

## **The effect of industrial processing of salmon oil on its ability to reduce serum concentrations of oxidized low-density lipoprotein- $\beta$ 2-glycoprotein-I complex in a mouse model**

**Bomi Framroze<sup>1</sup> and Sagar Sawant<sup>2</sup>**

<sup>1</sup>Hofseth Biocare ASA, Molvegen 6, Aalesund 6000, Norway; <sup>2</sup>SA-FORD, MIDC Talaja, Navi Mumbai, 410028, India

**\*Corresponding author:** Bomi Framroze, PhD, CSO, Hofseth Biocare AS, Molvegen 6, 6000 Ålesund, Norway

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### **ABSTRACT:**

**Background:** Circulating serum levels of oxidized low-density lipoprotein,  $\beta$ 2-glycoprotein I complex (oxLDL-GP), have been previously correlated with adverse cardiovascular events and have been shown to be reduced by consumption of enzymatically liberated extra virgin salmon oil (EVSO). This mouse study measured the changes in the oxLDL-GP lowering effect when consuming EVSO with varying levels of EPA+DHA (eicosapentenoic acid and docosahexenoic acid) as well as when consuming EVSO that was subjected to various processing treatments commonly carried out during fish oil production.

**Methods:** Sprague Dawley mice were fed a diet containing eight different EVSO's incorporated into a normal diet at the Human Equivalent Dose (HED) of 1000 mg for 8 weeks. Serum was collected at the start and at the end of the trial and the oxLDL-GP concentrations were measured using an ELISA assay. Statistical analysis of the results was carried out using a 1-tail, paired Student t-Test.

**Results:** In order to lower circulatory oxLDL-GP levels, the mice had to consume a minimum of 80 mg per day HED of EPA+DHA. Heat treatment of the EVSO did not affect this bioactivity but hydrolysis with acid or base and re-esterification to the triglyceride form or significant oxidation (rancidity) rendered the oil inactive on this important cardio-vascular disease (CVD) biomarker.

**Conclusions:** This result shows that harsh processing conditions on fish oils can lead to the destruction of biological efficacy in spite of increasing the concentration of typical fish oil bioactive constituents such as EPA+DHA. It also lends support to the developing nutrition theory that eating highly-refined, processed or concentrated-ingredient supplements derived from functional foods may not be able to reproduce their full nutritive and health-benefiting effects.

**Keywords:** Oxidized-LDL; processing; Salmon; Oil; omega-3; rancidity