with a damp, clean paper towel. Adjust lids and process as directed (Table 1).

Strips, cubes, or chunks of meat

Procedure: Choose high quality chilled meat (stored at 40°F or lower for 6 to 12 hours). Remove excess fat. Soak strong-flavored wild meats for one hour (in the refrigerator) in saltwater (one tablespoon of salt per quart of water). Rinse meat. Remove large bones.

Hot pack: Precook meat until rare (120 to 125°F) by roasting, stewing, or browning in a small amount of fat. Add ½ teaspoon salt to pints; add 1 teaspoon salt per quart to each jar, if desired. Fill hot jars with meat pieces and add boiling broth, meat drippings, water or tomato juice (tomato juice is especially good to use with wild game). Leave a 1-inch headspace. Remove air bubbles.

Raw pack: Add ½ teaspoon salt to pints; add 1 teaspoon salt per quart to each jar, if desired. Fill hot jars with raw meat pieces, leaving 1-inch headspace. Do not add liquid since raw meat forms its own juices.

Wipe rims of jars with a damp, clean paper towel, adjust lids, and process as directed (Table 1).

MEAT STOCK (BROTH)

Beef

Saw or crack freshly trimmed beef bones to help draw flavor from bones. Rinse bones and place in a large stockpot or kettle. Cover bones with water, cover pot, and simmer 3 to 4 hours. Remove bones and pick off meat. Chill broth, skim off fat, and return meat to broth, if desired. Reheat meat and broth to boiling. Fill hot jars, leaving a 1-inch headspace. Remove air bubbles and adjust headspace, if needed. Wipe rims of jars with a damp, clean paper towel, adjust lids, and process as directed (Table 1).

Chicken or turkey

Place carcass bones, with most of the meat removed, in a large stockpot; add enough water to cover bones. Cover pot and simmer 30 to 45 minutes or until meat can easily be stripped from bones. Remove bones and meat pieces. Chill broth and skim off fat. Strip meat, discard excess skin and fat, and return meat to broth, if desired. Reheat to boiling and fill hot jars. Leave a 1-inch headspace. Remove air bubbles and adjust headspace, if needed. Wipe rims of jars with a damp, clean paper towel, adjust lids, and process as directed (Table 1).

Table 1.
Recommended Processing Times for Meat and Poultry in Pressure Canners.

TYPE of MEAT	STYLE of PACK	JAR SIZE	PROCESS TIME (minutes)	RECOMMENDED PRESSURE (in pounds)			
				Dial Gauge ≤ 2,000 feet	Dial Gauge > 2,000 feet	Weighted Gauge ≤ 1,000 feet	Weighted Gauge > 1,000 feet
CHICKEN OR RABBIT WITHOUT BONES	Hot and raw	Pints	75	11	12	10	15
		Quarts	90	11	12	10	15
CHICKEN OR RABBIT WITH BONES	Hot and raw	Pints	65	11	12	10	15
		Quarts	75	11	12	10	15
GROUND OR CHOPPED MEAT	Hot	Pints	75	11	12	10	15
		Quarts	90	11	12	10	15
STRIPS, CUBES, OR CHUNKS OF MEAT	Hot and raw	Pints	75	11	12	10	15
		Quarts	90	11	12	10	15
MEAT OR CHICKEN STOCK	Hot	Pints	20	11	12	10	15
		Quarts	25	11	12	10	15

Chili Con Carne (Yield: 9 pints)

Ingredients:

- 3 cups dried pinto or red kidney beans
- 5½ cups water
- 5 teaspoons salt (separated)
- 3 pounds ground beef (or ground venison)
- 1½ cups chopped onions
- 1 cup chopped peppers of your choice (optional)
- 1 teaspoon black pepper
- 3 to 6 tablespoons chili powder
- 2 quarts crushed or whole tomatoes

Directions:

1. Wash beans thoroughly and place them in a 2-quart saucepan. Add cold water to a level of 2 to 3 inches above the beans and soak 12 to 18 hours. Drain and discard water.
2. Combine beans with 5½ cups of **fresh** water and 2 teaspoons salt. Bring to a boil. Reduce heat and simmer 30 minutes. Drain and discard water.
3. Brown ground beef (or venison), chopped onions, and peppers, if desired, in a skillet. Drain off fat and add 3 teaspoons of salt, pepper, chili powder, tomatoes, and drained cooked beans. Simmer for five minutes.
4. Do not thicken. Fill hot jars, leaving 1-inch head space. Do **NOT** use quarts; safe processing time has not been determined. Clean jar rims with a clean, damp paper towel. Adjust lids and process according to the instructions below:

Table 2.
Recommended Processing Time for Chili Con Carne
in Pressure Canners.

JAR SIZE	PROCESS TIME (minutes)	RECOMMENDED PRESSURE (in pounds)			
		Dial Gauge ≤ 2,000 feet	Dial Gauge > 2,000 feet	Weighted Gauge ≤ 1,000 feet	Weighted Gauge >1,000 feet
Pints	75	11	12	10	15
Quarts	No safe processing recommendations are available for chili con carne in quarts.				

FISH (*Trout, catfish, salmon, blue, mackerel, steelhead, and other fatty fish except tuna*)

Gut fish within two hours after they are caught. Keep cleaned fish on ice until ready to can. For most fish, no liquid, salt, or spices need to be added, although seasonings or salt may be added for flavor. Glass-like crystals sometimes form in canned salmon. These crystals are magnesium ammonium phosphate and are safe. There is no way for the home-canner to prevent these crystals from forming, but they usually dissolve when heated.

Procedure: If the fish is frozen, thaw it in the refrigerator before canning. Rinse the fish in cold water. You can add vinegar to the water (2 tablespoons per quart) to help remove slime. Remove the head, tail, fins, and scales; it is not necessary to remove the skin. You can leave the bones in most fish because the bones become very soft and are a good source of calcium. For halibut, remove the head, tail, fins, skin, and bones. Wash and remove all blood. Refrigerate all fish until you are ready to pack in jars.

Pint jars

Split fish lengthwise, if desired. Cut cleaned fish into 3½-inch lengths. If the skin has been left on the fish, pack the fish skin facing the outside of the jar for a nicer appearance, or with the skin facing toward the inside for easier jar cleaning. Add 1 teaspoon of salt per pint, if desired. Fill hot jars, leaving a 1-inch headspace. Do not add liquids. Carefully clean the jar rims with a clean, damp paper towel; wipe with a dry paper towel to remove any fish oil. Adjust lids and process as directed (Table 3).

Quart jars

Cut the fish into jar-length fillets or chunks of any size. If the skin has been left on the fish, pack the fish skin facing the outside of the jar for a nicer appearance, or with the skin facing toward the inside for easier jar cleaning. Pack solidly into hot jars, leaving a 1-inch headspace. If desired, run a plastic knife around the inside of the jar to align the product; this allows firm packing of fish. Carefully clean the jar rims and wipe dry to remove any fish oil. Adjust lids and process as directed in Table 3.

SMOKED FISH (*Salmon, rockfish, flatfish [sole, cod, flounder], and other fish*)

Safe home-processing times for other smoked seafood have not been determined. Those products should be frozen. Smoking of fish should be done by tested methods.

Lightly smoked fish is suggested for canning because the smoked flavor will become stronger and the flesh drier after processing. However, because it has not yet been cooked, do not taste lightly smoked fish before canning.

It is safe to can smoked fish using only pint-size jars or smaller. Although you can safely can smoked fish in half-pint jars, the quality of the product may be less acceptable. To can smoked fish, use a 16- to 22-quart pressure canner. Do not use smaller pressure saucepans since safe processing times have not been determined.

Procedure: If smoked fish has been frozen, thaw in the refrigerator until no ice crystals remain before canning. If you did not slice the fish before you smoked it, cut fish into pieces that will fit vertically into pint canning jars. Pack smoked fish vertically into jars, leaving 1-inch headspace between the pieces and the top rim of the jar. The fish may be packed either loosely or tightly. Do not add liquid to the jars. Clean jar rims with a clean, damp paper towel. Adjust lids and process as directed (Table 3).

Processing change for smoked fish — The directions for filling the pressure canner for processing smoked fish are different from other pressure canning, so please read the following carefully: To ensure a safe product, measure 4 quarts (16 cups) of cool tap water and pour into the pressure canner (**NOTE:** The water level probably will reach the screw bands of pint jars). **Do not** decrease the amount of water or heat the water before processing begins. Place prepared, closed jars on the rack in the bottom of the canner, and proceed as with usual pressure canning instructions.

Table 3.
Recommended Processing Times for Fish Pressure Canners.

TYPE of MEAT	STYLE of PACK	JAR SIZE	PROCESS TIME (minutes)	RECOMMENDED PRESSURE (in pounds)			
				Dial Gauge ≤ 2,000 feet	Dial Gauge > 2,000 feet	Weighted Gauge ≤ 1,000 feet	Weighted Gauge >1,000 feet
FISH	Raw	Pints	75	11	12	10	15
		Quarts	160	11	12	10	15
SMOKED FISH		Pints	110	11	12	10	15
		Quarts	No safe processing recommendations are available for fish in quarts.				

ADDITIONAL RESOURCES

The following resources provide a wide variety of tested recipes and information, based on USDA recommendations, especially important for the beginning food preserver.

National Center for Home Food Preservation (NCHFP), USDA sponsored website is the most current source for publications, video clips, tutorials for the beginning home food preserver, frequently asked questions, and seasonal tips: <http://www.uga.edu/nchfp/>

USDA Complete Guide to Home Canning, 2009. Available on NCHFP website, above, click on “publications.”
So Easy to Preserve, 5th edition only. <http://www.soeasytopreserve.com>

The following publications are available at local stores or online at <http://www.kitchenkrafts.com>:

New Ball Blue Book of Preserving, 2009 edition only

Ball Complete Book of Home Preserving, 2006 edition only

Ball Blue Book of Preserving, 2006 edition only

FOR MORE INFORMATION

For more information on food preservation call your local extension office or Answer Line (800) 262-3804 (voice) or (800) 854-1658 (telecommunications device for deaf).

ISU Extension fact sheets are available at www.extension.iastate.edu/store

The U.S. Department of Agriculture’s *Complete Guide to Home Canning* is available at www.uga.edu/nchfp.

Written by: Sarah L. Francis, PhD, MHS, RD, assistant professor and state nutrition extension and outreach specialist, and nutrition and health program specialists (Cindy Baumgartner, Nancy Clark, Renee Sweers, Holly VanHeel, and Jill Weber), Iowa State University Extension and Outreach.

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Lynn Paul, Ed.D., R.D., Professor and Extension Food and Nutrition Specialist, Montana State University-Bozeman;
and MSU Extension Agents: Bernice Mason, Yellowstone County; and Karen Tyra, Stillwater County.

<http://msuextension.org/publications/HomeHealthandFamily/MT200903HR.pdf>

University of Missouri Extension. *Food Preservation canning meat, fish, and poultry.* GH1490

<http://extension.missouri.edu/explorepdf/hesguide/foodnut/gh1490.pdf>

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<http://www.ag.ndsu.edu/pubs/yf/foods/fn188.pdf>

Map prepared by Iowa Department of Natural Resources, Geological Survey Bureau

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