



ARE FARM-RAISED SALMON SAFE TO EAT?

Yes. Farm-raised salmon are safe to eat, and experts recommend eating it! Farm-raised salmon is a nutrient-rich protein high in healthy omega-3 fatty acids. Many of the essential vitamins and minerals that the American Heart Association highly recommends are highly recommended by Canada's new Food Guide (1). Canada's Heart and Stroke Foundation recommends eating fish high in omega-3 fatty acids and low in mercury, such as Atlantic salmon, as an essential part of a heart-healthy diet (2).



FARM-RAISED SALMON IS GOOD FOR THE BODY AND THE MIND

Omega-3 fatty acids, found commonly in salmon, have been shown to reduce triglycerides in your blood, reduce the risk of developing an irregular heartbeat, slow the build-up of plaque, and may help lower blood pressure (3). Omega-3 fatty

acids have been demonstrated to support eye health (4) and help maintain brain health and reduce cognitive decline (5). Skin and hair also benefit from omega-3 fatty acids (6).



Total mercury in BC farm-raised salmon is well below limits set by Health Canada and similar to or lower than that of BC wild caught salmon.

DO I HAVE TO BE WORRIED ABOUT MERCURY IN FARM-RAISED SALMON?

No. The Canadian Food Inspection Agency tests fish, including farm-raised salmon, for mercury at each processing plant. Results have shown that mercury in farm-raised salmon is well within safe eating limits. A recent study has also demonstrated that total mercury in BC farm-raised salmon was below the limit of 0.5 µg/g set by Health Canada; at 0.021 µg/g- similar to or lower than that of wild BC-caught salmon (0.013-0.077 µg/g)(7, 8).

Some fish species have high mercury levels, while salmon, farm-raised or wild, do not. Some species of tuna, shark and swordfish can have unsafe levels of mercury.

Mercury is a naturally occurring metal found in the environment in soil, rocks, and water. Some environments can have higher levels of mercury caused by human activities such as burning waste, mining, and coal fire power generation. Fish bioaccumulate mercury in their tissues as a result of eating foods with mercury, including plants or other fish. This is why long-lived top predatory fishes such as some tuna species, which consume other fish, can have higher levels of mercury in their tissues. They have consumed mercury through bioaccumulation in many other fish.

The BC Centre for Disease Control (BCCDC) has stated that mercury toxicity in humans is rare in Canada. The two likely sources of exposure are the consumption of large predatory fish high in mercury and occupational exposure, including working around smelting, recycling, and other industries. Salmon, farm-raised or wild, does not appear on their list of fish species commonly found with moderate or high levels of mercury.

ARE GROWTH HORMONES USED?

No. Growth hormones are not approved for use in farm-raised fish in Canada nor used in most animal food production.



ARE FARM-RAISED ATLANTIC SALMON HIGH IN PCBs?

No. Levels of polychlorinated biphenyls (PCBs) and dioxins in farm-raised Atlantic salmon from BC are up to 71 times *lower* than Health Canada's level of 2000 parts per billion for edible fish products (7). Several recent studies have demonstrated that levels of PCBs in fish are very low, similar, or less than in other foods such as beef, chicken, and pork (9).

Health Canada is currently reviewing its limits for a number of substances in food, including PCBs (8).

Dioxins and PCBs are toxic, environmentally persistent substances that accumulate in the food chain. They are a class of industrial chemicals that were once used in the manufacturing of goods such as electronics. Because of both environmental and human health concerns, the import, manufacture and sale in Canada was banned in 1977; their release into the environment was made illegal in 1985 (8).



Farm-raised Atlantic salmon have PCBs in their flesh, albeit at extremely low levels, because of the ingredients that go into their feed, specifically fish oils. In order to minimize the amount of PCBs potentially getting into Atlantic salmon feeds,

manufacturers source raw materials from areas known to have lower environmental levels of PCBs and continue to decrease the dependence on fish oils by substituting other sustainable ingredients.



PCBs in farm-raised salmon are very low and similar or less than in other foods such as beef, chicken and pork.

ARE DRUGS AND ANTIMICROBIALS USED?

BC farm-raised Atlantic salmon are rarely treated with antimicrobials (antibiotics). BC farm-raised certified organic Chinook salmon are not treated with any antimicrobials during grow-out to maintain their organic status. Should they need to be treated, they cannot be sold as certified organic.

Many countries, including the United States of America (USA), use more antimicrobials in agriculture than in humans, but the data are not always

reported. For example, in the USA, more than 70% of the antimicrobials identified as medically important for humans are sold for use in animals (10). The United Nations warns that by 2030, antimicrobial resistance at livestock farms could force more than 24 million people into extreme poverty, and drug-resistant diseases in humans will likely result in 10 million deaths yearly by 2050 (10) (11).

Medicines used in farming salmon are regulated differently than in other agriculture sectors. In Canadian aquaculture, antimicrobials can only be prescribed by a licenced veterinarian; they cannot be prescribed prophylactically (preventively) to prevent a disease from occurring or for growth promotion. They may only be used when a clinical disease is diagnosed. There are only four antimicrobials licenced for use in BC salmon farming. In BC, all antimicrobials used must be reported to DFO and data on the treatment of fish with antibiotics is made publicly available in Fish Health Event Reports on Canada's Open Government portal (12).

The use of antimicrobials in farm-raised Atlantic salmon in BC has decreased dramatically in the past 20 years due to improvements in production, health management, and livestock selection (Figure 1). Most bacterial infections in Atlantic salmon can now be prevented with vaccines. However, antimicrobials are occasionally needed to treat diseases such as yellow mouth and SRS (Salmon Rickettsial Septicaemia). The development of effective vaccines could further reduce the need to treat these diseases with antimicrobials.

The Canadian Food Inspection Agency and producers test fish, including farm-raised salmon, for antimicrobial residue at each processing plant.



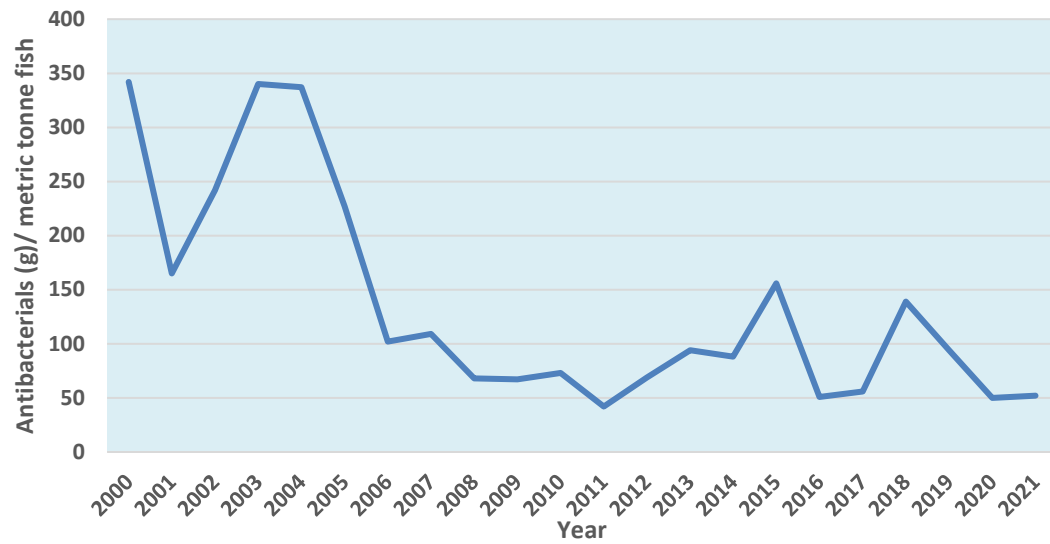


Figure 1. Reduction in antimicrobial use in farm-raised Atlantic salmon in BC, 2000 – 2021.

Source [DFO open data \(13\)](#)



HOW DO I KNOW THE FISH ARE SAFE TO EAT?

All farm-raised salmon are processed in licenced, inspected processing plants following Preventive Control Plans and HACCP (hazard analysis and critical control points) principles (14). In Canada, there are regulations which require farmers to demonstrate that fish do not exceed acceptable levels of a number of compounds to ensure the fish is safe for human consumption. Fish are tested for the following groups of compounds: heavy metals, pesticides and herbicides, antibiotics, polyaromatic hydrocarbons, dyes, dioxins, and furans. In addition, any fish being exported may have other testing requirements to comply with importing country's specific regulations.

To ensure quality, companies also test their fish for dozens of different nutritional parameters including protein, calories, and fatty acids. Third-party certifications, including Aquaculture Stewardship Council (ASC) and Best Aquaculture Practices (BAP), also have their own testing and food safety requirements; BC organically certified Chinook salmon farmers must follow the Organic Aquaculture Standard (15-17). All Atlantic salmon farms in BC are BAP-certified, and

many are ASC certified. In addition, processing facilities can be BAP certified themselves. Guidelines for these standards are available online (18).

In Canada, there is a very short list of therapeutants can be used to treat farm-raised Atlantic salmon. Therapeutants can be drugs or pesticides. They are all administered under prescription by a licenced veterinarian. Veterinary drugs authorized for sale by Health Canada for use in farm-raised salmon include four antimicrobials, one anesthetic, two parasiticides and one fungicide (19).

The Veterinary Drug Directory (VDD) through Health Canada is responsible for protecting both human and animal health and Canada's food supply. The VDD determines the withdrawal times and residue limits for farm-raised Atlantic salmon for all veterinary drugs. A list of all approved drugs as well as withdrawal periods is provided to the public by Health Canada (19). Residue limits for these drugs are monitored in the muscle and or skin. If residue limits are exceeded, the product will not enter the food chain (20).



ARE FARM-RAISED SALMON PINK BECAUSE THEY ARE DYED?

No. Wild and farm-raised salmon have pink flesh because of the foods that they eat. Salmon, both in the wild and those raised on farms, have pink flesh from consuming carotenoids.

Carotenoids are essential pigments produced by bacteria, fungi, algae and plants. Since animals cannot make carotenoids on their own, these pigments are accumulated from food or partly modified through their own metabolic reactions (21). Many carotenoids have been shown to be antioxidants, directly

improving the immune system aiding in disease resistance, improved growth, survival, and egg quality (22).

Wild salmon consume prey species such as krill which are high in carotenoids, particularly astaxanthin and canthaxanthin. Farm-raised Atlantic salmon fish pellets are supplemented with naturally-sourced as well as synthetic astaxanthin. Farm-raised organically certified Chinook salmon feed is supplemented with a natural astaxanthin pigment to maintain compliance with their organic certification.

ARE BC FARM-RAISED SALMON GENETICALLY MODIFIED?

No. There are no genetically modified (GM) farm-raised salmon produced in BC.

Health Canada and the Canadian Food Inspection Agency have approved the genetically modified AquAdvantage Salmon to be sold in Canada for human consumption and livestock feed (23). In BC, there are no AquAdvantage Salmon being produced.





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CHAPTER 13

CARING FOR COMMUNITIES

SALMON AQUACULTURE IN COASTAL COMMUNITIES



This document describes the benefits to communities
from salmon farming in coastal British Columbia

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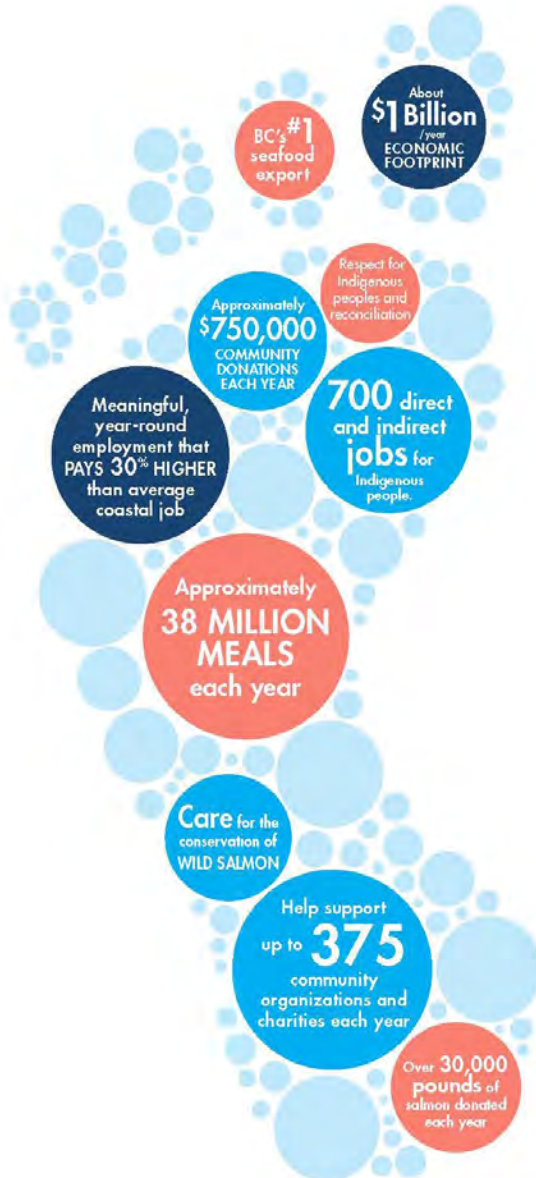
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CHAPTER HIGHLIGHTS - CARING FOR COMMUNITIES – SALMON AQUACULTURE IN COASTAL COMMUNITIES



OUR COMMUNITY FOOTPRINT

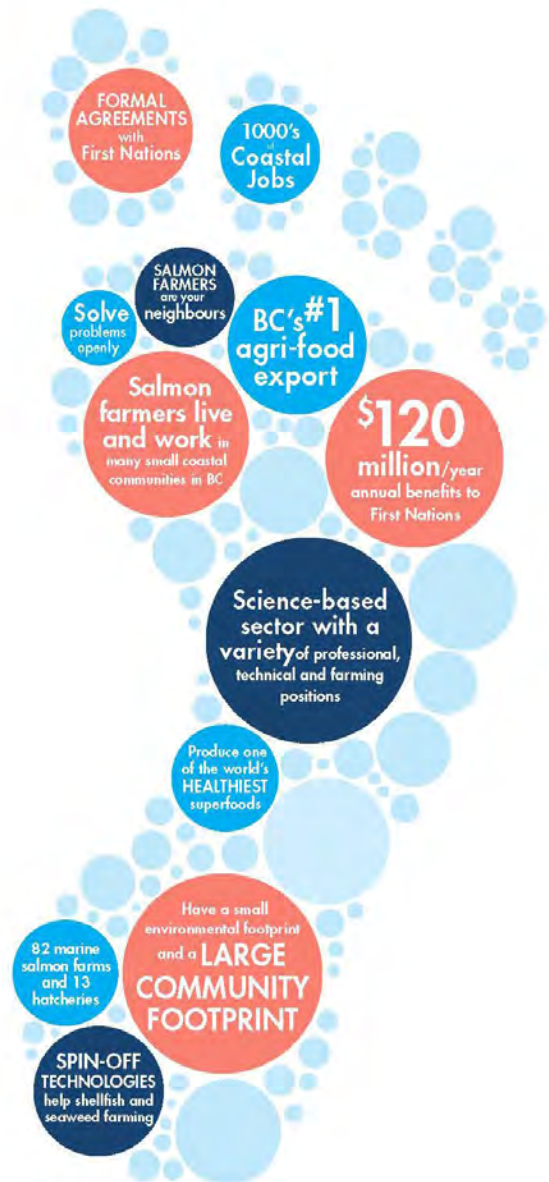




TABLE OF CONTENTS

Introduction.....	1
Working with others – community employment.....	2
Caring for others – community supports	6
Connecting on the water and at the table.....	9
Connecting with the culinary community.....	10
Supporting coastal communities	11
Continuing our commitments	17
Imagine the future.....	18
References.....	19