



Home Canning Smoked Fish and Home Smoking Fish for Canning

FNH-00223

The following directions for canning smoked fish are a result of research conducted at Oregon State University. Oregon researchers determined the processing times and conditions needed to reach a temperature within the fish that is hot enough to destroy the spores of the Clostridium botulinum bacteria — the bacteria that can cause botulism.

It is important to follow these directions carefully to ensure a safe and good-tasting product. Please read directions thoroughly before beginning the smoking and canning processes.

Smoked fish is considered a delicacy in Alaska and the Pacific Northwest. Whether you catch it yourself or purchase it at the store, fish can be smoked successfully at home.

Contrary to popular belief, smoking is not a true food preservation technique — it changes the flavor and texture of the product but does not "preserve" or create a shelf-stable product. Even refrigeration won't guarantee that smoked fish will stay safe to eat. The bacteria that cause botulism food poisoning could start to grow after 2 to 3 weeks of refrigeration.

For long-term storage, smoked fish must be frozen or canned. Canning or jarring is preferred by many who smoke fish at home. Jarred or canned smoked fish must be processed in a pressure canner to destroy *Clostridium botulinum* spores.

The length of processing time needed to guarantee safety can affect the quality of home-canned smoked fish. Canning tends to dry the fish, darken the color and intensify the smoked flavor. **However, it's not safe to reduce the processing time** to lessen these undesirable quality changes. Instead, the smoking procedure must be modified.

Fully smoked fish that is dry enough to eat tends to be too dry and strong-flavored after canning. For best quality, fish that will be canned should be smoked for a shorter time than ready-to-eat products.

Lightly smoked fish for canning should be processed as soon as possible after smoking for safety and best quality. **Don't eat it before canning.** Some bacteria survive the low heat during the short smoking process although they'll be destroyed during canning.

The following smoking procedure will give the best results if you're planning to can your fish. (Refer to FNH-00325, *Smoking Fish at Home* for instructions on smoking ready-to-eat fish.)

Preparing Fish For Smoking

Different species of fish require different preparation techniques. Salmon are usually prepared by removing the backbone and splitting. Bones are usually not removed. Rockfish and flatfish — such as sole, cod and flounder — should be filleted. You'll need about $\frac{3}{4}$ pound of smoked fish for each pint canning jar. About 1½ to 3 pounds of whole fish will yield this amount of smoked fish depending on the amount of waste removed, such as head, tail, fins and entrails. Be sure to use good-quality, firm fish. Smoking and canning won't improve poor quality! Keep fish refrigerated, or on ice, prior to smoking.

1. Remove blood and scales (and skin, if desired). Rinse well with fresh cool water.
2. Cut prepared fish into pieces that will fit vertically into pint canning jars, about 1 inch shorter than the jar height. Salt will be more uniformly absorbed if pieces are a uniform thickness.

Salting

Soaking fish in a strong salt solution (brine) before smoking will give a good surface texture and retard surface spoilage.

1. For each 2 to 3 pounds of prepared fish, dissolve 1 cup salt in 7 cups water.
2. Soak thin pieces of fish ($\frac{1}{2}$ inch at the thickest point) for about 5 to 10 minutes. Larger, thicker pieces of fish (over $\frac{1}{2}$ inch thick) will need 30 to 45 minutes of soaking.

Note: If you want less salt in the finished product, reduce the brining time and smoke for no longer than 1 hour. Be sure to can lower salt fish immediately after smoking to ensure safety.

Smoking For Canning

Small commonly available smokers without thermostats are suitable for smoking fish that will be canned. Fish prepared for canning doesn't have to reach the internal temperature required for ready-to-eat products, which is 160°F for at least 30 minutes.

Heat isn't needed to smoke fish for canning, although some heat will help promote drying. The temperature of home smokers will vary depending upon the type of smoker and external conditions and will generally reach at least 130° and up to 160°F. These temperatures are high enough to dry the fish if air flow isn't severely restricted.

- Smoke only the amount of fish that you plan to can that same day.
- Smoke fish for up to 2 hours, depending on the level of smoke flavor desired.

Lightly smoked fish isn't safe to eat, so don't taste it to see if it's done. The best way to judge readiness for canning is to measure weight loss. Weight is lost as moisture evaporates during smoking.

A 10 percent weight loss yields a moist, good-quality product after canning. The moisture loss in most ready-to-eat smoked fish is generally 20 to 30 percent. Lightly smoked oily fish such as black cod and Chinook salmon will seem very moist due to their higher fat content.

You can measure weight loss easily with a kitchen scale. Calculate percentage loss by comparing the difference in the weight of one piece of raw fish before and after smoking. For example:

- (A) Weigh a piece of fish before smoking.
- (B) Weigh the same piece of fish after smoking.
- (C) Subtract the ending weight (B) from the beginning weight (A) to calculate weight lost (C).
- (D) Divide weight lost (C) by beginning weight (A).
- (E) Multiply (D) by 100 to calculate percent of weight loss.

For example:

$$\begin{aligned} & \text{8 ounces beginning weight (A)} \\ & - \underline{\text{7 ounces ending weight (B)}} \\ & \quad 1 \text{ ounce weight lost (C)} \\ & \quad 1 \text{ ounce (C)} \div 8 \text{ ounces (A)} = .125 \text{ (D)} \\ & \quad .125 \text{ (D)} \times 100 = 12.5 \text{ percent (E)} \end{aligned}$$

This 12.5 percent weight loss would yield a fairly moist piece of smoked fish after canning. A 20 to 30 percent weight loss would tend to be too dry after canning.

Note: If your smoked fish cannot be processed immediately, refrigerate it for processing later that day. If canning will be delayed for more than one day, freeze the fish. **Frozen smoked fish must be thawed to refrigerator temperature before canning.** Thaw fish in the refrigerator, not on the counter.

Canning Smoked Fish

Supplies Needed

Pressure canner, 16- or 22-quart size. Don't use smaller pressure saucepans. Safe processing times haven't been determined for smaller pressure cookers.

If you use a dial-gauge canner, be sure to have it checked for accuracy at least once each year.

Follow the processing procedure in this publication even if pressure canner use and care manual instructions differ. It's particularly important to use the amount of cool water specified and to vent the canner.

Pint canning jars. Don't use quart jars or tin cans. Safe processing recommendations haven't been determined.

Although half-pint jars could be safely processed for the same length of time as pints, the quality of the product may be less acceptable and the jars may float in the canner.

Two-piece metal canning lids. Wash jars, rings and flat lids in hot, soapy water and rinse well. Wash the flat lids gently; do not scrub the sealing compound.

Procedure

1. If smoked fish has been frozen, thaw in the refrigerator until no ice crystals remain before canning.
2. 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.** Doing so could result in underprocessing because the canner will heat up and cool down more quickly.
3. Pack smoked fish vertically into jars, leaving 1 inch headspace between the pieces and the top of the jar. The fish may be packed either loosely or tightly.
4. To get a good seal, clean rims of the filled jars with a clean, damp paper towel before putting on flat lids. Carefully apply the ring (screw band) and tighten until "finger tip" tight.
5. Put jars into the canner on a rack. Jars may be double-stacked by placing another rack over the jars on the bottom layer. .
6. Heat the canner on a high range setting until steam escapes from the air vent.
7. "Exhaust" the canner by allowing a steady stream of steam to escape for 10 minutes. This prevents cold spots in the canner that may result in **underprocessing**.
8. Close the petcock or cover the vent and adjust the heat to reach the required pressure. After reaching the recommended pressure, adjust the heat to maintain a steady pressure for the duration of the canning time. At sea level, process pint jars for **110** minutes (1 hour and 50 minutes) at 10 pounds pressure (weighted gauge) or 11 pounds pressure (dial gauge). Increase pressure at higher elevations as shown in the following table:

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

9. At the end of processing, turn off the heat. If using an electric range, remove the canner from the heating element. Let the canner cool slowly without removing the vent cover or opening the petcock. When the pressure returns to zero, carefully open the canner and remove jars. Leaving jars in an unopened canner for an extended time could result in spoilage or a stuck lid!
10. After cooling jars for 12 to 24 hours, test the seals. If jars have sealed correctly, the jar lid will make a ringing, high-pitched sound when tapped with a metal spoon.

Jars that haven't sealed can be reprocessed within 24 hours. Use new flat lids and process again for 110 minutes. Because reprocessing could affect quality, a better option would be to refrigerate and consume the contents within one week or freeze for later use.

Storing Canned Smoked Fish

Wash the jars, label and date. Store jars in a clean, cool, dark and dry place. Storing them in direct sunlight, in areas that are hot (such as near hot pipes, a range or a furnace) or in areas where they might freeze (such as in uninsulated garages) could affect quality or cause spoilage.

For More Information

<i>Canning Can Fish in Cans</i>	FNH-00125
<i>Canning Fish in Quart Jars</i>	FNH-00126
<i>Canning the Fish Catch</i>	FNH-00128
<i>Canning Smoked Fish in Cans,</i>	FNH-00129
<i>Add Variety to Home-Canned Fish</i>	FNH-00224
<i>Smoking Fish at Home</i>	FNH-00325
<i>Canning Basics DVD, \$5</i>	FNH-01280
<i>Canning Meat and Fish in Jars DVD, \$5</i>	FNH-01281
<i>Canning Meat and Fish in Cans DVD, \$5</i>	FNH-01282

FOR SAFETY'S SAKE HEAT HOME CANNED FISH BEFORE EATING!

- Do you know if the dial gauge on your canner is reading accurately?
- Do you know when the rocking or jiggling weight is signaling properly?
- Did you follow the USDA Cooperative Extension Service recommendations for pressure processing this food?
- Was this preserved food a gift? If it was, do you know if the USDA Cooperative Extension Service recommendations for pressure processing this food were followed?

If you answered no to any of these questions, you should heat this home canned food before you eat it. Here's how:

1. Open the jar of fish. Check the contents. **If fish smells bad or if you see gas bubbles, THROW CONTENTS AWAY! Do not taste!***
 2. If fish smells and looks good, insert a meat thermometer into the center of the fish. Cover the jar loosely with foil.
 3. Place the opened jar in an oven that has been preheated to 350°F.
 4. Remove jar from the oven when the meat thermometer registers 185°F. This heating takes about 30 minutes.
 5. Allow the jar to stand at room temperature for about 30 minutes to let the heat distribute evenly.
 6. Serve the fish hot or chill for later use.
 7. If jar is recovered, cover with a clean lid.
- * Before you throw it away, detoxify so that no humans or pets can get poisoned by eating spoiled foods. To detoxify, open jars and carefully place them, along with canning lids, on their sides in a large pan with a lid. Add water to cover jars, put lid on pan and boil for 30 minutes. Cool. Drain liquid. Throw away food and jar lids. Wash hands, counters, can opener and jars with soap and water. Jars may be reused.

Research on food preservation is an ongoing process. The United States Department of Agriculture and the Cooperative Extension Service continuously apply new research findings to their recommendations for food preservation techniques. The guidelines in this publication may be revised at any time additional knowledge is gained that may increase the margin of safety or improve the quality of home preserved products. Please consult your local Cooperative Extension Service annually for updated information.

www.uaf.edu/ces or 1-877-520-5211

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