Active agents, the effective skin care - smoothing the skin and providing overall protection

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Active agents are a favorite subject of discussions and an important topic of many publications. Above all, the advertising material provides abundant printed information. However, what are the specific features of active agents, how do they work and what are their advantages and disadvantages? All these questions will be answered in the following article.

As defined by cosmetics, active agents with skin care effects are all those substances which help to preserve the skin in its natural condition and to objectively modify (or improve) the skin condition as well as to protect the skin. Their use in cosmetic products results from the various influences our skin is exposed to as e.g. climatic conditions like cold temperature, low humidity and ultraviolet rays or chemical and biological irritants in form of household chemicals as well as micro-organisms and mechanical strain. Also the prevention of endogenous skin problems plays a major part.
An alternative here are individual modular systems which do not only include the creativity and competence of beauty institutes but even challenge them.

Effects of active agents

Reducing rough skin resp. smoothing effects
- Treatment of chapped skin
- Removing surface scales
- Removing cornifications
- Anti-wrinkle

Influencing the skin color
- Self-tanning products
- Make-up (pigments)
- Bleaching

Skin protection
- Protection against ultraviolet rays (sun screen)
- Protection against occupational substances, cleaning agents and household cleaners
- Protection against microorganisms
- Protection against cold temperature

Prevention
- Dry skin with all its consequences
- Skin barrier disorders
- Cornification disorders
- Erythema
- Inflammations
- Itching

Regeneration
- Supporting the natural skin regeneration
- Supporting the treatment of photo dermatoses
- Anti-wrinkle effects
- Anti-aging
- Supporting the skin elasticity
- Supporting the microcirculation
- Balneological effects
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Improving effects like
- Penetration
- Encapsulation of active agents
- Synergy of different substances
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Hygiene
- Cleansing of skin and hair
- Reducing transpiration
- Reducing body odour
- Avoiding dandruff

There is one common rule for cosmetic active agents: they have to be free of systemic effects. That is the reason why the German Cosmetic Decree (KVO) for example bans hormones and such substances which may have effects on the whole body after penetrating into the skin. Cosmetic active agents which simultaneously have healing effects may be used if these effects are limited to the skin only. These effects however are not allowed to be used for promotional purposes. It applies for example for the following substances or mixtures of substances: D-panthenol, urea, evening primrose oil, hamamelis, aloe, echinacea, camomile, linoleic acid, and vitamin K as they are also used in dermatology. In terms of cosmetics, we speak of "supportive prevention" and an example here is evening primrose oil which is applied for the treatment of neurodermatitis. Frequently, active agents have more than one single effect with the result that they are difficult to catego-

rize as for instance lipids which have smoothing, protecting and preventive properties.

Differentiating between active agent and additive

In contrast to **active agents, additives** are included to provide the physical and microbiological stability as well as an extended shelf-life. They protect the products against microorganisms, hot and cold temperatures, atmospheric oxygen, sunrays and improve transport and shelf-life properties. Part of this group are among others, preservatives, emulsifiers, substances to control the consistency, gelling agents, solvents, solubilizers, complexing agents, filming agents, antioxidants, and dyes. Perfumes and aromatic principles also are important additives which help to improve the sensory acceptance of the products. Frequently, there is no clear dividing line between additives and active agents. Thus, gelling agents often help to improve the skin moistness for example. The INCI declaration of cosmetics makes no distinction between active agents and additives and non-professionals sometimes have difficulties to differentiate between active agents and additives and to identify their functions. It is recommended to remember bit by bit the different properties of certain groups in order to be able to evaluate cosmetic products by means of the INCI declaration. The focus of attention should be the natural physiology of the skin; therefore the origin of the substance, either from vegetable, synthetic, biosynthetic, animal or mineral sources should be neglected for the moment.
With respect to physiology, emphasis has to be laid on the dosage as the following example will explain: Glycerin as a substance is produced synthetically or by saponification of vegetable oils. Glycerin is a natural skin component and part of the NMF (Natural Moisturizing Factor). Included in low dosages, it increases the skin moistness as desired. In high concentrations, however, it is able to dehydrate the skin tissue due to the high osmotic pressure and consequently becomes counterproductive. A further example is vitamin E which has pro-oxidative effects in high dosages while low concentrations are anti-oxidative and anti-radical. Vitamin C in very high concentrations has the effects of fruit acids. The position of a substance in the INCI declaration may give a clue regarding its concentration, as in compliance with § 5a of the German Cosmetic Decree (KVO), the ingredients have to be listed according to their weight ratio in decreasing order and ingredients with a ratio of 1 % or less may be listed unsorted.

Base substances and specific active agents

The active agents are divided into substances which are used for the **basic skin care** and substances with **specific effects**. Thus, fats, oils and waxes generally belong to the group of basic active agents which influence skin smoothing and skin protection, in other words they are primarily effective on the skin surface. Within this group substances may often be interchanged without any major consequences on the efficacy. By contrast, every single vitamin has a very characteristic and unmistakable sphere of activity.
Similar to the differentiation of active agents and additives there neither is a clear dividing line between basic and specific active agents. Hence, also the individual properties of the different substances are important. Wheat germ oil is a typical example in this field. As it has a very high lipid content, it smoothes the skin, lowers the transepidermal water loss (TEWL) and consequently increases the skin moistness. These are typical features of a basic active agent shared with a lot of other vegetable oils. Just like those, it will be integrated into the skin barrier, however, it additionally builds up a depot for the vitamins and essential fatty acids it carries along. As a consequence, it has additional effects on the reduction of scaly skin. Evening primrose oil also has a very high lipid content, but it supplies gamma-linolenic acid which helps against symptoms of neurodermatic skin in cases where enzyme deficiency is diagnosed.
Active agents also show less positive features. Especially the last-named oils have special characteristics which are very unpopular especially in the field of cosmetics: they have a very specific smell which can still be identified in small concentrations. Now, opinions are divided on those substances, a fact which can be compared with the acceptance of specific fragrances: there are those who are fond of and those who dislike them. Specific scents of some substances are a frequent reason for adding aromatic principles to cover up smells. Further examples for a pure active agent with a very typical smell are vitamin A and its derivatives.
An important criterion for an active agent is its localization: is it supposed to stay on the surface or should it penetrate into the skin? A substance applied to smooth the skin like a mineral oil is not designed to penetrate into the skin. The final destination of other substances, however, is in the skin layers as e.g. vegetable oils which contain linoleic acid. These have to penetrate in those layers where the linoleic acid can be hydrolytically and enzymatically released. Only then the substrate for the for-

mation of ceramide I can be provided or local cornifications at the orifices of the sebaceous glands be avoided. For this reason, particles like liposomes and nanoparticles are used which boost the effects of actives and themselves are effective active agents. Vitamins also only can be active after they passed through the dead horny layer.

The ratio is the crucial point

To add a final remark on the ratio of the different ingredients: It is recommended to individually adapt the lipid content of a cream to the skin. A low fat skin requires a higher lipid content than normal or oily skin. In order to diagnose the skin condition mostly the initial feeling on the skin will be evaluated. Unfortunately the ratio of lipids (basic active agent) to emulsifier (additive) frequently is neglected but it actually is the essential factor which then later on determines the wash out effect on the skin during skin cleansing. This means that the long term effects of active agents are influenced by the additives. In extreme cases, there are higher quantities of fat washed out than are externally transported into the skin. Consequently, the skin subjectively feels very dry which in this specific case is caused by the cream applied.

Dr. Hans Lautenschläger