FACT SHEET

SUPERBA™ KRILL OIL

OMEGA-3 PHOSPHOLIPIDS FROM KRILL

An Aker BioMarine™ product
OMEGA-3 – ESSENTIAL FATTY ACIDS IN DIET
The long-chain omega-3 polyunsaturated fatty acids DHA and EPA are popularly called omega-3. Supplementary intake of omega-3 is recommended in the western world, due to generally low dietary intake and omega-3’s health-promoting benefits. Benefits attributed to omega-3 include reduced risk and improved treatment outcomes regarding cardiovascular disease and inflammatory joint diseases. Better brain and central nervous system development, improved cognitive functioning, and improved skin health are additional benefits. Research indicates that even more omega-3 benefits for individuals will be identified and that greater intake can lead to better general health in western, industrialized cultures.

ANTARCTIC KRILL – AN IMPORTANT SOURCE OF OMEGA-3
Aker BioMarine’s krill oil – Superba™ – is extracted from the Antarctic krill species Euphausia superba, which is rich in omega-3. Moreover, the omega-3 in krill oil is mainly in the omega-3 phospholipid form, which research suggests is a preferred dietary supplement when compared to omega-3 in triglyceride form. Marine omega-3 in dietary supplements is mostly derived from fish, such as fish body oil and cod liver oil, which provide omega-3 in triglyceride form. The omega-3 obtained from eating fatty fish such as salmon also provide some omega-3 in the phospholipid form.

CHANGES IN THE WESTERN DIET – REDUCED INTAKE OF PHOSPHOLIPIDS
Food sources and their nutrient values have changed tremendously over the past century in western cultures. In fact, while the human genome most likely has changed insignificantly over the past 10,000 years, the foods eaten in industrialized countries are a far cry from the staples consumed when mankind evolved. Reasonable assumptions are that “primitive” diets provided phospholipids in greater abundance than the current Western diet and that humans evolved such that phospholipids are the preferred source of omega-3. The current Western diet provides only small amounts of phospholipids; dietary phospholipids represent only 5 percent of total lipid intake, of which very little is in the form of omega-3 phospholipids.

FACT SHEET Omega-3 phospholipids from krill

For further details, please contact Aker BioMarine ASA at superba@akerbiomarine.com
Research indicates that phospholipid omega-3 fatty acids have greater bioavailability for cell growth and functioning, compared with omega-3 triglycerides.

DIGESTION AND ABSORPTION OF OMEGA-3 PHOSPHOLIPIDS

Triglycerides and phospholipids are digested and absorbed in different ways in the small intestine. Omega-3 phospholipids follow simpler digestion and distribution routes than omega-3 triglycerides in the human body. Greater bioavailability and bioefficiency of omega-3 phospholipids relative to omega-3 triglycerides influence cellular absorption, functioning and distribution of omega-3.

Triglycerides are insoluble in water; their digestion by enzymes and subsequent absorption in the small intestine requires emulsification by bile salts via the formation of micelles.

Phospholipids are not dependent on bile for digestion; they can spontaneously form micelles and be conveyed in an aqueous environment. Phospholipids can be absorbed without digestion in their intact form, or as lysophosphatidylcholine after digestion by enzymes in the small intestine. Their simpler digestion process in the small intestine before absorption is one of the factors indicating that omega-3 phospholipids offer greater bioavailability in the human body than omega-3 triglycerides. Another suggested factor is that phospholipids are directly absorbed by intestinal epithelia for distribution via blood plasma, considerable triglyceride transport involves facilitation by the lymphatic system.

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After absorption in the small intestine, lysophosphatidylcholine is reassembled (via the addition of a fatty acid) to phosphatidylcholine. Phosphatidylcholine is an important structural component of cellular membranes and participates in fatty acid transport in blood and across membranes. Because fatty acids are water insoluble, they can not be transported in their free form in blood; instead, lipoprotein assemblages act as a vehicle for fatty acid transport in blood. Lipoproteins located along the surface of lipoproteins play important roles in fatty acid transport in blood. Human lipoproteins include chylomicrons, HDL, LDL, and VLDL.

The size of a lipoprotein assemblage varies according to the amounts and types of fatty acids transported in it. Larger assemblages deliver fatty acids to various tissues throughout the human body, while small lipoprotein assemblages serve as “housekeepers,” bringing excess fatty acids to the liver for degradation. Omega-3 phospholipids in the lipoproteins can influence the distribution of lipoproteins in the body and, hence, the availability of fatty acids. Increased transport to and utilization of omega-3 by various tissues has been demonstrated, when delivered as omega-3 phospholipids. For example, elevated concentrations of omega-3 in target organs, such as the brain and liver, are observed when delivered as omega-3 phospholipids. Thus, dietary intake of omega-3 phospholipids appears to play a beneficial role in the distribution of fatty acids to various body tissues.

**OMEGA-3 PHOSPHOLIPIDS**

**- A MORE BIOEFFICIENT SOURCE OF OMEGA-3**

Increased intake of omega-3 is recommended due to its beneficial overall health effects and its capacity to prevent and ameliorate disease. Krill oil delivers omega-3 in the phospholipid form. Omega-3 phospholipids are more efficiently absorbed via the small intestine and distributed to tissues, compared with omega-3 triglycerides. Omega-3 phospholipids are suggested as preferred sources of omega-3 for human cell structures and cell functions, as a result of greater bioavailability and bioefficiency, compared with omega-3 triglycerides. Thus, omega-3 phospholipids from krill are a more bioefficient source of omega-3 than the omega-3 triglycerides derived from fish oil.

**Omega-3 phospholipids from krill are a more bioefficient source of omega-3 than the omega-3 triglycerides derived from fish oil**

**ILLUSTRATIONS:** Kari C. Toverud, MS, CMI

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