

Commercially Farmed and Wild-Caught Salmon Bon Appétit!

Salmon is the second most popular type of fish eaten in America. It tastes savory and earthy, yet slightly sweet and is among the richest sources of long-chain omega-3 fats. It is also full of high quality protein, vitamins, and minerals. Research shows that eating fish like salmon promotes healthy hearts and brain development. All types of commercial salmon are healthful to eat. The most readily available kinds in the U.S. are wild Pacific and farmed Atlantic salmon. Farmed and wild salmon are similar in many ways.

Frequently asked questions about salmon

How do farm-raised and wild-caught salmon differ?

Farm-raised and wild-caught salmon are usually different species of fish. Most farm-raised salmon are Atlantic salmon. Wild populations of Atlantic salmon are generally at very low levels and their commercial harvest is limited. Farm-raised fish are hatched, raised, and harvested under controlled conditions similar to other farmed animals except they are raised in water. Farmed Atlantic salmon are readily available year-round in fresh or frozen forms.

Most wild-caught salmon are one of five species of Pacific salmon. They are harvested by fishing with a variety of gear types mostly in the north Pacific from about June through September. Fresh wild Pacific salmon are available during this time. The rest of the year, frozen or canned wild salmon are available.

How are farmed and wild salmon similar?

Farmed and wild salmon have very similar nutrients. Atlantic salmon and each species of Pacific salmon look a lot alike on the outside. But between species and even within the same species, each type of salmon can have different flavors, textures, and flesh color. How the fish is processed and handled can also dramatically influence these characteristics.

In taste tests between farmed and wild-caught salmon sometimes farmed salmon is preferred and sometimes taste panels prefer wild fish. However, often these taste tests compare farmed and wild-caught salmon of different species and are not really designed to tell the difference between the taste of the farmed and wild-caught version of the same type of salmon.

Often wild-caught salmon is higher priced than farmed salmon. Especially when buying fish fillets, it can be hard to tell the difference between how wild-caught and farmed salmon look. It may take DNA analysis to confirm the identity of the species. Species substitutions sometimes occur, either accidentally or through business practices that mislead consumers. Consumers should buy salmon from trustworthy retailers and restaurants with good reputations.

Commercial Salmon Facts

Atlantic salmon, *Salmo salar*, are more closely related to brown trout than to the Pacific salmon of the genus *Onchorhynchus*. Atlantic salmon have been domesticated and selectively bred for many generations. They are the primary species used in fish farming. They are grown in net pens in coastal waters and are typically harvested at a weight of 8 to 10 pounds and a length averaging 28 to 30 inches. Greatly reduced populations of wild Atlantic salmon still spawn in rivers on both sides of the Atlantic. Historically of great commercial importance, today less than 1% of commercially available Atlantic salmon are from the wild.

Chinook salmon, *Onchorhynchus tshawytscha*, also known as king salmon, live from San Diego to Japan with successful new populations in the Great Lakes and New Zealand. Chinook is the largest of the Pacific salmon species weighing on average 20 pounds and ranging from 30 to 40 inches in length. Small quantities of farmed Chinook salmon can be found in the marketplace.

Sockeye salmon, *Oncorhynchus nerka*, also known as red salmon, is an important commercial species in British Columbia and Alaska. Its bright red flesh is prized for canning and for fresh and frozen products. It is the second most abundant Pacific salmon species. The average weight of fish in the market is approximately 6 pounds and reaches up to 34 inches in length. Landlocked sockeyes are called kokanee and are popular with recreational fishers.

Coho salmon, *Oncorhynchus kisutch*, also known as silver salmon, live from northern Baja California to Korea. The average weight is 10 pounds and they range from 25 to 35 inches in length. Small quantities of coho salmon are also farmed and can occasionally be found in the marketplace.

Pink salmon, *Onchorhynchus gorbuscha* are also known as humpback salmon because of their large hump when releasing eggs. Pinks are the smallest but most abundant Pacific salmon, generally weighing 2 to 3 pounds with a length up to 30 inches. They live from Puget Sound to Russia. Most pinks are canned and tend to cost less than other types of salmon.

Chum salmon, *Oncorhynchus keta*, are also known as silver-bright, keta, or dog salmon. Chum is the second most abundant Pacific salmon. The average weight is 8 pounds and they can grow to 27 inches long. They are relatively easy to farm, and large hatchery programs in Japan and southeast Alaska complement wild populations. Chum are harvested commercially in large numbers when they return to their release site. Like the pink salmon, chums tend to cost less than other types of salmon. They are sold canned, smoked, and as fresh, and frozen.

What do salmon eat?

For survival and growth, both farmed and wild-caught salmon need a well-balanced diet of protein, vitamins, minerals, and pigments. In the wild, salmon eat zooplankton and fish. About 10 pounds of prey is needed to make one pound of wild-caught salmon. This means wild salmon have a food conversion rate (FCR) usually around 10:1.

Farmed salmon need the same well-balanced diet to live and grow. They are fed a combination of fish meal, fish oil, and other land-based protein sources. The FCR is usually around 1:1, so about one pound of feed is needed to make one pound of farmed salmon. However, it should be noted that the water content in prey is much higher than in feed.

Some nutrients in prey and feed are considered essential because the fish is unable to make them and they must come from the diet. One such nutrient is the orange pigment called astaxanthin, which is in the same family of nutrients as vitamin A. It is a powerful antioxidant that is thought to be involved in ovarian development, hatching, survival, growth, and respiration of salmon. Astaxanthin is also what causes the reddish-orange color of salmon flesh. The color of wild-caught and farmed salmon can vary widely from red to orange-red, rose, pink and even white. The color depends mostly on the amount of astaxanthin in what salmon eat. Wild-caught salmon get natural astaxanthin from the prey they eat. Farmed salmon get natural or added astaxanthin from the feed they eat.

How does eating farmed and wild salmon make people healthier?

Both farmed and wild-caught salmon are healthful choices that are low in total fat and high in protein (Table 1). Both are rich in vitamins, minerals, and omega-3s. In recent years research has linked eating seafood to many health benefits throughout life. Babies of moms who eat fish during pregnancy have the best possible brain and eye development. Adults who eat fish twice a week have up to 40% lower risk of dying from a heart attack. And a seafood-rich diet can help prevent depression and dementia as people age.

Table 1. USDA Nutrition Information for 100 Grams of Edible Cooked (Dry Heat) Farmed and Wild Salmon

	Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Sodium (mg)	Cholesterol (mg)	Omega-3 (g) ¹
Farmed							
Atlantic	206	22.1	12.3	2.5	61	63	2.1
Coho	178	24.3	8.2	1.9	52	63	1.2
Wild							
Chinook (King)	231	25.7	13.3	3.2	60	85	1.7
Sockeye (Red)	216	27.3	10.9	1.9	66	87	1.2
Coho (Silver)	139	23.4	4.3	1.0	58	55	1.0
Pink (Humpback)	149	25.5	4.4	0.7	86	67	1.3
Chum (Keta)	154	25.8	4.8	1.0	64	95	0.8

¹Omega-3 values equal the sum of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

Is salmon safe to eat?

Most foods contain traces of substances other than nutrients. Scientists have compared concerns with eating fish to concerns with limiting or avoiding fish. They find that the biggest risk is limiting or avoiding fish, which results in thousands of extra heart disease deaths per year and less than optimal brain development in children.

Mercury and PCBs

Methylmercury, an organic form of mercury, and polychlorinated biphenyls (PCBs) are not a health concern associated with eating of farmed or wild salmon.

Minute quantities of mercury are detectable in air, water, soil, and all living matter. The Institute of Medicine reports that salmon, whether farmed or wild is one of the species lowest in mercury levels and the highest in omega-3 fatty acids. A 2008 study by Barry C. Kelly (et al.) found mercury in all species of farmed and wild salmon to be relatively low. Methylmercury in all salmon samples ranged from 0.03 to 0.10 parts per million (ppm). This is well below the action level of 1.0 ppm set by the U.S. Food and Drug Administration (FDA). Negligible differences in mercury concentrations were observed between the various species of farmed and wild salmon.

Up until the late 1970s, PCBs were manufactured globally and used in many electronic products. Health concerns about PCBs led to a ban on their use in the late 1970s and since then the level of PCBs in food products and the environment has declined significantly. Currently, over 90% of PCBs that remain in Americans' foods come from sources other than seafood. PCB levels in farmed and wild salmon are low and range from 5 to 60 parts per billion (ppb). This is over 30 times lower than the FDA tolerance level of 2000 ppb.

Antibiotics

In the U.S., the FDA regulates antibiotics which are used to treat ill farm-raised animals including fish, swine, cattle, and chickens (except in certified organic animal culture). Veterinarians oversee the way antibiotics are used when they are needed. Farmers must follow U.S. Environmental Protection Agency (EPA) and FDA regulations that monitor use and environmental impacts. These regulations also make sure antibiotics are used for the shortest time possible so residual traces do not go above the FDA level of concern.

Hormones

There are no hormones used in salmon farming or added to salmon diets. So hormones are not a concern when eating wild or farmed salmon.

Further reading:

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