



*Echium Plantagineum*

## BioMega SDA™

Refined Echium oil

### Echium Plantagineum

Echium plantagineum is a species of Echium, a genus of the borage family of plants, native to western and southern Europe, northern Africa, and southwestern Asia. It is an annual or biennial plant, growing to 20-60 cm tall, with rough, hairy leaves and beautiful purple flowers.

Echium plantagineum is cultivated under contract by selected growers in Europe. The Echium seeds are harvested in late summer, dried and thoroughly cleaned before oil extraction occurs. After extraction a rigorous refining process takes place to produce a clean, colourless and neutral tasting oil.

### Novel Food status

In November 2009 the European Commission acknowledged that our Refined Echium oil fully complies with the Novel Food Legislation granting it novel food status. This means our Refined Echium oil is proven to be safe for human consumption and can be supplied to the

food and supplement industry in the European Union. Up until this point, the oil was being sold and used for cosmetic applications only.

Refined Echium oil provides a unique composition of essential fatty acids (EFAs), a combination of the beneficial Omega 3, 6 and 9 fatty acids. The oil is rich in Alpha-Linolenic Acid (ALA, typically 33%) and Gamma-Linolenic Acid (GLA, typically 12%), and also contains a minimum of 12% Stearidonic Acid (SDA), the precursor of EPA.

Because of its unique fatty acid content with high SDA level our Refined Echium oil is marketed under the Bioriginal brand name:

*BioMega SDA™ has an unique fatty acid profile providing a beneficial combination of Omega 3, 6 and 9 in natural form*



More information on nutritional properties of our Refined Echium oil is explained on the back side of this newsletter.

# Refined Echium oil

## Delivering Stearidonic acid, the vegetable precursor of EPA

The oil from the seeds of Echium Plantagineum is one the richest sources of essential fatty acids known within the plant kingdom. It is rich in the well known alpha-linolenic acid (ALA) and gamma linolenic acid (GLA), but also provides the less known stearidonic acid (SDA). The SDA content in Refined Echium oil is the highest compared to all oils on the market, offering customers the opportunity for differentiation, and more importantly, health benefits formerly only associated with fish oil.

### Benefits of fish oil mostly from EPA

Fish oil has been given a lot of attention the last decade and rightfully so, when considering the large amount of scientific evidence. The best documented benefits of fish oil are those in the area of coronary vascular disease (CVD). The contributors to these benefits have been shown to be the LC PUFA, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Over the last decade, it has become clear that EPA and DHA might exert different physiological roles. DHA seems to be a more structural molecule, present in the brain, retina and semen. DHA can be reconverted to EPA, whereas EPA is hardly converted to DHA, at least in liver and red blood cells. EPA, however, can be converted to eicosanoids, bioactive anti-inflammatory molecules. These eicosanoids are believed to be the major driver behind the CVD benefits found from taking fish oil.

### SDA readily converted to EPA

With EPA being a major precursor of anti-inflammatory eicosanoids, any molecule that leads to higher EPA status in the body is likely to contribute to these health benefits. ALA is at the top of n-3 pathway and is considered truly essential (see pathway).

*Refined Echium oil, vegetable source of SDA, ALA and GLA*

has been collected in the area of skin and joint health. However, GLA also shows effects on CVD parameters. Patients suffering from hypertension that were administered GLA showed a drop in blood pressure of around 6-16%, with lowered VLDL and LDL cholesterol levels and a reduction of atherosclerotic lesions.

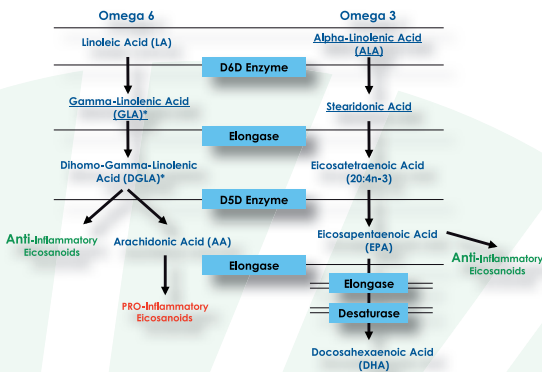
### Synergy between SDA and GLA

As indicated above, both SDA (through EPA) and GLA (through dihomo-GLA) produce anti-inflammatory eicosanoids. Question is, do these components show synergistic effects in the body? Considering the n-6 pathway, dihomo-GLA can potentially be converted to Arachidonic acid (AA). AA, in turn, can deliver inflammatory eicosanoids. Though it is clear from many studies that GLA is safe to consume and shows many benefits, some AA will be formed and thus be incorporated in cell membranes.

Surprisingly, EPA prevents the formation of AA from dihomo-GLA in humans, creating a full anti-inflammatory set of pre-cursors when consuming Echium oil. Though this theoretically already makes sense, it has also been shown in research done under (physiological) stress and injury. Looking at different study outcomes combinations of GLA and EPA outperformed the individual fatty acids. The combination of GLA and EPA is already used in clinical food when treating lung diseases with inflammatory backgrounds.

### Health Areas for Echium oil

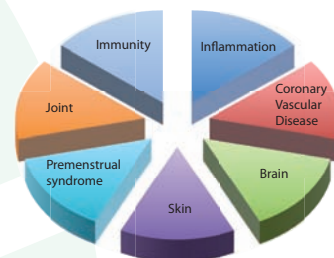
Considering the anti-inflammatory properties of Echium oil, the health areas associated with the oil are diverse and numerous (see pie chart). Broader areas on Immunity and Anti-inflammation can be combined with more narrow ones, like conditions of the skin and joints. Based upon the combination of the PUFA's ALA, GLA and (the pre-EPA) SDA also CVD, Brain, and PMS are health areas combining well with Echium, as also witnessed by the many claims submitted to EFSA on these fatty acids (161).



The body can convert this molecule to EPA, however, only 2-5% of ALA molecules are turned into EPA. This is caused by Delta-6-desaturase (D6D), which is rate limiting in humans. SDA, therefore, overcomes this problem, as D6D in vivo is not needed to synthesize EPA. Conversion rates of SDA to EPA lie around 20-30 %, thus substantially higher than ALA. This is also confirmed by studies that show 3 x SDA provides the same physiological effects as 1 x EPA, as measured by the CVD risk factors omega-3 index and serum triglycerides.

### Anti-inflammatory properties of GLA

Next to the exceptional high levels of SDA, Echium oil also contains a considerable amount of GLA. GLA is easily converted to dihomo-GLA, from which the body can make n-6 based anti-inflammatory eicosanoids. A lot of evidence on the inflammation lowering properties



Refined Echium oil, named BioMega SDA™, provides real benefits to patients and consumers while it can help you differentiate amongst your competitors. Please contact us for further information, study details, safety and more so for ideas on concepts that work for you and your market.

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