

CANNING SEAFOOD

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Coastal waters, lakes, and streams in the Pacific Northwest provide a variety of seafoods including salmon and many other fish, clams, oysters, shrimp, and crab. You can enjoy these delicacies throughout the year if you preserve them when supplies are abundant.

Canning is a popular method for preserving seafood. Products are high in quality and safe to eat when you can them correctly. *It's important to pack and process seafood as directed to guarantee safety.* Processing recommendations in this publication have been tested by researchers.

Lemon juice, vinegar, salt, and oil are added to maintain quality (flavor, color) of canned seafood. You can leave them out of the recipes in this publication, if you wish—but don't omit vinegar when you pickle these products.

Use *top-quality, fresh* seafood. Can it as soon as possible after you catch or buy it. The longer you wait, the poorer the quality will be. To prevent spoilage, keep fish and shellfish cold, on ice or in your refrigerator.

Handle raw seafood safely. Raw seafood may contain microorganisms that cause food poisoning. These bacteria are destroyed by heating the seafood before eating. Make sure that you wash your hands, utensils, and work surfaces (such as cutting boards) after handling raw seafood. Don't let raw seafood come into contact with cooked seafood.

First steps

- Keep live shellfish (clams, oysters, mussels) moist and cold. Place them in a bowl, cover with a wet cloth, and store in the refrigerator.
- Keep fish on ice. Avoid rough handling. Don't stack fish on top of one another—this causes crushing and bruising, which speeds up spoilage.
- Keep live crab cool.

Preparation tips

- Prepare fish and shellfish as directed. If you wish, add lemon juice, vinegar, salt, or oil to maintain quality of the seafood.
- When you can fatty fish, use nonporous equipment that you can clean easily (such as an acrylic cutting board). Cover work surfaces with a layer of paper (such as freezer wrap). Use paper towels rather than cloth.
- Pack into pint or half-pint jars. (*Safe processing times have not been determined for quart jars.*)
- If you wish, add 1 to 3 tablespoons vegetable oil or French-type dressing per pint of fish for flavor.
- To get a good seal, wipe jar rims clean with a wet paper towel before putting on the lid. Moisten towel with vinegar when you pack fatty fish (such as tuna and salmon).

Processing tips

- Process seafoods in a pressure canner as directed. The high temperatures reached under pressure are necessary to destroy the bacteria that cause spoilage and food poisoning.
- Use a pressure canner that's in good condition. Replace the gasket if necessary. If you use a dial pressure gauge, check it for accuracy at least once a year. If pressure is off by more than 1 pound, replace the gauge. (Your county Extension office can tell you where to have the testing done.)
- Reread the directions for the canner and follow them. If you no longer have an instruction manual, write the manufacturer to ask for one.
- Exhaust the canner by allowing steam to flow from the petcock for 10 minutes before processing.
- Process foods at the correct pressure. At sea level, use 10 pounds pressure for a weighted gauge, 11 pounds for a dial gauge. (A 10-pound weighted gauge actually processes food at 11 pounds.) Increase pressure if you're canning at high altitudes (see Table 1).
- Process foods for the correct length of time (see Table 2). When the required pressure is reached, write down the time and continue processing for the specified period. Remove the canner from the heat at the end of the processing time and let pressure return to zero before you open the canner.
- Test seals on jars within 24 hours. If jars haven't sealed, use a new lid and reprocess in the canner for the entire length of time. As an alternative, refrigerate the product for later use or freeze it.

Table 1. Recommended pressures for higher elevations*

Weighted-gauge canner	
Sea level to 1,000 feet	use 10-pound weight
Above 1,000 feet	use 15-pound weight
Dial-gauge canner	
Sea level to 2,000 feet	use 11 pounds pressure
2,001 to 4,000 feet	use 12 pounds pressure
4,001 to 6,000 feet	use 13 pounds pressure
6,001 to 8,000 feet	use 14 pounds pressure

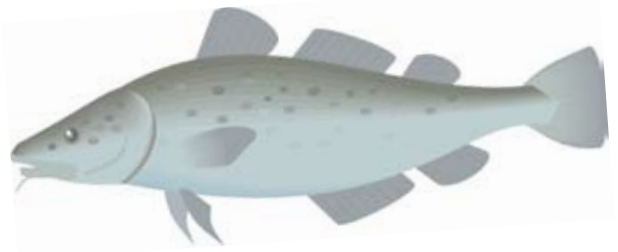
* To make sure that the pressure stays constant during processing, check the gauge periodically. Weighted gauges should jiggle or rock the number of times per minute specified in canner directions.

Table 2. Recommended processing times (minutes)*

Seafood	Half-pint jar	Pint jar
Raw fish	100	100
Whole clams	60	70
Minced clams	60	70
Crab	70	80
Oysters	75	75
Shrimp	45	45

* Use 10 pounds pressure with a weighted gauge, 11 pounds with a dial gauge. Increase processing time as directed for altitudes above sea level. Safe processing times have *not* been determined for:

- Canning seafood in quart jars (use pint or half-pint jars)
- Canning smoked shellfish (freeze it instead; see also PNW 450, *Home Canning Smoked Fish*)



Salmon, trout, steelhead, and all other fish (except tuna)

1. When you catch fish, remove viscera at once. Chill the cleaned fish until you're ready to can.
2. Before you can, remove head, tail, and fins. Wash fish carefully, removing all blood.
3. Split fish lengthwise. Cut into lengths suitable for jars. (About 1 pound of fish will fill one half-pint jar.)
4. Pack fish tightly into pint or half-pint jars, leaving 1-inch headspace. You may add 1 teaspoon salt per pint.
5. Adjust lids. Process half-pints and pints for 100 minutes at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure for higher elevations (see Table 1).

Tuna

1. You may can tuna either precooked or raw. Precooking removes most of the oil that tends to have a strong flavor; however, many people find it easier to can the tuna raw in its own juices.
2. To precook, remove viscera and wash fish well in cold water. Allow blood to drain from the cavity. Place cleaned tuna on a rack or metal tray, at the bottom of a large baking pan. Bake at 225o to 250oF for 2 1/2 to 4 hours depending on size; or bake at 350oF for about 1 hour. In place of baking, tuna may be steamed for 2 to 4 hours. The internal temperature of the fish should reach 165o to 175oF. Refrigerate the fish overnight to firm the meat.
3. When you can raw tuna, it's easier to fillet the fish if it's partially frozen. You can skin raw fish before or after filleting. It's not necessary to remove the viscera before filleting.
4. For either raw or precooked tuna, peel off the skin with a sharp knife. Scrape the surface lightly to remove blood vessels and any other discolored flesh.
5. Separate the fish into quarters by cutting meat away from the bones. Pull off and cut out all bones and fin bases. Scrape and cut out all dark flesh. The dark flesh has a strong flavor and can affect the delicate tuna flavor. Many people prefer not to can this part (however, it makes excellent pet food).
6. Cut quarters crosswise with a sharp knife into lengths suitable for jars. (About 1 pound of fish will fill a half-pint jar.) Pack pieces into pint or half-pint jars, pressing down gently to make a solid pack. Leave 1-inch headspace.
7. For precooked tuna, add 1/2 teaspoon salt and 1 to 3 tablespoons oil (cottonseed, soy, or other vegetable oil) per half-pint; 1 teaspoon salt and 2 to 6 tablespoons oil per pint. If you prefer, use water instead of oil. For raw pack tuna, no added liquid is needed. Salt is optional.
8. Adjust lids. Process half-pints and pints for 100 minutes at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure for higher elevations (see Table 1).

Clams, whole

1. Keep live clams cool until you're ready to can. Wash shells and steam to open. Remove meat and save the juice.
2. Wash meat in a weak salt brine (1 to 3 tablespoons salt per gallon of water).
3. Blanch meat for 1 to 2 minutes in boiling acidic solution (2 tablespoons vinegar or lemon juice per gallon of water).
4. Drain meat and pack into pint or half-pint jars, leaving 1-inch headspace. Pour hot juice over clams. Add boiling water, if needed, leaving 1-inch headspace.
5. Adjust lids. Process half-pints for 60 minutes (pints for 70 minutes) at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure for higher elevations (see Table 1).

Clams, minced

1. Follow steps 1 through 3 for whole clams.
2. Drain blanched meat and grind, using a meat grinder or food processor.
3. Pack 4 ounces (about $\frac{3}{4}$ cup) into half-pint jars or 7 ounces (about $1\frac{1}{2}$ cups) into pint jars, leaving 1-inch headspace. Cover with hot clam juice. Add boiling water, if necessary, leaving 1-inch headspace.
4. Adjust lids. Process half-pints for 60 minutes (pints for 70 minutes) at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure for higher elevations (see Table 1).

Crab

You may cook crab, either whole or in sections, before you can. Add lemon juice and vinegar, if you wish, during preparation to keep the color light and to enhance the natural flavor.



Crab, whole

1. Keep live crabs cool on ice until you're ready to can.
2. Cook whole crabs in boiling water (with $\frac{1}{4}$ cup lemon juice per gallon) for 20 minutes. (You may need a longer time when you cook more than 3 or 4 crabs at one time.)
3. Cool cooked crab for 10 minutes in cold water.
4. Remove backs and clean. If you place them in cold water again until they're completely cool, crabs will be easier to remove from shell.
5. Remove meat and rinse in cool brine (2 tablespoons salt and 1 cup lemon juice per gallon of water).
6. Gently squeeze meat to remove excess water.
7. Pack meat into pint or half-pint jars, leaving 1-inch headspace.
8. Add $1\frac{1}{2}$ teaspoons vinegar per half-pint (1 tablespoon per pint) to help keep the color light and to enhance flavor. Cover with boiling water, leaving 1-inch headspace.
9. Adjust lids. Process half-pints for 70 minutes (pints for 80 minutes) at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure for higher elevations (see Table 1).

Crab, sections

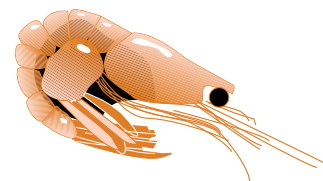
1. Keep live crabs cool on ice until you're ready to can.
2. Remove backs and clean.
3. Soak in running water for 20 minutes to bleed.
4. Cook for 12 to 15 minutes after water returns to a boil. (You may need a longer time when you cook a large quantity.)
5. Remove meat and rinse in cool water. (Add 2 tablespoons salt per gallon of water, if you wish.)
6. Gently squeeze meat to remove water.
7. Pack meat into pint or half-pint jars, leaving 1-inch headspace.
8. Add $1\frac{1}{2}$ teaspoons vinegar per half-pint (1 tablespoon per pint) to enhance flavor and help keep the color light. Cover with boiling water, leaving 1-inch headspace.
9. Adjust lids. Process half-pints for 70 minutes (pints for 80 minutes) at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure for higher elevations (see Table 1).

Oysters

1. Keep live oysters cool until you're ready to can. Wash shells and steam to open. Remove meat.
2. Wash meat in water. (Add $\frac{1}{2}$ cup salt per gallon of water, if you wish.)
3. Drain meat and pack into jars, leaving 1-inch headspace. Cover with a weak salt brine (about 1 tablespoon of salt per quart of water).
4. Adjust lids. Process half-pints and pints for 75 minutes at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure for higher elevations (see Table 1).

Shrimp

1. Remove heads as soon as you catch shrimp. Chill until you're ready to can.
2. Wash and drain shrimp.
3. Cook shrimp 8 to 10 minutes in boiling acidic brine ($\frac{1}{4}$ to 1 cup salt and 1 cup vinegar per gallon of water). Rinse in cold water and drain.
4. Peel shrimp.
5. Pack into jars, leaving 1-inch headspace. Cover with boiling salt brine (1 to 3 tablespoons salt per gallon of water).
6. Adjust lids. Process half-pints and pints for 45 minutes at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure for higher elevations (see Table 1).



Using home-canned seafood

Examine home-canned seafood for spoilage before you serve it. Bulging jar lids, spurting liquid, an “off” odor, or mold indicate that the food is not safe to eat.

Do not taste questionable food.

If the food shows signs of spoilage

- Remove the lid and carefully place the suspect jars on their sides (along with the lids) in a stock pot, pan, or boiling-water canner (8-quart volume or larger).
- Wash your hands well.
- Carefully add water until the level is 1 inch above the jars. Put a lid on the pot and heat the water to boiling.
- Boil for 30 minutes to detoxify the food. Cool and discard.
- Thoroughly scrub counters, containers, and equipment that have come into contact with the contaminated food.

If the food shows no signs of spoilage

An invisible toxin can form if canning instructions haven’t been followed exactly. If you’re uncertain, heating before eating gives an extra margin of safety. There are two ways to destroy the *Clostridium botulinum* toxin. One is to boil canned seafood for 10 minutes on the range. The other is to heat home-canned fish in the oven, using the instructions below. The quality may be better for most uses because oven-heating fish can prevent texture changes.

Oven heating fish for safety

- Open the jar of fish and examine for spoilage as described above. Wash the lid before discarding or reusing it on the opened jar.
- Insert a meat thermometer upright into the center of the jar. The tip should be at the approximate center of the fish.
- Cover the jar loosely with foil and place in an oven preheated to 350°F.
- Remove the jar from the oven when the thermometer registers 185°F. You’ll need about 30 to 35 minutes.
- Let the jar stand at room temperature for about 30 minutes. This lets the temperature become uniform throughout the jar.
- Serve the fish hot or refrigerate immediately for later use.
- *Note:* If you prepare canned fish in a casserole, bake at 350°F and check the temperature at the end of the cooking time as described above for jars.

Questions frequently asked

Is it safe to can shellfish that shows no sign of life?

It’s safe but not advisable. Though any harmless microorganisms and toxins would be destroyed during processing, the quality of the product most likely would be poor. For example, if crabs die before cooking, the meat may look off-color after canning.

To get the best quality product, raw shellfish (oysters, clams, and mussels in the shell) should be alive until you can them. Look for tightly closed shells. If the shells are gaping open or don’t close when you tap them or put them in cold water, discard the shellfish.

Is it safe to process seafoods in a boiling water canner?

No. The temperature must be above the boiling point of water to destroy *Clostridium botulinum* spores. If you don’t process

seafoods in a pressure canner, these spores will grow and produce the toxin that causes botulism.

What causes canned crab to darken?

Darkening is caused by changes in blood pigments. Canned crab won’t be as light in color as fresh crab. However, you can keep the color as light as possible by adding acid (vinegar or lemon juice) to the cooking water or to the packed jars before processing.

Another way to minimize darkening is to “bleed” live crab before canning by removing the backs, cleaning away the viscera and gills, and soaking the clusters of legs (sections) in running water to remove blood.

Is it safe to leave salt out of canned seafood?

Yes. Salt is added only as a flavoring. Add an amount that’s suitable for your own taste.

Glasslike crystals sometimes form in canned salmon. Are they harmful?

No. These crystals of magnesium ammonium phosphate are safe to eat. There’s no way for the home canner to prevent their formation, but they usually dissolve when heated.

Prepared by Carolyn A. Raab, Extension food and nutrition specialist emeritus, Oregon State University, in consultation with Extension food specialists at Washington State University and the University of Idaho. Research to develop a safe oven method for reheating canned fish was conducted by Margy Woodburn, professor emeritus, Nutrition and Food Management Department, Oregon State University. Steve Berntsen, former OSU Extension seafood processing specialist, assisted with research to revise crab-canning procedures. Research to verify that seafoods are safe when canned as directed was funded by the OSU Sea Grant College Program, under grant 04-7-158-44085.

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