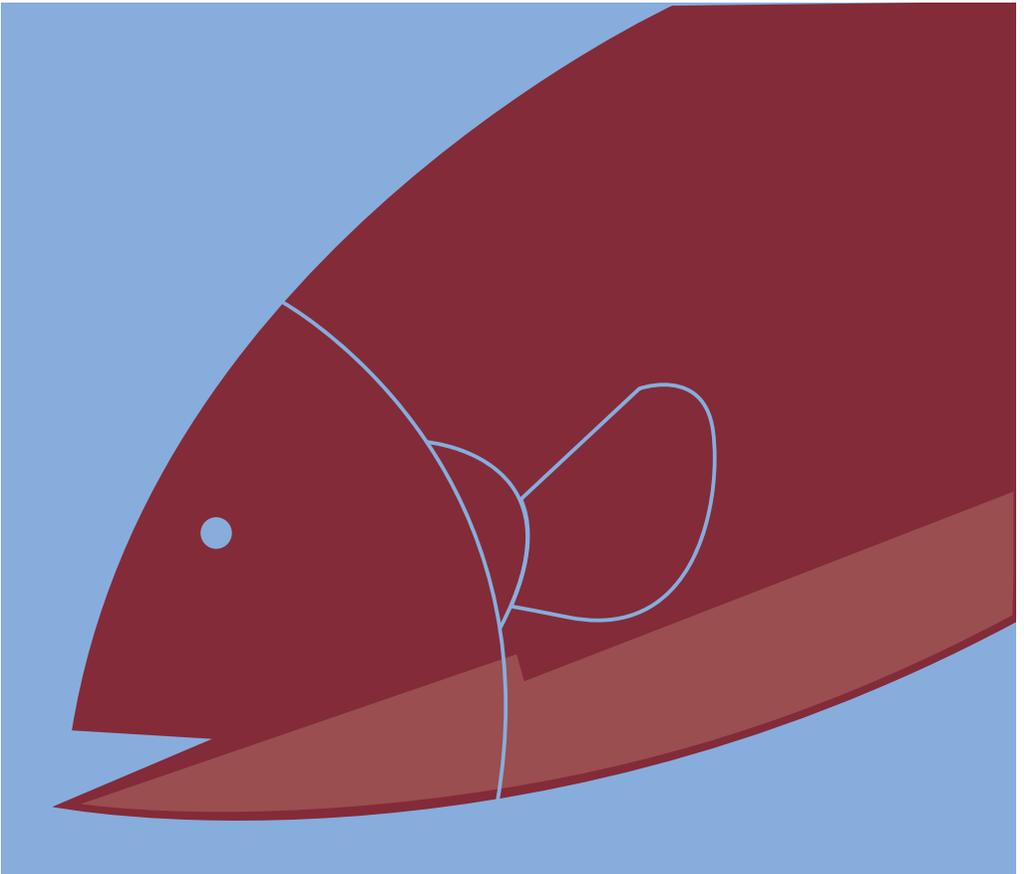


# ***A Review of the Fish Food Chain***

*Summary Document*



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# Acknowledgements

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Prof Don Anderson, Communications Consultant, **safefood** Advisory Board Member  
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Ms Catherine Morrison, Head of Environment & Quality Section, Aquaculture Division, Bord Iascaigh Mhara  
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# Background, Purpose and Scope

During 2005, **safefood** undertook a review of how fish are caught, processed, sold and consumed on the island of Ireland. This review focuses on finfish, looking at both those caught in the wild and farmed.

The aim of this review is to address issues of consumer concern and provide consumers with relevant information to help them make informed choices about the food they eat. The resulting summary report is one of a series of food chain reviews that **safefood** is carrying out over a three-year period.

The review outlines the nutritional and health benefits of eating finfish as well as the basic processes by which fish enter the consumer food chain, the controls in place to protect consumers from potential risks and the food hygiene practices that consumers should follow when storing and preparing fish.

As part of the review process, **safefood** conducted research into consumer awareness and perception of nutrition and safety issues regarding fish. The findings highlighted key concerns such as freshness, food-borne illness, low fish consumption despite well-documented health benefits, and consumer barriers to purchase and preparation.

# The Finfish Supply Chain

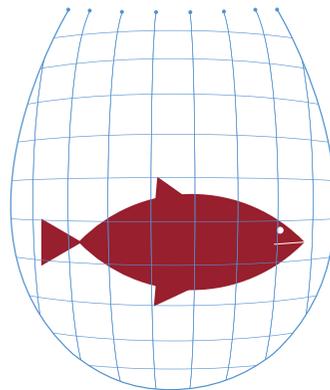
Fish fall into two main categories – finfish and shellfish. This review focuses solely on finfish.

Finfish species can be further sub-divided into demersal fish (living on or near the sea bed and including round and flat white fish) and pelagic fish (living in mid-water or near the surface and including oil-rich fish). Examples of demersal fish include plaice, cod, haddock, sole and ray while mackerel, herring, salmon, tuna and trout are examples of pelagic fish.

Fresh finfish on sale to consumers on the island of Ireland (IOI) have been caught at sea or in inland waters, grown in aquaculture (also known as fish farming) or imported.

The caught finfish industry is historically important to IOI and currently employs more than 5,000 fishermen. Northern Ireland landings come primarily from the Irish Sea and Republic of Ireland landings primarily from the North Atlantic. In 2004, finfish landings on the island were valued at almost €135 million/£93 million.

Aquaculture on the IOI has plateaued in recent years and in 2004 employed a total of 536 full- and part-time workers. There are currently 589 aquaculture licences in the Republic of Ireland, of which 76 are finfish licenses while in Northern Ireland there are 125 aquaculture licences, of which 68 account for finfish. The main finfish farmed are salmon and, to a lesser extent, trout.



# From Reel to Meal

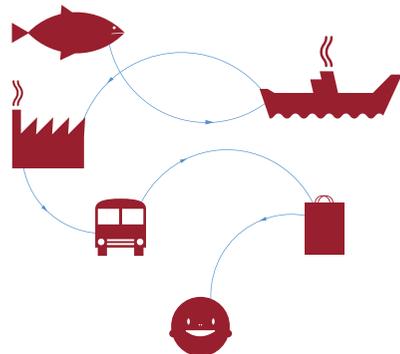
## Regulating the supply chain.

In the Republic of Ireland, the Department of Communications, Marine and Natural Resources (DCMNR) is responsible for the implementation and enforcement of national and European Union (EU) legislation, fisheries control and seafood safety programmes. Sea Fisheries Officers of the DCMNR also ensure compliance with public health and hygiene regulations through service contracts with the Food Safety Authority of Ireland (FSAI). In Northern Ireland, enforcement of fisheries legislation is carried out by the Sea Fisheries Inspectorate of the Department of Agriculture and Rural Development (DARD), with public health compliance enforced by the Food Standards Agency (FSA NI). Hygiene requirements for fish in the retail and catering sector are enforced by Environmental Health Officers in both jurisdictions.

Since January 2002, EU legislation has demanded that the species name and production method (e.g. 'caught at sea'

or 'farmed') of fresh, unpackaged finfish, as well as the catch area, must be displayed in the retail environment.

In January 2006, a series of new EU hygiene laws came into effect under the term 'the hygiene package'. The new legislation covers food hygiene aspects of the food chain including the finfish supply chain and sets out official controls that monitor and inspect fishing vessels, landing conditions, factory facilities, markets, storage, transport and retailing of fish.



# Finfish Consumption

The consumption of fish on the island is low. The North South Ireland Food Consumption Survey (NSIFCS) found that one third of adults on the island do not eat any fish.

The average consumption of fish and fish products across the adult population aged 18 to 64 years was 23 grams per day; the recommended intake level is 35 grams per day, equivalent to two portions of fish per week (one of which should be oily) with an average portion size of 120g for fresh (uncoated) cod and 100g for fresh salmon fillet.

Research carried out for **safefood** found that consumers have concerns about food safety in the supply chain that provides fish for their shopping baskets. They had issues around the lack of labelling information and quality assurance marks. They were also concerned about the quality of the water environment where the fish lived, the lack of information about the origin of fish and about hygiene practices of retail outlets.

**safefood**'s research has also highlighted certain barriers for consumers to eating fish, including:

- expense
- the presence of bones
- smell
- a perception that fish is difficult to cook and tastes bland
- a belief that fish needs to be eaten on the day of purchase

While many consumers consider fish a healthy food, they have concerns about freshness and the risk of food poisoning, often believing that fish must be eaten on the day of purchase. In reality, if refrigerated properly at 5°C or below, fresh fish will keep for a day or two after purchase or according to the use by date if pre-packaged.

# Food Safety Issues

Finfish are generally regarded as safe foods, but there are certain food safety issues that may arise through poor handling or storage of fish, or through environmental contamination.

Research carried out for **safefood** in 2005 found that consumers saw freshness of fish, risk of food poisoning and pollutants as concerns.

## Food-borne illness

Raw fish can be contaminated with microbes and parasites, and should be handled and stored carefully to avoid cross-contamination on surfaces or other foods. However, fish that is prepared hygienically and properly cooked is not considered an important cause of food-borne illness.

### *Bacteria*

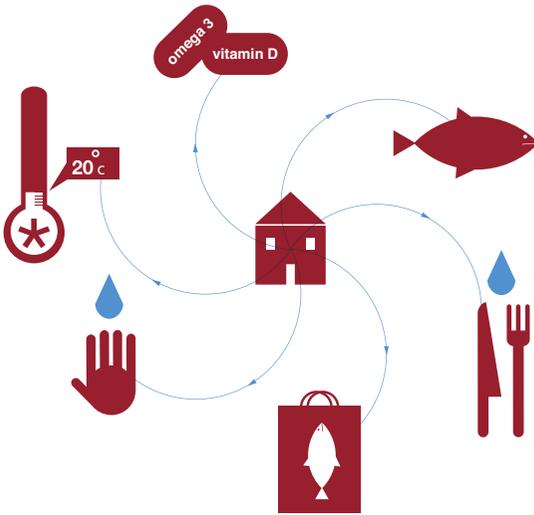
While many bacteria live in water and are naturally present on finfish, the risk of their causing illness is extremely low. However, bacteria such as *Salmonella*, *Campylobacter* and *Listeria* may be introduced during unhygienic processing or handling of fish and fish products and these are more significant in causing foodborne illness. Simple practices such as washing hands, cleaning preparation

surfaces and treating raw fish in the same way as raw meat when refrigerating and defrosting, can reduce cross-contamination of foods.

### *Histamine*

Fish that is not adequately chilled can support the growth of certain spoilage bacteria that break down the fish tissue and produce histamine, a toxic bi-product. Histamine if consumed, can cause a rapid and allergy-like reaction in sensitive consumers. The potential presence of histamine and other similar compounds means that fish is classified as an allergen and in the EU its presence in a food must be stated on the label.

Keeping fish chilled from shortly after it has been caught and throughout the supply chain while also practising good hygiene during processing, storage and handling reduce the potential for histamine formation. New legislation which came into force in 2006 establishes permissible



levels of histamine allowed in certain fish species during their shelf life.

#### *Listeria*

Smoked salmon can be a source of infection from *Listeria* and hence care should be taken in the handling and storage of this product, particularly for those groups considered to be at high risk, namely pregnant women, older people and younger children. Smoked salmon should be stored and handled similarly to cooked meat products / pâté and kept refrigerated and in a sealed container if opened.

#### *Worms*

Research carried out for **safe food** found that consumers are aware of ‘worms’ in fish through media reports. However parasites such as worms do not pose a large food safety issue on the island. Most are rare and cause only a mild illness. Cooking quickly kills any worms that might be present.

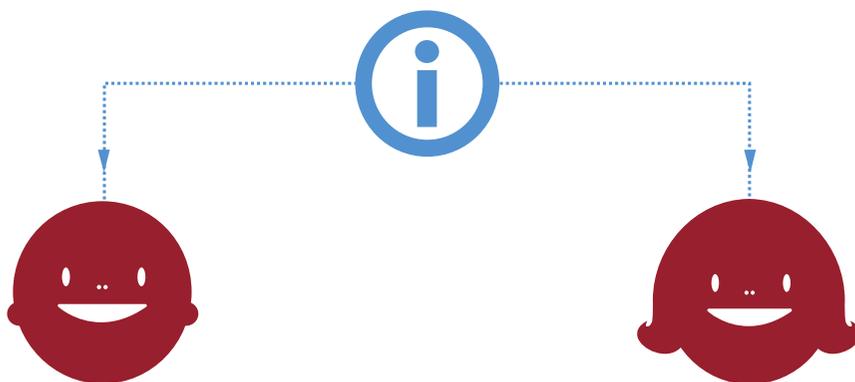
Illness occurs by eating raw or insufficiently cooked fish where the worm is present. EU controls demand that fish is inspected for parasites and that if fish is to be consumed raw, such as in sushi, roll mops etc, it must be first frozen to -20 degrees Centigrade, which kills the parasites.

#### **Pollutants and contamination**

Fish live in water that can become polluted by microbes or chemicals and the fish may accumulate contaminants like heavy metals or dioxins in their tissues. When asked, consumers were concerned about pollutants but were generally not aware of the types and levels of contamination. Of the contaminants which have been documented in finfish, two have given particular cause for concern, namely mercury and dioxins.

#### *Mercury*

Consumers generally have a low awareness about the contamination of certain types of fish with mercury. This metal occurs



naturally in bodies of water and can accumulate in fish tissue. Fish with the highest contamination levels of mercury include large carnivorous species such as swordfish, marlin, shark and tuna. With the exception of tuna, consumption levels of these species on the island of Ireland is extremely low.

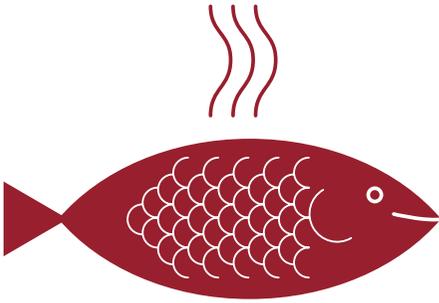
For women of childbearing age, pregnant women or nursing mothers, consumption of tuna should be limited to two fresh or four canned portions per week and consumption of the other species (swordfish, marlin & shark) should be avoided. There is no reason for other adults or children to restrict their intake of tuna.

Research on commonly consumed finfish from five ports around the Republic of Ireland in 2003 found that mercury levels were much lower than current EU safe limits and were not a cause for concern.

### *Dioxins*

Dioxins are a group of closely-related chemicals that are common environmental pollutants. They can accumulate in living organisms, especially in fatty tissue and are associated with a number of diseases including cancer and birth defects. People receive approximately 90% of their daily exposure through food, including fish. The EU has set very low limits for dioxin in fish, fish products and fish oils.

A 2002 FSAI investigation involving salmon and trout found low levels of dioxins in wild salmon, farmed salmon and farmed trout in the Republic of Ireland. All levels were below the safety limit.



### Finfish in the home

Overall, fish carries much health benefit and little risk of food-borne disease when handled properly and appropriately chilled. Consumers should buy fish at the end of a shopping trip, return straight home without delay and put the fish in the fridge or freezer promptly to help slow the growth of micro-organisms that can cause illness. If fresh fish has been frozen, it must be defrosted fully before cooking.

Raw fish, just like any raw meat, should be stored away from other foods on the bottom shelf of the fridge in a sealed container and consumers should make sure hands and surfaces are clean to prevent cross-contamination. Proper cooking will help eliminate the risk of food-borne illness.

When buying unprocessed whole fish, consumers should check that it looks ‘fresh’ by checking for moist scales and bright eyes. Unpackaged fillets should smell fresh and look glossy.

# Nutrition and Health Benefits

**Finfish is a highly nutritious food. It is a rich source of good quality protein, vitamins and minerals, and it is low in saturated fat.**

In all finfish, the predominant fats are polyunsaturated fatty acids (PUFAs). These include omega-3, which are associated with a number of health benefits such as reduced risk of cardiovascular disease and protection against stroke. Fatty acids are also essential for the developing brain and spinal cord of the foetus. We need to include these fatty acids in our diets as while our own bodies can create many fatty acids, omega-3 is not one of them. Due to their higher overall fat content, oily fish are a richer source of fatty acids than white fish.

All fish provide vitamins in the diet, and a portion of oily fish may supply or even exceed a day's requirement of vitamin D for an adult. Fish is also a good source of minerals, including iodine and selenium.

As with many foods, processing and cooking methods can affect the nutritional content of fish.

Freezing has little impact on the nutritional quality of fresh fish and keeps it fresh and hygienic. Many frozen fish products are

pre-coated in batter or breadcrumbs, increasing the fat and salt content and reducing levels of micronutrients per portion.

Canning has few effects on the nutrients in the fish itself, although it does have the effect of reducing the level of omega-3 in canned tuna. In addition, oil, sauce or brine used to store canned fish will increase the fat or salt content of the overall product.

Different cooking techniques can alter the nutritional value of fish. Poaching in liquid, baking or grilling fish are healthier options than frying. Fried fish is higher in fat, particularly if cooked in batter or breadcrumbs. Cooking at high temperatures will destroy some of the beneficial omega-3 fatty acids but importantly, cooked fish in any form remains an important source of these essential fats in the diet.

Health professionals recommend that consumers eat at least two portions of fish per week, with one portion being an oily fish such as salmon or mackerel.

# Key Facts



The caught finfish industry is historically important to the Island of Ireland and currently employs more than 5,000 fishermen. Northern Ireland landings come primarily from the Irish Sea and Republic of Ireland landings primarily from the North Atlantic. In 2004, finfish landings on the island were valued at almost €135 million/£93 million.



The consumption of fish on the island is low. The North South Ireland Food Consumption Survey (NSIFCS) found that one third of adults on the island do not eat any fish.



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