



Issue 3: July, 2012: This e-bulletin is aimed at personnel in fisheries & aquaculture, at fish packers, processors, distributors, retailers, and finally consumers.

Oil Your Heart: - Eat Oily Fish!

The benefits of fish oil (lipid) for cardiovascular health came to prominence some years ago when it became apparent that Eskimo populations consuming large amounts of oily fish and seal meat had a low incidence of cardiovascular disease. Follow-up scientific studies indicated that this was partly due to the so-called omega-3 components of fish oil, notably eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids which act as blood thinners, help maintain a healthy heart rhythm, and in some cases reduce blood pressure. The seafood industry is using this information to promote consumption of oily fish. The mainstream food industry, health professionals and consumers are also responding to these potential benefits and a plethora of food products enriched with EPA/DHA are now on the market as are fish oil supplements. 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. Most white fish also contain oil and EPA/DHA but the amounts are small relative to oily fish. However, organs of some white fish, e.g. cod liver, are major sources of oil and EPA/DHA, and have been recognised as such by our forefathers.

Availability of oily fish

Oily fish are widely available on a year-round basis for Irish consumers and include farmed salmon and sea trout, mackerel, herrings, farmed sea bass, and on a less frequent basis tuna and sardines. Oily fish are usually fish that shoal near the surface (pelagic species) while most low oil species feed close to, or on the sea bottom (demersal species). Many consumers don't recognise sea bass as an oily fish and assume it is a low-fat white fish. This is not so as it contains 8-14% oil depending on the season. Oily fish are available from wet fish counters, or in modified atmosphere packs (MAP) from chill counters, or as processed products, e.g. frozen, smoked or canned.

Oil content of oily fish

Oil content of wild fish (see Link 1) varies with catching location, maturity, time of season and other factors being lowest after

spawning, while in farmed fish it depends on the oil content of the feed and on fish maturity. For example, mackerel oil content ranged from 2.5 (March) to 17% (October) in UK caught fish (Wallace, 1991) and herrings from 0.8 to 25% (see Link 2). A Greek study (Zotos & Vouzanidou, 2012) on the effects of season on oil content of the edible portion of different species indicated ranges of 9.2-5.0 (June-September; mackerel), 14.3-8.1 (December-January; farmed sea bass), 14.5-4.2 (September-December; sardines) and 11.7-8.2%; June-April; farmed sea trout). An Irish study indicated oil content ranges of 3.3 to 12.3% and 2.4 to 14.5% for spot samples of farmed and wild salmon respectively (Cronin et al., 1991). Oil content is measured in the laboratory by the traditional solvent extraction procedure but can be approximated rapidly on whole fish or fillets using a Torry Fish Fatmeter. Consumers can sense fish oil content during fillet handling (oily to the touch), during cooking (exudation of oil), and during eating (oily versus dry). Make sure to consume the brown flesh of oily fish as this contains most of the oil.

EPA/DHA content of oily fish

In wild fish the higher the oil content the higher the content of EPA/DHA (see Link 1). The content of EPA/DHA can be approximated from the oil content as the % EPA/DHA in the oil ranges 20-30% (sardine), 15-25% (mackerel), 17-27% (sea bass), and 14-24% (farmed and wild salmon). However, for farmed fish this may not always be the case as vegetable oil, in addition to marine oil, is increasingly used in fish feed for sustainability reasons. For example, Atlantic salmon reared on diets based on marine oil contain about 2.5g of EPA/DHA per 100g of flesh while those on a diet with 75% vegetable oil contain 0.8-1.0g. However, some farmed salmon dardnes currently on retail sale in Ireland out-perform this and contain more than 3g of EPA/DHA per 100g. EPA and DHA are relatively stable to heat and hence largely survive heat processes such as canning (see Link 3) and hot smoking. For example, some smoked mackerel contain up to 8g of EPA/DHA per 100g flesh.

References

Cronin et al. 1991. *Irish Journal of Food Science and Technology*, 15, 53-62.

Link 1: http://www.health.gov/dietaryguidelines/dga2005/report/html/table_g2_adda2.htm

Link 2: <http://www.fao.org/wairdocs/tan/x5933e/x5933e00.htm>

Link 3: <http://whfoods.org/genpage.php?tname=george&dbid=97>

Wallace. 1991. *MAFF (UK) Fisheries Research Technical Report*, No. 91.

Zotos & Vouzanidou. 2012. *Food Science and Technology International*, 18(2), 139-149

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

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