



HOME CANNING

SMOKED FISH

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Oregon State University
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S smoked fish is considered a delicacy in the Pacific Northwest. Whether caught or purchased, fish can be smoked successfully at home.

Once smoked, fish has a short shelf life. 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 is preferred by many who smoke fish at home. 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 flesh, 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 must be promptly canned to assure that it will be safe and top quality. Don't eat it before canning. Some bacteria survive the short smoking process. 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 *Smoking Fish at Home—Safely*, PNW 238, for instructions on smoking ready-to-eat fish.)

Preparing fish for smoking

Different species of fish require different preparation techniques. Salmon usually are prepared by removing the backbone and then splitting. Bones usually are not removed. Rockfish and flatfish—such as sole, cod, and flounder—should be filleted.

You'll need about $\frac{2}{3}$ 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 similar size.

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 (more than $\frac{1}{2}$ inch thick) will need to soak 30 to 45 minutes.

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

Smoking for canning

Small, factory-made smokers are suitable for smoking fish that will be canned. Lightly smoked fish doesn't have to reach the internal temperature required for ready-to-eat products, which is 160°F for at least 30 minutes.

Although heat isn't needed to smoke fish for canning, some heat is helpful if a drier product is desired. The temperature of home smokers will be 140° to 160°F as a result of the combined heat of burning chips and a hot plate. This temperature is 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 whether it's done. The best way to judge that 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 because of 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 get percent of weight loss.

For example:

$$\begin{array}{r} 8 \text{ ounces beginning weight (A)} \\ - 7 \text{ ounces ending weight (B)} \\ \hline 1 \text{ ounce weight lost (C)} \\ 1 \text{ ounce (C)} \div 8 \text{ ounces (A)} = 0.125 \text{ (D)} \\ 0.125 \text{ (D)} \times 100 = 12.5\% \text{ (E)} \end{array}$$

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 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 more than 1 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.

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 might float in the canner.

Two-piece metal canning lids. Follow manufacturer's instructions for preparation.

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 head space between the pieces and the top of the jar. The fish may be packed either loosely or tightly.
4. For a good seal, clean jar rims with a clean, damp paper towel before putting on lids.

5. Adjust lids and put jars into the canner on a rack.
Jars may be double-stacked if another rack is used to separate layers in the canner.
6. Heat the canner on a high range setting until steam escapes from the air vent.
7. Vent the canner by allowing a steady stream of steam to escape for 10 minutes. This prevents cold spots that result in underprocessing.
8. Close the petcock as directed and adjust the heat to reach the required pressure. 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 below.

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. When the pressure returns to zero, remove jars. Leaving jars in the canner for an extended time could result in spoilage or a stuck lid.
10. After cooling jars 12 to 24 hours, test the seals. If jars have sealed correctly, they will make a ringing, high-pitched sound when tapped with a metal spoon.

Jars that haven't sealed can be reprocessed if this is discovered within 24 hours. Use new lids and process again for 110 minutes. Because reprocessing could affect quality, a better option would be to either refrigerate and consume the contents within 2 to 3 weeks or freeze for later use.

Storing canned smoked fish

Label and date jars and store them in a clean, cool, dark, 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.

Using canned smoked fish

Examine jars for signs of spoilage before use, such as discoloration, an unnatural odor, unsealed lids, or spurting liquid when the jar is opened.

If the fish has spoiled, it should be detoxified before discarding. **Don't taste food that shows signs of spoilage.** To detoxify, open jars and carefully place them, along with canning lids, on their sides in a large pan with a lid. Add enough water to cover the jars, put a lid on the pan, and boil 30 minutes. Then cool and discard the food. Wash hands, counters, and can opener with soap and water.

If any of the following applies, the fish has been underprocessed and should be detoxified and discarded even if there are no signs of spoilage.

- If canned in an oven
- If canned in a boiling water canner
- If canned for too little time in a pressure canner
- If canned at the wrong pressure

Note: Underprocessed fish may be safely reprocessed if the error is discovered within 24 hours after canning.

Fish that has been correctly processed and shows no signs of spoilage may be heated in the oven before eating, for an extra margin of safety. This will destroy the toxin produced by *Clostridium botulinum* bacteria. (Refer to instructions in *Canning Seafood*, PNW 194, for oven temperature and time required.)

For more information

These publications are available at most county Extension offices. Check your telephone directory for the office nearest you (usually listed in the “Government” pages, in the “County” section).

Smoking Fish at Home—Safely, PNW 238. K.S.

Hilderbrand, Jr. 1999. Corvallis: Oregon State University Extension Service. 4 pp.

Canning Seafood, PNW 194. C.A. Raab. 1999.

Corvallis: Oregon State University Extension Service. 12 pp.

Fish Pickling for Home Use, PNW 183. K.S.

Hilderbrand, Jr. 2001. Corvallis: Oregon State University Extension Service. 6 pp.

Home Freezing of Seafood, EC 1363. K.S. Hilderbrand,

Jr. and C.A. Raab. 1999. Corvallis: Oregon State University Extension Service. 4 pp.

These publications also can be viewed on the OSU Extension website. Go to: <http://extension.oregonstate.edu/> then select “Publications.”

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