

Phospholipids for human wellbeing



Novastell is specialized in phospholipid and omega 3 fatty acid ingredients dedicated to functional and nutritional applications.

Created in 2006, Novastell is installed in Normandy with a fast and easy access both to the west coast of France and Paris.

Since its creation, Novastell has developed an international distributor network and is actively present in the most important tradeshows in the world.

Novastell offers functional lecithins for the food industry, from the classical liquid soya lecithin to most elaborated products like sunflower, rapeseed and egg lecithins, both in liquid and powdered forms. Hydrolyzed lecithins are also available, used as emulsifying, anti-sticking and anti-spattering agents.

Hydrogenated lecithins are proposed for cosmetic applications.

Thanks to its development laboratory and facilities, Novastell is able to perform formulation tests and personalized blends.

Novastell also develops innovative products for nutritional applications. Phospholipids are now recognized as essential components of living cells. They represent the building blocks of the membranes which not only isolate the cell interior media from its outer environment but also regulate its properties. The most recent biological research highlights the involvement of the phospholipids in our physiological and behavioural functioning.

Beside their role in the cell membranes, phospholipids are also the most effective carriers for fatty acids. Through its range of nutritional ingredients, Novastell promotes the simultaneous use of two specific nutrients: phospholipids and the omega 3 fatty acid DHA (docosahexaenoic acid), in the form of [phospholipid – DHA] complex.

Based on updated scientific research and a pragmatic development activity, Novastell proposes a complete range of active phospholipid ingredients which can be incorporated in the largest panel of formulations and applications.

Fractionated phospholipids: phosphatidylcholine enriched fractions

Basically, lecithins are mixes of several phospholipids embedded in an oily phase. Phospholipids can be isolated and then fractionated to obtain products enriched in one specific component. Novastell offers phosphatidylcholine enriched fractions from soya or egg lecithins.

learning and memory impairments.

This particular phospholipid is almost absent from vegetal sources of phospholipids and was primarily extracted from bovine brains.

Novastell proposes a range of phosphatidylserine from pure vegetal origin: the LIPO-PS range (20 to 70% phosphatidylserine, fluid or powdered) from soya origin, and recently LIPOSUN-PS from sunflower origin with a 70% phosphatidylserine content.

Phosphatidylserine is produced from other sources of phospholipids, rich in phosphatidylcholine, by an enzymatic modification. The enzyme itself, phospholipase D, is extracted from cabbage while most of the other processes use bacterial enzyme.

More recently, phosphatidylserine has also



The physiological activity of phosphatidylcholine is mainly dedicated to liver protection. It had been shown that phosphatidylcholine is effective in protecting liver from damages induced by an elevated consumption of alcohol. It also improves the liver status of patients suffering from chronic hepatitis.

been found to improve sports performance and recovery after physical training. This effect can be seen at elevated concentrations. When given to sportsmen, phosphatidylserine has shown positive effects on resistance to effort: longer physical exercise before exhaustion and increase in VO_2 max. The availability of a concentrated, vegetal and secured source of phosphatidylserine

Origin	Soya	Sunflower	Rapeseed
Phosphatidylcholine	15	16	17
Phosphatidylethanolamine	10	8	9
Phosphatidylinositol	10	13	10
Phosphatidylserine	< 1	< 1	< 1
Phosphatidic acid	4	3	4

Typical phospholipid compositions of various vegetal lecithins (weight per cent)

Phosphatidylserine, the brain phospholipid

The central nervous system is the organ with the higher lipid content of the whole body in mammals. Almost 50% of these lipids are phospholipids, 15% of them being phosphatidylserine. The phosphatidylserine content of brain decreases with age and this decrease seems to be concomitant with the alteration of memory and learning performances. It has been shown that a dietary supply of phosphatidylserine restores the brain content and helps to slow down age-related

allows the development of totally new products dedicated to sports performance.

Phospholipids from eggs with a specific fatty acid composition

Novastell has an original range of egg phospholipids specifically enriched in the long-chain omega 3 fatty acid, DHA. DHA concentrations range from 2 to 10% of total fatty acids. DHA is incorporated in eggs via the hens' food. Egg phospholipids of Novastell are designed for human nutrition, from infant milk to memory and vision applications.

With a unique ingredient, it is possible to supply three essential nutrients to nervous cells: phosphatidylcholine, phosphatidylethanolamine and DHA. These three nutrients are linked in the form of [phosphatidylcholine - DHA] and [phosphatidylethanolamine - DHA] complex called [GPL-DHA].

The next generation of marine phospholipids

In collaboration with Arctic Nutrition, Novastell has launched a new marine phospholipids extract prepared from fish eggs. This natural resource is based on the valorization of herring roe which is a fishing industry by-product under-valued before.

Herrings are caught for food purposes. The phospholipids are extracted with an alcohol-based process from the fish roe. This doesn't necessitate any additional fishing effort and preserves marine resources. Herring roe phospholipids are the Novastell's product Lecicaviar Arctic which represents a sustainable alternative to krill oil.

Lecicaviar Arctic F50 is the most concentrated form of Lecicaviar. It has a waxy consistency, and contains more than 50% of phospholipids. Lecicaviar F50 can be diluted with fish oil to obtain liquid extracts such as Lecicaviar Arctic F30 in a standard version containing 14% DHA, and a premium version containing 28% DHA. The content in phospholipids of Lecicaviar F30 is standardized to 28%.

Recently, a powdered presentation has been developed. Dried on a carrier, LIPOMEGA DHA contains 17% minimum of total phospholipids. It allows the use of a marine source of phospholipids in dried formulations like powder sticks or tablets.

Lecicaviar Arctic contains twice more DHA than EPA making it particularly well suited for brain applications. Docosahexaenoic acid or DHA is the longer and most unsaturated fatty acid of the omega 3 family and is the only omega 3 fatty acid present in high levels in human cell membranes. It is considered to be essential for an optimal brain functioning and must be in majority provided by food. There are some periods of life particularly concerned by a sufficient supply in DHA, during pregnancy and first months of life when the nervous system is at its maximal growth rate, and during aging where the brain content in DHA decreases and dietary supply becomes insufficient.

Unlike fish oils, Lecicaviar Arctic provides DHA as [phospholipid-DHA]. Phospholipids have been demonstrated to be the best carriers for omega 3 fatty acids. In the case of DHA, they are also the best way to target DHA to brain and allow it to be incorporated in nervous cells membranes where it will exert its positive effects. The term bioaccretion, developed by Novastell, is used to describe this targeted and optimized transport of DHA in cell membranes when supplied as [phospholipid-DHA] complexes.

Numerous studies have demonstrated that an insufficient omega 3 fatty acid dietary supply during the fetal development and after birth

leads to learning and memory performance impairments. It is also well known that DHA content of the brain diminished during aging. An increased nutritional supply of DHA is able to restore not only the brain content in DHA but also its phosphatidylserine content. At the same time, an increased nutritional supply in DHA slows down age-related cognitive impairments. These observations emphasize the importance of DHA for brain functioning, and also how much the nervous system relies on food for its supply in DHA.

DHA and its physiologically optimized form of [phospholipid-DHA] in Lecicaviar are also active against inflammation-related skin problems. Striking results have been obtained after a few months of a marine phospholipids treatment.

Origin	Hen egg	Fish roe
Phosphatidylcholine	69	42
Phosphatidylethanolamine	18	10
Phosphatidylinositol	< 1	---
Phosphatidylserine	< 1	---
Phosphatidic acid	---	---
Other phospholipids	3	2

Typical phospholipid compositions of purified egg and marine lecithins (weight per cent).

Beyond active ingredients: semi-finished products

Novastell offers active ingredients with various physical presentations adapted to the variety of food supplements available. Novastell's ingredients are proposed in liquid, powdered and granulated forms.

Novastell can also offer these ingredients as original formulations in the form of semi-finished products ready to be packed and marketed.

According to the formulation, small powder bags, tablets, capsules and soft gel capsules can be provided.

The synergy of actives with the LEA range: 1+1=3

The products of the LEA range associate

phospholipids and DHA in the same formulation to optimize their respective efficacy. Their synergistic effects are promoted in 4 formulations distributed as bulk or semi-finished products. Each LEA product is dedicated to a specific target and is stemming from a complete scientific study.

LEA® is for "Les Essentiels Associés".

The 4 existing products are:

- **Brain Synergy**

Helps to prevent cognitive decline, boosts concentration and memory.

- **Stress Synergy**

Helps stress management through metabolic actions. The Stress Synergy formulation is patented.

- **Performances Synergy**

Helps athletes to improve their performances, their stamina and recovery.

- **Eye Synergy**

Helps to maintain vision and to prevent degenerative eye disease. Helps to fight against dry eye.

Novastell can also offer 100% vegan versions of LEA products. **Manager and business contact:**

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