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CONFIRMATION NO. 7678

72960
Casimir Jones, S.C.
440 Science Drive
Suite 203
Madison, WI 53711

FILING RECEIPT



Date Mailed: 12/14/2007

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Applicant(s)

Inge Bruheim, Volda, NORWAY;
Asgeir Saebo, Eidsnes, NORWAY;
Snorre Tilseth, Bergen, NORWAY;
Mikko Griinari, Espoo, FINLAND;

Power of Attorney: The patent practitioners associated with Customer Number 72960

If Required, Foreign Filing License Granted: 12/11/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 60/975,058

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

Bioeffective Krill Oil Compositions

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## **Bioeffective krill oil compositions**

Inventors: Inge Bruheim (Volda, Norway), Asgeir Sæbø (Eidsnes, Norway), Snorre Tilseth (Bergen, Norway) and Mikko Griinari (Espoo, Finland).

### **FIELD OF THE INVENTION**

This invention relates to extracts from Antarctic krill that comprise bioactive fatty acids.

### **BACKGROUND OF THE INVENTION**

In the Southern Ocean, off the coast of Antarctica, Antarctic krill (*Euphausia superba*) can be found in large quantities, ranging from 300-500 million metric tons of biomass. It feeds on phytoplankton during the short Antarctic summer. During winter, however, its food supply is limited to ice algae, bacteria, marine detritus as well as depleting body protein for energy [1].

In order to isolate the krill oil from the krill, solvent extraction methods have been used [7-8]. Krill lipids have been extracted by placing the material in a ketone solvent (e.g. acetone) in order to extract the lipid soluble fraction. This method involves separating the liquid and solid contents and recovering a lipid rich fraction from the liquid fraction by evaporation. Further processing steps include extracting and recovering by evaporation the remaining soluble lipid fraction from the solid contents by using a solvent such as ethanol [8]. The compositions produced by these methods are characterized by containing at least 75 µg/g astaxanthin, preferably 90 µg/g astaxanthin. Another krill lipid extract disclosed contained at least 250 µg/g canastaxanthin [8], preferably 270 µg/g canastaxanthin.

Krill oil compositions have been described as being effective for decreasing cholesterol, inhibiting platelet adhesion, inhibiting artery plaque formation, preventing hypertension, controlling arthritis symptoms, preventing skin cancer, enhancing transdermal transport, reducing the symptoms of premenstrual symptoms or controlling blood glucose levels in a patient. [9] In yet another application, a krill oil composition has been disclosed [4] comprising a phospholipid and/or a flavanoid. The phospholipid content in the krill lipid extract could be as high as 60% w/w and the EPA/DHA content as high as 35% (w/w).

Furthermore, nutraceuticals, pharmaceuticals and cosmetics comprising the phospholipid extract were disclosed. Previously, it was also shown that supercritical fluid extraction using neat CO<sub>2</sub> could be used to prevent the extraction of phospholipids in order to extract the neutral lipid fraction from krill, which comprised of esterified and free astaxanthin [10]. Supercritical fluid extraction with solvent modifier has previously been used to extract marine phospholipids from salmon roe [11], but has not been previously used to extract phospholipids from krill meal.

The methods described above rely on the processing of frozen krill that are transported from the Southern Ocean to the processing site. This transportation is both expensive and can result in degradation of the krill starting material. Data in the literature showing a rapid decomposition of the oil in krill explains why some krill oil currently offered as an omega-3 supplement in the marketplace contains very high amounts of partly decomposed phosphatidylcholine and also partly decomposed glycerides. Saether et al., *Comp. Biochem Phys. B* 83B(1): 51-55 (1986). The products offered also contain high levels of free fatty acids.

What is needed in the art are methods for processing krill that do not require transport of frozen krill material over long distances and the products produced by those methods.

#### **SUMMARY OF THE INVENTION**

In a first aspect of the invention is a composition characterized by comprising at least 65% (w/w) phospholipids.

In another aspect of the invention is a composition obtained from aquatic or marine sources, characterized by comprising 65% (w/w) phospholipids.

In yet another aspect of the invention is a composition obtained from krill, characterized by comprising at least 65% (w/w) phospholipids.

In another aspect of the invention is a composition obtained from krill, characterized by comprising at least 65% (w/w) phospholipids and at least 39% omega-3 fatty acids (w/w).

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