

Skin care for cosmeticians – new developments in skin care

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The latest amendments in the German Cosmetic Directive (KVO) have shed some light on the ingredients of cosmetic products. As Dr Hans Lautenschläger explained in his lecture held at the 5th Professional Training on Dermatology and Cosmetics in Munich, declarations regarding the ingredients (INCI) frequently are neglected when selecting a product.

Looking at the INCI declaration it is possible to predict whether there are any possible negative effects caused by the use of cosmetic products besides the expected benefits for the skin. The focus of attention here are the strains due to preservatives and other formulation additives which actually have no specific skin care functions. They are just added for reasons of safety for transport, shelf life and application. Thus, jar products generally contain more preservatives due to the permanent risk of contamination every single time the product is applied. The tolerance to conventionally produced cosmetic products cannot be taken for granted and references like "dermatologically tested" only have little validity as long as test design and also test results are not made public.

Everyday strains for the skin

Naturally, the strain for the skin is closely connected with the frequency of applications and above all, professionals in the beauty institutes similar to the hairdressers particularly have intense contact with cosmetic products.

The increased strain on the skin of cosmeticians can be referred on the one side to the constant daily contact in combination with the mechanical energy necessary for cosmetic treatments and on the other side to frequent hand cleansing. This causes a particularly intense exchange respectively an increased wash out effect of the natural protective substances of the skin. The skin care products used in the beauty institute with all the active agents and additives contained therefore penetrate into the deeper layers of the skin and thus may cause negative responses of the skin in cases of a certain disposition.

Requirements for cosmetic products

Skin protection is a very important even vital subject for professionals of beauty institutes and hairdressers and that is the reason why the Federal Ministry for work and social order edited the technical regulations TRGS 531 "Risks of skin disorders caused by working in humid conditions" as well as the TRGS 540 "Sensitising substances". The regulations make recommendations on preventive measures in the professional practice. Protective creams are not really a practical preventive measure for cosmeticians. But what can they do?

It is essential to refer to the INCI declaration which means to pay attention to the ingredients of the substances used. Besides avoiding substances which do not correspond to today's latest developments in the field of cosmetics, high-quality skin care products provide protection against environmental influences for customers as well as cosmeticians. A good skin protection is the best skin care! Skin-related substances should be preferred here and non-related substances be under close scrutinise. A further important aspect is that the natural skin protection factors are not affected by externally applied products. The ideal condition would be the appropriate skin care for the customer in connection with an adequate skin protection for the cosmetician. Hence, studying the INCI declaration of the products applied in the beauty institute should involve questioning the specific functions of a certain ingredient in the preparation. Is the specific component essential for the skin?

Special attention should be given to the following substances:

- Preservatives – they may not be tolerated and can cause irritations and sensitisation.

- Perfumes – they should be restricted to the skin surface only and avoided in creams which penetrate into the skin.
- Mineral oil products – they cause occlusive effects and thus affect the natural activity of the skin to produce its own protective substances.
- Emulsifiers – they may influence the integrity of the skin barrier and cause the loss of natural protective factors when cleansing the skin.
- Dyes – they generally only change the appearance of a product and will not have any functions on the skin with the exception of pigments covering up skin anomalies.
- Amines – they frequently are accompanying substances of so-called anionic emulsifiers and stress the skin especially if they belong to the group of alkanolamines.

In the field of occupational skin protection, both mineral oil products and silicones are excluded due to technical reasons. Frequently silicones are accompanying substances of products containing emulsifiers and create a very smooth and agreeable feeling on the skin. They compensate the loss of natural protective substances during skin cleansing.

A new skin care and new skin care products

As important as the knowledge on substances which should be avoided is the identification of components which are required by the skin. Substance groups which are naturally present in a healthy and intact skin may serve here as a guideline, as for instance:

- Ceramides
- Glycerides
- Sterols incl. squalene as well as
- Fatty acids

Ceramides are securely anchored interstitial components of the horny layer and together with further skin components they form the most important natural barrier which is very resistant against foreign substances as e.g. soaps and aggressive occupational substances. As ceramides still are rarely available as ingredients for skin care creams and as their transport into the horny layer still is difficult to manage, there is a need for substances with similar properties which correspond to the physiology of the skin. One of these substances is phosphatidylcholine

which is the main constituent of cell membranes. **Phosphatidylcholine** is a component of natural lecithin and has been known for a long time as a key element of innovative products on the base of liposomes and nanoparticles. Only recently, above all the saturated phosphatidylcholine (HPC) has gained some importance. **HPC** is related to the physiology of the skin and provided with a high barrier activity similar to the ceramides. It shows the capacity of integrating watery and fatty substances without the disadvantages of conventional emulsifiers. As it adheres to the keratin of the skin it only shows a minimal wash out effect when cleansing the skin which means that the transepidermal water loss (TEWL) will be stabilised even when foreign substances affect the skin and water above all belongs to these substances. Occlusive conditions are avoided which means that the skin can "breathe". Among others, HPC is a main component of DMS base creams which correspond to the skin care concept of a "composition similar to the skin" and consist of layered membrane structures just like the intracellular components of the human horny layer (DMS = Derma Membrane Structure). Therefore they cannot not be categorised in one of the main groups like "water in oil cream" (W/O) or "oil in water cream" (O/W). They are adequate skin care creams and can be applied just in their basic formula or they can be individually adapted to the customers' specific needs. Just like the intracellular substance of the human horny layer, DMS creams are capable to absorb watery and fat-like substances (lipids) without losing their stability. Typical adaptations are creams for the supportive prevention of particularly dry skin, cases of neurodermatitis, skin impurities or other skin disorders. Additives which generally strain the skin and are only included to stabilise additional active agents can be avoided here. Due to their characteristic features, in the meantime DMS creams have also been used in individual dermatological prescriptions. In the field of dermatology the protection and the treatment of a disordered skin barrier are given special emphasis.

A very important indication for products with excellent skin protection properties is their long term effect. Measurements of pure DMS base creams in comparison to high-quality skin care creams on W/O and O/W basis which contain emulsifiers have proved, that the increase of skin moistness and skin smoothness still is visible for a span of 72 hours even after stopping the treatment which points to a high skin barrier affinity, a comparably low wash out effect and a high water resistance. An

important field of application therefore are sun protection creams.

Ceramides – the natural skin protection

Among the different ceramides of the skin, besides ceramide III above all ceramide I is an important component of the stratum corneum. Moreover, biological reaction products of the ceramides, the sphingomyelins as well as their degradation products play a major role to preserve a healthy skin. In case the natural skin balance is disturbed, dry skin or even pathological skin conditions like dermatoses, neurodermatitis or psoriasis may develop. It is an interesting fact that phosphatidylcholine has a specific function in balancing ceramides and sphingomyelins.

One of the specific features of ceramide I is its high content of linoleic acid which is an essential fatty acid needed by the human body and which can only be assimilated by food intake or externally supplied via care products containing linoleic acid. If there is a lack of linoleic acid, ceramide I cannot be formed and the results are dry and scaly skin and barrier disorders like neurodermatitis (atopic dermatitis). A decrease of the linoleic acid content of the horny layer virtually is the indication for atopic dermatitis. Currently, the most elegant method to enrich the skin with linoleic acid and to support the formation of ceramide I is to supply the skin with linoleic acid in form of nanoparticles and liposomes. This method is based on the knowledge that liposomes and nanoparticles penetrate very well into the intracellular layers of the horny layer without disturbing their membrane structure. They even build up depots. As their main component usually is phosphatidylcholine with a high content of linoleic acid, the result is a continuous release of linoleic acid.

Just like the intracellular layers of the horny layer are destroyed by emulsifiers, also liposomes and nanoparticles show very sensitive reactions to them. By contrast, ceramides, liposomes, nanoparticles and DMS base creams are very well compatible in almost every possible ratio due to their membrane-forming structure. In cosmetic products however, ceramides are not really essential as liposomes and nanoparticles are able to support the natural formation of ceramides in the skin. While DMS establishes immediate skin protection, the formation of ceramide I is a time dependent process due to the release of linoleic acid from liposomes and nanoparticles.

Lipid content in creams

Frequently the lipid content is a criterion for the application of skin care and skin protection creams. The term lipid generally includes natural fats and oils (triglycerides), waxes and mineral oil products, however this is a general approach which often neglects the quality and quantity of the emulsifiers used. Emulsifiers however have a major influence on the wash out process of the applied lipids as well as the natural protective lipids of the skin. The higher the emulsifier content, the higher is the expected wash out effect.

Emulsifier free systems with physiological lipids are the ideal solution. Besides skin barrier disorders (neurodermatitis, psoriasis) ceramides and phosphatidylcholines also play a major role in the aging process of skin cells and that is why a whole range of different new developments can be expected for the future.

The selection of the skin care products used in the beauty institute should be based on their ingredients and the INCI declaration. The requirements for skin care products should also be considered from the perspective of the skin care for the cosmetician. It has to be stated, that besides the conventional O/W and W/O creams products have been developed which contain membrane-like structures just like the intracellular components of the horny layer.

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