Health Benefits of Omega-3 Fatty Acids from Neptune Krill Oil

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Feature

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Summary

Over the last few decades, natural health ingredients have gained the interest and support of both science and industry. The increasing incidence of adverse events associated with synthetic drugs has created a demand for effective and safe alternative treatments. The few natural health ingredients that have been rigorously researched for their safety and efficacy and have passed both peer and regulatory scrutiny can provide a solution to this problem. Neptune krill oil® (NKO®) fulfills these criteria by supporting solid scientifically validated research proving safety and efficacy. Furthermore, the company is involved in several novel clinical trials to further expand its proprietary and innovative portfolio.

Introduction

Neptune krill oil (NKO) is extracted with a patented GMP-accredited process from Antarctic krill (Euphausia superba), which is considered the most abundant biomass on the planet (1). Antarctic krill have a life span of about 5 to 10 years and are considered to be a keystone species, an organism upon which very many Antarctic predators depend. They spend their days in the dark depths of the ocean, safe from their major predators (like baleen whales and sea birds). Marine ecologists believe that the annual production of Antarctic krill is several hundred million tonnes of which 85 million tonnes are consumed by Antarctic baleen whales. The new krill total annual precautionary catch limit acceptable to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) corresponds to about 8.33% (or -/12) of the baleen whales consumption. In fact, the actual total annual catch of 127,000 tonnes (2004–2006) equals to about 0.15% (or -/670) of the baleen whales krill consumption.

NKO is distinct from other marine oils in that the omega-3 fatty acids are attached to phospholipids, which due to their amphiphilic nature act as superior delivery systems. Furthermore, naturally inherent powerful antioxidants like astaxanthin, also attached to the phospholipids confer exceptional stability and antioxidant potency. NKO has been scientifically proven with thorough preclinical and clinical studies to be safe for chronic use and effective for the management of dyslipidemia, chronic inflammatory conditions and cognitive disorders.

NKO components

Phospholipids

Phospholipids, known as “Life’s Building Blocks”, are integral to the construction of cell membranes and work cooperatively with omega-3 and antioxidants within the cell membrane to assist a variety of processes essential to life. Most of the eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in NKO are structurally attached to phospholipid molecules mimicking the way these nutrients occur naturally in cell membranes. By weight, NKO is comprised of at least 30% EPA and DHA and 40% phospholipids, mostly in the form of phosphatidylcholines. In contrast, the EPA and DHA in fish oil are in the form of triacylglycerols. It has been demonstrated that essential fatty acids in the form of phospholipids are superior to those in the form of triacylglycerols in increasing the bioavailability EPA and DHA (2).

Astaxanthin

Astaxanthin, a red-orange pigment found in aquatic animals, is another valuable constituent of NKO. Astaxanthin is closely related to better-known carotenoids such as beta-carotene and lutein. Like other carotenoids, astaxanthin cannot be synthesized by animals and must therefore be provided in the diet. Certain marine species, however, such as shrimp, have a limited capacity to convert closely related dietary carotenoids into astaxanthin. The presence of this antioxidant carotenoid in NKO, combined with other antioxidants in the oil (vitamins E and A, and a bioflavonoid), creates a natural protection against oxidation of the oil. Independent analysis performed at Bruiswijk Laboratories with NKO and published literature suggest that astaxanthin is a significantly more effective as an antioxidant than vitamin E (3). Astaxanthin can quench free radicals and protect the cell membrane phospholipids against the free radical damage. When measuring the oxygen radical absorbance capacity (ORAC), a measure of a compound’s ability to block free radicals, NKO was 48 times more effective than fish oil and 34 times more effective than coenzyme Q10 (Fig. 1).

NKO health benefits

Cholesterol levels

Werner et al. demonstrated that essential fatty acids in the form of phospholipids were superior to essential fatty acids in the form of triacylglycerols for significantly decreasing the saturated fatty acid ratios of liver triacylglycerols (4).

One of NKO most promising actions is its dual ability to improve cholesterol and triacylglycerol levels. Recent research
suggests that NKO may be even more effective at lowering cholesterol levels than fish oil.

A prospective randomized double-blind clinical trial performed by researchers affiliated to Quebec University demonstrated that NKO can safely and effectively increase high density lipoprotein (HDL) and reduce low density lipoprotein (LDL) in patients suffering from hyperlipidemia. This 12-week study compared the effects of NKO, high EPA/DHA fish oil and a placebo (5). Study participants included subjects 25-75 years old diagnosed for at least 6 months with mildly-high to very-high blood cholesterol (193.6-347.9 mg/dL) and triacylglycerols (203.8-354.4 mg/dL). The researchers divided the 120 subjects into four groups. The first group received 2 or 3 g NKO once per day, with the dosage determined by body weight. Another group received 1 to 1.5 g of NKO once per day, depending on body weight, during the study and then a maintenance dose of 500 mg per day for 90 days during follow up. A third group received 3 g per day of fish oil containing 180 mg EPA and 120 mg DHA per gram. A fourth group received a placebo (Fig. 2).

In this study blood glucose, cholesterol, triacylglycerols, LDL (the "bad" cholesterol), and HDL (the "good" cholesterol) were measured. Fasting blood lipids and glucose were measured at baseline and at 30 and 90 days after the study's start. For the group consuming the maintenance dose of NKO, blood lipids and glucose were measured at 30, 90 and 180 days.

The results showed that NKO had an impressive effect on cholesterol. After 12 weeks of treatment, patients receiving 1 or 1.5 g NKO per day experienced a 13.4% and 13.7% reduction in mean total cholesterol, from 236 mg/dL and 231 mg/dL to 204 mg/dL and 199 mg/dL, respectively. Subjects treated with 2 or 3 g NKO showed a significant reduction in mean total cholesterol of 18.1% and 18% respectively. Levels were reduced from a baseline of 247 mg/dL and 251 mg/dL to 203 mg/dL and 206 mg/dL, respectively. In comparison, people receiving 3 g of fish oil had a mean reduction in total cholesterol of only 5.9%, from a baseline 231 mg/dL to 218 mg/dL. Placebo-treated subjects experienced a 9.1% increase in mean total cholesterol, from 222 mg/dL to 242 mg/dL.

Levels of LDL, the "bad" cholesterol, also plummeted in the NKO group. NKO at a daily dose of 1, 1.5, 2 or 3 g caused a significant 32, 36, 37, and 39% drop in LDL cholesterol, respectively. Baseline levels were decreased in the NKO 1-g per day group from 168 mg/dL to 114 mg/dL, in the 1.5-g per day group from 165 mg/dL to 106 mg/dL, and in the 2- and 3-g per day groups from 183 mg/dL and 173 mg/dL to 114 mg/dL and 105 mg/dL, respectively. Patients treated daily with 3 g fish oil did not achieve a significant LDL reduction. In placebo-treated patients, LDL levels rose by 13% from 137 mg/dL to 154 mg/dL.

NKO’s positive effects extended to HDL, the "good" cholesterol. Researchers noted a rise in HDL cholesterol in subjects taking NKO. At 1 g of NKO per day, HDL levels increased from 57.2 mg/dL to 82.4 mg/dL (a 44% rise). Subjects consuming 1.5 g of NKO per day experienced a 43% increase in HDL from 58.8 mg/dL to 83.9 mg/dL. At 2 g per day, the subjects experienced a 55% increase in HDL from 51 mg/dL to 79.3 mg/dL. Subjects treated with the highest dose (3 g of NKO per day) experienced an impressive 59% increase in HDL from 64.2 mg/dL to 102.5 mg/dL. Three grams of fish oil also caused a smaller increase in HDL from 56.6 mg/dL to 59.03 mg/dL (a 4.2% increase). No significant decrease of HDL was observed within the placebo group, with levels of HDL remaining almost stable.

Although lower doses (1-1.5 g per day) of NKO resulted in only small, non-significant drops in triacylglycerols, higher doses (2 and 3 g) resulted in a significant 27 to 28% reduction of triacylglycerols decreasing from baseline levels of 160.4 mg/dL for the 2-g group and 152.8 mg/dL for the three gram group to 116.1 mg/dL and 112.3 mg/dL, respectively. Fish oil at 3 g per day achieved a non-significant 3.2% reduction of triacylglycerols. Inexplicably, the placebo-treated patients experienced a 9.8% decrease in triacylglycerols.

After the main part of the study was over, patients receiving 1 g and 1.5 g per day of NKO continued for another 12 weeks with a lower maintenance dose of 500 mg NKO per day. These patients maintained a mean total cholesterol level of 192.5 mg/dL, a reduction of 19% from baseline. In addition, LDL cholesterol declined 44% from baseline. A moderate decrease in HDL was seen, from the 36% increase at 90 days to 33% after 180 days of treatment, which still constituted a significant improvement from baseline. Triacylglycerol levels also dropped farther from the 12% reduction that occurred at 90 days of treatment to 25% while on the maintenance dose.

**Blood sugar**

The study also showed another promising effect of NKO – the ability to lower blood sugar. Patients treated with 1 g and 1.5 g of NKO per day saw a 6.3% reduction (from 105 mg/dL to 98 mg/dL) in blood glucose levels. Subjects receiving 2 or 3 g of NKO per...
day experienced a 5.6% drop in blood glucose (from 92 mg/dL to 88 mg/dL). A daily dose of 3 g fish oil reduced blood glucose by 3.3%, from 90 mg/dL to 87 mg/dL. Placebo treatment resulted in a slight increase in blood glucose. Blood glucose continued to decrease slightly in the subjects who continued on with the follow-up maintenance dose of 500 mg of NKO.

Chronic inflammation

Another clinically proven health benefit of NKO is its effect on chronic inflammation and arthritic symptoms. Supporting this is a prospective randomized double-blind clinical trial study whose objective was to evaluate the effect of NKO on C- reactive protein (CRP) on patients with chronic inflammation and on arthritic symptoms (6). The results clearly indicated that NKO significantly inhibits inflammation and reduce arthritic symptoms within a short treatment period of 7 and 14 days. For this study, 90 patients were recruited with confirmed diagnosis of cardiovascular disease and/or rheumatoid arthritis and/or osteoarthritis and with increased levels of CRP (>1.0 mg/dL) upon three consecutive weekly blood analysis. Group A received NKO (300 mg daily) and Group B received a placebo. CRP and Western Ontario and McMaster Universities (WOMAC) osteoarthritis score were measured at baseline and days 7, 14 and 30 (Fig. 3 and 4).

Specifically, researchers found that after 7 days of treatment NKO reduced CRP by 19.3% compared to an increase by 15.7% observed in the placebo group (p = 0.049). After 14 and 30 days of treatment NKO CRP further decreased by 29.7% and 30.9% respectively (p < 0.001). The CRP levels of the placebo group increased to 32.1% after 14 days and then decreased to 25.1% at day 30 (Fig. 3). The between-groups difference was statistically significant; p = 0.004 at day 14 and p = 0.008 at day 30. NKO showed a significant reduction in all three WOMAC scores. After 7 days of treatment NKO, reduced pain scores by 28.9% (p = 0.050), reduced stiffness by 20.3% (p = 0.001) and reduced functional impairment by 22.8% (p = 0.008) (Fig. 4). We speculate that this is based on the blockage of leukotriene formation by interfering at the level of the lipoxygenase pathways. The results of the present study validate the potent anti-inflammatory properties of NKO and reinforce the potential mechanism of action.

Cognitive disease

Yet another health benefit of NKO is on attention deficit hyperactivity disorder (ADHD). The study was designed as a pilot, uncontrolled, open-label study. The objectives were to evaluate the safety and effectiveness of NKO in the treatment of ADHD.

30 patients having age distribution ranging between 10 and 32 years and a mean age of 23 years (SD of 12 years) were enrolled into the trial. All of the 30 patients enrolled were known as having ADHD for many years (mean 7 years and a SD of 3 years) and were free of acute and chronic physical diseases. The subjects were administered 500 mg of NKO daily and the Barkley executive functions score were noted. After completing the treatment, patients showed a statistically significant improvement in all three Barkley's Executive Function scores (behavioral inhibition, self-control and executive function). This indicates NKO can be considered as a safe, toxic free treatment able to improve brain executive function for adults having ADHD, and reduce the need for stimulant medication and treatment costs and improve the quality of life of patients. Further research is needed in order to better understand dosage and long-term effects of the treatment in different physical and psychological conditions of adults and children.

Conclusion

NKO combines multiple ingredients with synergistic bioactivity and its efficacy is supported by thorough and authentic clinical data. Further elucidation of the mechanism of action is progressing rapidly and it will be important to compare the effects of NKO with other anti-inflammatory agents and lipid-lowering agents presently used as standard care. Nevertheless, NKO's unique profile of phospholipids and antioxidants, proprietary extraction process and solid scientific evidence distinguishes it from all other natural ingredient supplements.

References


