

The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance.

# INTRODUCTION TO AQUATIC SCIENCES

**2. The role of fish in  
Week human consumption**

## Introduction to Aquatic Sciences

### WEEKLY TOPICS (CONTENT)

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Week	Topics
1. Week	Aquaculture in Turkey and world
2. Week	The role of fish in human consumption
3. Week	What is fish? Taxonomy of fish
4. Week	Aquatic Crustacean
5. Week	Water quality for aquaculture
6. Week	Introduction to marine fish
7. Week	Introduction to freshwater fish
8. Week	Live foods (microalgae, zooplankton and <i>Artemia</i> )
9. Week	Introduction to fishing techniques
10. Week	Fish transport
11. Week	Introduction to fish disease
12. Week	Introduction to fisheries economy
13. Week	Processing and marketing of fish
14. Week	Introduction to fisheries and aquaculture management



Fish meat can be described as a complete food.

Complete foods have contains sufficiently levels of valuable biological effective/useful protein and lipid storage.

According to the nutritutional terminolgy protein and lipid sources availablity and the benefits may depends on species requirements. It is also specific for the species. In fact, aquatic animals are known as a valuable nutrition source for all the terrestrial animals and also human.



n-3 polyunsaturated fatty acids are essential to the health of humans. Aspects of some diseases and clinical conditions can be alleviated by the supplementation of n-3 fatty acids. Fishery produce is the major source of n-3 fatty acids in the human diet and the public have become more aware of the health benefits associated with consuming more fish. As world fisheries are declining the demands upon the aquaculture industry to supply consumers with fishery produce are increasing. An important area of research in aquaculture is the development of diets that are both cost effective and produce adequate growth in fish. Preserving the n-3 polyunsaturated fatty acid content of the final fishery product is an additional pressure when designing these diets.

Hunter, B. J., & Roberts, D. C. (2000). Potential impact of the fat composition of farmed fish on human health. *Nutrition Research*, 20(7), 1047-1058.

A reference text for food scientists, nutritionists, dietitians, pharmacologists, physicians, and other health professionals and biomedical researchers provides detailed discussions and information concerning the essential polyunsaturated fatty acids (PFA's) of the n-6 family and their metabolic conversion to eicosanoids, prostaglandins, and leukotrienes which evidently exert protective effects against cardiovascular disease (CD) and other diseases and disorders. Topics include the effects of omega-3 PFA's and their interactions in n-6 fatty acid metabolism, the effects of seafood and fish oil fatty acids on reducing CD risk based on clinical trials, and the nutritional value of fish and fish oils. Tabular data are provided throughout the text, and literature citations are appended to each of the 11 text chapters

Globally, *Salmonella* is one of the most important food borne zoonotic pathogens. Norway has a favourable situation regarding *Salmonella*, as these bacteria are virtually absent in food producing animals and domestically produced food, including products from fish. Consequently, Norway has a low incidence of domestically acquired salmonellosis in the human population. Some *Salmonella* serovars can however occasionally be found in animal feed and its ingredients, as well as in the feed production facilities. During the years

cases in Norway. There is no evidence for transmission of *Salmonella* from fish feed to humans. However, there is little information on the risk of *Salmonella* cross-contamination from fish feed, the ingredients and the factories to other parts of society, including wildlife. A probable cross-contamination between fish feed factories and seagulls have been described. The prevalence of antimicrobial resistant *Salmonella* strains isolated from fish feed, its ingredients and the production environment have so far been very low.

Lunestad, B.T., Nesse, L., Lassen, J., Svihus, B., Nesbakken, T., Fossum, K., Rosnes, J.T., Kruse, H. and Yazdankhah, S., 2007. Salmonella in fish feed; occurrence and implications for fish and human health in Norway. *Aquaculture*, 265(1-4), pp.1-8.

## **Role of fish oil in human health and possible mechanism to reduce the inflammation**

reducing blood clotting. Some review studies have described the beneficial roles of Omega-3 FAs in cardiovascular diseases (CVDs), cancer, diabetes, and other conditions, including inflammation. Studies of the effect of Omega-3 FAs gathered from studies in diseased and healthy population. CVDs including atherosclerosis, coronary heart diseases, hypertension, and metabolic syndrome were the major fields of investigation. In studies of

Ellulu, M.S., Khaza'ai, H., Abed, Y., Rahmat, A., Ismail, P. and Ranneh, Y., 2015. Role of fish oil in human health and possible mechanism to reduce the inflammation. *Inflammopharmacology*, 23(2-3), pp.79-89.

**Table 1** Influence of Omega-3 FAs in health conditions based on review studies

Authors	Type of study	Condition of interest	Effect of Omega-3 FAs	
			Improve	Not improve
Rizos et al. (2012)	Review	CVD		✓
Chowdhury et al. (2012)	Review	Cerebrovascular disease	✓	
Delgado-Lista et al. (2012)	Review	High risk CVD	✓	
Marik and Varon (2009)	Review	CVD	✓	
Hooper et al. (2006)	Review	CVD		✓
Wu et al. (2012)	Review	Type-2 DM		✓
Gerber (2012)	Review	Cancer	✓	
MacLean et al. (2006)	Review	Cancer		✓
Hooper et al. (2006)	Review	Cancer		✓
Lin and Su (2007)	Review	Depressive disorder	✓	
Parker et al. (2012)	Review	Liver disease	✓	
Rangel-Huerta et al. (2012)	Review	Inflammation	✓	



## Contamination of fish in UK fresh water systems: Risk assessment for human consumption

There is growing evidence that more people in the UK are consuming fish taken from inland waterways. This may be partly due to the increased numbers of migrants from Eastern Europe where this is part of traditional culture and partly because of a desire to try new foods encouraged by celebrity chefs. Fish can bioaccumulate environmental contaminants and so could contribute a significant amount to dietary exposure to these chemicals. This study examined the changing habits of anglers and consumers and

Rose, M., Fernandes, A., Mortimer, D. and Baskaran, C., 2015. Contamination of fish in UK fresh water systems: risk assessment for human consumption. *Chemosphere*, 122, pp.183-189.

## Consumer perception versus scientific evidence about health benefits and safety risks from fish consumption

*Conclusions:* Despite conclusive evidence about the content and positive effect of omega-3 fatty acids in fish, related consumer awareness and beliefs are poor and often wrong. This study exemplifies the need for nutrition education and more effective communication about the health benefits of fish consumption.

Verbeke, W., Sioen, I., Pieniak, Z., Van Camp, J. and De Henauw, S., 2005. Consumer perception versus scientific evidence about health benefits and safety risks from fish consumption. *Public health nutrition*, 8(4), 422-429.

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Hunter, B. J., & Roberts, D. C. (2000). Potential impact of the fat composition of farmed fish on human health. *Nutrition Research*, 20(7), 1047-1058.

Kinsella, J. E. (1987). Seafoods and fish oils in human health and disease. M. Dekker.

Lunestad, B.T., Nesse, L., Lassen, J., Svihus, B., Nesbakken, T., Fossum, K., Rosnes, J.T., Kruse, H. and Yazdankhah, S., 2007. Salmonella in fish feed; occurrence and implications for fish and human health in Norway. *Aquaculture*, 265(1-4), 1-8.

Ellulu, M.S., Khaza'ai, H., Abed, Y., Rahmat, A., Ismail, P. and Ranneh, Y., 2015. Role of fish oil in human health and possible mechanism to reduce the inflammation. *Inflammopharmacology*, 23(2-3),79-89.

Rose, M., Fernandes, A., Mortimer, D. and Baskaran, C., 2015. Contamination of fish in UK fresh water systems: risk assessment for human consumption. *Chemosphere*, 122, 183-189.

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