SeaHealthUCD

Issue 31: November, 2019: This e-bulletin is aimed at personnel in fisheries and aquaculture, at fish packers, processors, distributors, retailers and finally, consumers.

Omega-3 index:-how do I achieve a good score?

Dr William Harris (University of South Dakota, USA) and other researchers have promoted the omega-3 index (O3I) as an indicator of coronary heart disease mortality risk on the basis of strong epidemiological evidence (1-4). The index is defined as the content of eicosapentaenoic (EPA)+docosahexaenoic (DHA) fatty acids in red blood cells (erythrocytes) divided by the total fatty acid content in the erythrocytes expressed as a percentage. Research has indicated that an omega-3 index of 4 or below is 'bad' and 8 or above is 'good' (1) as reported in SeaHealth-ucd Issue 24. Values circa 4-5% prevail in the USA and Europe but up to 8% in Japan.

Recent USA study

Jackson *et al*. (5) have outlined a 2019 study linking self-reported fish intake and omega-3 supplementation status with omega-3 index in a trial with 3458 subjects. The aim of the study was to determine, in a large group of people, what combination of these two sources of EPA and DHA was required achieve an O3I of >8%. EPA and DHA levels in the blood were determined using dried blood spots (DBS) submitted by the participants. The mean O3I in the US study was 5.99(±2.29) and over half the subjects were taking EPA+DHA supplements. Individuals also completed a short form with details of age, sex, country, frequency of oily fish consumption and also if they were taking an omega-3 supplement. The amount of EPA+DHA provided by two oily fish meals (fish serving 115g/meal) per week plus supplementation was estimated at 3.1g or 0.44g/d i.e. 2.5g from oily fish plus 0.6g from two capsules. However, the blood speck tests indicated that 0.84g/day was necessary to raise the O3I to 8%. Based on the above estimates this would require four oily fish servings/week (supplying 5g) plus three supplements (supplying 0.9g) equalling 5.9g or 0.84g/day. This is much higher than current EPA+DHA recommendations from the Dietary Guidelines for Americans (0.25g/d), the US Academy of Nutrition and Dietetics (0.5g/day) and the American Heart Association (two fish portions/week). However, Dyerberg, the pioneer of fish oils research, in a recent article (6) has defended the benefits of high EPA+DHA intakes and stressed that the reason why

some supplement trials were inconclusive or showed no protective effects was that the dose was too low; he suggests 4g/d.

How does USA study relate to Ireland?

The author is not aware of any O3I data for Irish subjects so perhaps it can be assumed that values would be in the range 2-5% as in the US study above. The Irish NANS dietary survey (7) indicated fish intakes of 23(±34)g/d for those in the age range 18-64 and 34(±42)g/d for those ≥65. An Irish in-store survey (8) indicated that 19% of the 371 consumers interviewed did not purchase or eat fish while 35% of the 300 consumers who did buy fish did so once per week, 25% twice per week and 13% three to four times per week. These examples of Irish fish consumption suggest that they would not supply 0.84g/d or 4g/d as proposed by Jackson *et al* (5) or Dyerberg (6) respectively. The former equates to consuming circa 100g daily portions of Irish farmed salmon based on a EPA+DHA content of 0.82g/100g (9), or 3x0.3g supplement sachets/d, or a combination thereof. The latter means daily portions of 488g of farmed salmon or 13x0.3g supplement sachets/d, or a combination thereof. The European Food Safety Authority (EFSA) has concluded that intakes of EPA+DHA of 2-4g/d are safe and are needed to reach claimed effects such as the maintenance of blood pressure and triglyceride levels. However, an intake of 0.25g/d is sufficient for the maintenance of normal cardiac function. The reasons why many Japanese have an O3I of 8% may be twofold: (i) they have a high seafood consumption; (ii) they may have considerably lower levels of fatty acids of dairy, meat or plant oil origin in their red blood cells resulting in a lower denominator in the O3I equation. The conclusion is that EPA+DHA supplements are needed if Irish consumers are to attain an O3I of 8%.

References:

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The previous 30 issues of Seahealth-ucd can be viewed at: http://www.ucd.ie/foodandhealth/newsevents/outputs/

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