

Active agents, the effective skin care – vitamins, oils & more

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From A like allantoin to Z like zinc. There is a multitude of active agents on the market either as substances to be used for cosmetics or substances contained in cosmetics. Effects as well as efficacy depend on various factors which will be described in detail in the following article.

Before the active agent can become effective a number of prerequisites have to be met as for instance its concentration in the product should be adequate, its release out of the cream base has to be ensured as well as the transport to its destination to start its activity. All these prerequisites also demand for an appropriate packaging.

Thus, **vitamins** are most effective if they are not free but encapsulated as esters in liposomes or nanoparticles in order to be released by enzymatic hydrolysis after penetrating into the deeper skin layers. Vitamin C for example can be encapsulated in nanoparticles as a fat-soluble palmitic acid ester and in liposomes as a water-soluble phosphate ester. In both cases, after their hydrolysis there will be only substances released which are also natural components of the skin.

The advantage of esterified vitamin C in contrast to free vitamin C is its increased stability against atmospheric oxygen and subsequently its increased shelf-life. Therefore, vitamin concentrations may be reduced and keratolytic and pro-oxidative side effects can be excluded. Vitamin C is able to activate the synthesis of collagen in the skin and deactivate free radicals. In practice, also a bleaching effect on the skin pigmentation can be observed. Similar to vitamin C, also the vitamins A and E are effectively used in form of appropriate encapsulated esters. They protect the skin and support its regeneration. A very interesting active agent too is vitamin K which stabilizes the surface capillary system of the skin and therefore reduces erythema (purpura) as well as dark eye contours. Hence, vitamin K can also be applied for the cosmetic treatment of rosacea and couperosis. Though, couperosis can alternatively be treated with echinacea. Both the substances can be used to soothe the skin in cases of temporary erythema.

While vitamins are primarily produced synthetically and consist of a single substance, **extracts** are vegetable essences and for each plant they represent a characteristic mixture of various substances. Therefore, either the specific effect of a single substance or of a substance group may dominate.

The extract produced from the bark and leaves of the hamamelis, a brush which resembles the hazel, e.g. has a high content of astringent agents belonging to the family of tannins which help in cases of cracked skin by reacting with the proteins of the skin so that minor lesions may re-close. Hamamelis acts on the skin surface and is recommended to use in combination with smoothing natural oils which additionally relieve tensions out of the surface layers of the skin and thus very effectively help the skin to regenerate.

Oils: for a smooth skin

The smoothing effect of oils is based on the fact that it fills up all the microscopic craters on the skin surface. Furthermore, they reduce the transepidermal water loss (TEWL) which increases the skin hydration from the inside and also avoids that the keratin of the horny layer hardens. The skin becomes soft and smooth and thus its capacity to cope with mechanical strains increases.

In contrast to mineral oils (vaseline oil, petrolatum) and mineral waxes, natural oils (triglycerides) have the advantage of a structure which is similar to the skin lipids. They meet the physiological needs of the skin which can also be seen as a disadvantage as they gradually are absorbed by the skin and noticeably disappear from the skin surface. Mineral oils stay on the skin surface and their smoothing effects are felt for a longer time. However, due to the considerably higher occlusive capacity of mineral oils, the natural regenerative capacities of the skin are reduced on the long run which leaves the subjective

feeling of dry and low-fat skin if the skin care has once not been applied. A change from mineral oils to natural oils will however restart the natural regeneration within a period of several weeks. The skin which felt dry appears to be back to its normal condition.

Active agents included

One of the advantages of natural oils is their content of additional components which on their turn also show active agent features. The most important here are vitamins, essential fatty acids and phytosterols. An outstanding natural oil is avocado oil with its particularly high content of accompanying substances and its excellent skin care properties for normal to dry skin.

Hyaluronic acid & Co

Not only the use of oil or other fatty substances are contributing to a smooth skin but also **mucins** as e.g. from aloe extracts can have very positive effects. Mucins retain water and enclose the skin just like a moisturizing film. Among others, hyaluronic acid, glucans and cellulose compounds belong to the group of mucins.

In contrast to cellulose compounds like carboxymethylcellulose, and due to their specific chemical composition, hyaluronic acid and glucans bind stronger to proteins and ceramides of the skin, thus they show fewer tendencies for filming. Furthermore, similar to protein containing products they result in a noticeable smoothing of the surface skin. These active agents are high-quality components in products for the facial care. An advantage here is that this special kind of smoothing will not result in any surface glistening which would be a negative side effect for the facial care.

In order to increase the skin hydration, there are frequently substances added which penetrate into the horny layer of the skin and bind the free water available. Moisturizing agents are glycerine, urea, amino acids and salts. They are also called **natural moisturizing factor** (NMF) as they are natural components of the skin. Their efficacy can be proved with a corneometer and their main field of application is low-fat and dry skin.

Though, there are certain limits to their efficacy as e.g. extremely low humidity which can be found on cold and dry winter days or on warm days in air-conditioned rooms in cases where the air-conditioning besides cooling also lowers the humidity. In those cases the water binding capacity of the above-mentioned active agents

is insufficient and the TEWL may increase. Given these specific conditions, combinations with hyaluronic acid and other substances of this group are recommended. Sometimes also a combination of moisturizing substances with additives to control the consistency like xanthan gum or sodium carbomer are definitely more effective than moisturizing agents alone. Their example shows that an active agent may lose its efficacy in certain very extreme conditions.

Only a small number out of the multitude of cosmetic active agents could be introduced here with special emphasis on active agents which are related to the physiology of the skin. Experience shows that active agents which perfectly blend into the natural balance of the skin are the most appropriate substances for preserving and supporting the natural skin condition.

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