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Latest trends in Salmon Aquaculture: A review

Daram Balaji*
Department of Pharmacology, Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India

Review Article

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*For Correspondence
Daram Balaji, Department of Pharmacology, Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India. Tel: 08842300991
E-mail: daram.balaji@gmail.com

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ABSTRACT

Salmon is one of the most edible fishes in the world. It is anadromous by nature i.e., the adult salmon migrate from the freshwater to the sea for spawning, reproduction and then again they return to the fresh water and continue their lifetime. These salmon are indigenous to Atlantic region in the north and Pacific Ocean. As the world's population is increasing day by day, the productivity of the salmon is also increasing along with the recently developing trends and research to satisfy the human demand.

INTRODUCTION

Nativity and distribution of species of Salmon

Mainly 2 genera of salmon are present; they are Salmo commonly known as the Atlantic salmon and Onchorhynchus which is known as the Pacific salmon. There are about 8 species are present in the genus Onchorhynchus. There is also various no. of species which has been referred to salmon as well. A large fresh water fish called Danube salmon is related to salmon. Chinook salmon is famous as the king salmon or black mouth salmon in the U.S. Major salmon species are distributed and described table 1 [1-10].

Species	Distribution area
Atlantic salmon (*Salmo salar*)	Atlantic Ocean
Landlocked salmon (*Salmo salar m. sebago*)	North America and in Northern Europe
Chinook salmon (*Oncorhynchus tshawytscha*)	Central Canadian arctic
Chum salmon (*Oncorhynchus keta*)	Sea of Japan
Coho salmon (*Oncorhynchus kisutch*)	Coastal waters of Alaska
Masu salmon(*Oncorhynchus masou*)	Pacific Ocean in Japan
Pink salmon (*Oncorhynchus gorbuscha*)	Northern California and Korea
Sockeye salmon (*Oncorhynchus nerka*)	Klamath River in California
Danube salmon (*Hucho hucho*)	Danube basin in Europe

Table 1. Distribution of major species of the salmon across the globe.

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Changes occurring in the lifecycle of salmon

The lifespan of salmon is about minimum 3 years to maximum 8 years. Kokanee salmon has a special feature when compared to all other salmon i.e., it either lives in fresh water or salt water but not both. The newly born fish are called alevins **(Figure 1).** These alevins contains yolk sac which on absorption becomes more active [11-13]. These fry upon several changes transforms in to Parr and then to the adult salmons [14-20].

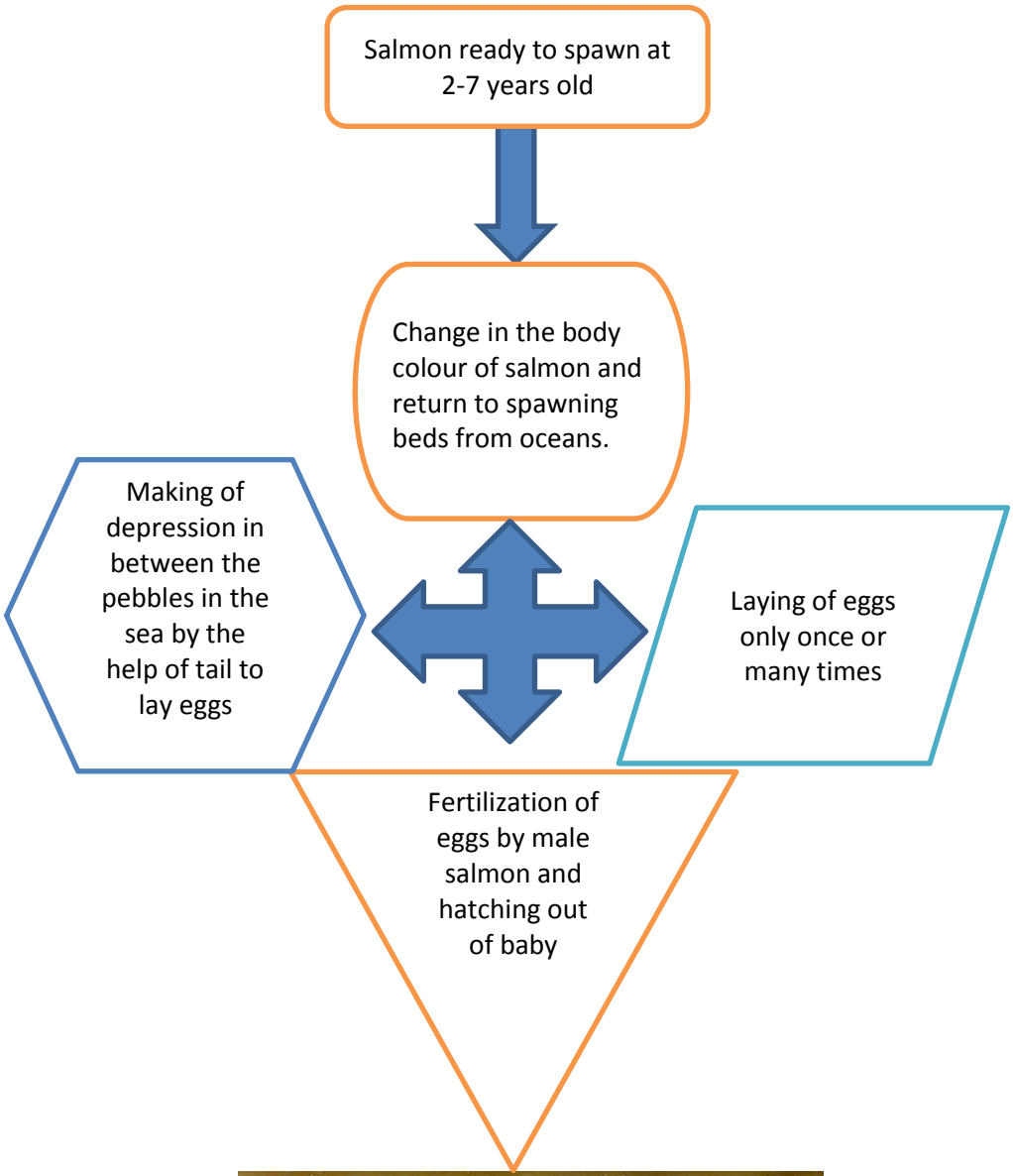

Figure 1. Lifecycle of salmon fishes [21].

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Production process of the salmon

The cultivation of farmed salmon had been started when there was a drastic decline in the production of shrimp and salmon in 1980's [21, 22]. At this point of situation, salmon cultivation is divided in in to two types, namely: wild salmon that are growing naturally and salmon farms in which salmon are grown artificially [23-26]. The main disadvantage with these farm salmon is that they are transforming the disease causing pathogens and parasites, resulting in the death of the wild salmon. This is the reason why mainly the wild salmon population is going to decline day by day [27-35]. Compared to the Atlantic salmon to that of the salmons of the Columbia region, the Atlantic salmon population is more as they are having more susceptibility to genetic effects from interbreeding [36-50].

This salmon aquaculture emerged as an industry in Norway for the first time. The world is mainly focusing on the salmon farming rather than the wild salmon. Hence catching capacity of farmed salmon is more [51-65].

Process of cultivation of farmed salmon

It takes nearly 3 years for the farmed salmon to grow and get it sold in the market. There are nearly 3 stages in the cultivation of the farmed salmon. They are shown below in the **figure 2.**

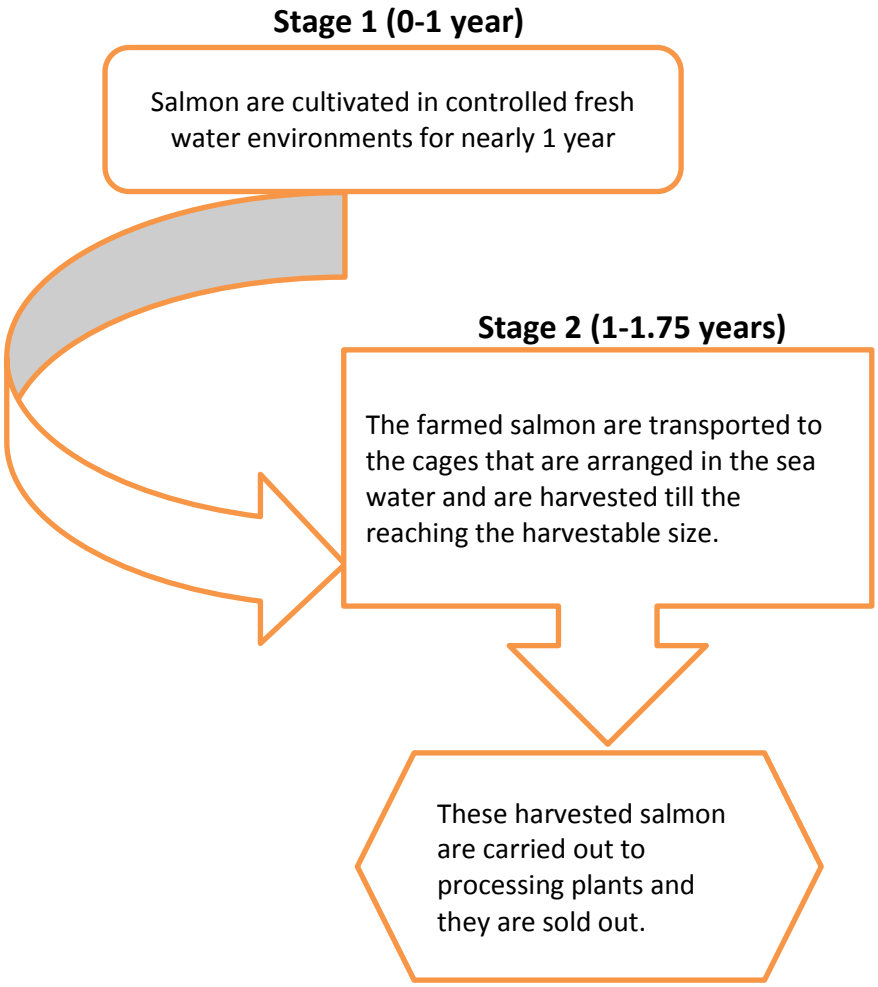

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Figure 2. Mature adult salmon fish.

Nutritional values in the salmon

As the population all over the world is increasing day by day, the demand for fish, chicken and meat is also increasing. The protein values in fish are more numerous when compared to that of the chicken and meat. Governments all over the world has been advertising and advising the people to include fish in their meal as it is rich in proteins and vitamins as well. Hence most people prefer salmon as their fish meal as these farmed salmon are rich in omega-3-fatty acids, proteins and as well minerals (Table 2) [66-81].

Amount per 100 g	
Type of Nutrients	**% Daily value**
Total Fat: 13 g	20%
Saturated fat: 3.1 g	15%
Monounsaturated fat: 3.8 g	0%
Polyunsaturated fat: 3.9 g	0%
Protein: 20 g	40%
Cholesterol: 55 mg	18%
Potassium: 363 mg	10%
Sodium: 59 mg	2%
Vitamin A	1%
Vitamin B-6	30%
Vitamin B-12	53%
Vitamin C	6%
Iron	1%
Magnesium	6%

Table 2. Composition of nutrients in the salmon.

GLOBAL MARKET AND TRENDS

North America, Japan and many of the European countries play major role in the supply of Atlantic salmon all over the world [82]. Many of the time, these salmon will be available as frozen, fresh in some areas and new measures are also taken to make fish in the processed form for future preservance. The production of Atlantic salmon is more all over the world as the demand for these is very high [83-95].

SALMON AQUACULTURE AFFECTING THE ENVIRONMENT

The remnant feed and faeces of the salmon are discharged in to the local rivers, ponds, lakes, seas and oceans as well. Due to this, these water bodies are getting polluted and affecting the remaining

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wild life. The chemicals that had been using for the killing of disease causing pathogens are also affecting resulting in the chemical pollution [95-100].

CONCLUSION

Currently the world is focussed only on the farming the salmon and selling them in to the market. Hence government should implement new schemes for increasing the life-time, disease resistance capacity and sustainability in the environment of the salmon aquaculture.

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