



Issue 1: January 2012: This e-bulletin is aimed at those involved with fish including fishermen, fish packers, processors, distributors, retailers, and finally consumers.

Fish for Health and Life

Fish has long been recognised as good for health but in the last decade consumer awareness of this has increased dramatically, especially in relation to oily fish. White fish (cod, hake, plaice . . .) contain approximately 20% protein 80% water, 0.5-3% oil with small amounts of vitamins, minerals, carbohydrate and other substances. Oily fish (mackerel, herring, salmon . . .) also contain about 20% protein but their water (62-70%) and oil contents (10-18%) vary depending on their condition, and one exchanges with the other. High oil content is evident when grilling oily fish on tinfoil. Droplets exude in the case of well conditioned fish whereas recent spawners may show virtually no oil. Don't discard the oil from the tinfoil – instead pour over potatoes, rice or vegetables.

Cardiovascular health

Fish has anti-inflammatory properties and is associated with reduced cardiovascular disease risk via omega-3 polyunsaturated fatty acids (PUFAs). The two main ones have long names, i.e. eicosapentaenoic acid and docosahexaenoic acid; hence the abbreviations EPA and DHA. They reduce the level of platelet aggregation in the blood, i.e. they thin the blood thereby reducing the likelihood of clot formation. The recommended minimum daily intake of EPA/DHA varies from 250mg (EU dietary reference value) to 1250mg (British Nutrition Foundation). An average serving of salmon or mackerel will easily supply these amounts. Make sure to consume the brown flesh of oily fish as this contains most of the oil.

Brain development, function and cognitive health

Research from India (2011) suggests that DHA enhances neuronal development and cognitive functions in young children and in older age decreases progression of neurodegenerative disorders. However, international opinion deems that more studies are needed before a definitive statement can be made. Over 100 clinical trials are currently running globally on the effects of DHA on cognitive health and nutrition – so watch this space!

Peptides, amino acids and whole fish utilisation

The protein in oily and white fish breaks down on digestion into polypeptides, peptides and amino acids. Many of these compounds have bioactive properties. Researchers in Europe have shown that taurine is beneficial for cardiovascular health. Fish is a good source

and research from the EU SEAFOODplus project shows a consistent difference in taurine content of four species in the order plaice (126), cod (93), mackerel (69) and farmed salmon (53mg/100g) i.e. white fish have more than oily fish.

Utilisation of the whole fish is essential in which the fillets are eaten while the bones, head, skin, fins and organs are fractionated or extracted to yield bioactive compounds. For example, fish bones are a good source of calcium; skin/flesh extracts of two eel species showed antioxidant activity; alkaline extracts of halibut skin inhibited proliferation of some tumour cells *in vitro*; fish and fish extracts have anti-hypertensive peptides (ACE inhibitors), i.e. they reduce blood pressure and prevent atherosclerosis.

Seafood safety

This relates to bacteria, viruses and chemical contaminants and is of paramount importance to consumers. Open sea fish and shellfish often have more than 10 types of different bacteria. However, most are not disease causing and produce metabolites during fish storage which give off-flavours and thus rejection of the fish by the consumer. Fish caught near the coast may contain additional pathogens due to faecal pollution in the water. Other pathogens may be picked up during handling and processing operations. Risk from these is minimised by good in-factory hygiene, by the application of hazard analysis, and by full cooking of the fish before consumption. Shellfish may pose an additional hazard as they are filter feeders and, therefore, should be sourced from clean-water areas. Contaminants dioxins and PCBs (polychlorinated biphenyls) are found at low levels in all foods. However, levels in Irish seafood are well within permitted levels. A survey on heavy metals in six slow growing species of Irish caught sea fish in 1998 indicated extremely low levels which were below the USA Environmental Protection Agency Limits by a factor of 1000 or more.

In conclusion, fish contain many important nutrients and bioactives which may have a profound beneficial effect on health. Losses of most of these during processing are generally small. Cook fish with care and eliminate high fat sauces, breading and deep fat frying. So be a 'lifer' and eat fish at least three times per week for life. It may improve health and quality of life – in fact it may prolong your life!

Compiled by Ronan Gormley, UCD Institute of Food and Health, Belfield, Dublin 4. More information from ronan.gormley@ucd.ie

DISCLAIMER: While every care has been taken in ensuring the accuracy of the material presented, no liability as to its use or interpretation is accepted by the author or by UCD.

