



**OLIVOIL**  
A V E N A T E  
E M U L S I F I E R

Natural PEG-free

Soft and emollient emulsifier of vegetal origin

Silicone-like skin feel

Ecocert

International patent



*Kalichem*  
*Italia s.r.l.*

# OLIVOIL PRODUCTS

## “PEG-FREE” SURFACE TENSION MODIFIERS OF VEGETAL ORIGIN INTERNATIONALLY PATENTED

### >> PRODUCTS BACKGROUND

In the modern concepts of wellness, now consisting in the responsible respect of both body and skin equilibrium and environment, the wide success of ingredients of natural origin is due to two key aspects. **Firstly, the need for developing formulas as much as possible compatible with the physiology of skin and its annexes, without any adverse effect or allergic potential. Second, the growing confidence of the consumers in the beneficial properties provided by complex mixtures of natural ingredients.** The quest for PEG-free surfactants and emulsifiers led Kalichem to the creation of new classes of base ingredients for skin-friendly and environmental-friendly cleansing cosmetic products, the OLIVOIL Series. These ingredients of vegetal origin are ethylene oxide free and highly performing in cosmetic formulations. Moreover, they provide to the skin the pleasant accompanying effects of vegetal structures. The OLIVOIL brand references are based on the multi-faceted combination of OLIVE OIL and vegetal PROTEINS, derived from WHEAT and OAT.



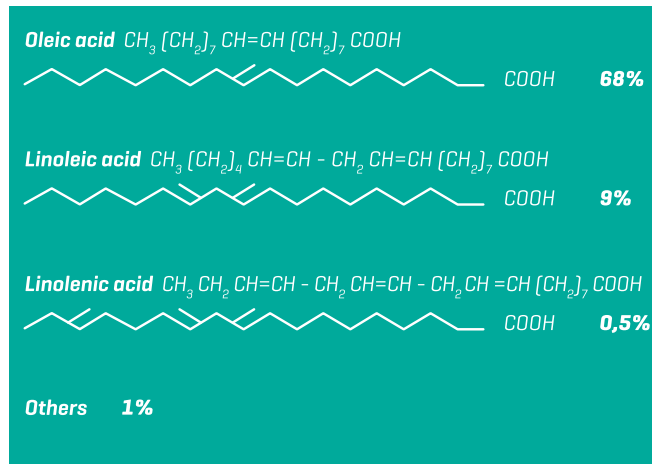
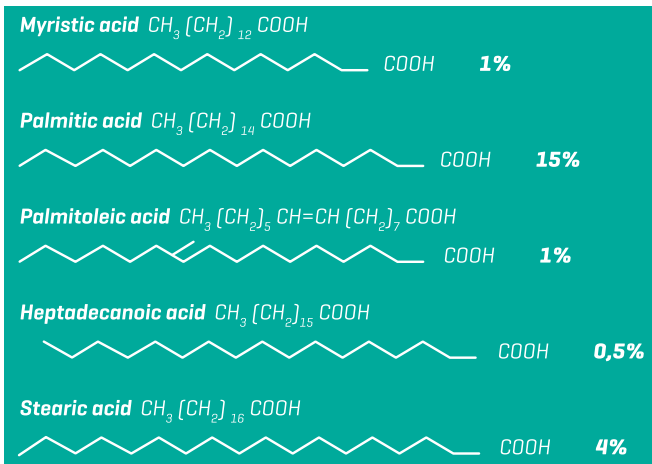
### >> THE ORIGINS

Extra-virgin **Olive** oil is obtained by cold pressing of the pulp of fruits of *Olea europaea* [Olive], a species of small tree of the family Oleaceae, native to the coastal areas of the eastern Mediterranean region from Lebanon, Syria, the maritime parts of Asia Minor to the south end of the Caspian Sea and successively cultivated in all the Mediterranean area. Its stone fruit, the olive, is of major agricultural importance in the Mediterranean region as the source of olive oil.

**Olive oil shows the following average composition, here given in comparison with the most used edible oils:**

OILS	SATURATED LIPID CHAINS	MONO-UNSATURATED LIPIDIC CHAINS	POLY-UNSATURATED LIPIDIC CHAINS
OLIVE OIL	16%	75%	9%
PEANUT OIL	19%	53%	28%
SUNFLOWER OIL	11%	33%	50%
CORN OIL	5%	31%	50%
SOYA OIL	4%	23%	59%
COCONUT OIL	87%	6%	2%

Widely preferred to other vegetal oils for its high amount of mono-unsaturated fatty acids, it exhibits well-known properties of integration with the body physiology. Olive oil has the undoubted advantage of its lipidic fraction, provided by a millenary history of contact with vital human cells, which thus allows to boast high safety standards. When the complex of its lipidic chains is chemically combined with hydrophilic molecules of known performances, functional ingredients suitable for innumerable cosmetic formulations can be created. Another interesting aspect of olive oil properties concerns its unsaponifiable fraction [0.6-1.5%]. This fraction is kept unchanged in the finished material. Its antioxidant power, as well as the emollient effects of the lipidic moiety, contributes to skin normalization and protection.



## >> VEGETAL PROTEINS

Once were animal proteins. Used as active ingredients of primary choice for most cosmetic formulators, they offered economical, functional molecules of acceptable colour and odour in a variety of forms. For known reasons, today's cosmetic chemist is faced with the challenge to replace the traditional animal-derived proteins with ingredients offering the same functionality. Plants have traditionally been viewed as renewable sources of supply, as they are "harvested" on an annual basis. In addition, consumers often associate plant and vegetal derived products with improved health and cleanliness. Plant proteins are devoid of stigmas associated with the developments in BSE (Bovine Spongiform Encephalitis) and other diseases related to animals.

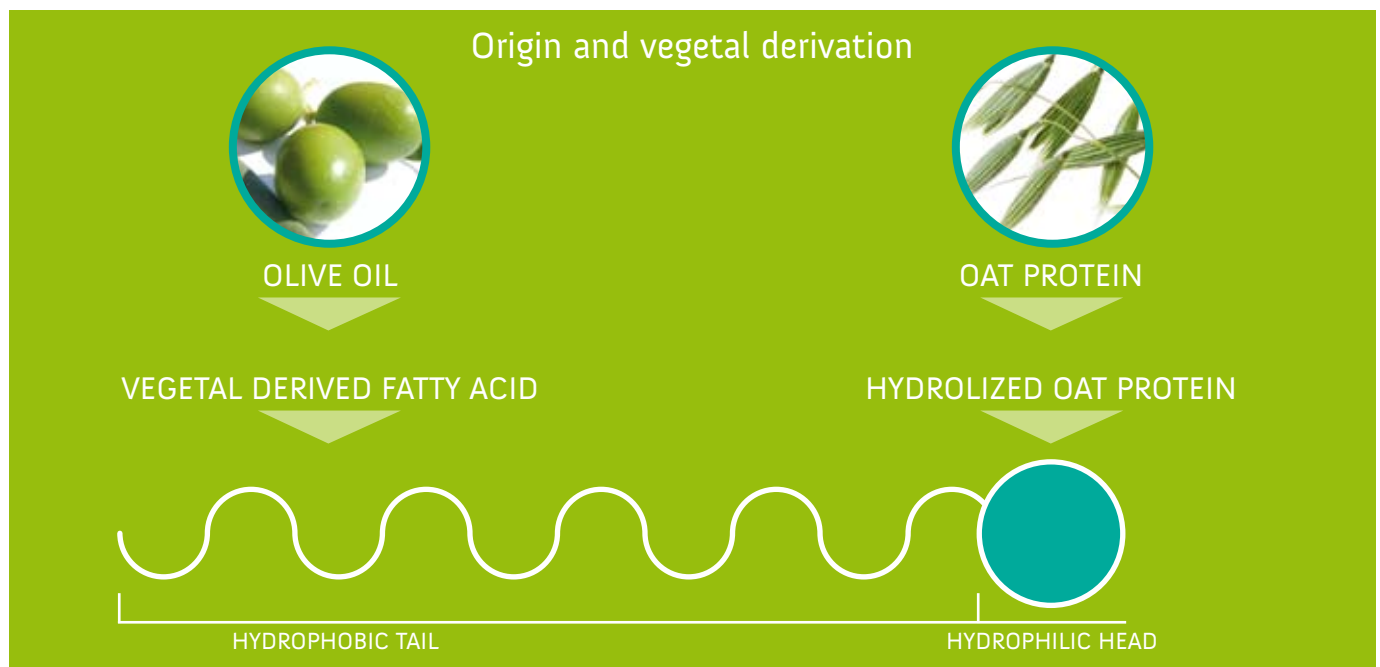
## >> HYDROLYZED OAT PROTEINS

Oat is the only cereal containing a globulin or legume-like protein, avenalin, as the major [80%] storage protein. Globulins are characterized by their water solubility. Because of this property, oats flour may be turned into milk but not into bread. The minor protein of oat is a prolamine [typical cereal proteins such as zein] called avenin. Oat protein properties are comparable to soy proteins, which the World Health Organization considers to be equal to meat, milk, and egg protein. The protein content of the hulls of oat kernel ranges from 12 to 24%, the highest among cereals. Moreover, the hydrolyzed protein fraction generally contains an average amount of beta-glucan of 3%. It has skin healing power, stimulates collagen synthesis, promotes cellular turnover, protects and moisturizes the skin. Kalichem Italia srl has selected hydrolyzed proteins from oat which do not incorporate any genetically modified organisms [GMO].



## >> OLIVOIL TECHNOLOGY

Combining the best of both vegetal oils and protein sources allowed Kalichem to achieve new molecules having relevant interfacial properties:



These new surface-active agents can be used to formulate 'totally natural' finished cosmetic products that are very suitable for sensitive skin, baby-care, hair-care and personal-hygiene.

Furthermore, beside being extremely performing as vehicle ingredients [as surfactants and emulsifiers], thanks to their special composition they may act as functional substances with protecting, soothing and restoring ability.

**As for their environmental impact, they are characterized of high biodegradability [according to the CEE regulation N.82/242 OECD Method].**

## Bibliography

1. Watts R, Sousselier L: "Fruits of the gods" – *Soap, Perfumery & Cosmetics* : October [2000], 63-8;
2. Kiritsakis AK: "Virgin olive oil composition and its effect on human health" – *Inform*, [13] 3 [2002], 237-41;
3. Sousselier L: "Novel ingredients from Olive-nature's gift for beauty"- 131 [88] 12-8;
4. Montgomery, Dryer R, Conway T, Spector A: *Biochimica – Aspetti medico biologici*, Ed.Ermes, III edit. [1981], Cap. 8, 429;
5. Kruh J: *Biochimica-aspetti medici e biologici*, Ed. Scientifiche e Tecniche Mondadori, I edit. [1976] IV, 339;
6. Rigano L, Sirigu S: "Analisi sensoriale: uno strumento della qualità in cosmetica" – *Cosmesi Dermatologica* 47 [1997] 81-94;
7. Stone H, Mc Dermott BJ, Sidel JL: "The importance of sensory analysis for the evaluation of quality" – *Food Technology*: June [1991].
8. Stone H, Sidel JL: "Sensory evaluation practices"- Academic Press Inc. [1995].
9. Hootman RC: "Manual on descriptive analysis testing for sensory evaluation"- ASTM manual series: MNL 13 [1992].
10. I.F.S.C.C. Monograph: "Principle of Product Evaluation: Objective Sensory Methods"- [1995] 1, 7.
11. *Olivoil products- Brochure*, By Kalichem Italia S.r.l.
12. *Technical file: Olivoil PCA*, By Kalichem Italia S.r.l.
13. *Technical file: Olivoil Avenate*, By Kalichem Italia S.r.l.
14. Rigano L, Giammarrusti G, Rastrelli F: "Vegetable Oils – The Base of New Active Principles" – *SÖFW Journal*, 132 [2006] 1-2, 25-33
15. Lasztity R [1999]. *The Chemistry of Cereal Proteins*. Akademiai Kiado [English]. ISBN 978-0849327636
16. D'Angelo M, Proserpio G, Rastrelli GB: "An Olive Oil- and Wheat-derived Lipoprotein Emulsifier" – *C&T*, 116 [2001] 8, 45-6.

# OLIVOIL AVENATE EMULSIFIER

NATURAL PEG-FREE

SOFT, MOISTURIZING  
AND REGENERATING EMULSIFIER  
OF VEGETAL ORIGIN

SILICONE-LIKE SKIN FEEL

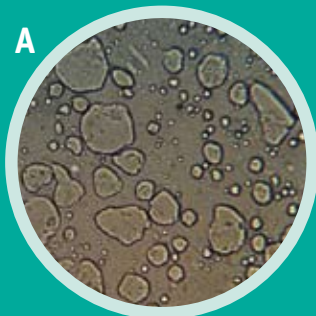
OLIVOIL AVENATE EMULSIFIER® is a non-ethoxylated, vegetal derived surfactant that combines the unique fatty acid profile of olive oil with the special affinity of hydrolyzed oat proteins toward the skin surface. The result is a new emulsifier structure with high skin compatibility and maximum biodegradability. OLIVOIL AVENATE EMULSIFIER® is based on Olivoyl Hydrolyzed Oat Protein, a lipo-aminoacid with a fatty amide structure, showing high inter-facial activity. It is obtained by condensation of one amino group of protein chains and the carboxyl group of fatty acids of olive oil.

## >> EMULSION TYPE

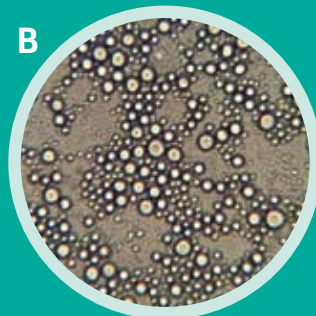
With OLIVOIL AVENATE EMULSIFIER®, the concepts of skin respect and skin friendly emulsifier become a reality. The hydro-lipidic balance of the skin, that is significantly lowered by traditional emulsifiers, is only barely altered. Furthermore, the lipidic moiety of the Olivoil Avenate Emulsifier, thanks to the saturated and unsaturated fatty acids from olive oil, can significantly contribute to the functionality of the whole cosmetic formula.

### Crystal Liquid Emulsions

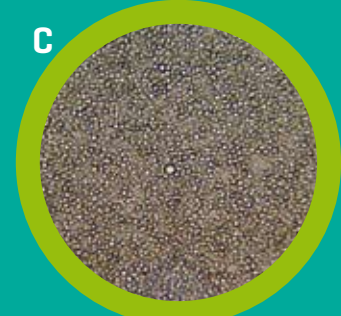
#### HOMOGENEITY & SIZE MICROSCOPE



Not fine - Not Homogeneous



Quite fine - Quite Homogeneous



Very fine Homogeneous  
[with **Olivoil Avenate Emulsifier®**]

### Chemical structure of Potassium Olivoyl Hydrolyzed Oat Protein (POHOP)

*The lipophilic part of olive oil*

*The hydrophilic part  
made up of oat polypeptides*



## >> TECHNICAL ADVICE

The product comes in solid waxy blocks with a characteristic, but faint, odour and ivory white colour. It is suggested its addition to the oil phase of cosmetic emulsions. Having a melting point within the range 62-67 °C, it may require heating up around these temperatures for easy solution. On the basis of experimental trials of emulsification, in order to achieve fine and homogeneous emulsions, the best method suggested is as follows:

- > addition of the emulsifier to the oil, and heating to the required temperature
- > addition of a little amount (20% of the total) of hot (70-75°C) water phase to the oil phase for the emulsion process
- > slow addition of the remaining part of the water phase to cool the system.

*The correct operating parameters in the emulsification phase (time, speed, cycles of stirring and homogenization) need to be defined precisely by taking into account the specific equipment and formula characteristics .*

## >> COSMETIC APPLICATIONS

OLIVOIL AVENATE EMULSIFIER® can be used in a wide range of skin-care products.

It represents a useful choice to formulate performing traditional and special cosmetic emulsions, even those suitable for sensitive and delicate skins (dry skin, baby skin, ethnic products). Emulsions with very pleasant white appearance and characteristic soft-touch, stable at high temperature, can be obtained without the addition of co-emulsifiers.

### Oily phase obtained by use percentage of Olivoil Avenate Emulsifier



## >> SENSORIAL EVALUATION

In order to underline the outstanding skin-feel of emulsions realized with OLIVOIL AVENATE EMULSIFIER®, sensorial evaluations were carried out using two approaches:

- > the evaluation of formulations prepared with different oils and different polarity, made by a panel of experts;
- > the evaluation of two formulations (Eye contour cream; Face lenitive cream), made by a trained sensorial panel.



### Panel of experts

Each of the realized formulas was evaluated in terms of initial perception, during application and final perception. All emulsions using several oil types, made with OLIVOIL AVENATE EMULSIFIER® had a very light initial perception, independently from the type of oil used, even when high amounts of vegetable oil (eg Sweet Almond Oil) are contained. The spreadability of all emulsions was related to the characteristics of the used oil. The final perception was an emollient feel, irrespective of the oils nature.

### Consumer panel

Two formulations were prepared and their sensorial profiles were evaluated using the following parameters: Softness, Smoothness, Stickiness. The tests were made using a trained panel of twenty people. The evaluated formulas had the following structure.  
*[Complete formulations are available on request].*

FORMULA 1 - EYE CONTOUR CREAM	% w/w
OLIVOIL AVENATE EMULSIFIER®	5.00
WATER PHASE	75.00
OIL PHASE (CAPRYLIC/CAPRIC TRIGLYCERIDE, PHYTOSTERYL CANOLA GLYCERIDES, BUTYLENE GLYCOL DICAPRYLATE/DICAPRATE, DIISOPROYL SEBACATE, MANGIFERA INDICA SEED OIL)	16.00
OTHER INGREDIENT (ANTIOXIDANT, PRESERVATIVES, pH ADJUSTER)	Q.S.

**Results - Formula 1:** after application, around 65% of the volunteers perceived their skin as soft and smooth, while 40% of the volunteers did not perceive any sticky sensation.

FORMULA 2 - FACE LENITIVE CREAM	% w/w
OLIVOIL AVENATE EMULSIFIER®	5.50
WATER PHASE	80.00
OIL PHASE (DICAPRYLYL ETHER, SIMMONDSIA CHINENSIS SEED OIL, PRUNUS PERSICA KERNEL OIL, PRUNUS ARMENIACA KERNEL OIL, LIMNANTHES ALBA SEED OIL, BUTYROSPERMUM PARKII EXTRACT)	11.00
OTHER INGREDIENT (ANTIOXIDANT, PRESERVATIVES, pH ADJUSTER)	Q.S.

**Results - Formula 2:** after application, 50% of the volunteers perceived their skin as soft, 65% perceived it as smooth and almost 80% of the volunteers did not perceive any sticky sensation.

## >> PRODUCT SPECIFICATIONS

INCI NAME and COMPOSITION:	CAS No	EINECS / ELINCS	RANGE %
POTASSIUM OLIVOYL HYDROLYZED OAT PROTEIN	-	Biopolymer	25-50%
CETEARYL ALCOHOL	67762-27-0	267-008-6	25-50%
GLYCERYL OLEATE	25496-72-4	247-038-6	5-10%
GLYCERYL STEARATE	31566-31-1	250-705-4	25-50%

PHYSICO - CHEMICAL ANALYSIS	METHOD	LIMITS
APPEARANCE	Visual	SOLID
COLOUR	Visual	IVORY WHITE
ODOUR	Sensorial	SLIGHT CHARACTERISTIC
MELTING POINT (°C)	Internal	62 - 67°C
pH (5% ETHANOL / WATER SOLUTION; 50/50)	Internal	6.0 - 7.0
NITROGEN	Kieldhal	1.0 - 1.4%
PEROXYDES	Internal	0 - 10 mEq O <sub>2</sub> / kg
MICROBIOLOGICAL SPECIFICATIONS	Internal	< 100 UFC/g

**SHELF LIFE:** 12 months in the original containers.

**BIODEGRADABILITY:** high, according to the CEE regulation N.82/242 OECD Method.

**IN-VITRO SAFETY EVALUATIONS:** Red Blood Cell test: non irritating.

**LP0586:** it does not induce any lipo-peroxidation.

**USE PERCENTAGE: SKIN CARE PRODUCTS (O/W emulsions):** between 3 and 6%. If the amount of oil phase is in the range 10-20% the amount of emulsifier should range between 3 and 4%. Higher amounts of oil phase require 5-6% emulsifier. By introducing a little amount of stabilizing polymer [e.g. Xanthan Gum], the emulsifier can give stable emulsion with up to 50% of oil phase. pH range: the optimum stability interval for finished products is obtained between 5 and 7 values.

OLIVOIL AVENATE EMULSIFIER® has the ECOCERT certification.





OLIVOIL  
AVENATE  
EMULSIFIER

The logo features the word "OLIVOIL" in a bold, teal, sans-serif font. The letter "O" is replaced by a stylized olive fruit with a green cap and a yellow-green body. Above the "O" are two smaller, similar olive fruit icons. Below "OLIVOIL" are the words "AVENATE" and "EMULSIFIER" in a smaller, teal, sans-serif font.

*Head Office and Production:*

Via G. Pastore,1 - 25082 Botticino Sera (BS) ITALY  
Tel: +39.030.26.93.532 - Fax: +39.030.21.93.581  
kalichem@kalichem.it

[www.kalichem.it](http://www.kalichem.it)