

home freezing of seafood

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Home freezing is not only an excellent method for preserving seafood, but an economical alternative, whether you catch the seafood yourself or buy it in season—when prices generally are lower.

Seafood products from the Pacific Northwest provide superior nutritional value and an opportunity to add variety to family menus. However, because most fresh seafood is seasonal, it's important to learn what the availability of seafood is in your area at certain times of the year. Your local fish dealer can provide you with this information and indicate which varieties are the best value. Fresh fish may be purchased by the pound in any of the following forms: dressed, steaks, fillets, and chunks.

Keep in mind that seafood products are more susceptible than most other food items to changes in color, flavor, and texture from exposure to air through a process called oxidation. Commercial and custom processors may use vacuum packaging, antioxidants such as vitamin C (ascorbic acid), and other techniques to control these changes. Seafood products can also spoil more quickly because the bacteria associated with them can grow at low temperatures. This means that they have a shorter shelf life than red meat. Because aquatic foods are

so sensitive to deterioration, freezing is an important way to maintain seafood quality.

Your family can enjoy seafood from the freezer that tastes almost as fresh and delicately flavored as the day it was caught, if you follow a few rules during preparation and storage.

If you catch your own fish

Fishers should be aware that the process of stiffening (rigor mortis) of freshly caught fish has a significant influence on the quality of the frozen product. The best quality frozen fish is produced from fish that have been handled and frozen *immediately after the process of rigor is over* and the fish muscle is relaxed.

Fish should be bled as soon as they are caught, and then iced immediately. Under these conditions, a fish will pass through rigor slowly, and there is less of a chance for gaping (separations in the meat) to occur. Passing through rigor could take up to a day for large fish. Make sure that ice completely surrounds the fish. (If the fish touches the sides of the container, it will cool too fast.) On a warm day, fish that have not been iced suffer a harsh rigor by going through the process quickly. This causes the flesh to tear and damages the muscle structure, especially if the fish is stiff when you handle it.

Fish flesh that was frozen *before* going through rigor should have excellent flavor, but it may be slightly tough if you thaw it before the 6–9 weeks it takes to pass through rigor during frozen storage. If you

have little influence over how your catch is handled or filleted, the best advice is simply to keep fish as cool as possible after catching it, ice the fish immediately after butchering or filleting, and freeze it as soon as possible. Remember: if you're ever in doubt as to the freshness of seafood, then by all means, *don't freeze it*. If you have a serious doubt about the quality or safety of the product, discard it.

Freezing can never improve the quality of a bad product. Handling fish poorly before freezing will make it impossible to obtain good results. Freezing can only slow the loss of quality of the fish—it can't put any quality back. In some cases, poor handling can start chemical changes that even freezing can't stop, such as oxidation of fats that lead to undesirable flavor and color changes.

Choosing the right package

You can prepare fish for freezing in any of several ways: dressed or pan-dressed, steaks, and fillets (Figure 1). It's usually best to freeze fish in a tightly wrapped package that will exclude air. An additional advantage is that these types of packages take up less storage space. It is also a good idea to wrap fish in meal size portions, so that only the product that is needed is removed from the freezer at one time.

Most undesirable seafood flavors and color changes are caused by oxidation of sensitive unsaturated fatty acids and pigments. These "heart healthy" unsaturated fatty acids are one of the most important nutri-

tional aspects of seafood products, particularly in fattier fish such as salmon and tuna.

Once oxidation starts, it's almost impossible to stop. This is why careful handling and proper packaging *before* freezing are essential. Loss of water during frozen storage (freezer burn) not only dries the fish out and toughens it, but it also promotes oxidation. Freezer burn is always accompanied by an "off" flavor, color change, and odor.

A vacuum sealing machine is one of the best ways to prepare seafood for freezing. Thawed fish will only "keep" for a couple of days, so do not thaw out more than you plan to consume right away.

Glass jars and plastic containers made for canning and freezing can also be good choices for freezing fish, as long as you make sure not to overfill the containers (allow for about 10% expansion during freezing) and have enough water frozen along with the product (glaze or otherwise) so that the fish is not exposed to air—which would encourage both oxidation and freezer burn. Freezer paper, as well as plastic bags and cling plastic wrap manufactured for freezer use, can also prevent moisture loss and keep oxygen from contacting frozen seafood.

Preparing seafood for freezing

To clean and dress fish:

1. Remove the scales by scraping with the dull edge of a knife.
2. Remove the entrails by cutting the entire length of the belly from vent to head.
3. Remove all blood and kidney tissue.
4. Cut off the head above the collar.
5. Remove fins and backbone if desired.
6. Wash the fish thoroughly in cold running water.

It's now ready for the freezer.

Prepare steaks by cutting the fish crosswise into slices about 3/4 inch thick. Cut fillets with a sharp knife from each side of the fish from head to tail. Flat fish and smaller fish, like

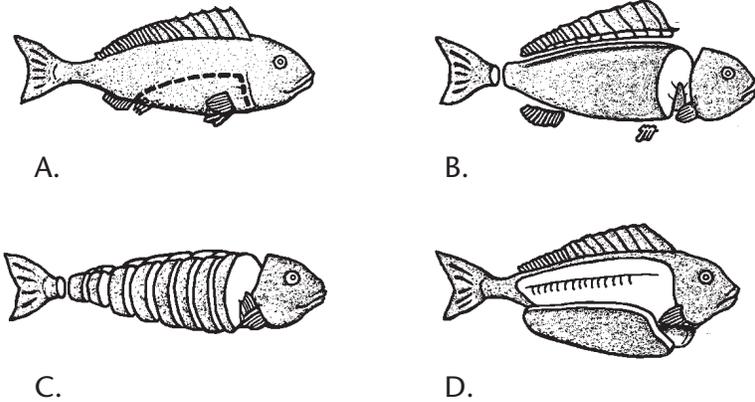


Figure 1. Some of the forms in which fish are cut for freezing. A. Drawn—whole fish with entrails removed; B. Dressed or pan-dressed—whole fish with scales, entrails, head, tail and fins removed; C. Steaks—cross-section slices from large dressed fish; D. Fillets—sides of the fish, cut lengthwise away from the backbone.

small perch, can be filleted without eviscerating.

Shrimp

The small pink Pacific shrimp available on the market are already cooked, peeled, and ready to eat or freeze. Larger prawns may be either raw or cooked. Shrimp freezes well in either vacuum bags or re-sealable freezer bags.

Whole crab

To prepare crab meat for freezing, remove the back shell and break the crab in half, front to back, shaking out the viscera. Thoroughly clean the crab under a flow of fresh water. Remove any newly forming shell (a jelly-like substance containing dark pigments).

Cook in boiling salt water (2–4 Tbsp. per gallon, according to your taste preference) for 12–15 minutes. Some people prefer the flavor of crab cooked with the back left intact, if you use this method, add 10 minutes to the cooking time. Add 2–3 minutes to the cooking time if the water doesn't boil within a few minutes after adding the crab.

To remove the edible portion from the crab, place on ice or in the refrigerator until it is just cool enough to handle, then shake the meat from the legs and body cavity. It is easier to clean crab while it

is still somewhat warm. To avoid cross-contamination, do not return the cooked crab to any of the baskets or trays used for the raw crab.

Clams

Remove visible sand and dirt. Sometimes, allowing clams to sit in cool fresh seawater or a weak salt water solution for several hours will remove most internal dirt and sand. Wash all clams carefully in fresh water.

Open raw clams with a knife (cut both adductor muscles with the knife point) or pour boiling water over them until they open. Remove the shell (and neck "skin" on some species). Slit the neck (or siphon) lengthwise and open the stomach to clean. Wash the meat thoroughly.

Oysters

Wash with a strong spray before removing the whole meat, including the eye (adductor muscle), from its shell. Collect the meat in a strainer to allow drainage, and then wash in a mild salt solution to free it of sand and dirt. Commercially shucked oysters are ready to freeze.

Wrapping seafood for the freezer

Figure 2 shows several types of wrappings and containers. Gener-

ally speaking, pan-dressed, small whole fish, fish steaks, and fillets (raw or cooked) are easy to prepare for freezing. First, wrap them tightly and individually (double thickness, if possible) in cling plastic wrap, forming a tight “skin” around the product.

Put the individually wrapped items into a “master bag.” A heavy-duty polyethylene freezer bag is recommended—but avoid placing more than 1 pound of product per master bag. Wrapping in foil is also satisfactory. Wrapping smaller portions of seafood individually lets you thaw pieces separately, quickly, and in the quantity you want to use.

Large fish and shellfish and crabs in their shells have large exposed surface areas that are difficult to protect from oxidation and freezer burn. The best way to handle these fish is simply to freeze them unwrapped or in a loose plastic bag. After they are frozen, cover the fish with a protective glaze of ice.

To glaze fish or shellfish, dip the frozen product in cool water, coating the entire surface with a

thin layer of ice. This will serve as a protective coating during frozen storage. Then, place the fish in freezer storage bags. Because the glaze can be lost as a freezer cycles, you may need to reglaze the product every 5–6 weeks.

Another technique for smaller fish is to freeze them in a can or carton filled with water. If you can’t tightly pack the fish in a container, place individually in the freezer just until frozen, then remove briefly to run ice cold water over them. This will add a protective glaze, but also has two disadvantages:

1. You will need more time to thaw the entire package to remove any portion of its contents.
2. Some seafood items, such as shucked shellfish or shrimp, have a tendency to leach flavor and colors into ice and therefore lose quality.

Raw or cooked seafood can be frozen in a canning jar or a new waxed or plastic carton. If natural juices don’t cover the product, you can add a small amount of water to cover the contents to reduce freezer burn. Be sure to leave at least one-half inch of space at the top of the container for ice expansion during freezing. This is very important to prevent glass jars from breaking due to the volume expansion of water when it freezes into ice. For containers with a great deal of headspace, it may help to protect the top layer of food by topping off the container with fresh water after the bulk of material in the container has frozen.

The importance of excluding as much air as possible from the package to limit oxidation can’t be overemphasized. Besides promoting oxidation, air acts as an insulator and slows the freezing process. Any pocket of air between the package wall and its contents will promote the formation of large ice crystals that can damage the product, increasing drip, change the texture or flavor, and cause surface dehydration.

Even after seafood freezes, water molecules will migrate from inside the muscle cells to packaging surfaces as the freezer cycles and each

time the freezer door is opened. During these cycles the product warms up slightly and a small amount of melting occurs. The moisture released moves out from the tissue to the product surface or from the product surface to inside the package. When the package is cooled down again, the liquid water will settle on the existing ice crystals, making them larger. As this cycle repeats itself, a large quantity of water can be removed from the food, leaving it severely dehydrated and of very poor quality.

Vacuum packaging can reduce both this effect of freezing and the oxidation that accompanies it. If you use a vacuum packaging machine, be sure to follow the manufacturer’s directions and freeze the package immediately after sealing.

Labeling seafood for the freezer

Trying to guess the age and contents of a frozen package of seafood can be frustrating and wasteful. People often discard food because they don’t know how long it has been stored. Although properly frozen and stored food isn’t likely to become harmful after long-term storage, the product will no longer be top quality.

To avoid such waste, label each package with the date, species, form of seafood (for example, “tuna steak” or “trout fillets”), and the approximate weight or number of servings or pieces. A crayon, grease pencil, or permanent marker is ideal for this purpose.

Attaching a record near the freezer will also allow you to keep track of inventory. It should carry the same information you placed on the package, as well as the location of each package in the freezer, the package size, and a current record of the number of packages you’ve put into and removed from the freezer. This prevents unnecessary searching for a particular package—and the harmful practice of warming of the contents while the freezer door is open.



Figure 2. Types of containers and wrappings for freezing seafood that are readily available at your local market (brand-name products are shown here as examples only; no endorsement of products is intended).

Storing seafood in the freezer

Usually, the faster any food is frozen, the better the quality and the longer the storage life. This is partly because there is less cell destruction during freezing as smaller, and therefore less damaging, ice crystals are formed. Slow freezing may actually encourage food spoilage through enzyme reactions that occur at low temperatures because reactants are more concentrated when food is in a semifrozen state.

Home freezers are designed for storage, but not rapid freezing; most can properly freeze about 1–2 pounds per cubic foot in 24 hours. Don't overload your freezer, and don't pack the unfrozen seafood too tightly—either of these practices can greatly reduce the freezing rate, extend the time it takes to freeze the product, and result in reduced quality.

To obtain the fastest freeze, place packages in direct contact with the freezer floor or walls until they're frozen. If the packages take more than 5–6 hours to freeze, they are too large for long-term storage in your freezer. Either reduce the package sizes or take to a commercial locker that has adequate refrigeration capacity.

Store your packages at a consistent 0°F or colder. Generally, the

farther away from the freezer door, the more stable the temperature. As mentioned above (“Wrapping”), temperature fluctuations can harm the quality of frozen seafood. Although commercial packaging may allow more than a year of good shelf life, freezing methods available in the home won't generally permit storing seafood that long *while still maintaining its flavor and texture*.

Most home-frozen seafood should not be stored more than 6 months, and not more than 3 months for salmon and crab to maintain optimal quality. A good rule for a continuous supply of high-quality frozen foods is “first in-first out.” For really good eating, 1–2 months of storage should be the maximum, as these foods deserve to be eaten at the peak of their quality.

Thawing seafood

Properly thawing seafood is almost as important as properly freezing it. Usually, the quicker you thaw a product, the better. However, avoid the use of hot water, as it can cause seafood to cook. Thawing in a refrigerator is a slow process; it can take several days to thaw a large fish in a refrigerator near 40°F. Seafood can be thawed in a microwave oven using defrost cycles, but make sure to follow the manufacturer's instruc-

tions and rotate or turn the product often to avoid scorching.

Bacterial spoilage from microbes growing on the surface of the product can take place quickly if you thaw seafood at room temperature or in warm water. This practice should not be used if it will take more than a couple of hours to thaw the product and you don't cook thoroughly prior to consumption (for example, with molluscan shellfish or smoked seafood).

One of the best methods for thawing involves running cold tap water on containers and large packages. For this to be successful, the containers must be watertight (if they have been properly packaged, they *should* be watertight). As soon as you can pull the package contents apart, continue thawing the product in the refrigerator. To maintain food safety, seafood should be cooked immediately after thawing.

Important: *Smoked and kippered seafood is perishable, and has a shelf life that is only a little longer than fresh fish. Always keep smoked or kippered fish in the refrigerator and consume within 2–3 weeks.*

For more information see:

PNW0183, *Fish Pickling for Home Use*
PNW0194, *Canning Seafood*
PNW0450, *Home Canned Smoked Fish*

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