

FANCOR[®] MEADOWFOAM SEED OIL

Benefits in Personal Care



ELEMENTIS
SPECIALTIES

Pure in Cosmetics

Introduction

Oils are one of the most common groups of materials used in the personal care industry. They provide emolliency, to impart protection to the skin while also giving good lubrication and a positive feel to the skin. They can help provide consistency to the texture of products and also help to replace the oils found in the skin that may have been lost through the use of harsh cleansing preparations.

Natural oils are essential ingredients for formulation chemists. Plant oils are esters of glycerin and fatty acids which form triglycerides. Natural oils can also contain various smaller components, such as free fatty acids, phospholipids, tocopherols and hydrocarbons.

FANCOR[®] MEADOWFOAM SEED OIL has a unique molecular structure not found in any other naturally occurring substance. FANCOR[®] MEADOWFOAM SEED OIL contains approximately 95% fatty acids having chain lengths of 20-22 Carbon atoms. The typical fatty acid profile is as follows: C20:1(61%), C22:1(16%) and C22:2(18%). Most importantly, the unsaturated double bonds are located at the $\Delta 5$ and $\Delta 13$ position. Combination of lack of conjugated double bonds and carrying its natural antioxidant brings this oil extraordinary oxidative stability. Furthermore, it is liquid at room temperature regardless its high molecular weight. It is effective against heat breakdown and is resistant to oxidation.



Meadowfoam Plant

Native to the northwestern Pacific coastal regions of the United States, a small plant, bearing the botanical name *Limnanthes alba*, begins to bloom with such an abundance of delicate, beautiful white flowers that there appears to be a natural foam on the meadow.

Limnanthes Alba is a flowering plant commonly known as meadowfoam (See figure 2). It is a herbaceous winter plant, which means that it has a soft green stem and all of its parts above ground level die after it has finished growing. It is native to Oregon, where it preferentially grows in moist environments. It is an annual plant which can grow to 30cm tall and the petals on the flowers can become 1-1.5cm long.

The seeds of the meadowfoam plant, seen in Figure 3, are about 3mm in diameter and contain 20-30% meadowfoam seed oil, whereas the nuts of the jojoba shrub, seen in Figure 4, are about 12mm long and contain about 48-56% jojoba oil.



Meadowfoam Seed Oil Processing

FANCOR® Meadowfoam Seed Oil is removed from the *Limnanthes Alba* (Meadowfoam) seed using a mechanical crushing process. Elementis Specialties does not use an external heat source to aid in the process. The product is then neutralized, lightened in color and deodorized in order to produce the final refined Meadowfoam Seed Oil. Unlike other oils, FANCOR® Meadowfoam Seed Oil is not produced via solvent extraction, so it is a natural product which has been refined in a natural way. This green processing method has enabled Elementis Specialties to conform to the Ecocert standard for FANCOR® Meadowfoam Seed Oil.

FANCOR® Meadowfoam Seed Oil is a slightly golden colored clear liquid oil.

FANCOR® Meadowfoam Seed Oil INCI: *Limnanthes Alba* (Meadowfoam) Seed Oil



Figure 1. Meadowfoam plant



Figure 2. Meadowfoam Seed



Figure 3. Cosmetic Oils

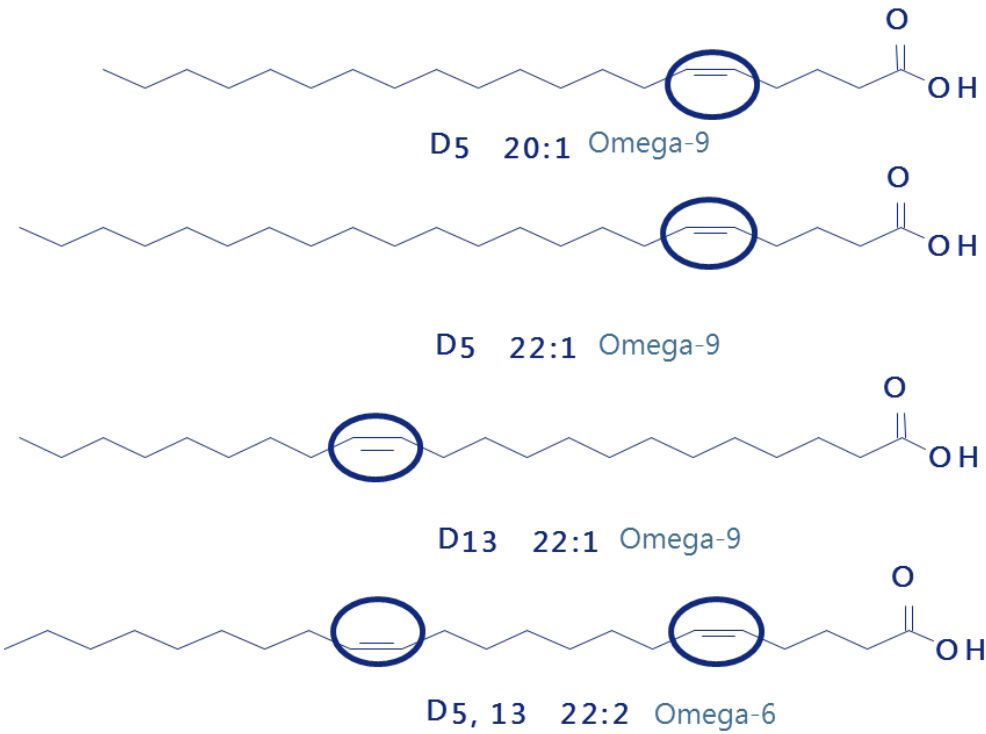
Meadowfoam Seed Oil Composition

FANCOR® Meadowfoam Seed Oil has a unique structure comprised of approximately 95% of C₂₀₋₂₂ fatty acids.

The typical fatty acid profile of Meadowfoam Seed Oil is as follows:

	TYPICAL COMPOSITION
EICOSENOIC ACID C20:1	61%
DOCOSENOIC ACID (ERUCIC ACID) C22:1	16%
DOCOSADIENOIC ACID C22:2	18%

Table 1. Fatty Acid composition of Jojoba Oil and Meadowfoam Seed Oil

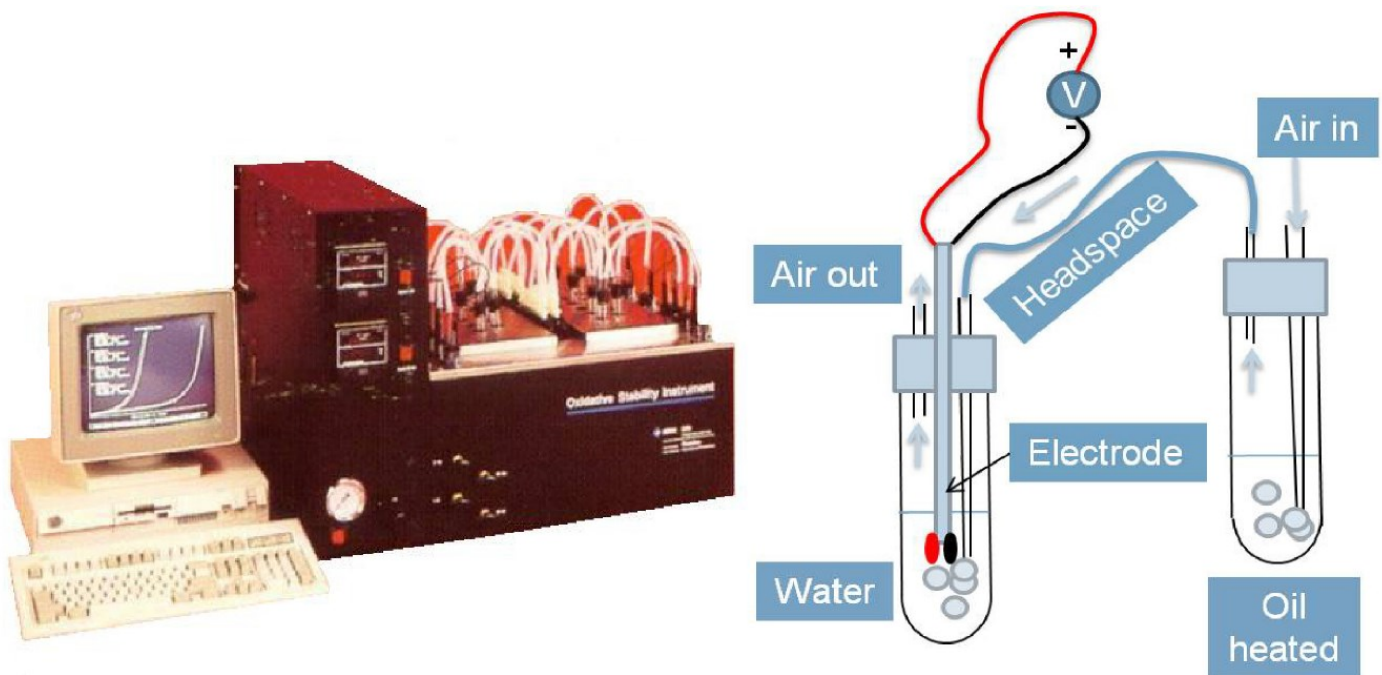


Methodology for Determining the Oxidative Stability Index

The Oxidative Stability Index (OSI) determines the relative resistance of an oil to oxidation. Most oils are prone to oxidation and the speed at which this happens depends on the degree of unsaturation in the product and the presence of any antioxidants.

The Oxidative Stability Index was determined using the oxidative stability instrument manufactured by Omnion, as seen in Figure 9, using the American Oil Chemists' Society (AOCS) official method number Cd 12b-92

The temperature is set at 130°C. A stream of air is passed through the oil in the sealed test tube and then passed into another sealed test tube containing distilled water, as shown in Figure 10. The conductivity of the water is constantly monitored. During the test the conductivity of the water remains consistent until a sudden increase is measured. This value in hours is recorded as the Oxidative Stability Index.



Oxidative Stability Index Comparison

Meadowfoam seed oil is the most stable vegetable oil in the world. It contains powerful natural antioxidants and most importantly, the unsaturated double bonds on the fatty acids are located at the $\Delta 5$ and $\Delta 13$ position. The lack of conjugated double bonds and natural antioxidants delivers extraordinary oxidative stability, thus making it resistant to heat breakdown and oxidation.

Meadowfoam seed oil is a highly stable oil from nature and will extend the shelf life of less stable ingredients when added to the system.

When tested at 130°C, meadowfoam seed oil has an average oxidative stability of 15 hours, whereas most other natural oils have a much lower Oxidative Stability Index (Figure 11).

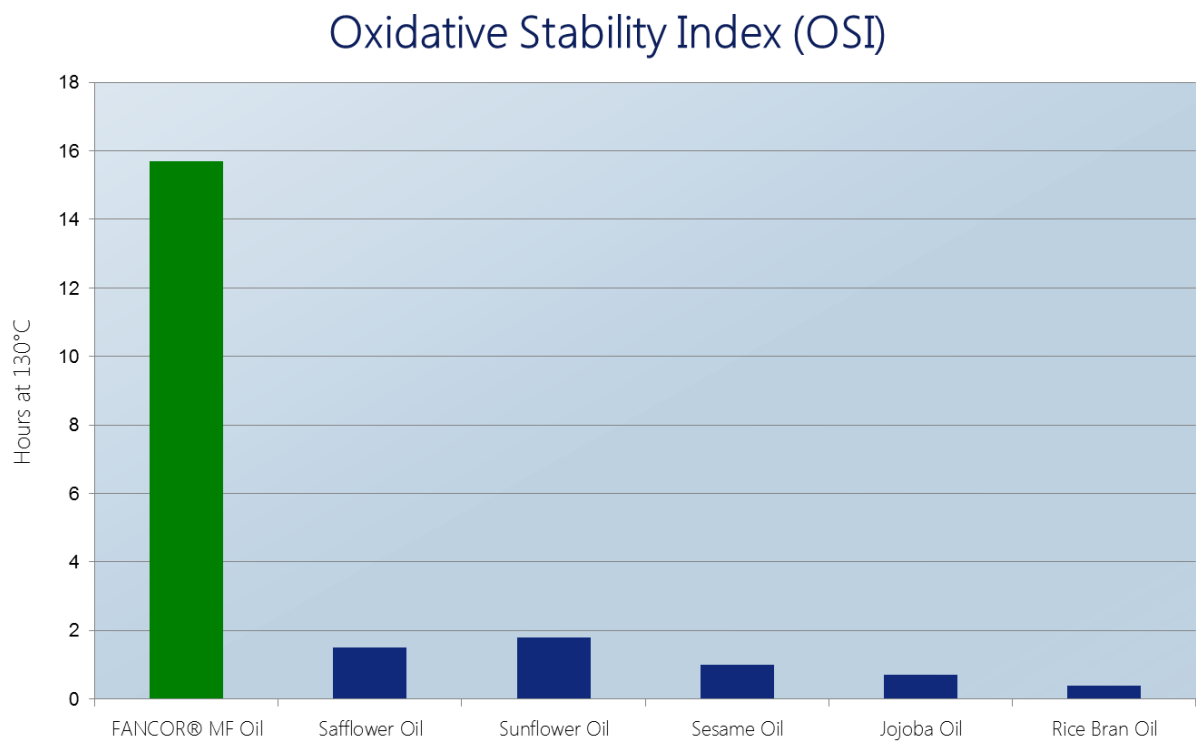


Table 2. Oxidative Stability Index comparison of Meadowfoam Seed Oil and various natural oils

FANCOR® Meadowfoam Seed Oil Applications

The unique chemistry of Meadowfoam Seed Oil, it provides a rich emolliency to cosmetics without being greasy. Meadowfoam Seed oil is used as an aesthetic enhancer and moisturizer in color cosmetics, face, body and hair care formulas. In lipsticks and balms, it helps revitalize dry, cracked lips and they stay moist longer. Meadowfoam Seed Oil has a wide variety of cosmetic applications.

Benefits of Meadowfoam Seed Oil

- Promote hair softness and shine
- Non-greasy for skin care
- Provides good pigment dispersion
- Lipid modifier for better emulsions and suspensions
- Provides natural luster to cosmetics and hair care products
- Can be used as a binder in powder products
- Ecocert Approved

Sunscreen Oil Spray

Ingredients	Supplier	Formula 1
Phase A		%w/w
FANCOR® Meadowfoam Seed Oil (Limnanthes Alba (Meadowfoam) Seed Oil)	ELEMENTIS Specialties	11.00
Cyclopentasiloxane		66.50
Eusolex OCR (Octocrylene)	Azelis	10.00
Eusolex 2292 (Ethylhexyl Methoxycinnamate (and) BHT)	Azelis	7.50
Eusolex OS (Ethylhexyl Salicylate)	Azelis	5.00
Total		100.00



**Sunscreen Oil Spray
with Meadowfoam
Seed Oil**

Procedure:

1. Combine Phase A and mix until clear and uniform.



Lipstick

Ingredients	Supplier	Formula 1	Formula 2	Control
Phase A		%w/w	%w/w	%w/w
FANCOR® Meadowfoam Seed Oil (Limnanthes Alba (Meadowfoam) Seed Oil)	ELEMENTIS Specialties	25.00	-	-
Simmondsia Chinensis (Jojoba) Seed Oil		-	25.00	-
Ricinus Communis (Castor) Seed Oil		30.80	30.80	55.80
Koster Keunen Candelilla Wax (Euphorbia Cerifera (Candelilla) Wax)	Koster Keunen	7.00	7.00	7.00
Microcrystalline Wax		3.00	3.00	3.00
Koster Keunen Carnauba Wax (Copernicia Cerifera (Carnauba) Wax)	Koster Keunen	2.00	2.00	2.00
Ozokerite		2.00	2.00	2.00
Tocopheryl Acetate		0.10	0.10	0.10
Propylparaben		0.10	0.10	0.10
Phase B				
Ricinus Communis (Castor) Seed Oil		15.00	15.00	15.00
Red 7 Lake		3.00	3.00	3.00
Red 6 Lake		1.00	1.00	1.00
Red 33 Lake		1.00	1.00	1.00
Phase C				
Talc		10.00	10.00	10.00
Total		100.00	100.00	100.00

Procedure:

1. Combine Phase A and mix until clear and heat to 85°C.
2. Mill Phase B and add to Phase A. Mix until uniform.
3. Add Phase C and mix until uniform.
4. Pour into mold and cool.

Lipstick Comparison

W we can see lipsticks which were made using meadowfoam seed oil, jojoba oil or neither oil. The lipstick with jojoba oil yielded a slightly harder stick. The lipstick prepared with meadowfoam seed oil gave a smoother appearance on the surface of the stick and also improved the release of the lipstick from the mold. The lipstick with meadowfoam seed oil also gave the most shine.



Appearance of lipsticks without test oil, with jojoba oil and with meadowfoam seed oil

Summary

FANCOR® Meadowfoam Seed Oil is a good, high quality, aesthetically elegant oil. As meadowfoam seed oil is an annual crop that is planted each year and yields seeds within months, it is a reliable, renewable oil source .

Highlights

Unique Fatty Acid Composition

- FANCOR® Meadowfoam Seed Oil has a unique combination of long chain fatty acids that contribute a rich skin feel.

Improved Oxidative Stability

- The determination of the Oxidative Stability Index (OSI) reveals Meadowfoam Seed Oil as being the most stable oil against oxidation due to its unsaturated double bonds in position D5 and D13 and a natural antioxidant.



Before using any of our products, please consult our Safety Data Sheets.

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For more details please contact:

AMERICAS **Elementis Specialties**
469 Old Trenton Road
East Windsor
New Jersey 08512
Tel: +1.609.443 2500
Fax: +1.609.443.2446

EUROPE **Elementis GmbH**
Stolberger Strasse 370
50933 Cologne
Germany
Tel: +49.221.2923.2000
Fax: +49.221.2923.2011

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