

Nutritional and Social Consequences of Cheating Trout Distribution Instead of Salmon Fish

Over the past few years, some doubts have been cast over the genuineness and nutritional values of special trout, misleadingly named as “trout salmon” compared with Atlantic Salmon in social networking sites and mass media. As a result, some people have refused to buy any kind of Salmon and have deprived themselves of this nutritious food. The objective of this letter is to review the similarities and differences between currently supplied by the market, Atlantic Salmon and special trout in terms of zoology, process of production, nutritional quality, and safety of consumption.

Atlantic Salmon (*Salmosalar*) and rainbow trout (*Oncorhynchus mykiss*) are both cold-water fish and belong to the family of Salmonidae and order of Salmoniformes but are different in genus and species.^[1]

Salmon is a kind of oily fish with a tough, pink flesh. High concentration of unsaturated fatty acids specially Omega3 and vitamin D3 in the oil as well as high nutritional quality protein have made it a rich, nutritious fish in comparison with other fish. For this reason, there is a growing demand for this kind of fish, and consequently, it is supplied at a high price.^[2,3]

Norway, Chile, Scotland, and Canada are among the main Salmon producing countries in the world. This is a kind of cold-water fish that naturally lives in the water melted from polar ice. Farmed Salmon is raised in marine fish cages, which are located in the deep oceans. Wild species living in free waters and rivers possess a natural pink flesh which is due to feeding on crustaceans that contain carotenoid pigments, such as astaxanthin. Accordingly, in order to approximate the natural pink flesh of wild species, using two carotenoid pigments called astaxanthin and canthaxanthin have been authorized.^[2]

Up until now, no license has been issued to raise Salmon in Iran due to undesirable farming conditions. Norwegian Salmon is imported to Iran by Iran Fishery Organization under the supervision of Iran Veterinary Organization and is sold in the form of frozen fillets across the country.^[4]

On the other hand, rainbow trout is one of the most important farmed species in Iran and it is popular because of its reasonable price, marketability, and quality flesh.^[4]

In much the same vein, the flesh of wild species of trout turns pink as they feed on a particular crustacean.^[5]

Owing to the similarities in appearance, physiology, and life cycle between Salmon and trout,^[1] some companies have produced adulterated Salmon like fish by adding the

pigments to the diet of farmed trout,^[4] while such a kind of farmed fish must be named as “Special trout.”

In general, “Special trout” is totally different from salmon in terms of unsaturated fatty acids.^[3] Also, the economical production of “Special trout” would be less costly which apparently result in lowering prices and this should be highlighted in consumer awareness, distribution, and pricing.

The suitable and marketable weight for trout is about 400–500 g, but Norwegian Salmon is much bigger, about 6 kg.^[4]

Some Fish farmers, two weeks prior to fishing, would feed the old reproductive fish to the weight of 2 or 3 kg with the feed containing Astaxanthin pigment and sell them as more expensive Norwegian. Therefore, consumers are deluded into buying such an adulterated product as they see the size and pink flesh of the fish. It should be noted that the old reproductive trout contains less protein compared with the young species due to repeated reproduction.^[4]

Generally, the process of adding the natural carotenoids is legalized by safety organizations.^[6] Currently, two natural pigments, including astaxanthin (E161j) and canthaxanthin (E161g), have been authorized in the process of Salmon farming.^[6,7] But, astaxanthin is used more commonly because of its effectiveness.^[2]

US Food and Drug Administration and European Food safety Authority permitted the application of Carotenoid pigments up to the levels of 80 and 100 mg per kg of the fish food, respectively.^[6,8] While based on unofficial reports, in Iran, usage of the pigments is limited to 30–60 mg/kg of fish food.^[9] It is worthy to mention that searching the Institute of Standards and Industrial Research of Iran (ISRI) website, there was no relevant document regarding usage of pigments in farmed dietary fish.

Astaxanthin is manufactured both artificially and naturally and is available on the market.^[2] According to the chief executive officer of Cold Water Fish Farmers syndicate in Iran, all the pigments that are used in the farming of pink-flesh trout have been licensed.^[5] However, the usage of artificially produced astaxanthin has been of concern due to lack of information regarding its safety, which additionally increases the doubts over the ultimate products.

Finally, the use of natural edible pigments is quite common in many fish farms at international level and it could be totally in compliances with high standard protocols.^[2,5] However, it seems that application of this technology in farmed trout yet to be regulated and established in terms of safety, regulations, and consumer

awareness and consequently prevents the possible adulteration to ensure the public for reliable purchases.

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Conflicts of interest

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