



Seafood Health Facts: Making Smart choices

Balancing the Benefits and Risks of Seafood Consumption

Resources for Healthcare Providers and Consumers

Parasites [1]

Introduction

All living organisms, including fish, can have parasites. Parasites are a natural occurrence, not contamination. They are as common in fish as insects are in fruits and vegetables. There are two types of parasites that can infect people through food or water: parasitic worms and protozoa. Parasitic worms include roundworms (nematodes), tapeworms (cestodes) and flukes (trematodes). These worms vary in size from barely visible to several feet in length. Protozoa are single-cell animals, and cannot be seen without a microscope.

Just as there are risks to eating raw or undercooked meat, there are also risks with eating raw, undercooked, pickled, and lightly or cold-smoked seafood dishes. Parasites do not present a health concern in thoroughly cooked fish.

Parasites become a concern when consumers eat raw or lightly preserved fish such as sashimi, sushi, ceviche, and gravlax. When preparing these products, use commercially frozen fish. Alternatively, freeze the fish to an internal temperature of -4°F for at least 7 days to kill any parasites that may be present. Home freezers range from 0°F to 10°F and may not be cold enough to kill parasites.

Parasites (in the larval stage) consumed in uncooked, or undercooked, unfrozen seafood can present a human health hazard. Among parasites, the nematodes or roundworms (*Anisakis spp.*, *Pseudoterranova spp.*, *Eustrongylides spp.* and *Gnathostoma spp.*), cestodes or tapeworms (*Diphyllobothrium spp.*) and trematodes or flukes (*Chlonorchis sinensis*, *Opisthorchis spp.*, *Heterophyes spp.*, *Metagonimus spp.*, *Nanophyetes salminicola* and *Paragonimus spp.*) are of most concern in seafood. Some products that have been implicated in human infection are: ceviche (fish and spices marinated in lime juice); lomi lomi (salmon marinated in lemon juice, onion and tomato); poisson cru (fish marinated in citrus juice, onion, tomato and coconut milk); herring roe; sashimi (slices of raw fish); sushi (pieces of raw fish with rice and other ingredients); green herring (lightly brined herring); drunken crabs (crabs marinated in wine and pepper); cold-smoked fish (lox); and, undercooked grilled fish.

The process of cooking (145°F for 15 seconds) raw fish sufficiently to kill bacterial pathogens is also sufficient to kill parasites.

The effectiveness of freezing to kill parasites depends on several factors, including the temperature of the freezing process, the length of time needed to freeze the fish tissue, the length of time the fish is held frozen, the fat content of the fish, and the type of parasite present. The temperature of the freezing process, the length of time the fish is held frozen, and the type of parasite appear to be the most important factors. For example, tapeworms are more susceptible to freezing than are roundworms. Flukes appear to be more resistant than roundworms.

Freezing and storing at -4°F (-20°C) or below for 7 days (total time), or freezing at -31°F (-35°C) or below until solid and storing at -31°F (-35°C) or below for 15 hours, or freezing at -31°F (-35°C) or below until solid and storing at -4°F (-20°C) or below for 24 hours is sufficient to kill parasites. FDA's Food Code recommends these freezing conditions to retailers who provide fish intended for raw consumption.

Trimming away the belly flaps of fish or candling and physically removing parasites are methods for reducing the numbers of parasites. However, they do not completely eliminate the hazard, nor do they minimize it to an acceptable level.

The health risk from parasites is far less than the risk from bacterial pathogens and mishandling of seafood.

Additional Links for More Information:

A California Sea Grant publication "[Fish Parasites and Human Health, Epidemiology of Human Helminthic Infections](#) [2]" by J. Sakanari, et al. includes the life cycles of common parasites in freshwater and marine fishes, transmission, and prevention.

The US Food and Drug Administration's "[BAM](#) [3]" (Bacteriological Analytical Manual) has a chapter on Parasitic Animals in Foods which discusses techniques for examining foods for the presence of parasites. An in-depth discussion of the candling method with finfish and molluscs is described.

The US Food and Drug Administration's "Bad Bug Book" (Foodborne Pathogenic Microorganisms and Natural Toxins Handbook) includes basic facts on foodborne pathogenic microorganisms and natural toxins. The material is collected from the Food and Drug Administration, the Centers for Disease Control & Prevention, the USDA Food Safety Inspection Service, and the National Institutes of Health.

[Bad Bug Book: *Anisakis simplex* and related worms](#) [4]

[Bad Bug Book: *Diphyllobothrium* spp](#) [5].

The US Food and Drug Administration's "[Fish and Fisheries Products Hazards and Controls Guidance](#) [6]" describes the potential hazard of parasites and methods of its control in commercially processed seafood.

The U.S. Food Code 2009 provides the time and temperature for parasite destruction (see [Food-Freezing, Chapter 3, Section 402.11](#) [7])

[CDC: A-Z Index of Parasitic Diseases](#) [8]



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Links

[1]
<https://www.seafoodhealthfacts.org/seafood-safety/general-information-healthcare-professionals/seafood-safety-topics/parasites>

[2] <http://nsgl.gso.uri.edu/cuimr/cuimrt95001.pdf>

[3]
<http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/UCM071468>

[4]
<http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070768.htm>

[5]
<http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070785.htm>

[6]

<http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/Seafood/FishandFisheriesProductsHazardsandControlsGuide/ucm091704.htm>

[7]

<http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodCode/FoodCode2009/ucm186451.htm>

[8] <http://www.cdc.gov/ncidod/dpd/parasites/index.htm>