

Ahiflower® SAP

Science-based essential fatty acids for optimal health

The numerous health benefits of polyunsaturated fatty acids (PUFAs) have been extensively researched and established through clinical studies. PUFAs, especially EPA and DHA have beneficial effects on the cardiovascular system, reproductive system and cognition due to their anti-inflammatory properties. Ahiflower® provides a natural, non-GMO, vegan source of PUFAs, and provides a renewable and sustainable alternative in a high demand market for PUFAs. Preclinical studies conducted with Ahiflower® show the ability of Ahiflower® to increase EPA and DHA accumulation in the tissues and their anti-inflammatory effects. Additionally, Ahiflower® contains high amounts of stearidonic acid (SDA), which is a precursor of EPA and DHA, and γ-linolenic acid (GLA), known for attenuation of inflammatory conditions. Ahiflower® is unique in that it provides SDA which can be converted to EPA and DHA, without the need for ALA and enzymes required to convert ALA to EPA. In addition, Ahiflower® supports gut bacterial proliferation and shows potential protective action on probiotics and enhances the efficacy of probiotics. Preliminary clinical trials conducted with Ahiflower® show promising results, where increased EPA accumulation in tissues has been observed. Future clinical studies will help establish the efficacy of Ahiflower® as a natural vegan source of essential fatty acids.

Ahiflower® SAP is a source of essential fatty acids and may help enhance cardiovascular health, improve cognition and alleviate inflammation.

ACTIVE INGREDIENTS

Each 1 ml (930 mg) contains:

Ahiflower® (<i>Buglossoides arvensis</i>) oil, providing:	
SDA (Stearidonic acid)	158 mg
ALA (Alpha-Linolenic acid)	390 mg
GLA (Gamma-Linolenic acid)	42 mg
LA (Linolenic Acid)	77 mg
OA (Oleic Acid)	51 mg

Other ingredients: Rosemary extract, mixed tocopherols, and ascorbyl palmitate.

Contains no: Gluten, soy, wheat, eggs, corn, dairy, yeast, preservatives, artificial colours and flavours, starch or sugar.

Ahiflower® is a licensed trademark of Technology Crops LLC.

Crop Assured 365® is a licensed trademark of Technology Crops LLC.

This product is non-GMO and vegan friendly.

Do not use if seal is broken. Keep out of reach of children.

DIRECTIONS FOR USE

Adults: Take 1-2 ml once daily or as directed by your healthcare practitioner.

INDICATIONS

Ahiflower® SAP is a source of essential fatty acids (SDA, ALA and GLA), and may help:

- Promote cardiovascular health.
- Improve cognition.
- Support a healthy inflammatory response.

CONTRAINDICATIONS

Do not use if you are pregnant or breastfeeding.

PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for each **Ahiflower® SAP** have been tested by an ISO 17025 accredited third-party laboratory for identity, potency and purity.



Scientific Advisory Panel (SAP):
adding nutraceutical research
to achieve optimum health



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Polyunsaturated fatty acids (PUFAs), especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) have been extensively studied for their numerous health benefits. Their anti-inflammatory effects have vital health benefits such as mitigation of cardiovascular diseases, improvement of brain and vision health and alleviation of joint inflammation among other benefits. [1, 2] The high demand for PUFAs and PUFA-enriched foods has created a strain on omega-3 fatty acid sources such as salmon and tuna, necessitating the search for alternative PUFA sources which provide renewable and sustainable options. [2] The need for plant-based non-GMO sources of essential fatty acids has led to the discovery of the ideal fatty acid composition of Ahiflower®.

What is SDA?

Stearidonic acid (SDA) is an omega-3 polyunsaturated fatty acid. It has a chain length of 18 carbon atoms, and occurs in the omega-3 biosynthetic pathway, between the conversion of α -linolenic acid (ALA) to EPA and DHA. [3] A study of essential fatty acid metabolism has shown that dietary SDA may be more effective than ALA rich food sources in the production of EPA and DHA in the body, being able to sidestep conversion of ALA to SDA which requires the $\Delta 6$ desaturase enzyme, that often has poor activity in humans due to various factors, primarily owing to genetics. [4] SDA is not commonly found in natural food sources, the most abundant sources being seed oils from plants belonging to the *Boraginaceae* family. The amount of SDA in these seeds is 15-22% of total fatty acid content. [3] SDA benefits have been studied in various clinical trials, the results of which show the ability of SDA to improve serum blood-lipid profile in dyslipidemic subjects [5], and potentially modulate inflammation. [6]

Ahiflower® (*Buglossoides arvensis*) is a naturally occurring non-genetically modified plant, whose seeds are rich in SDA as well as γ -linolenic acid (GLA), an omega-6 fatty acid known for attenuation of inflammatory conditions. [1, 7] It has been postulated that plants of the *Boraginaceae* family possess the $\Delta 6$ desaturase enzyme, allowing them to convert Linoleic acid (LA) and ALA to GLA and SDA respectively. Additionally, Ahiflower® is the only plant in this family that has higher levels of the omega-3 fatty acid SDA than omega-6 fatty acid GLA, making it an ideal vegan source of PUFAs. [1]

Preclinical data

Being a newly found sustainable vegan source of PUFAs, the research on Ahiflower® is still ongoing, however initial preclinical studies show promising results. A combination of Ahiflower® and the phytoestrogen Equol administered to rainbow trout showed an increase in EPA and DHA in the liver and other tissues. [8] Another study looking at Ahiflower® supplementation confirmed these findings, where rainbow trout were fed incremental Ahiflower®-containing diets (33%, 66%, 100%) for 56 days. It was found that Ahiflower® increased the body weight of fish and 66% and 100% Ahiflower® diets increased EPA and DHA levels in the fish livers. An additional increase in EPA was found in the fish fillets, indicating the ability of Ahiflower® to compensate for a diet deficient in EPA and DHA. [9] A study conducted using an animal model has elaborated on the therapeutic efficacy of the increase in PUFA levels post Ahiflower® consumption. When mice were fed diets with 2.5% w/w Ahiflower® oil for four weeks, supplementation with Ahiflower® significantly regulated intestinal inflammation and promoted fecal microbial diversity, and increased levels of pro-resolving mediators D, E, T-series resolvins. [10] The ability of Ahiflower® to promote intestinal flora diversity was further demonstrated in an in-vitro study, where five probiotic strains encapsulated with Ahiflower® showed an increase in the number of viable probiotic cells in the upper gastrointestinal tract, and implied

that the PUFAs in Ahiflower® protected the probiotics in the small intestine. [11] This could point to a beneficial probiotic application for PUFAs in the future, specifically Ahiflower®, substantiated with clinical trials.

Clinical data

Although clinical data for Ahiflower® is limited, early randomized controlled trials show promising results. A randomized, double-blind, parallel, comparator-controlled trial was conducted with 40 healthy subjects as phase I. Participants were provided 9.1 g daily of Ahiflower® for 28 days. Ahiflower®, containing 46% ALA, 20% SDA was compared with flax seed oil supplementation, which contained 59% ALA. Supplementation with these plant oils increased ALA and EPA levels, with Ahiflower® supplementation showing higher EPA increase in all cell types compared to flax seed oil. Ahiflower® also showed significant increase in eicosatetraenoic acid (ETA) and docosapentaenoic acid (DPA) in plasma and mononuclear cells compared with flax seed oil, with no adverse effects. Ahiflower® thus showed higher efficiency in PUFA proliferation in tissues compared to flax seed oil. [12]

Another follow-up randomized, double-blind, placebo-controlled, dose-dependent study evaluated supplementation in 88 participants with 9.7 ml daily of 100% high oleic sunflower oil (HOSO), compared with 60% Ahiflower® + 40% HOSO; 30% Ahiflower® + 70% HOSO; or 100% Ahiflower® for 28 days. Supplementation with Ahiflower® increased EPA in mononuclear cells and plasma for all diet groups in a dose-dependent manner, and increased levels of ALA, ETA and DPA were observed with all diets. Ahiflower® also increased lipopolysaccharide stimulated interleukin 10, indicating that consumption of Ahiflower® in healthy participants is associated with anti-inflammatory responses. [13] Further clinical trials with Ahiflower® should help corroborate these results and explore additional therapeutic benefits of Ahiflower®.

Ahiflower® has been trademarked by Nature's Crops International, which implements a Crop Assured 365® system to ensure identity preservation, lot traceability, and high level of quality assurance.

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