

S g F h a H e

Producing high quality home-smoked fish is a popular recreational activity and a point of pride for many Alaskans. In earlier times, smoking was a form of food preservation; large amounts of salt and long smoking times were used to help preserve the fish. Now fish is smoked more for flavor and appearance. Today's lightly salted and smoked fish is not a preserved product; the amounts of salt and smoke used are NOT sufficient to prevent bacterial spoilage. Most food poisoning bacteria can and will grow under the conditions normally found in preparation and storage of smoked fish. *Clostridium botulinum*, the bacteria that may cause botulism, is the most harmful of these bacteria.

A safe, home-smoked product requires a good understanding of the procedures and precautions needed to prevent food poisoning. This publication explains why certain procedures must be followed and precautions taken to prepare safe, high-quality smoked fish.

Smoking fish usually includes five steps. These are:

- Product preparation
- Salting or brining
- Equilibration and drying
- Smoking and cooking (hot or cold smoke)
- Product packaging and storage

Careful handling, as described in this publication, will help minimize the potential for bacterial spoilage and food poisoning and yield a high quality finished product.

Almost any fish can be smoked. Fatty fish, such as salmon and black cod, can be brined and smoked

much more easily than lean fish. Low-fat fish, such as grayling and halibut, absorb salt quickly, and it is easy to get the fish too salty.

Only high-quality fresh or frozen fish should be used for smoking. Using poor-quality, freezer-burned fish will produce a poor smoked product. Smoking will not hide poor quality; it will call attention to the problem.

When preparing fish for smoking, it is important to keep the preparation area clean and sanitary. Keeping the work area, cutting boards, knives and hands clean will help prevent bacterial contamination. Do not, under any circumstances, place your finished smoked fish on unclean, unsanitized surfaces that have previously held raw fish. This could result in cross-contamination; spoilage bacteria could transfer from the raw to the finished product.

Rinse and clean all fish carefully to remove slime, dirt and blood and to help remove harmful bacteria. Then fllet or split the fish, leaving the skin on the fllet. Cut the fllet into uniformly sized pieces so that no parts will get oversalted. Pieces should not be more than one inch thick. Pieces smaller than 1

the addition of any wood chips for between 30 minutes and 3 hours. The time required for the additional drying will depend upon the temperature and air circulation in the smoker and the general humidity level (often high in Southcentral and Southeast Alaska). If possible, avoid the longer times because the potential for bacterial spoilage becomes greater.

The fourth step of the process is smoking. There are many recipes for smoking using different times and temperatures, but only two basic methods:

1. "Hot" smoke: the internal product temperature reaches 160°F and higher. A cooked, smoked product such as kippers is produced.
2. "Cold" smoke: the internal product temperature is below 90°F. The resulting product is a raw, smoked fish such as lox or Nova Scotia-style salmon.

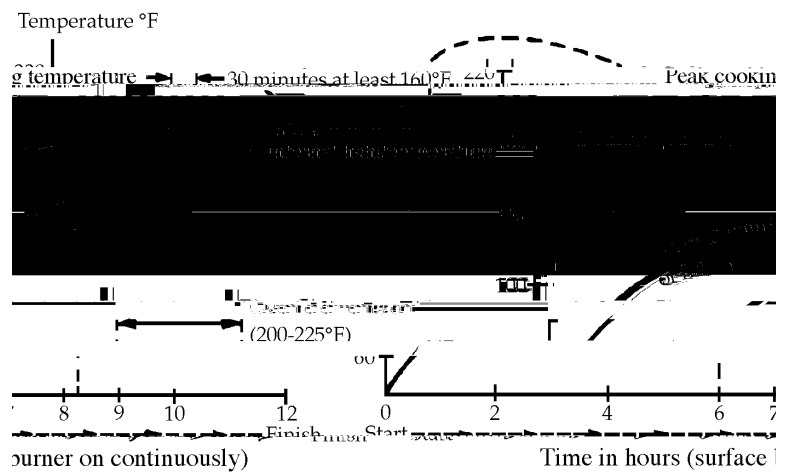
For most people, hot smoking is the most popular product and easiest to produce in home smokers.

Also, the temperatures recommended for hot smoking are high enough to kill most bacteria. Cold smoke temperatures are not hot enough to kill bacteria and actually may promote growth of bacteria.

Recommendations for each smoking method:

Hot Smoking

- Heat the fish to 160°F internal temperature (use a thermometer) for at least 30 minutes at some time during the smoking cycle, preferably toward the end. This temperature will kill most food spoilage bacteria, and combined with proper refrigeration will ensure a safe product. A typical fish smoking cycle (Figure 1) should bring the internal temperature of the fish to 160°F within 6 to 8 hours after placing it in the smoker.
- Use a standard meat thermometer to monitor internal temperature. Insert the thermometer into the thickest part of the fish.
- It is best to wait 3 to 5 hours before raising the



cycle.

internal temperature of the fish to 160°F. This will prevent curd formation and "exploded" pieces that occur when the temperatures are elevated too quickly.

- If the smoker does not heat hot enough to produce an internal temperature of 160°F in the fish, the smoked fish can be transferred to a home oven set at 300°F for a final heat treatment. Bring internal fish temperature to 160°F and bake for at least 30 minutes. Adjust the oven temperature as needed throughout this baking period to maintain the 160°F internal temperature. Be sure that hands, utensils and work surfaces are clean when transferring fish from smoker to oven to avoid cross-contamination.
- Depending on the desired finished product, smoking should take anywhere from 6 to 15 hours. Shorter heating and smoking times will result in moister finished products.

Cold Smoking

If cold-smoked fish will not be cooked prior to eating, the freezing step (page 2) is necessary to destroy harmful parasites that may be present in uncooked fish.

- Temperature control is very critical. Never allow the internal product temperature to exceed 90°F. At 95°F, the fish will start to cook.

erly protected smoked salmon will last for 2 to 3 months.

You MUST refrigerate or freeze the finished product in order to keep the smoked fish SAFE. Even vacuum-packaged smoked fish MUST be kept refrigerated or frozen. NEVER leave smoked fish at room temperatures. Please refer to FNH-00221, *Storing and Mailing Vacuum Packaged Fish*.

Heavy salt brine: 2½ pounds (4½ cups) of salt per