

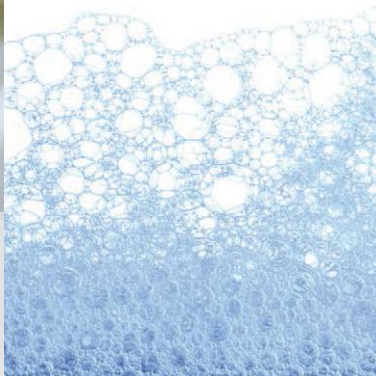
# GLOBAL INGREDIENTS & FORMULATIONS GUIDE 2015

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## Natural Ingredients

Multifunctional Emollient

### EVOIL® CARESS, a Skin-Friendly Natural Massage-Oil

Victoria Donat, Anna Marti

#### Abstract

A massage oil and multifunctional emollient with outstanding spreadability and high moisturizing properties was developed at Textron, making EVOIL® CARESS, an ideally suited massage oil. This oil, rich in vitamins, acts as a skin protector by repairing lipid barrier, and leaves a non-greasy feeling, showing also an excellent oxidative stability. The main difference between this new massage oil and the existing market offer is its remarkable content in multiple unsaturated fatty acids from vegetable oils of the maximum quality, with a particularly high content of naturally occurring long-chained fatty acids and linear esters, displaying a number of functional cosmetic properties. EVOIL® CARESS is free from pore-clogging mineral oils, usually present in current massage oils in the market.

#### Introduction

Skin is an important interface between humans and the environment. In the driest regions of the world, plants and animals have evolved to develop sophisticated strategies to prevent water loss. Most of these systems are based upon various lipids, complexed into organized structures (membranes), to form a protective impermeable layer.

Survival in a terrestrial environment needs the prevention of water and electrolyte loss through the body surface to minimize desiccation. In mammals, the epidermal permeability barrier in the cornified layer of the skin

(*stratum corneum*) provides this function [1]. The barrier is embedded in a lipid-containing extracellular matrix that mediates permeability of the barrier function. This prevents the excessive loss of body fluids but in addition also provides an effective barrier against environmental xenobiotics and host infections by pathogens.

The most common lipids found in the extracellular matrix of the *stratum corneum* are ceramides, cholesterol and non-esterified fatty acids (FAs), built from precursor molecules secreted by lamellar bodies from keratinocytes at the *stratum granulosum/stratum corneum* interphase [1]. Triacylglycerols (TAGs) are a minor lipid species of lamellar bodies, but playing a crucial role in the generation of a functional permeability barrier in the skin.

In the *stratum corneum* of human skin, highly organized multi-lamellar structures provide protection and water impermeability [2]. These membranes slow down the passage of water from the fully hydrated body core to the relatively drier environment. Age, skin metabolic changes, and environmental stress mediate changes in skin physiology and function, resulting in a defective water regulatory system [3]. This can lead to cosmetic dry skin, abnormal enzyme function, increased susceptibility to irritation, and can result in various forms of dermatitis [4,5].

Healthy and functioning skin barrier is an important protector against dehydration, penetration of various microorganisms, allergens, irritants, reactive oxygen species and radiation [6]. Actually, many of the ichthyoses de-

scribed and studied up to date are associated with inherited disorders of lipid metabolism, having demonstrated a permeability barrier abnormality [7].

In humans, long lineal chain esters have long been recognized as an important component in the skin barrier function. Long chain fatty acids combined with cholesterol and triglycerides, form stable multilayered membrane structures in the skin. EVOIL® CARESS mimics these structures with an intelligent formula design, which literally recreates a perfect water regulatory system, such as those found in younger, healthy skin.

Long-chain fatty acids are key structural components of ceramides, which decrease skin permeability to water and prevent its losses [8,9]. Some examples are secretions of Meibomian glands, preventing excessive evaporation of tears, or insulating lipids of neural tissues, enabling faster signal conduction along axons. Unsaturated fatty acids are also fundamental to keep a healthy cutaneous biology, as their deficiency is associated to skin clinical conditions [8,10]. Linear esters provided by EVOIL® CARESS are comparable to that produced in our skin and fully miscible with sebum secreted by epidermal glands.

The epidermis has a higher protective and antioxidant capacity than the dermis because it houses essential free radical scavengers such as vitamin E. *Stratum corneum* is protected by vitamin E, delivered to the surface of skin through sebum. Vitamin E ( $\alpha$ -tocopherol) is a paramount antioxidant, because of its ability to penetrate the skin through its small molecular weight, used as a component of skin products that acts by smoothing the skin and increasing the ability of the *stratum corneum* to maintain its humidity, to accelerate the epithelialization, and contribute to photoprotection of the skin [6].

Direct topical application of antioxidants, such as  $\alpha$ -tocopherol naturally present in EVOIL® CARESS, would be expected to facili-

tate this protection. Many studies on topically applied vitamin E point to a major protective role in oxidatively challenged skin. It has been demonstrated that topical supplementation with  $\alpha$ -tocopherol not only increases epidermal and dermal levels of  $\alpha$ -tocopherol, but also bolsters the levels of other enzymatic and nonenzymatic cutaneous antioxidants [11]. Further studies suggest that vitamin E may assist in wound healing, improving surgical wound healing and cosmetic results when applied before and after surgery [12].

EVOIL® CARESS also contains natural vitamin A (retinol), belonging to retinoids family, that were introduced in OTC cosmetic products and into the treatment of dermatoses and photoaging more than two decades ago. Retinol has the potential to induce epidermal thickening and stimulating collagen synthesis in photoaged skin, as proved by several studies [13].

Cell regulators, such as vitamin A and its derivatives, polypeptides and botanicals, act directly on the collagen metabolism and stimulate the production of collagen and elastic fibers. Vitamin A (retinol) and its derivatives also have antioxidant effects. They can induce the biosynthesis of collagen and reduce the expression of collagenase. Retinol is, at the moment, the substance that is most often used as an anti-aging compound, exerting positive effects in extrinsic and intrinsic skin aging, as well as on collagen metabolism [6]. A deficiency of epidermal vitamin A may be the consequence of nutritional vitamin A deficiency, exposure to sunlight or any UV source, oxidative stress or chronological ageing. As a consequence, any treatment aiming at increasing epidermal vitamin A would exert a protective effect against these deleterious conditions. Retinoids may counteract some deleterious actions of UV radiation by physical and biological mechanisms [14]. Topical natural retinol may prevent epidermal vitamin A deficiency due to defective nutrition, exposure to sunlight or any condition leading

## Natural Ingredients

### Multifunctional Emollient

to free radical production. Topical retinoids are able to load the skin with high amounts of retinol and, unlike systemic retinoids, no study demonstrated a teratogenicity of topical retinoids in humans, due to the negligible rate of retinoid delivery to the circulation following topical application [14].

A suitable moisturizing treatment involves repairing the skin barrier, retaining/increasing water content, reducing TEWL, restoring the lipid barriers' ability to attract, hold and redistribute water, and maintaining skin integrity and appearance. Moisturizers also act to reduce skin friction and increase skin hydration by providing water directly to the skin from their water phase and by increasing occlusion, as measured as a decrease in TEWL.

Skin care products not only form an inert, epidermal layer, they also penetrate and influence the structure and function of the skin. The ideal moisturizer should not only be effective in terms of water-loss prevention, but also be a good emollient, making skin smooth and supple. It should be cosmetically elegant and acceptable, friendly to sensitive skin, hypoallergenic, nonsensitizing, fragrance free, non-comedogenic, affordable, and long-lasting.

EVOIL® CARESS has been designed *ad hoc* to accomplish these conditions but, furtherly, an extra quality has been intended for this oil: idoneity for massage application.

Massage therapy has been applied to skin problems as wound care, pressure ulcers, scar management, cellulite or burns [15-18]. Massage technique with vegetable oils is even a widespread traditional newborn care practice in many countries and is associated with improved weight gain, reduced risk of infection, among other advantages, as reducing transepidermal water loss and conserves heat and energy to promote growth [19, 20].

Altogether, the cosmetic care functions in-

herent to its formulation can be achieved by means of a pleasant and also highly beneficial application method. It is widely known and accepted that skin massage stimulates blood circulation and oxygenation, and allows muscle relaxation, by the time active ingredients penetrate easier into the dermis. Increase of peripheral circulation allows a faster penetration and better action and effects of vitamins, long-chained fatty acids, unsaturated fatty acids and linear esters present in EVOIL® CARESS.

### Description

EVOIL® CARESS is an optimized biomimetic combination of lineal esters and long chain fatty acids, isolated from natural vegetable oils with outstanding qualities for the skin and hair. This complex mixture replenishes and rebuilds the skin barrier. In addition, its composition is very similar to the lipids that make up 25–30% of human sebum. Therefore, it is a highly effective moisturizer, extremely compatible with human skin.

EVOIL® CARESS contains multiple unsaturated fatty acids from vegetable oils of the maximum quality with a particularly high content of naturally occurring long chained length fatty acids and linear esters with many functional cosmetic properties: protects the skin from drying out and supplies it with special lipids components similar to human sebum, to restores physiological lipid barrier functions, revitalizes dry, damaged hair.

This multifunctional massage oil and emollient is obtained from natural vegetable oils and contains:

- Circa 25 % of long chain length fatty acid.
- Up to 75 % of unsaturated fatty acids.
- Excellent oxidative stability.
- Rich in natural vitamins (A, E and F).

### Benefits & Applications

EVOIL® CARESS may be applied directly to the skin and makes an ideally suited massage oil, with an exceptional spreading performance. EVOIL® CARESS spreads easily on the skin, preventing the oil film being absorbed too quickly.

EVOIL® CARESS can also be used as an extender in formulation, becoming ideal for use in personal care products as an emollient, to give an enhanced richness and creamier texture to emulsions. This multi-functional emollient softens the skin, leaving a silky and dry feel after absorption. Therefore, it is possible to create elegant skin care systems when used in combination with other active ingredients. Other advantages of this excellent cosmetic oil developed by Textron are harmlessness, naturalness, preservative absence and intrinsic stability, all of these supported by efficacy, safety and physico-chemical assays performed. Main functional cosmetic properties of EVOIL® CARESS are:

- Protection of skin from drying out.
- Replenishing special lipid components
- Restoring of physiological lipid barrier funktion
- Minimizing trans-epidermal water loss (TEWL).

### Substantiation

#### MOISTURIZING EFFICIENCY

To assess moisturizing efficiency of EVOIL® CARESS, two different assays were performed:

##### 1) Corneometry:

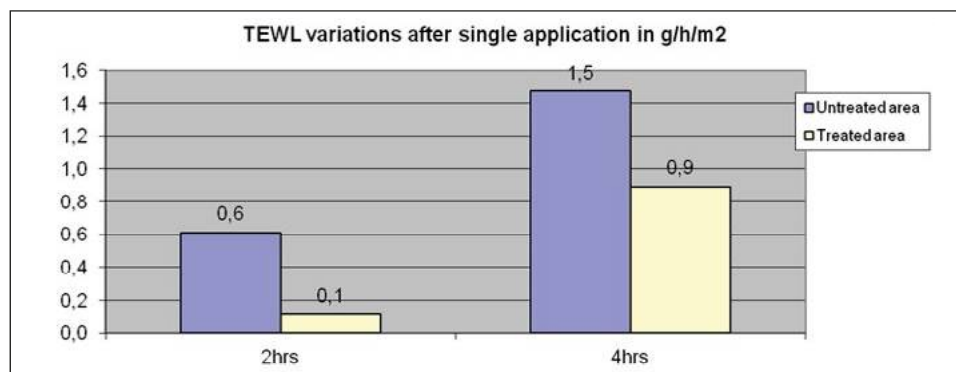
Results of corneometry after a single and standardized application of EVOIL® CARESS in the assayed conditions on 13 healthy female volunteers, leads to a SIGNIFICANT IMPROVEMENT of the skin hydration rate after 1 hour and 3 hours. Thus, the hydration of the upper layers of the epidermis is proven by these results.

##### 2) Measurement of the trans-epidermal water loss (TEWL):

Moreover, measurement of trans epidermal water loss in the experimental conditions on 12 healthy female volunteers lead to a non significant variation of the TEWL values 2 hours and 4 hours after application. So, these results demonstrate that EVOIL® CARESS indeed maintains the skin barrier state (**Table 1, Fig. 1**).

##### PATCH TEST:

Acute skin tolerance of a EVOIL® CARESS (tested pure) was evaluated by application under occlusive patch over a 48-hour period



**Fig. 1** Measurement of the trans-epidermal water loss (TEWL) (see Text-passage)

## Natural Ingredients

Multifunctional Emollient

<b>Table 1</b> Measurement of the trans epidermal water loss (TEWL) (see Text-passage)			
M.I.I.	30 minutes	24 hours	Global M.I.I.
	0.00	0.00	0.00
Class	Non-irritating	Non-irritating	Non-irritating

on healthy adult volunteers with sensitive skin and it can be concluded that the product is classified as NON IRRITATING (**Table 2**).

### OXIDATIVE STABILITY:

#### OIL STABILITY INDEX (OSI)

Oil Stability Index (OSI) of EVOIL® CARESS was determined using a Rancimat instrument, by means of ISO 6886 (2006) animal and vegetable fats and oils method.

Oxidation of oil depends on the unsaturation degree, presence of antioxidants, and prior storage conditions. In the OSI analysis, oxidation rate is slow until resistance to oxidation is overcome. This time is known as the oxidation induction period and is a tool to assess shelf life of the oil.

Experimental conditions were as follows:

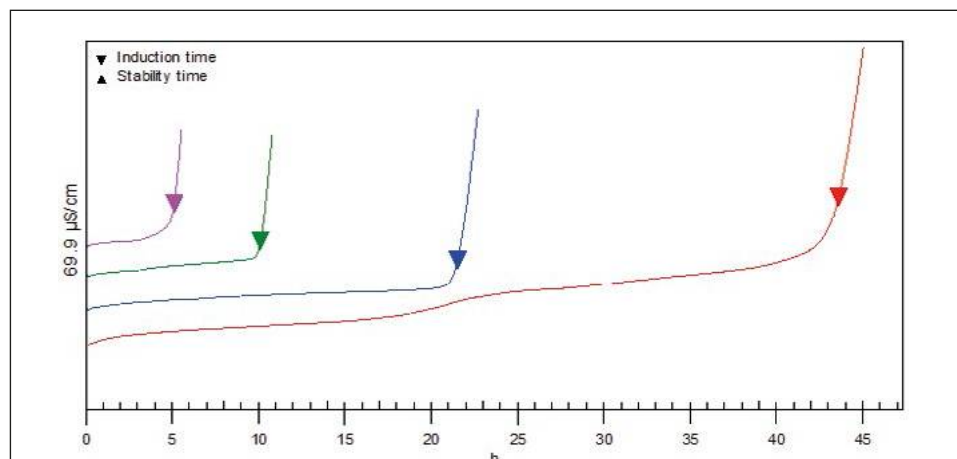
- Sample amount  $2.5 \pm 0.01$  g
- Temperature  $100^\circ\text{C} \pm 0.2^\circ\text{C}$

- Gas flow 20 L/h
- Vessel: 50 mL distilled water
- Evaluation Conductivity Induction time (tangent method).

OSI of EVOIL® CARESS was found to be 43.6 h ( $100^\circ\text{C}$ ) (**Fig. 2**).

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**Fig. 2** Oil Stability Index (OSI) of EVOIL® CARESS determined by means of a Rancimat instrument, found to be 43.6 h ( $100^\circ\text{C}$ ). Red:  $100^\circ\text{C}$ , Blue:  $110^\circ\text{C}$ , Green:  $120^\circ\text{C}$ , Pink:  $130^\circ\text{C}$ .

<b>Table 2</b> Patch Test (see Text-passage)	
<b>Product</b>	<b>EVOIL® CARESS</b>
Area	Scapular part of the back
Number of volunteers	10
Specificity of the panel	Sensitive skin
Type of patch	Finn Chamber® 8 mm (50 mm <sup>2</sup> ) occlusive
Dose	25 µl
Condition of application	Pure
Application duration	48 hours
Control	Patch without product
Average irritation score	0.00
<b>Classification</b>	<b>NON IRRITANT</b>

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## Natural Ingredients

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