

# Innovative powder products - from urea powder to wrinkle killers

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Powders are an essential component of the decorative skin care. In the course of time their composition has changed considerably and besides their application on normal skin, they are also used on problem skin today as well as for the optical reduction of wrinkles. More details are given in the following article.

**A**s a matter of fact, powders belong to the most traditional cosmetic products and the whole range of existing natural color pigments has finally been used as components for decorative powders. As a result also substances containing particles of heavy metal compounds as e.g. cadmium sulfide (yellow), lead carbonate (white), mercury sulfide (vermilion), arsenic and antimony sulfide (yellow, red and orange colors) were applied for decorative purposes. Only with the implementation of the cosmetic decree (KVO) many substances were finally banned from daily use and this is the reason why the substances still are listed in supplement 1 (list of illegal substances).

## Iron oxide & co.

Process engineering replaced the naturally occurring pigments by industrially manufactured substances. One of the main reasons is the particle size and in connection with it the adhesive power related herewith. Today, for the most part iron oxides are used as they are inexpensive and available in food quality on the one hand and offer a wide range of colors beginning from red to purple, red green, ochre, brown and black nuances on the other hand. Iron oxides respectively their pre-stages, the iron hydroxide or hydrated iron oxide are gained in chemical precipitation reactions and occur in a largely dispersed and highly voluminous form which is the reason for their excellent adhesive power. Besides the above mentioned substances titanium dioxide is used as a white pigment, chromium oxide as green and iron hexacyanoferrate (INCI: CI 77510) as a blue pigment.

## High tech manufacturing

Nevertheless, natural minerals are still of importance which is mainly due to their specific optical features. Just to mention mica as an example which is coated with iron oxides in layers of different size and processed into

mixed pigments with a wide range of different colors. This specific process can be repeated several times with different substances as e.g. in the following order mica, titanium dioxide and iron oxide.

## Pearl gloss and luster effects

Coated mica generates its color effects by absorbing light from metal oxides on the one hand and on the other hand by the reflecting characteristics of the mica particles which otherwise are colorless. Thus, pearl gloss pigments made of tiny coated mica platelets generate color effects that are comparable to the optical characteristics of natural pearls which mainly consist of colorless calcium carbonate. Pearl gloss pigments absorb part of the wavelengths of the incident light, whereas the remaining rays are reflected and cause interferences. The respective size of the coatings as for example of the titanium dioxide layer on mica particles determines the resulting color. The interference effects will even gain brilliance with a series of consecutive coatings like e.g. mica, titanium dioxide, silica and titanium dioxide. While small particles show the highest covering effect, the use of larger and coarser particles generates luster effects (e.g. also possible with glass powder). Metal effects are produced by a complete light reflection similar to the mirror. A frequent component of silver pigments is bismuth oxychloride and compared with their effects pure iron oxides appear rather matted due to their absorption of light.

## Fillers – the wrinkle killers

Interesting results can be achieved by coating silica with titanium dioxide and iron oxide. Unlike the pointed reflections of mica containing pearl gloss pigments the gained spherical particles produce a diffuse light reflection that is scattered in all directions. As only small amounts of light are absorbed and the transmission of diffuse light out of the skin is high, powders based on the above mentioned sub-

stances will enhance the natural skin color and also soften contrasts which normally become visible in the deeper parts of the wrinkles. The result is an optical reduction of wrinkles and a visible smoothing with the effect of a quite even appearance of the skin.

Said effect can be compared with the solar radiation through a thin cloud cover. The light intensity still is high but hardly any shadows (contrasts) are cast around the objects. These pigments are also called fillers and belong to the group of effective agents. They follow the trend to preserve a natural appearance of the skin and avoid the mask-type look. By mixing the filler substance with other pigments a whole series of different color nuances can be achieved.

### Additives: talc & others

Besides the coloring and optically effective components additional substances are used in powder bases as e.g. additives to improve the gliding characteristics of the powders in order to prevent chafed spots on the skin, or, to absorb lipids as e.g. in acne powders or moisture as e.g. in baby powders and also substances to improve the adhesive characteristics.

**Natural talc** with its characteristic greasy feel has excellent adhesive powers. Talc is a sheet magnesium silicate (phyllosilicate) i.e. an inorganic substance. As it is related with natural asbestos which may also occur as a natural impurity in talc it has been discussed for quite some time whether it can be safely used in cosmetic products. It is susceptible to germ contamination and that is why it is sterilized and frequently combined with preservatives before it is added to powders. It is a fact though that talc itself is no substrate to grow germs on as e.g. **starch** (as e.g. **rice starch**), **starch derivatives** and **celluloses** which may also be used as powder bases and are biodegradable as they consist of sugar units (polysaccharides). They have excellent adhesive and moisture absorbing characteristics but they also tend to become sticky. Talc easily absorbs oils and lipids, but hardly any moisture. Just like talc, kaolin (bolus alba) also improves the adhesivity of powders.

**Metal salts of long chained fatty acids** as e.g. magnesium stearate and aluminium stearate improve the gliding characteristics of powders. Additionally, they have good covering and adhesive features. **Silk powders** and **synthetic polyamides** as e.g. nylon-12 which are also very adhesive and blend well with other components like **urea** provide an excellent sensorial perception on the skin surface. **Boron nitride** also gives a silky and smooth feeling. Small amounts of **silica** improve the

sprinkling ability of powders and it may also absorb water and lipids.

While loose powders will not require any further additives besides active agents like anti-inflammatory and antiseptic components (e.g. for dermatological formulations), binding agents in form of waxes, long-chained alcohols, oils or fatty acid esters are a necessary component for compact powders.

### Specific powders for problem skins

In the field of decorative cosmetics color nuances generally are adapted to the latest fashion trends. Problem skin products, however, rather demand for colors which enhance the natural appearance of the skin. In addition to that, these powders should be free of perfumes, preservatives or BHT type antioxidants as they may cause irritations and allergic reactions on the barrier disordered or allergy-prone skin. In case of sensitive skin it should be avoided that powders dehydrate the skin by absorbing its moisture and lipid substances. On the contrary, dry skin which may be the first symptom of a barrier disorder should be supported with moisturizing substances. That is the reason why recently formulated powder bases contain urea.

### Powders containing urea

Urea itself is a component of the natural moisturizing factor (NMF) of the skin and in solid form it also has antimicrobial effects. Measurements show that powders containing urea will not require any additional preservatives. Even an induced contamination shows that the germs have no chance to survive and will die off.

According to the INCI these specific powders generally contain nylon-12, bolus alba, magnesium stearate, silica, iron oxide, urea, mica, titanium dioxide. All the components mentioned prove excellent physiological tolerance and may also be used in medical powders containing additional pharmaceutical agents. Urea is also effective against itching which is a specific problem in case of atopic skin, and beyond that, it is capable to transform the nitrite resulting from nitrogen oxide radicals into harmless nitrogen.

### Skin care - foundation - powder

Powders are directly applied on the skin and serve as a finishing touch on foundations or on camouflage in order to fixate decorative components or achieve matting effects. Regarding their application on problem skin, however, a complete coverage of the skin should be

avoided. In case that active agents are used below the make-up as e.g. essential fatty acids for the acne treatment, the skin still should be able to breathe, i.e. the skin **should by no means be completely covered** in order to prevent an unfavorable change of the microclimate. It is highly recommended in these cases to avoid occlusive mineral oil components in base creams and also in the following foundation as well as additives with counterproductive effects.

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