

HEMP OIL IN BODY CARE PRODUCTS

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The beneficial effects of hempseed oil, or hemp oil, for the skin, its use in the cosmetics industry, and the clinically proven therapeutic uses of its essential fatty acids are summarized below.

Body Care

Hemp oil makes an excellent emollient which moisturizes skin and hair. In the old days it had mainly been used to manufacture greenish soft soap and soothing emulsions for skin care. It was also said to bring relief from dandruff and remedy hair loss. In the past years, the renaissance of hemp and the claims of the beneficial effects of its oil have stimulated a great deal of experimentation in the body care sector. Today, a range of body care products containing hemp oil are available: body lotion, moisturizer, lip balm, hand cream, elbow grease, shampoo, conditioner, soap, shower gel, massage oil, and baby cream.

Benefits of Hemp Oil

Hemp oil provides several benefits as a natural ingredient in cosmetics. In addition to the general emollient and lubricating effects of polyunsaturated fatty acids, which account for more than 80% of hemp oil, these fatty acids are primarily the two essential fatty acids linoleic acid and *alpha*-linolenic acid, as well as *gamma*-linolenic acid. While essential fatty acids and *gamma*-linolenic acid are also present at high levels in other seed oils, such as evening primrose or borage, hemp oil has a major advantage over of these oils:

Even when grown conventionally, hemp farming does usually not require the use of pesticides and herbicides. Consumers of hemp seeds and oil thus don't need to be concerned about pesticide residues. This compares favorably to evening primrose and borage, specialty cultures which are sensitive to pests and weeds and require, unless grown organically, the use of synthetic chemicals.

The way our skin works

Our skin is not just a sensory organ and temperature regulator, but has important barrier functions: it protects the body from excess water loss as well as from penetration of foreign substances and pathogens such as bacteria and viruses. Cosmetic skin care products are formulated to enhance this barrier or to restore defects.

The health of our skin depends largely on the presence and retention of water. This task is performed by the epidermis, the topmost and thinnest layer of the skin. Most important is the stratum corneum, the horny layer of the epidermis, which is composed of dying and dead cells which are cemented by lipids just like brick and mortar in a wall. These skin lipids are composed of cholesterol, free fatty acids and ceramides¹. Ceramides have been shown to form lamellar structures which retain water in the skin. The most important ceramide, which has been shown to

be of critical importance for the water ecology of the skin, contains the essential fatty acid linoleic acid.

Dry skin can be caused by environmental factors such as dry air, sun, excessive use of soaps, shower gels or other detergents with strong degreasing action. Slow-down of cell metabolism with age or diabetes are other causes. All these factors result in a 'degreasing' of the skin and changes in the lipid composition. In fact, the skin becomes thinner, thereby facilitating increased water loss. Alleviation of this condition can be achieved through improved supply of suitable dietary fats and, since skin is permeable to topically applied lipids and contains esterases which may hydrolyze fatty acids from the applied triglyceride lipids², through application of skin care products.

Benefits of plant oils in cosmetics

Cosmetic benefits of plant oils are based on the physical and biochemical effects of their fatty acids. Although the cosmetics industry claims generic use of unsaturated or essential fatty acids as beneficial for the skin, only the essential fatty acid linoleic acid and its metabolite *gamma*-linolenic acid have clinically proven biochemical and therapeutic effects on the skin. It has been demonstrated that the skin defects caused by dietary essential fatty acid deficiency can be reverted by topical applications of linoleic acid. Although true essential fatty acid deficiency in humans is a rare condition, cosmetic skin problems such as scaling or dry, cracking skin also respond to cosmetics containing linoleic acid. Topically applied linoleic acid has been shown to be incorporated as a component of the ceramides in the stratum corneum^{3,4}. Hemp oil for its high content of linoleic acid and *gamma*-linolenic acid will have beneficial effects when used in cosmetics.

The benefits of all other unsaturated fatty acids in body care products are not related to biochemical or therapeutic effects, but rather rely on the well established physical emollient, lubricating, and moisturizing effects of these fatty acids, some of which are unique to the individual lipid². In contrast to saturated or mono-unsaturated fatty acids, polyunsaturated fatty acids are non-sticky. The double bonds in the fatty acid chain cause the molecule to bend and 'curl up', thus leading to an increase in lubrication and viscosity and to lower stickiness. Because of their mobility, polyunsaturated fatty acids can counteract the ongoing loss of the skin's natural barrier substance between the cells of the epidermis, thus preventing excessive moisture loss, dry-out, and cracking of the skin. Their natural anti-inflammatory properties⁵ can aid in the healing process of minor skin abrasions. Thus, hemp oil with its high content of polyunsaturated fatty acids is an excellent ingredient for skin care products.

From an environmental perspective, plant oils in shampoos, soaps, and shower gels are preferable to synthetic or petrochemical products because of their ready biodegradability.

Can hemp oil prevent skin aging?

The slow-down with age in the metabolism of cells in the basal layer of the epidermis also reduces the amount of essential fatty acids ingested and released into the epidermis. This age related decline in activity is a major contributor to the above mentioned detrimental effects to the skin, thus contributing to the formation of wrinkles and overall skin aging. Topical application of linoleic acid and *gamma*-linolenic acid partially compensates for their decline in the skin and the obvious effects of aging⁶. The brown spots, also called chloasma or liver spots, that form with

age, however, cannot be prevented by skin care, but only via a diet rich in unsaturated fatty acids.

Antioxidants in body care products

Application of a natural lipid in a finished cosmetic product to the skin exposes the lipid to light and oxidation. This in situ exposure can result in free radical formation, catalyzed by UV light absorbing photosensitizers. Antioxidants are necessary to stabilize the natural lipids in the skin. For these reasons, natural lipids should either be carefully purified before use in cosmetics or antioxidants should be added to increase the shelf-life of commercially available body care products. Vitamin E is often used as a natural antioxidant and preservative.

Lipids for hair protection

A hair is a compact mass of keratinized, dead cells which form in the hair bulb. There are approximately 90,000 to 150,000 hair bulbs in the scalp. The already dead cells are pushed by newly forming cells below through the hair shaft at a rate of approximately half an inch a month. Each hair bulb is equipped with a sebaceous gland which lubricates the hair in the hair shaft. Each hair continues to grow for about 6 years before it falls out and the hair bulb starts producing a new hair.

Hair is exposed to harsh treatment: exposure to sun and UV-radiation, degreasing through frequent washing, heat from the blow-dryer, or aggressive chemicals for bleaching, coloring or perms. Other than the human skin, its outer layers are not continually renewed but become gradually more damaged with age, the hair becomes brittle, the surface is rough and lacks luster. Hair care products are designed to prevent the damage to hair and repair minor damages. Lipids in hair care products are used for their ability to enhance gloss and make hair more manageable.

Hemp oil for therapeutic applications

The essential fatty acids *alpha*-linolenic acid, an *omega*-3-fatty acid, and linoleic acid, an *omega*-6-fatty acid, compete with one another in their metabolic pathway because the enzyme system *delta*-6-desaturase, which metabolizes both fatty acids, has a higher affinity for *omega*-3-fatty acids. Therefore a healthy diet not only provides a sufficient amount of essential fatty acids, but also a balanced *omega*-6/*omega*-3 ratio⁷.

It has long been known that the pathological symptoms of many skin disorders characterized by an increased loss of water through the skin, such as scaly dermatitis, psoriasis or epidermal hyperplasia, are associated with an *omega*-6-fatty acid deficiency^{8,9}.

Atopic eczema (dermatitis, neurodermitis) and psoriasis

Psoriasis and eczema both exhibit parakeratosis, i.e. a reduced barrier function of the skin and increased percutaneous absorption caused by a defective horny layer. Clinical studies showed elevated levels of linoleic acid and reduced levels of its metabolites, especially *gamma*-linolenic acid in patients with atopic eczema and psoriasis^{10,11,12}. Patients also showed elevated levels of *omega*-3-fatty acids and decreased levels of their metabolites, indicating an impaired *delta*-6-desaturase activity.

Several clinical trials showed significant skin improvement in patients with atopic dermatitis through dietary *gamma*-linolenic acid supplementation. Patients experienced less itching, consequential lower antihistamine intake, gradual improvement of erythema, excoriations and lichenification of skin^{13,14,15}. Alleviation of skin problems were associated with increased epidermal levels of *gamma*-linolenic acid, dihomo-*gamma*-linolenic acid, and prostaglandin E¹⁶.

Although dietary supply of fatty acids is one important factor in the treatment of skin disorders, topical application of creams can provide relief from itching and improve the appearance of the dry, scaling skin. Clinical studies showed the efficacy of ointments containing *gamma*-linolenic acid for the treatment of atopic eczema after a period of only two weeks¹⁷.

Acne

Topical administration of linoleic acid has also been shown to be effective in the therapeutic treatment of acne skin conditions¹⁸. Hemp oil, with its high content of linoleic acid can therefore be used beneficially in cosmetics products for young skin with acne problems.

Allergic to hemp oil?

So far, allergic reactions to hemp oil have not been reported by the growing number of manufacturers and users of hemp oil based body care products. However, it is known that linseed (or flax) oil, which contains a high concentration of the triple-unsaturated *alpha*-linolenic acid is slightly irritating to mucous membranes and may cause allergic reactions in some people. While hemp oil contains considerably lower concentrations of *alpha*-linolenic acid, it is suggested that a consumer, as with any new body care product, perform an allergy test before using a new product.

Manufacture of raw materials for cosmetics

Finally, in addition to the use of hemp oil directly, it can also be an alternative source for other cosmetics raw materials. Raw materials, such as detergents, emulsifiers or fatty acids, can be produced by enzymatic or chemical processing.

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