



Issue 4: September, 2012: This e-bulletin is aimed at personnel in fisheries & aquaculture, at fish packers, processors, distributors, retailers, and finally consumers.

Should we Label EPA/DHA content of Farmed Oily Fish?

Salmon, sea trout and sea bass are the main farmed oily fish species available to Irish consumers. Many consumers are aware of the health benefits of the omega-3 components of fish oil, notably eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids, and purchase farmed fish in order to obtain these compounds in their diet. Farmed fish are what they eat and their oil content is, therefore, influenced by their feed and by other factors including stage of maturity/time of season. This gives rise to two concerns:

Firstly, EPA/DHA content of farmed fish is proportional to their oil content and to the amount of EPA/DHA in the feed. It takes 3-5kg of small oily fish (e.g. sprats, anchovies) to produce 1kg of farmed salmon; this is not sustainable and hence increasing amounts of vegetable oil are being added to fish feed and, therefore, into fish flesh. Vegetable oils have low levels of EPA/DHA (except for genetically modified oils) and instead deliver omega-6 linoleic acid. This gives farmed fish with significant oil content but low levels of EPA/DHA. While linoleic acid is an essential fatty acid for humans, western diets already have excess due to widespread use of vegetable oils as ingredients, as frying oils, etc.

Secondly, there are some low oil content farmed fish being retailed in Ireland; obviously these have a very low content of EPA/DHA.

These two aspects are misleading for consumers and warrant consideration of labelling farmed fish for EPA/DHA content.

Omega-3 and omega-6 PUFAs

It is important to clarify the significance of omega-3, omega-6 PUFAs (polyunsaturated fatty acids) and their ratio (omega-3/6). EPA and DHA are the two PUFAs of marine origin associated with beneficial cardiac and cognitive function. Alpha linolenic acid is also an omega-3 acid but of plant origin. It is cited as a precursor of EPA/DHA but current knowledge suggests that there is only small conversion to EPA/DHA in the body. Linoleic acid is an omega-6 acid of plant origin and its presence in farmed seafood indicates that vegetable oil is being used in the fish feed. The question is to what

extent? In this context the omega-3/6 ratio is important. In wild fish the ratio is high, e.g. salmon (18.4; Cronin et al., 1991), sardine (9.3), mackerel (10.8) (Zotos and Vouzanidou, 2012) but in farmed it is low, e.g. farmed salmon (2.7; Cronin et al., 1991), farmed sea bass (1.6), farmed trout (1.7) (Zotos and Vouzanidou, 2012). A low ratio suggests the presence of vegetable oil in the fish feed. Low omega-3/6 ratios in the diet are risk factors for some of the so-called western diseases (Zotos and Vouzanidou, 2012). However, high omega-3/6 ratios in the diet may be associated with lower breast cancer risk, especially in pre-menopausal women (Goodstine et al., 2003).

Which farmed oily fish can be labelled?

Logistically it is difficult to label oily fish on sale at wet fish counters and the best that could be achieved is ongoing spot checks on the oil content and EPA/DHA status of such fish and posting the results in-store, e.g. this salmon flesh contains at least 3% EPA/DHA. However, in the case of packaged oily fish such as pre-packed darnes/fillets, smoked fish and canned fish, labelling is easier and is already being carried out by some retailers. Farmed fish can be produced to a blueprint that will ensure a desired oil and EPA/DHA content and this approach should be implemented by all. Obviously this will increase production costs but which is the better scenario? Lower cost - poor EPA/DHA status or higher cost - good EPA/DHA status; the latter is the preferred option.

What information should the label contain?

Some retailers in Ireland voluntarily label the oil (fat) status of both wild and farmed packaged chilled fish portions including darnes, fillets and smoked products. This is important consumer information as it enables selection of fish with a significant content of EPA/DHA. Labels have information on total fat (oil), saturated fat, PUFAs, omega-3s, EPA & DHA, and in the case of smoked products, salt. However, omega-6 contents or omega-3/6 ratios are not cited; this is regrettable in view of the comments above on the desirability for high omega-3/6 ratios.

References

- Cronin et al. 1991. *Irish Journal of Food Science and Technology*, 15, 53-62.
Goodstine et al. 2003. *Journal of Nutrition*, 133 (5), 1409-1414.
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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