

# Active ingredient qualities – from natural to vegan

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Active ingredients are a hotly contested area in cosmetics – both on the part of manufacturers and among users. The assessment of their qualities is not only characterised by factual arguments, but also by philosophical and even esoteric viewpoints. This results in approval or rejection as well as placebo and nocebo effects during use.

**C**osmetics trigger effects on the skin that can be seen, felt, measured and imagined. How can women quickly recognise the active ingredients that are suitable for their personal skin care?

## Evaluation of active ingredients

Numerous commercial portals have recognised this topic as a business model and have set themselves the task of evaluating the suitability and quality not only of active ingredients, but also of cosmetic components and entire products in general when they are requested or entered. When visiting various portals, you will realise that the results do not always match.

There are reasons for this. The business models are linked to other interests. Displayed adverts indicate advertising activities. Some portals are interested in addresses via the login, others in ultimately selling quality labels and seals to manufacturers. There are also magazine publishers looking for subscribers with their test results. And last but not least, associations of manufacturers who cultivate their own standards in order to advertise them. It can therefore do no harm to check the imprint and find out who you are really dealing with.

## Natural or synthetic?

In fact, things are really complicated in detail. On the one hand, there are scientific facts – about the potential and activity of an antioxidant, for example – and on the other, the information that it is a product of chemical synthesis. Many people will say: nature is good; chemistry is not – an attitude that is often encountered. This is understandable when you consider how many chimneys chemistry needs in order to achieve just a fraction of what nature produces in forests, meadows and water in an environmentally friendly way.

However, if you look at the alternatives, i.e. antioxidants such as vitamin C (ascorbic acid)

or vitamin E (tocopherol), you will realise that extracting them from natural resources is many times more energy and climate-intensive and expensive than chemical synthesis. This is also reflected in its use. With a few exceptions, where the natural representatives are explicitly advertised, the synthetic compounds are found in cosmetic products.

## Origin unknown

In the case of antioxidants, it is still possible to trace back synthetic and natural substances to some extent. It becomes more difficult with very simple components such as glycerine. Glycerine can come from the splitting of vegetable oils into glycerine and fatty acids, i.e. the ancient chemical and still current process of saponification from pre-industrial times. Or it is produced purely synthetically, even more so from components taken from petrochemicals, i.e. crude oil. Very cheap, apart from the bad image! But wait: what actually is crude oil? Just as it is extracted from the earth as a sticky, dirty and smelly substance, it is clearly a natural substance. Is it no longer a natural substance after physical and chemical processing? No, it is no longer!

## Biotechnological and vegan

We encounter similar conditions in areas where things are less messy, i.e. in chemical derivatisation, i.e. the refinement of plant polysaccharides such as cellulose or starch. This even goes so far that glucose produced from polysaccharides is biotechnologically – i.e. with the help of bacteria – reassembled into new polymers such as hyaluronic acid. This is certainly a big step forward compared to production from cockscombs! Because we don't want cosmetic ingredients from animals either. We prefer vegan substances. But it would be too easy if we didn't also have genetically modified plants at this point. What do we think of oils made from soya, sunflower and rapeseed?

Shouldn't consumers expect to ingest substances whose side effects are not yet known?

### Labels and seals

This is where the institutions that sell certificates, labels and seals to manufacturers come in. Depending on their tastes, users can orientate themselves on the adjectives natural, organic, vegan and GMO-free and also reassure their conscience that the products are produced locally, in Europe or overseas under fair conditions for the workers.

Our skin doesn't really care about any of these aspects. It uses completely different criteria to decide whether it feels clean after using cosmetic products, whether it regenerates or whether it blossoms with itching, redness and irritation. And our skin is not alone. There is also the microbiome. What is best for them and what is detrimental to them?

### The link from brain to skin

Let's start with the placebo, an active ingredient that doesn't work but which makes women feel good. No, that's not nonsense. It's no secret that our skin reacts to signals from the brain. Contemporaries whose skin immediately protests when they see or feel something disgusting are not uncommon.

Conversely, many people react when something good happens to them. Gemstone cosmetics are an example of this. You don't have to be an esoteric to sense the absent trace elements and feel good about them. Even the reputation that precedes an active ingredient creates expectations that mutate into reality in a self-fulfilling prophecy.

### Physiological – with and without side effects

Apart from these placebos and nocebos, it can be stated: Any substance that integrates into the organism when absorbed through the skin is metabolised and disposed of without altering the biochemical balance and causing side effects, is a good and problem-free substance from the point of view not only of the skin but also of the microbiome. It is physiologically compatible or physiological for short. This applies regardless of the origin of the substance and how it was produced.

**No rule without exception:** We all know Paracelsus' rule that only the dosage – in the case of the skin this would be synonymous with the concentration – turns a substance into a poison. This also applies to physiological substances – for different reasons. Examples:

- Salt from the kitchen (sodium chloride) is physiological and circulates through our entire body with the blood. Highly hypertonic solutions or pure salt cause irritation on the skin. The same applies to urea, which is also physiological and is even able to have a keratolytic effect and can exfoliate toenails. High doses of potassium chloride in the cellular area have a lethal effect when injected.
- Vitamin A is physiologically important for our sea nerves and stimulates regeneration – making it ideal for anti-ageing products. High doses, e.g. applied to the entire body, can jeopardise the unborn child in pregnant women.

### Skin care at the wrong time

A further framework condition that applies to all substances – including physiological substances – is the consideration of external influences during and after dermal application. Radiation, for example. Polyunsaturated fatty acids are attacked in the sun with the formation of radicals and peroxides. If such conditions are foreseeable, application should be avoided and skin care should be concentrated on the evening in order to give the fatty acids sufficient time to be absorbed.

To stay on the subject of the sun, it is also the wrong time to treat the irritation with (physiological) radical scavengers after a sun erythema (sunburn) has developed. This hinders the natural, radical healing processes. Incidentally, the same problem also exists with chemotherapy.

### Non-quality in disguise

Another point are factors that are not even recognisable as such. These are impurities that may be contained in an active ingredient or excipient from the outset, but are not declared in the INCI. In some cases they are known, in other cases they are not, and it is uncertain what (long-term) effects they have.

**For example,** in the case of vegetable, i.e. generally physiological oils, there is usually a choice between cold-pressed, hot-pressed and refined oils. The pressed oils contain a wide range of secondary components, not all of which are known, develop discolouration and inherent odours and often limit the shelf life. They may also contain pesticides and heavy metals. Statistically speaking, a higher number of allergenic components must be expected than with refined oils. However, depending on the refining process, these can contain artificial impurities such as glycidol and 3-chloro-1,2-propanediol (3-MCPD) as well as their fatty

acid esters – a problem that naturally also occurs in milk substitute products.

### **Microbiome compatibility**

There is less need to worry about microbiome compatibility with physiological substances. This is almost automatic, as the epidermis and microbiome are perfectly attuned to each other. Dosage, treatment, general conditions and purity are the most important parameters of physiological active ingredients and additives. Seals are completely superfluous. The certificates on which the advertising with seals is based are paid for by the manufacturers and the costs are passed on to the users. The Baden-Württemberg consumer advice centre recently put it in a nutshell: "There are no legal regulations on seals. The seals are therefore nothing more than additional advertising."

Further details on this topic can be found at:  
Contents matter – evaluation of cosmetics,  
Beauty Forum 2018 (11), 34-36

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