

The Urgent Need to Re-Think Outside the “Omega-3 Pufas” Box

Ioannis Zabetakis*

Laboratory of Food Chemistry, Department of Chemistry, University of Athens, 15771 Athens, Greece

Introduction

Today, there is a growing controversy on the association of intake of omega-3 polyunsaturated fatty acids (PUFAs) and the onset of cardiovascular diseases (CVDs) in humans. Some studies suggest that the consumption of oily fish leads to increased levels of omega-3 PUFAs and thereafter a favourable cardiovascular prognosis. These views have been supported by epidemiological data evaluated by meta-analyses and they have been linked to higher levels of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Clinically, men who consume oily fish at least once a week had a 50 percent lower incidence of coronary heart disease (CHD) and sudden cardiac death (SCD). Mechanistically, though, we still do not know how omega-3 PUFAs work. Their postulated mechanism in preventing atherosclerosis could be through lowering the levels of triacylglycerol, preventing arrhythmias, decreasing platelet aggregation, or lowering blood pressure [1].

On the other hand, the association of omega-3 PUFAs and CVDs has been revised recently by evaluating all randomised trials on the supplementation of omega-3 PUFAs to adults. In a recent review the results of 20 studies on 68,680 patients were evaluated and omega-3 PUFAs were not found to be statistically significantly associated with CVDs in various patient populations [2]. There is still considerable doubt today if lowering blood cholesterol is a true prerequisite in order to protect ourselves from CVDs. In fact, cholesterol can be correlated with CVDs but without being a causal factor for it. Therefore, people with high levels of High Density Lipoproteins (HDL) face no higher risk for CVDs as the ratio (and not only the absolute levels!) of LDL to HDL is also important in disease prognosis [3,4].

With all the above in mind, it is rather surprising to see that most of the studies in aquaculture are still not addressing the nutritional value of the final produce from the consumer point of view. People eat fish because they have been told that “fish is good for you” and this is, still, valid and true. On top of that, aquaculture fish is even better

since all raw ingredients and fish are constantly scrutinised under strict quality assurance procedures following all relevant requirements (for example, those of ISO22000, ISO9001, IFS, BRC, etc). The final product is thus fully monitored in terms of safety and quality but also in terms of sensory properties.

However, is it properly evaluated for its nutritional value against CVDs? If not, future research into the identification of fish lipids with specific cardioprotective activities could bring added value to aquaculture and be a viable marketing tool in promoting (functional) aquafeeds and fish [5]. The commercial future can be bright if the functional properties of fish are emphasised on the label, after having carried out relevant bioassays. In doing so, it is rather vital to assess the full lipidomic spectrum for cardioprotective activities and not only the levels of omega-3 PUFAs. Fish does contain polar lipids with strong anti-atherogenic properties and these molecules can be further exploited, both academically and commercially [6].

References

1. Zabetakis I (2013) Food security and cardioprotection: the polar lipid link.
2. Rizo EC, Ntzani EE, Bika E, Kostapanos MS, Elisaf MS (2012) Association Between Omega-3 Fatty Acid Supplementation and Risk of Major Cardiovascular Disease Events. A Systematic Review and Meta-analysis. *JAMA* 308: 1024-1033.
3. Nasopoulou C, Karantonis HC, Perrea DN, Theocharis SE, Iliopoulos DG, et al. (2010) In vivo anti-atherogenic properties of cultured gilthead sea bream (*Sparus aurata*) polar lipid extracts in hypercholesterolaemic rabbits. *Food Chemistry* 120: 831-836.
4. Zabetakis I, Antonopoulou S, Demopoulos CA (2013) The prevention of atherosclerosis by food components: polar lipids VS omega-3 PUFAs.
5. Nasopoulou C, Smith T, Detopoulou M, Tsirikla C, Papaharisis L, et al. (2014) Structural elucidation of olive pomace fed sea bass (*Dicentrarchus labrax*) polar lipids with cardioprotective activities. *Food Chemistry* 145: 1097-1105.
6. Zabetakis I (Ed) (2015) Marine Oils: from Sea to Pharmaceuticals. Nova Science Publishers, New York.

*Corresponding author: Ioannis Zabetakis, Laboratory of Food Chemistry, Department of Chemistry, University of Athens, 15771 Athens, Greece, Tel: 509-335-1858; E-mail: izabet@chem.uoa.gr

Received March 05, 2015; Accepted March 10, 2015; Published April 15, 2015

Citation: Zabetakis I (2015) The Urgent Need to Re-Think Outside the “Omega-3 Pufas” Box. *J Aquac Res Development* 6: 332. doi:10.4172/2155-9546.1000332

Copyright: © 2015 Zabetakis I. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.