



Seafood Health Facts: Making Smart choices

Balancing the Benefits and Risks of Seafood Consumption

Resources for Healthcare Providers and Consumers

Seafood Handling and Storage [1]

Seafood Quality and Shelf Life

While proper handling and storage is critical to the quality and safety of all perishable food commodities, seafood is more perishable than many. Spoilage is a complex process caused by enzymes present in the flesh and by microbes that invade the flesh after death. Microorganisms can come from the marine environment, water pollution, or contamination caused by improper handling. These microbes increase the rate of spoilage and some can cause illness. For many seafood products, increasing the storage temperature from 32°F to 40°F can double the rate of spoilage. Intrinsic factors such as size (small vs. large), post mortem pH (acidity), fat content (fatty vs. lean) and skin properties (thick vs. thin) can all impact the spoilage rate of fish stored in ice. The fact that post mortem pH is usually higher in fish than warm-blooded animals may account for its higher perishability. In addition to bacteria and enzymes, the highly unsaturated fat in fish can deteriorate due to fat oxidation causing rancid or other off odors or flavors. There are many factors influencing the shelf life of different types of seafood. Due to the large variety of species, it is difficult to tailor optimum handling and storage criteria to specifically fit every type of finfish and shellfish. However, there are key practices that can maximize quality and, most important, ensure the safety of all types of seafood.

Seafood and Foodborne Illness

All food commodities can have food safety problems if they are not handled, prepared, cooked, stored and even harvested in ways that are consistent with the recommendations, guidelines or regulations of the FDA and USDA. Microbial food safety concerns can be bacterial, viral or parasitic. Examples include: *E. coli* 0157:H7 in hamburger; *Salmonella* and *Campylobacter* in chicken; *Trichinosis* in pork; *E. coli* 0157:H7 and *Salmonella* in produce; *Listeria* in soft cheeses, deli meats and other ready-to-eat food products; *Vibrio* or enteric viruses in shellfish; and parasites in sushi. Therefore, the general recommendations for maintaining quality and ensuring safety for seafood products are similar to those for any other perishable food product.

Quality problems and microbial hazards that cause foodborne illness in seafood can originate from point of purchase or when recreational fish are caught and continue to the table. The condition of the product when it is purchased ([see Guide to Selecting Seafood \[2\]](#)) or where it was recreationally caught ([see Recreational Fish State Advisories \[3\]](#)s) will directly affect its quality and safety. Once a consumer buys or catches their own fish or shellfish, subsequent improper storing, handling, preparing and cooking could lead to foodborne illness. Temperature control, cleanliness, proper hygiene, proper cooking, and prevention of cross-contamination will help prevent illness.

Pathogens of Potential Concern

As with all food commodities, there are many different pathogens that have been associated with seafood products. Pathogens can be present in the waters in which fish or shellfish live or they can be introduced when it is harvested or by improper handling and cross-contamination. Some pathogens that have been associated with seafood products include:

Bacillus cereus

Human enteric viruses

Listeria spp.

Salmonella spp.

Staphylococcus aureus

Vibrio spp.

Selecting, Handling and Preparing Seafood Safely

Food allergies may be a safety consideration that individuals should be aware of before selecting seafood products. For example, individuals need to be aware of any allergies that they might have to specific types of fish, shellfish (clams, oysters) or crustaceans (shrimp, lobsters, crab). Finfish and crustaceans are two of the eight key allergens that account for 90% of allergic responses from food. Since proper cooking and handling will not remove the allergenic properties of the food, it is necessary for individuals to avoid the food of concern. For more information on food allergies see the Food Allergy and Anaphylaxis Network (FAAN) website ([To visit this site click here](#) [4].)

Proper cooking is the most common and effective way to ensure that food safety concerns from bacteria, viruses and/or parasites that could be present in seafood and other raw foods is eliminated or controlled. Foods that will not be fully cooked before they are eaten pose a higher risk for foodborne illness, and certain groups should be discouraged from choosing these products. Individuals with underlying gastrointestinal disorders, the young, the elderly, individuals with a compromised immune system, and females that are pregnant or nursing should be advised against eating raw or undercooked seafood products like raw fish or shellfish, cold smoked seafood, and ceviche.

Heat stable toxins can be a concern in seafood and other foods that are contaminated or temperature abused. Proper cooking cannot be relied upon as an absolute control for these food safety hazards. Improper handling could lead to formation of heat-stable microbial toxins or biogenic amines that cannot be removed with cooking. When certain types of fish like tuna, mahi-mahi and mackerel are temperature abused, biogenic amines like histamine can be formed which cannot be eliminated by cooking. Value-added products like stuffed, breaded, and battered items that are temperature abused could also contain heat stable toxins.

Temperature control is the key to safety for these products. All seafood products should be kept at refrigeration temperatures as close to 32°F as possible to prevent the growth of microbial pathogens and prevent toxin formation.

Specific guidelines for selecting, handling and preparing seafood safely include:

- Purchase seafood products from a reputable establishment and avoid any products that an individual may be allergic to.
- Keep seafood cold (as close to 32°F as possible) from the time of purchase or harvest until you are ready to cook or prepare it. Store it on ice during transport and in the refrigerator.
- Keep preparation areas clean.
- Practice good personal hygiene.
- Seafood is perishable, use it quickly.
- Cook it properly (145°F for 15 seconds or until flaky and opaque - no longer translucent).
- Store leftovers properly at refrigerated temperatures (less than 40°F).

Resources

Fresh and Frozen Seafood: Selecting and Serving it Safely. FDA publication outlining the key issues about shopping, storing, preparing, and serving seafood along with special health notes. [To view this publication click here](#) [5].

A Consumer Guide to Safe Seafood Handling. This bulletin is published by the Marine Advisory Service, Sea Grant Program at the University of Delaware and provides a detailed guide to selecting, storing, preparing and cooking seafood. [To view this bulletin click here](#) [6].

Safe and Nutritious Seafood in Virginia. Publication 348-961. 2008. This publication was produced by seafood specialists at Virginia Polytechnic Institute and State University and provides an overview of

maintaining the safety and quality of seafood. [To view this publication click here](#) [7].

Seafood Savvy: A Consumer's Guide to Seafood Nutrition, Safety, Handling and Preparation. Bulletin 104IB226. Produced as a Cornell Cooperative Extension Publication, this brochure contains information about seafood and its nutrition along with suggestions about buying/selecting, handling, storing, and preparing. It also provides some information about seafood nutrient composition. [To view this publication click here](#) [8].

Seafood Network Information Center. This seafood Website at the University of California, Davis provides a wealth of information about quality and safety as well as consumer fact sheets. [To visit this site click here](#) [9].

Food Allergy and Anaphylaxis Network (FAAN). This Website contains information on food allergies, the major food allergens, current research and advocacy activities. [To visit this site click here](#) [4].

Seafood Health Facts Consumer and Health Professional brochures. The publications produced by this project on seafood health and safety for consumers and for healthcare professionals.

 [final-seafood-health-3fold-brochure.pdf](#) [10]  [final-seafood-health-reference-guide-for-professionals.pdf](#) [11]



© Copyright 2018. Project partially funded through a grant from from the National Aquaculture Extension Initiative of the National Sea Grant Program (Grant No. NA13OAR4170203), NOAA, U.S. Department of Commerce and the National Integrated Food Safety Initiative (Grant No. 2007-51110-03815) of the National Institute of Food and Agriculture, U.S. Department of Agriculture. This website is owned and maintained by Delaware Sea Grant.

Source URL:

<https://www.seafoodhealthfacts.org/seafood-safety/general-information-healthcare-professionals/seafood-handling-and-storage>

Links

[1] <https://www.seafoodhealthfacts.org/seafood-safety/general-information-healthcare-professionals/seafood-handling-and-storage>

[2] http://seafoodhealthfacts.org/seafood_safety/practitioners/selecting_seafood.php

[3] <http://www.epa.gov/waterscience/fish/states.htm>

[4] <http://www.foodallergy.org/>

[5] <http://www.fda.gov/food/resourcesforyou/consumers/ucm077331.htm>

[6] <http://www.deseagrant.org/products/mas-bulletin-consumers-guide-safe-seafood-handling>

[7] <http://web.vims.edu/adv/seafood/nutrition.htm>

[8] <http://www.seagrant.sunysb.edu/seafood/article.asp?articleID=231>

[9] <http://seafood.ucdavis.edu/%EF%BF%BD/%EF%BF%BD/>

[10] <http://dev-seafoodhealthfacts.pantheon.io/sites/default/files/final-seafood-health-3fold-brochure.pdf>

[11] <http://dev-seafoodhealthfacts.pantheon.io/sites/default/files/final-seafood-health-reference-guide-for-professionals.pdf>