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Short Communication

Can Canned Tuna Improve Cardiovascular Health? Study of the Effect of Consumption of a Functional Food Developed from *Thunnus albacares* on the Lipid Profile

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The Study

Cardiovascular diseases (CVD) and the cost of treatment pose a threat to society at large. Omega 3s are a type of polyunsaturated fatty acid necessary for the proper functioning of the body and that improves levels of lipoproteins (VLDL, HDL, LDL and triglycerides) in the blood.

Among the omega 3 are eicosapentaenoic acid (EPA) and docohexanoic (DHA), whose main sources are fatty fish such as tuna, mackerel and salmon, and the oil obtained from these species that is used as a nutritional supplement (nutraceutical).There are three basic pathways for the metabolism of omega 3 polyunsaturated fatty acids (AGPI) that occur during and after absorption .

The best-known effect of omega 3 is hypolipemia (Libby et al. 2011). Triglycerides are a risk factor in cardiovascular disease. Studies indicate that DHA and EPA intake reduce postprandial increase in triglycerides (Adler and Holub, 1997).

The reducing effect on triglyceride concentrations of omega 3 is due to their ability to reduce hepatic synthesis of triglycerides and very low density lipoproteins (VLDL) as the EPA and DHA are bad substrates for enzymes involved in the synthesis of triglycerides making it difficult to synthesis low-density lipoproteins involved in the transport of triglycerides (Katan and Mensink, 1992).

The ability of omega 3s to increase betaoxidation of fatty acids by hepatic peroxisomes cause the synthesis of VLDL to decrease, they are able to inhibit the enzyme acil-CoA:1.2-diaglycerol acylgasispher that is involved in the synthesis of triglycerides (Katan and Mensink, 1992).

Consumption of omega 3 in the population, recommendations for daily intake and alternatives to increase it

In the study "Polisaturated fatty acids in the food chain in Europa" (Sanders, 2000) estimates the intake at 0.1 to 0.5 g/day. These intakes are high compared to the US (0.1-0.2 g/day) but both are reduced compared to Japan (up to 2 g/day) (European Food Safety Authority), where fish is one of the most consumed foods. Omega 3 consumption varies from country to country, from 0.6 g per day in France and Greece to 2.5 gr per day in Iceland. In Spain (Kris-Etherton et al. 2003) consumption is relatively low (50 mg/day for a population between the ages of 35 and 65). A study on the Basque population (Amiano et al. 2001) shows that the contribution of DHA and EPA from food is less than 1200 mg/day, with a wide range of sporadic consumers of omega-3-rich fish (250 mg/day) to those of large consumers (1170 mg/day), indicating the existence of a high proportion of population that does not consume the recommended amount (200 to 600 mg/day) (Sanders, 2000).

The development of functional foods, rich in omega 3, may be an alternative to increasing daily intake.

An example of the importance of consuming foods that provide omega 3 is the study carried out by the Puleva Health Institute, which found that the daily supply of a functional dairy enriched with omega 3 reduced triglycerides, LDL cholesterol and homocysteine, risk factors in cardiovascular diseases.

A canned can is manufactured from *Thunnus albacares*, following a strict protocol of specimen selection, and manufacturing, continuously performing nutritional analyses confirming that each unit provides the recommended daily amount of omega 3.

The most effective routes of effect are identified based on hypolipidants, which interfere with the mechanism of HMG-CoA reductase **(Figure 1)**, as omega 3 interferes with lipogenesis-related enzymes (Katan and Mensink, 1992).

For the evaluation of its effect, we perform a measure of lipid blood levels and blood pressure before starting to consume it and after the experimental phase, just the day of consumption of the last can contributed to the participants, who have been selected under specific criteria.

The effects of the main pharmacological therapies, without using associated combinations of active substances, do not achieve in some situations the decrease obtained after the use of the can developed over 90 days **(Table 1)**.

The use of a can of Thunnus albares developed as a functional food provides the recommended daily amount of omega 3, 0.6 g per day.

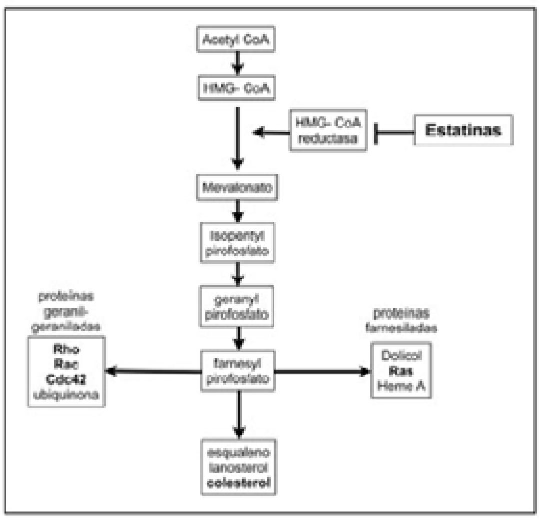

Figure 1: Mechanism of action of statins inhibiting HGMO-CoA reductase.

By consuming it at the given time we get it to act directly on lipogenesis, inhibiting HMG-CoA reductase, while inhibiting the genes involved in the synthesis of this enzyme (selective blockage of SREB proteins involved in the synthesis of HMG-CoA reductase).

Omega 3s also interfere with membrane permeability, decreasing the amount of lipids that pass into the cell interior.

The widespread increase in HDL confirms that the tuna can is a source of omega 3 with the ability to raise the values of this lipoprotein in the blood through consumption.

Table 1: The effects of the main pharmacological therapies, without using associated combinations of active substances.

Pharmacological group	c-LDL	c-HDL	Triglycerides
Resins	15-30%	3-5%	?
Statins	18-55%	5-5%	7-30%
Fibrates	5-20%	10-20%	20-25%
Ezetimiba	16-20%	1-5%	2-5%
Nicotinic acid	25%	14-30%	25-50%
Statin-ezetimide	35-80%	10-15%	30-35%
Statin-fenofibrate	40-45%	15-20%	50-55%
Statin-niacin	45-50%	30-35%	45-45%

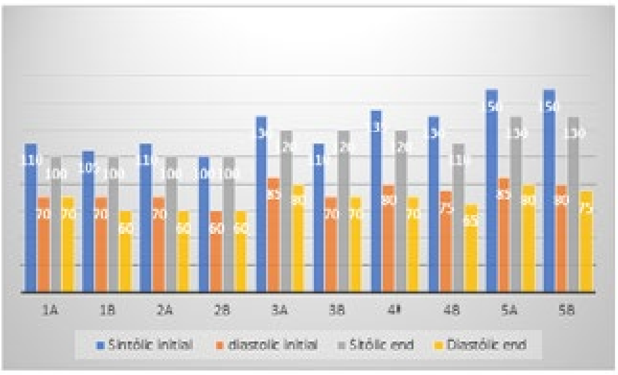

Figure 2: Analysis comparative values tension sanguine.

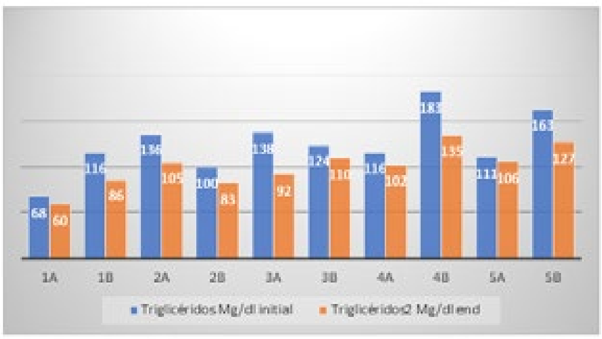

Figure 3: Comparative triglyceride analysis.

The effects of its consumption show an improvement in cardiovascular health, as they improve lipid profile and blood pressure values, as **Figures 2-6** and in other studies (Kromhout et al. 1985; Daviglus at al. 1997; Albert et al. 1998) (Von Schacky et al. 2001; Hopper et al. 1999).

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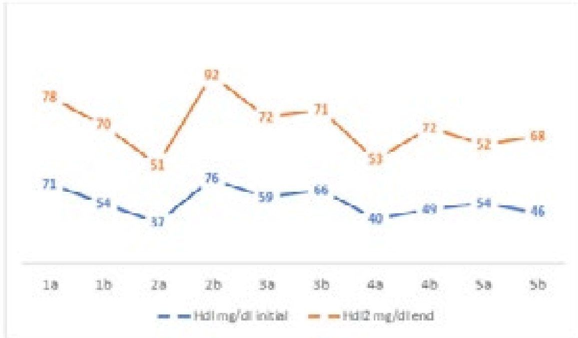

Figure 4: HDL Analysis.

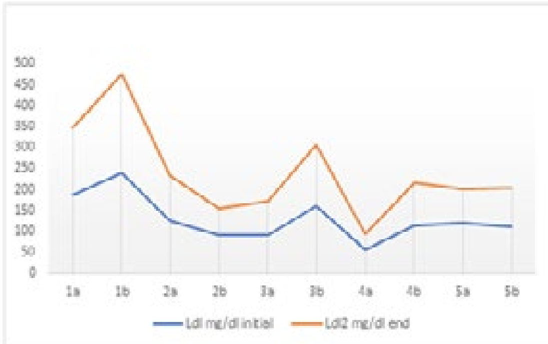

Figure 5: LDL Analysis.

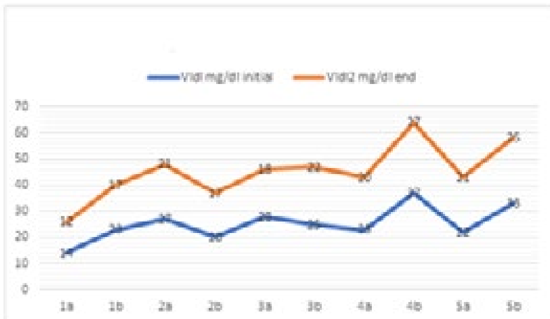

Figure 6: VLDL Analysis.

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