

MARINE ADVEISORY

SEA GRANT COLLEGE PROGRAM — TEXAS A&M UNIVERSITY

KEEPING FISH "TOURNAMENT FRESH"

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Fish, unlike beef or wine, does not improve with age. Fish quality is at its peak when it first comes from the water. About all a person can do is to take steps to preserve the existing quality and freshness.

If you are competing in a fishing tournament there are several reasons why you will want to keep your fish fresh.

First, most tournaments have a freshness requirement for all entries. So you'll want to keep your fish fresh enough to meet tournament standards.

Secondly, if you plan to eat your catch, be aware that the products of decomposition in fish flesh produce an objectionable odor and taste. Also, there exists a possible danger to one's health from ingesting bacteria and their toxins produced in stale or in inadequately preserved fish.

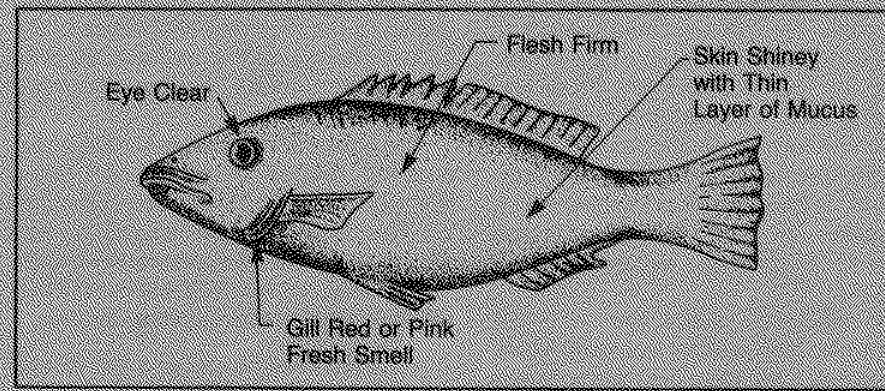
By keeping fish fresh on board your boat, it's possible to extend their storage life in your home refrigerator or freezer.

Finally, Texas has a fishery conservation law requiring that all sport fish taken into one's possession be kept in a fresh, edible condition.

Temperature and Time Determine Freshness

The two factors most potentially damaging to fish freshness are temperature and time. Fish have powerful enzyme systems in many organs that function naturally at relatively low temperatures. After the fish dies, these same enzymes can help speed the chemical breakdown and decomposition of tissues associated with spoilage. By lowering the temperature of a fish sufficiently through proper icing, the reaction rate is slowed, thus extending freshness.

Bacteria that normally live in, on and around the gut, gills and body surfaces of the fish grow rapidly at moderate temperatures, spreading through all the tissues and adding to the spoilage. If fish



Freshness indicators

are exposed to sunlight for even a few minutes, the resultant increase in temperature not only speeds bacterial growth, but causes dehydration as well. Fish weight loss from dehydration is preventable and certainly should be a concern of any fishing tournament contestant.

Careless handling of fish on deck may bring them into contact with gasoline, diesel fuel, lube oil or other contaminants causing loss of freshness.

Maintaining Freshness: The Fisherman's Responsibility

Ideally, fish should be bled, gutted and gilled aboard the boat before being iced. If the fish are gutted and gilled they should be stored belly-down. Fishermen should be careful not to cut into the gall bladder, stomach or intestine.

Gutting and gilling not only remove most of the bacteria-laden organs that contain powerful enzymes, but it conserves ice as well. More ice could be saved if the heads and tails also were removed. However, Texas law requires that all fish, with the exception of broadbill swordfish, shark and king mackerel, have heads and tails attached until delivered to their final destination.

Naturally, any fish being entered in a fishing tournament should remain whole. If whole fish are iced sufficiently, there will be little loss in quality within a day or so. If properly cared for, any

tournament fish should be good to eat.

Fish can be stored aboard the vessel in several ways to maximize freshness. These include using crushed ice in an insulated cooler, block ice in an insulated cooler, crushed ice in an insulated fish bag or perhaps storing the fish in the shade and covering it with wet burlap or terrycloth.

If the fish are to be stored in a built-in boat fish well, check with the manufacturer to be sure it is insulated on all sides. Rapid melting of ice in a fish well indicates inadequate insulation.

Each of these storage methods was tested and found to be, with certain considerations, effective in keeping fish fresh. The cooler or bag size should, within reason, match the size of the fish. This helps conserve ice needed to cool the fish adequately.

Ideally, after being caught, a fish's temperature should be lowered as quickly as possible and be maintained near freezing until the fish is utilized. This can best be accomplished by keeping crushed ice in contact with the entire surface of the fish's body. As the ice melts, it absorbs heat from the body of the fish.

Block ice melts slowly, and, therefore, absorbs heat at a slower rate. Also its limited surface area will drastically reduce the amount of body surface contact, thereby reducing its cooling efficiency.

An insulated fish bag proves satisfac-

tory when used with crushed ice. As the ice melts, water drains out of the zipper or velcro strip. When possible new ice should be added through a small opening in the bag rather than unzipping the bag entirely.

A minimum of one pound of ice per pound of fish per day fishing trip is recommended. New ice should be added to replace that which has melted. Once fish have cooled sufficiently, the melting rate is slowed and less ice is required to maintain the low temperatures. Variables affecting melting rate of ice are air temperature, water temperature where the fish are caught, amount of insulation and efficiency of the cooler.

Leaving fish on deck in the shade and covering them with burlap has proved to be a marginal storage method. By occasionally splashing with water, the temperature of these fish was lowered several degrees. The principle involved is heat absorption through evaporation of water.

The efficiency of the system is decreased by high relative humidity which is most often the case over water. In any respect, tests show the method should not be relied upon for more than four or five hours in warm weather.

Probably the worst thing a fisherman could do would be to cover a fish with a plastic tarp and leave it on deck in the hot sun for several hours. The plastic prevents adequate ventilation and heat is allowed to build up much like that of an incubator.

How Fish Freshness Tests Are Administered

Freshness standards required by tournament officials are usually equivalent to those possessed by fish given reasonable care over the tournament time period. Bear in mind, loss of freshness in fish can occur from neglect or abuse over a few hours time as well as during

prolonged storage under ideal conditions.

Evaluation of appearance, texture, color and smell can reveal much about how long a fish has been dead and how well it's been iced. In addition to these criteria, judges can use other means to determine fish freshness, the most practical being the Torrymeter and the light microscope.

The Torrymeter is a hand-held electronic device that senses the dielectric properties of fish flesh, converts them to a whole number on a scale between zero and 16, and displays it on a lighted panel. As the dielectric properties of the tissues change during spoilage, the subsequent Torrymeter readings decrease in value.

The light microscope is useful in examining stained blood smears taken from the hearts of the fish being evaluated. This technique is employed to identify fish that have been previously frozen.

Properties of fish that will most likely result in their disqualification include:

1. Flesh that produces a Torrymeter value of five or more below maximum for the species.
2. Gills that are white, gray, brown or any color other than red or pink.
3. A sour, ammonia, spoiled, rotten or any other objectionable odor.
4. A clouded crystalline lens of the eye and/or blood that contains free red blood cell nuclei.

Other indicators that judges may evaluate include:

1. Absence of mucus on skin.
2. Lack of rigor or stiffness in the body.
3. Skin that wrinkles excessively when body is bent.
4. Flesh not springy, but rather soft or mushy.
5. Eyes that are externally very cloudy or wrinkled.
6. Heavy slime on gills.

7. Skin sloughed off around the head or operculum.

8. Skin that appears dull rather than shiny.

Summary

If fishermen take reasonable care of their catch, they need not worry about being disqualified from a fishing tournament because of the freshness requirement. They also are assured of some excellent tasting and nutritious seafood meals for their effort.

In summary, the following suggestions should be followed to ensure fish freshness aboard fishing vessels:

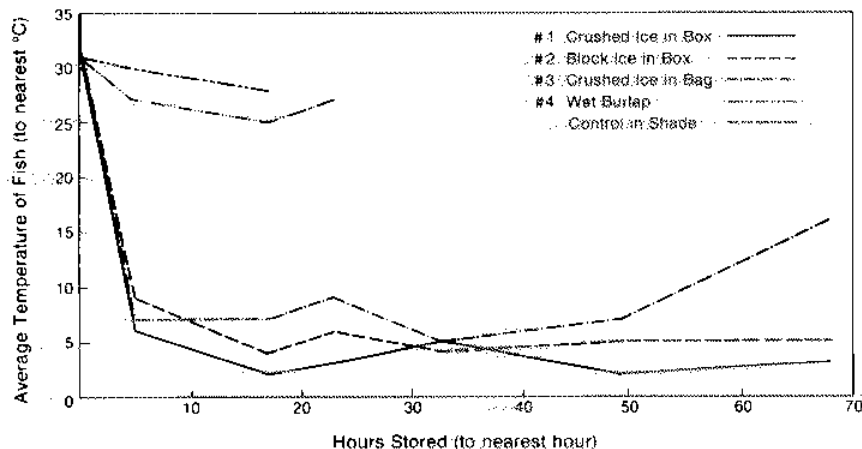
1. Fish should be stored, belly-down if dressed, in an insulated fish cooler or bag. The liner of the box or bag should be impervious to water to insure that the insulation remains dry. If a built-in boat fish well is used, be sure it is insulated on all sides. Rapid melting of ice in a fish well indicates inadequate insulation. The cooler or bag size should match the size of the fish to conserve ice.

2. The fish should be placed on ice as soon as possible after being caught. Even a 15-minute delay in hot weather could be detrimental to fish freshness.

3. Ice, preferably crushed, should be applied to fish at a weight ratio of no less than one to one. As ice melts, more should be added. Ice should remain in contact with fish on the entire surface of their bodies. In other words, don't layer fish upon fish. Do not allow fish to remain in water.

4. Don't delay in getting fish to their final destination. If you think your fish has a chance to win a tournament, get it to the weigh-in station as soon as practical. Delaying causes loss of body weight due to dehydration. If your fish is adequately iced, its freshness is ensured. If not, you run a chance of having it disqualified.

Cooling Efficiency of Various Storage Methods
(Using King Mackerel)



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