



OLIVOIL

PCA

Delicate and Active

Mositurizer and Emollient

Silky After Feel

Versatile: skin care & toiletries

Sulfate & PEG Free



Kalichem
a lamberti company

OLIVOIL PRODUCTS

“PEG-FREE” SURFACTANTS OF VEGETAL ORIGIN INTERNATIONALLY PATENTED

>> MARKET 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 compatible as much as possible with the physiology of skin and its annexes, without any adverse effect or allergic potential. Secondly, 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 the skin with the pleasant accompanying effects of vegetal structures.



>> THE ORIGINS

Extra-virgin Olive oil is obtained by cold pressing the pulp of the fruits of *Olea europaea* (Olive), a species of small trees 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 complete composition:

Myristic acid $\text{CH}_3 [\text{CH}_2]_{12} \text{COOH}$		COOH	1%
Palmitic acid $\text{CH}_3 [\text{CH}_2]_{14} \text{COOH}$		COOH	15%
Palmitoleic acid $\text{CH}_3 [\text{CH}_2]_5 \text{CH}=\text{CH} [\text{CH}_2]_7 \text{COOH}$		COOH	1%
Heptadecanoic acid $\text{CH}_3 [\text{CH}_2]_{15} \text{COOH}$		COOH	0,5%
Stearic acid $\text{CH}_3 [\text{CH}_2]_{16} \text{COOH}$		COOH	4%

Oleic acid $\text{CH}_3 [\text{CH}_2]_7 \text{CH}=\text{CH} [\text{CH}_2]_7 \text{COOH}$		COOH	68%
Linoleic acid $\text{CH}_3 [\text{CH}_2]_4 \text{CH}=\text{CH} - \text{CH}_2 \text{CH}=\text{CH} [\text{CH}_2]_7 \text{COOH}$		COOH	9%
Linolenic acid $\text{CH}_3 \text{CH}_2 \text{CH}=\text{CH} - \text{CH}_2 \text{CH}=\text{CH} - \text{CH}_2 \text{CH}=\text{CH} [\text{CH}_2]_7 \text{COOH}$		COOH	0,5%
Others			1%

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.



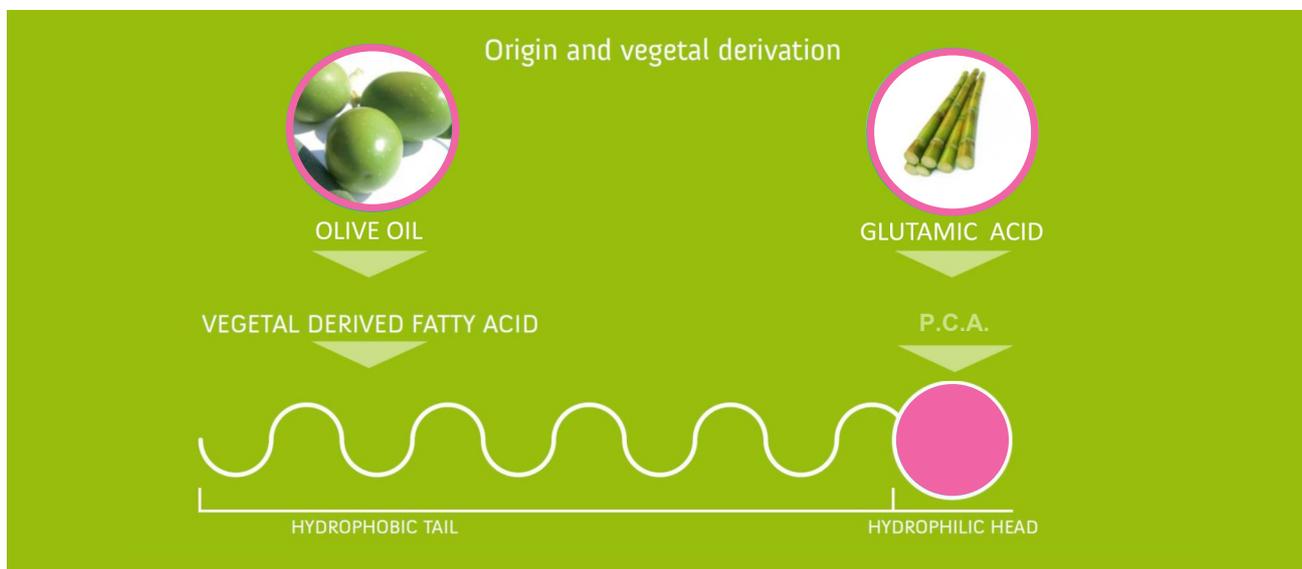
COSMOS
NATURAL

OLIVOIL TECHNOLOGY

ITALIAN INNOVATION FROM THE OLIVE FRUIT

THE TECHNOLOGY <<

Combining the best of both vegetal oils and protein sources allowed Kalichem to achieve new molecules having relevant interfacial properties. These new surfactants can be used to formulate “totally natural” finished products that are very suitable for sensitive skin, baby-care, hair-care and personal-hygiene. Furthermore, besides 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 by high biodegradability (according to the CEE regulation N.82/242 OECD Method).



OLIVE OIL AND SOFTNESS << OF OLIVE OIL PRODUCTS IN COSMETICS

One significant characteristic of the Olivoil products is given by the presence of long chain fatty acids, including oleic acid (68%), linoleic (9%) and linolenic (0,5%) and others like myristic acid, ...

Their presence explains the results of the tests carried out on the surfactants concerning their highly smoothing performance. In fact a number of scientific tests show that the molecules with short chain fatty acids, like for instance the lauric acid (12 carbon atoms), have a greater irritant power than the long chain fatty acids whereby the irritant power of a surfactant is influenced by the number of carbon atoms in the fatty acids. These fatty acids of olive oil bound to proteins have more similarities to both cutaneous secretion (sebum) and cutaneous structures themselves making the Olivoil products very tolerable at the cutaneous level and thus giving the finished products containing them a very nice psychoreologic effect. The Olivoil products have an effective functional action, very soft and moisturizing, according to a correct cutaneous physiology. They leave a good feel of hydration, moisturization, smoothness, softness and cleansing on the skin: after using a wash containing an Olivoil product, one has a feel of cleanliness, satisfaction and well-being.

Olivoil products are used in association with aggressive traditional surfactants (like SLES, reducing its irritant effect) in percentages ranging from 2% to 15% depending on the desired effect. To merely reduce the irritant effect of traditional surfactants, low percentages of Olivoil products (2 - 5%) may be employed. Higher percentages of Olivoil products are suggested (5 - 15%) where an immediate feel of moisturization, smoothness and softness wants to be additionally achieved. Moreover, the higher the percentage of Olivoil used, the higher the sensory eudermic effect obtained.

PRODUCT BACKGROUND

FROM THE ENVIRONMENT THE BASE OF NEW COSMETIC RAW MATERIALS

>> OLIVOIL PCA

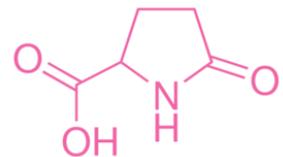
Olivoil PCA is a new functional active principle of vegetable derivation for cosmetic use that also acts as a surfactant, able to respect the integrity and the moisturization of the horny layer of the epidermis.

It is a condensate between the olive oil fatty acids and the potassium salt of the pyroglutamic acid. It is an active principle that is able to provide the skin with the benefits of the moisturising effect of potassium salt pyroglutamic acid, (a part of the natural moisturising factor of the epidermis and highly moisturising), together with the benefits of the unsaturated fatty acids of olive oil (oleic, linoleic, linolenic, etc.) which are: emolliency increase, reduction of the trans-epidermal dehydration, renovation of the normal barrier function of the epidermis and normal keratinisation, anti-desquamation and anti-chapping processes.

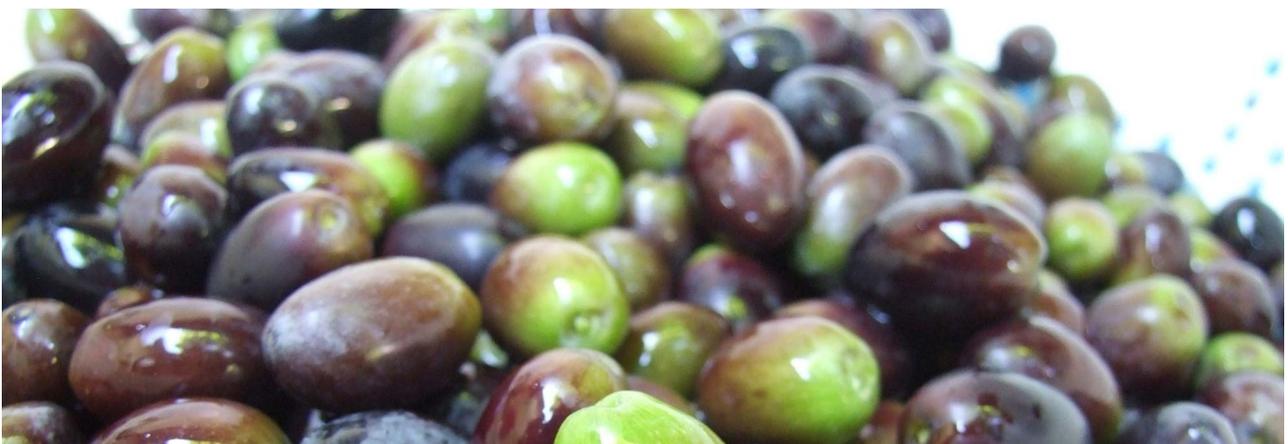


Furthermore it acts as a co-surfactant able to soften the aggressiveness of primary surfactants to respect the hydrolipidic surface film of the skin. In fact one of the problems is that washes generally cause the removal of the natural moisturising factor and the fatty skin barrier, the horny layer consequently is not able to maintain the correct level of moisturization, provoking dryness and desquamation. Olivoil PCA lowers the irritating capacity of the primary surfactant, improving compatibility and co-existence with the wash thus maintaining integrity and moisturising of the horny layer of the epidermis.

Pyrrolidine carboxylic acid has been chosen as the hydrophilic part of Olivoil PCA in that it has high moisturising properties for the skin (it is part of the natural moisturising factor and it is widely used in cosmetic products) and is of vegetable derivation: starting from glutamic acid, an amino acid characteristic of some vegetables such as wheat or tomatoes is obtained, which through pyrolysis causes cyclization inside the molecule which transforms into pyroglutamic acid.



Olivoil PCA is obtained by a condensation reaction between the carboxylic group of the fatty acids of the olive oil and the amino group of the Pyrrolidine carboxylic acid achieving an amide bond; by salifying the carboxylic termination with KOH.



AN ACTIVE DELIVERING BENEFITS

A FATTY ACIDS VEHICLE AND MOISTURIZER

FOAMING POWER <<

In normal conditions the water level in the horny layer is between 20-35%; this quantity of water gives the horny layer the essential characteristics of softness, flexibility and plasticity.

The wellbeing of the horny layer depends on the maintenance of an adequate water level in relation to the diffusion gradient due to the relative environment humidity.

The horny layer is made up of 30% of moisturizing substances soluble in water, 58% keratin and 12% lipids. The 30% of moisturizing substances soluble in water which go under the name of NMF (Natural Moisturising Factor) have water bonding properties, and give the horny layer water bonding capacities.

Some substances are hygroscopic such as the lactates, the PCA, some sugars and have the capacity to absorb humidity from the external environment. The PCA which forms 12% of the NMF, has the capacity to bond water and form ties with the horny layer, is the principle product of decomposition of filaggrin.

12% of the lipids of the horny layer coming from the lamellar bodies is a complex mixture of polar and apolar lipids, is able to form multi-lamellar structures and is made up of three classes: cholesterol, free fatty acids and ceramides. These intra-lamellar lipids bond with the protein shell of the corneocytes and have a selective permeability moisturising role: the lipid and protein components of the corneal structure bond strongly by means of covalent bonds to a part of the water of the corneal layer.

From this it can be seen how both the hydrophilic (NMF) and lyophilic substances are important in maintaining the correct hydration level of the cutis and the alteration of one or both components caused, for example, by the use of washes, may lead to a lack of water in the horny layer.

Olivoil PCA supplies the skin both with fatty acids and PCA: as regards to the skin, the hydrolytic enzymes present act on the amide group resolving the molecule into fatty acids and PCA. The PCA becomes a part of the NMF, carrying out the functions indicated above, whereas the fatty acids of the olive oil, rich in oleic and linoleic acids, become part of the skin fat composition. The oleic and palmitoleic fatty acids are monounsaturated; they are stable, have a strong affinity with the skin and easily melt to the composition of the cell membrane. The linoleic and linolenic fatty acids are also named Vitamin F and control and protect an enormous number of important functions for the skin, such as the maintenance and formation of the epidermis barrier (the ceramides contain linoleic acid), or the synthesis of prostaglandin which regulates the immunity functions of the skin in that linoleic acid is the starting molecule. The lack of Vitamin F causes dryness and desquamation of the skin, above all in children.

Olivoil PCA is an Active Principle for use in cosmetics having a moisturising action and delicate surfactant action able to respect the integrity of the horny layer of the epidermis and improve the cosmetic acceptability and tolerability of a wash. In order to evaluate these performances of Olivoil PCA, use tests have been performed which enable a real comparison to be carried out between two cosmetic products, recreating the normal use conditions. The products under examination are applied by the same subject for a subjective evaluation in the same time period and on the same cutaneous zone (the face).

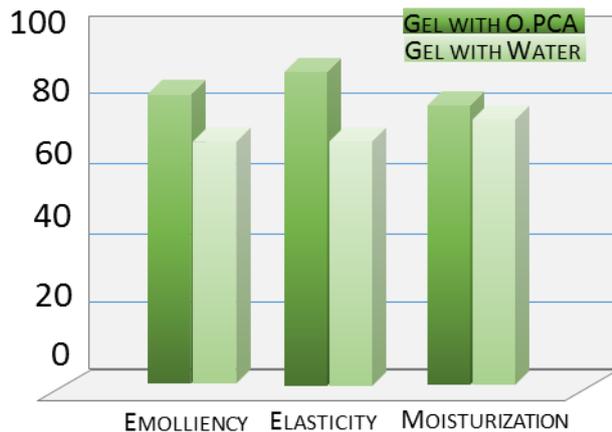


FUNCTIONAL TESTS

EVALUATION ON THE COSMETIC FUNCTIONALITY AND TOLERABILITY

The products under examination are applied by the same subject in the same time period and on the same cutaneous zone (the face), which gives a response and an unbiased evaluation.

>> AGREABILITY AND HYDRATION OF A GEL CONTAINING OLIVOIL PCA

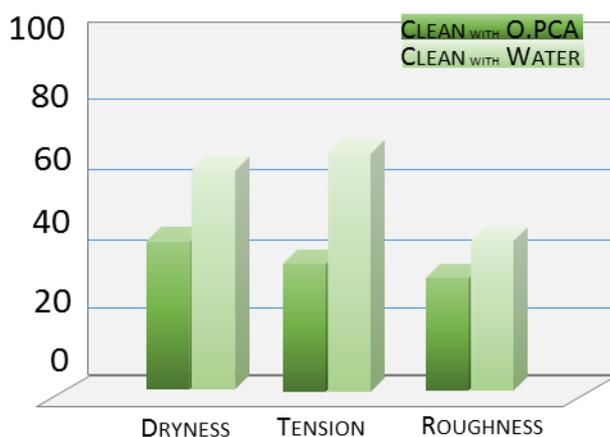


The first test evaluates the humectant, emollient action and soothing sensation given the skin by Olivoil PCA. An aqueous gel was chosen and 5% of Olivoil PCA was added to it and it was compared to the same gel to which 5% of water was added without the active addition.

The test was carried out on 20 volunteers, each volunteer used the sample applying it twice a day, (for five consecutive days), on the parts indicated, delicately massaging until the gel was completely absorbed. The volunteers used the gel with Olivoil PCA on one half of the face and gel with water on the other half. At the end of each day of using the products, the volunteers were asked to answer “yes” or “no” to the questions given on a special form regarding the evaluation of the following parameters: humectant,

emollient action and softness. The highest percentages between the two products with affirmative answers on the last day, refers to an affirmative judgement of the volunteers and are shown in the graph above. From the graph it can be seen that the gel with Olivoil PCA received a higher number of affirmative answers for all three parameters.

>> COSMETIC TOLERABILITY OF A CLEANSER WITH OLIVOIL PCA



The first test evaluates the dryness, the tension and coarseness resulting on the skin after applying a de-wash containing Olivoil PCA. As a product, wash containing 12% of SLES and 5% of Olivoil PCA was compared to the same product without Olivoil PCA.

The test was carried out on 20 volunteers, each volunteer used the samples, washing twice a day (for five consecutive days), the parts indicated. The volunteers used the wash with Olivoil PCA on one half of the face and the other with water on the other half. At the end of each day of using the products, the volunteers were asked to answer “yes” or “no” to the questions given on a special form regarding the evaluation of the following parameters: dryness, tension,

coarseness. The lowest percentages between the two products with negative answers on the last day, refers to an affirmative judgement of the volunteers and are shown in the graph. From the graph it can be seen that the gel with Olivoil PCA received a higher number of affirmative answers for all three parameters.

FOAMING CAPACITY OF OLIVOIL PCA <<

Foaming feature can mean either the quantity of foam produced following shaking, or the quantity of foam produced by falling, or the ability to stabilise the foam over a period of time, or the aspect of the foam, whether more or less creamy or compact. Olivoil PCA performs well both in the foam stabilisation and aspect improvement; fine, creamy and compact.

Test to evaluate the capacity to stabilise the foam

This test was carried out comparing Cocamide DEA normally used as a foam viscosity additive and stabiliser. A concentration of active material equal to 1% of each of the two substances was dissolved in a solution at 10% in active material of SLES; the foam was evaluated using the Ross Miles method at 20°C., water with a hardness factor of 15°F and surfactant concentration equal to 1 g/l. Figure shows the results achieved. It can be seen that Olivoil PCA tends to stabilise the foam over a period of time; a characteristic not to be overlooked is also the creamy and compact nature of the foam itself.



Test to evaluate the foam capacity following shaking or falling.

These tests were carried out comparing Olivoil PCA to SLES: they were carried out using an aqueous solution having the same concentration of SAL. The results are given in the tables.

Results of the foam test produced by falling

This table shows how Olivoil PCA produces a lower quantity of foam compared to SLES which in time however is more stable. The type of foam produced is finer and creamier compared to the foam produced by SLES.

SURFACTANT	Height of foam by falling	Height of foam after 3 minutes	Height of foam after 18 minutes	ASPECT OF THE FOAM
Olivoil PCA	1,9 cm	1,2 cm	0,6 cm	fine, creamy
SLES	2,5 cm	1,3 cm	0,7 cm	compact

Results of the foam test produced by shaking

This table shows how Olivoil PCA produces a lower quantity of foam compared to SLES which in time however is more stable. The type of foam produced is finer and creamier compared to the foam produced by SLES.

SURFACTANT	Height of foam by shaking	Height of foam after 5 minutes	Height of foam after 90 minutes	ASPECT OF THE FOAM
Olivoil PCA	8,0 cm	4,2 cm	1,0 cm	fine, creamy
SLES	10,0 cm	5,5 cm	0,6 cm	compact

APPLICATION AND WAY OF USE <<

Olivoil PCA can be used wherever humectant and emollient functional active principles are required in products for treatment of the skin and as a delicate surfactant which does not alter the balance of the epidermis horny layer maintaining hydration intact, improving the sensorial characteristics of the wash. As the product is in an aqueous solution it is ready to be inserted in a cosmetic formulation; it does not require pre-treatment (such as solubilisation or heating).

OLIVOIL AVENATE EMULSIFIER
OLIVOIL AVENATE SURFACTANT
OLIVOIL EMULSIFIER
OLIVOIL FRUTTOSIDE SURFACTANT
OLIVOIL GLUTAMMATE EMULSIFIER
OLIVOIL GLUTAMMATE SURFACTANT
OLIVOIL PCA
OLIVOIL SURFACTANT
POTASSIUM OLIVATE

The logo for OLIVOIL PCA features the word "OLIVOIL" in a bold, pink, sans-serif font. The letter "O" in "OLIVOIL" is replaced by a cluster of three green, glossy spheres of varying sizes, resembling olives or oil droplets. Below "OLIVOIL", the letters "PCA" are written in a smaller, pink, sans-serif font.

OLIVOIL
PCA



Head Office and Production:

Via Alessandrini 8 - 25086 Brescia - ITALY
Tel: +39.030.26.93.532 - Fax: +39.030.21.93.581
kalichem@kalichem.it

www.kalichem.it