

ÖKOLOGISCH-KOMPATIBLE DERMATOKOSMETIKA

# Dermoecocompatible Cosmetics

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Dermato-cosmetics, eco-compatibility, Skineco

**SUMMARY:**

This review provides data on the scope of eco-compatible dermato-cosmetics and the development of a new internationally acknowledged brand for such products, i.e. Skineco.

**SCHLÜSSELWÖRTER:**

Dermatocosmetika, ökologische Verträglichkeit, Skineco

**ZUSAMMENFASSUNG:**

Diese Übersicht liefert Daten zur Zielstellung ökologisch-kompatibler Dermatocosmetika und den Entwicklungen, die mit der international anerkannten Kennzeichnung derartiger Produkte unter dem Label Skineco verknüpft sind.

**INTRODUCTION**

It is now essential that takes on individual responsibility to evaluate, study and analyze the interaction between skin, substances, environment and all related connections. These are the values of Skineco, the first international Association of Ecological Dermatology. Founded one year ago, Skineco has introduced a brand new approach to eco-compatibility: ecological dermatology. We can take care of the planet by adopting ecological alternatives, but real ecological alternatives come from science only. When talking of sustainability, we need to be down-to earth – we need to be practical. We cannot change the structure of all Dermo-cosmetics, in just one day, or one year, but we can make a commitment to take progressive steps that in the mid-long term will result in a real ecological alternative. A cosmetic product should not be ecological only, it must be dermatologically functional, valid, effective, well tolerated by the skin and pleasant to use.

“Friendly Chemistry” and research, can gradually achieve this, thus overcoming the emotional and naive approach that is nowadays used. Skineco promotes and supports the study and development of formulations attentive to the environment, considering the human being as the most important form of „environment“. Over the last 20 years, a new environmental awareness was born, followed by a growing demand for products respectful to the environment. This phenomenon has had such an impact, and has led to the development of dedicated criteria even in the cosmetics field, with the aim of providing the consumer with the most natural and environmentally compatible cosmetic products. Two main schools of thought were born in this way:

The first one proposes cosmetics with high levels of natural and organic origin, i.e. products that not only contain the greatest amount of plant extracts, but that guarantee the organic cultivation of the same. All criteria certifications of bio-cosmetic products on the market fall in this category. The second one offers products that are not focused, in particular, on the presence of natural or botanical extracts, but rather on determining the environmental impact they have.

The determination of the environmental impact is calculated through their critical volume of dilution (CVDtox). In this category are included those products that meet with the specifications of the European criteria Ecolabel. There is therefore a double level of attention from the cosmetic criteria present nowadays on the market. The biological criteria pay particular attention to the origin of raw materials and to the environmental impact of their production, whilst they do not focus on the life of the product once used.

Ecolabel does not focus either on the origin of raw materials, or on the impact that the production of those materials has on the environment, but evaluates what happens to the finished product when it reaches the environment, determining the level of environmental damage it can generate. These schemes are complementary and, hopefully, in the near future can be integrated.

Many companies have engaged in the production of cosmetics that can boast, on various levels, the term „natural“ and/or “biological” and/or “organic products”. In order to protect the end users – the consumers, and to put a stop to misleading advertising claims, these companies are turning to certification bodies that monitor and evaluate the statements in the labeling of “natural” and/or “organic” products.

**NUMEROUS CERTIFICATION SCHEMES EXIST IN EUROPE**

In Europe, many certification schemes have been born; among the main ones, we can list: Ecocert (France), BDIH (Germany),

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Soil Association (UK), ICEA (Italy). The presence of such a high number of certification systems created confusion among consumers and companies who wanted to certify their products. The various systems, in fact, followed general and similar criteria, but among them there were substantial differences. Aware of this, since 2005, the main European Associations for certification are following a common path in order to create a unique criteria/specification.

This has led to the birth of the **CosmOS standard**: A common criteria, clear and unambiguous, that could be submitted to the European Community, that might spread within bio-cosmetics as well, the first germs of a greater ecological impact evaluation of certified products, as is already the case for products branded „Ecolabel“ (European Eco-label quality brand), which identifies the most eco-friendly cosmetics, produced through techniques with a low environmental impact). The purpose of the „**CosmOS – standard**“ is to provide guidelines that encourage the use of discoveries related to the technological development of our society, allowing them to contribute to environmental conservation. This target is a key challenge for sustainable growth, that takes into account the excesses and damage that technological, non-regulated development can lead to; practically it pursues „sustainable development“. To achieve this, the „**CosmOS Standard**“ points out that we need a radical change both in production flows, and in consumption habits.

In order to support the processes for production and sustainable consumption, simple rules have been proposed based on principles of prevention and safety at all levels of the production chain, from raw materials to the distribution of the finished products.

The European CosmOS encourages and promotes the use of organically grown products, with full respect for biodiversity: limitation (2%) in a cosmetic formulation of components deriving from petrochemical industry, the use of natural resources in a responsible manner and respectful with the environment, integrating and developing the concept of „Green Chemistry“ rather than the classical petrochemical processes, requiring, since 2012, the partial use (30%) of organic raw materials also in chemical synthesis.

## THE PROCESS OF CERTIFICATION

As in all bio criteria, even in the CosmOS raw GMOs cannot be used and raw materials and extracts derived from plants that are included in the International and European lists of protected species (ref. Washington Convention and the Berne Convention) cannot be used. Among natural products, raw materials extracted from live animals or from slaughter cannot be used. Ingredients of animal origin can be used only if produced from animals (for instance, milk).

The features described so far are just a few issues included into the new CosmOS bio-cosmetics specification. CosmOS also defines the characteristics of the packaging of the cosmetic product, with the objective of minimizing the environmental damage caused by cosmetic containers. At the end of

the certification process, the cosmetic product that contains at least 20% of raw materials of biological origin in its formulation can be presented as „organic“; in this case it can carry either the statement „COSMOS-ORGANIC“, or, alternatively, the logo „COSMOS-ORGANIC“.

Cosmetic products that contain natural raw materials, but do not reach such high levels of biological components can only be certified as „natural“ and can be marked on their label as ‘COSMOS-NATURAL’ or alternatively can carry the logo ‘COSMOS-NATURAL’. In this second cluster of products, the presence of biological components in the formulation can be highlighted.

The CosmOS certification system will gradually replace the other certification systems that have contributed to its development and have subscribed to the rules. On the European level, „NaTrue“ is a competitor to CosmOS. This is a standard that was created by a number of cosmetic companies (mostly German) who initially participated in the CosmOS project, but which decided to create their own specifications. In NaTrue, it is well underlined that the main challenge in the production of natural cosmetics, in addition to the selection of appropriate materials, is to provide consumers with products that are simultaneously high quality, effective, healthy and pleasant. This criteria shows how products featuring the above characteristics, cannot be manufactured using only natural ingredients, as cosmetics have a higher degree of production complexity, than the preparation of simple food.

In the development of high-level products, it is necessary to accept some compromise, but it must be clear and understandable to consumers. The criteria required by the certification system, NaTrue, are aimed at presenting high precision and transparency. The product can be produced only from natural raw materials or nature-identical (also called „natural identical“) or almost-natural. Apart from water – the ingredient in higher concentrations in most cosmetic products – natural untreated ingredients (natural substances such as fatty oils, hydro-alcoholic extracts of plants) are usually predominant in cosmetics labeled as „Natural cosmetic products“. Natural ingredients should preferably be used in „biological“ products.

The use of substances identical to natural (nature identical) should be limited to cases in which natural substances cannot, for technical reasons, be obtained from organic material. Natural substances must be derived almost exclusively from natural substances, excluding mineral oil. Almost-natural substances should only be produced through processes of which physiological mechanisms are well known (eg formation of partial glycerides by the synthesis of fat). Natural substances that are the source of raw material for almost-natural substances, should be used in the biological amount. Almost-natural molecules must feature environmental properties to ensure their compatibility with the environment once introduced into the natural cycle. As a consequence of this, NaTrue applies „very restrictive“ parameters in relation to the biodegradability of substances that are used as almost-natural surfactants.

Like the CosmOS, NaTrue also (indirectly stemming from CosmOS), emphasizes that in the preparation of cosmetic prod-

ucts, consideration must be given to all matters related to the concept of sustainable development, for instance, consideration of the characteristics of the packaging, and reducing it to a minimum.

### THE MAIN CRITERIA OF NATRUE

The main criteria of NaTrue, can be summarized as follows: in this criteria, positive lists of natural substances are defined, almost-natural substances, and almost identical to natural substances that can be used in natural cosmetics. There is a classification of production processes allowed for natural cosmetics, and a classification of production processes for natural substances, almost-natural substances, and almost identical to natural substances. It defines the minimum levels required of natural substances and natural substances of biological origin, and at the same time the maximum allowable levels for those almost-natural substances. Three levels of certification are defined: „Natural Cosmetics“, „natural cosmetics with biological parts“ „biological cosmetics“.

In order to ensure the conservation of natural personal care products, NaTrue allows the use of preservatives identical to the natural ones listed in the dedicated annex (benzoic acid, its salts and its ethyl ester, benzyl alcohol, formic acid, propionic acid and its salts, salicylic acid and its salts, sorbic acid and its salts. The use of these substances must be clearly indicated on the label by the words „preserved by ...“ on the product packaging). As a part of the „NaTrue“ natural cosmetics, inorganic pigments and minerals identical to natural ones can also be used. Study of the two criteria are surfacing similarities and differences.

In particular, the CosmOS standard has a system for defining the level of biologicals considered as the actual amount of organic ingredients present in the formula, whilst NaTrue defines the level excluding water and mineral formula, thus obtaining higher biological values. Even the method for calculating the natural or biological components, are very different. The system used for the CosmOS is much more complex, but much more defined than NaTrue's. But above all, the point that widens the gap between the two certification systems is certainly that NaTrue allows the use of raw materials that are similar to natural, and, products that are fully synthetic, but, none-the-less, defined as „natural.“

Both NaTrue and CosmOS pay great attention to environment and eco-compatibility of certified products, but neither has developed this aspect fully. In CosmOS, there is an attempt to define the limits of water toxicity of raw materials, despite the absence of an evolved computing system similar to EcoLabel. This approach does not exist in NaTrue, which on this basis, lags behind. Both systems of certification have a rather weak aspect: **the evaluation of the performance of products.** This means developing a functional product that is also cosmetic, skin-friendly, respectful of the environment and / or that maintains the skin and its annexes in good condition, pleasing the end user and responding to a specific dermatological rational.

As already studied for the Ecolabel scheme, it is necessary to define a qualitative approach to products' performance, so that certified products have a medium to high performance, able of justifying a new purchase and able to give prestige to the certification system. Analyzing the characteristics of the currently used certification systems and of the new proposed ones, it is clear that the presence of perfume might cause problems, because perfumes are synthetic substances that have little or nothing to do with natural products, as well as the use of essential oils of natural origin as they can cause various problems, and, as they contain many allergens that can trigger dermatological problems.

### THE USE OF PRESERVATIVES IN COSMETICS

Also as part of the „auxiliary“ substances contained in cosmetics (substances that make the product pleasant), the certification systems are looking for alternatives to „classic“ preservatives-substances often accused of not being very skin-friendly and skin-safe. To this extent, food preservatives are used but, especially now that their use has increased, they often appear to be excellent in food, but irritating to human skin. Very often products that pass the patch test for traditional preservatives, can appear to be irritating if food preservatives are used (such as benzoic acid, sodium benzoate, etc.).

It is necessary to study the preservation of cosmetic products in two ways: the first being a rational reassessment of classic preservatives, placing very precise limits in terms of safety, for example, by excluding all ingredients releasing formaldehyde and those suspected of mutagenesis. The second one is the research and promotion of the use of „natural“ alternative preservatives, which should be evaluated for both the antimicrobial activity (in order to give safety to the consumer) and the harmfulness to the skin. As part of this analysis, a few old preservatives possibly might be re-evaluated. A particular case history can be analyzed.

A cosmetic product is often rejected if the formula contains parabens; these preservatives were used for a long time both in the cosmetic and in the food industry. Parabens are currently under study, and the available case studies prove that their use in dermo-cosmetics must be carefully analyzed as it seems that the short-chain parabens (methyl and ethyl) are not involved in the phenomena of sensitization. This highlights the need to change the approach towards preserving the classics, trying not to make decisions under the influence of biases.

### ACTIVE INGREDIENTS WILL PLAY A BIGGER ROLE IN COSMETICS

Ecologic cosmetics or, better, „dermo-eco-compatible cosmetics“ in the near future, will become more and more oriented towards effectiveness, or rather cosmetics that want to have something more, a 'something' born from the synergy between the base of cosmetics (that must be of excellent quality and made in compliance with the principles related to ecological sustainability and tolerability), and an active ingredient

derived from neo-synthesis (in classical cosmetics) or nature (in eco-bio cosmetics - active ingredients that dermatologists have always used (for example, salicylic acid), and that contribute to improving the effectiveness of the product thanks to their quality.

Research is driven more towards those active ingredients, both synthetic (but dermo-eco-compatible or dermatologically tolerable and effective and as environmentally friendly as possible, in terms of production and disposal), or derived from plants. Today the search is active in plants living in extreme environments, that have developed substances capable of providing various substances and factors of cell protection, extremely useful for our skin. It is evident that biological cosmetics and ecological cosmetics are two arms of the same body, not overlapping, but that can and must coexist to give birth to the future - to a new type of cosmetics, that takes care of human skin of man and of environment in which this skin lives. The answer lies perhaps in eco-dermo-compatible cosmetics, or cosmetics with a low environmental impact (by improving gradually, year after year, the environmental impact of products), dermatologically valid, rational, functional, effective, and tested in their performances and claims.

To date, almost no cosmetics company focuses on sustainability and on the biodegradability of products: after all, the index of biodegradability of a cosmetic is not required. It is a slow and gradual improvement in the production of cosmetics and detergents worldwide, an improvement that includes a gradual reduction of mineral oil, silicones, synthetic fragrances, and all ingredients suspected of being toxic, mutagenic, triggering endocrine disorders, etc.

### WHY „SKINECO? WHY ECOLOGICAL DERMATOLOGY?

Ecologic Dermatology is a new theme, and, as we have seen, a very hot topic. On the one side, there is a large increase in the interest in cosmetics – in their ingredients and the actual effects on the skin, and on the other, a greater attention to the environment and its preservation is growing. The question that must be answered is: „what is good for your skin and at the same time does not affect the environment?“ The answer may come from the dermatologist, the true point of reference as a doctor and scientific expert in skin care. Thus was born the new concept of eco-dermo-compatible cosmetics, which requires a **scientific** discipline and a very rational approach. In Europe and worldwide in recent years, there has been an increase of:

- Sensitive Skin
- Reactive Skin
- Cosmetics-induced dermatoses caused or triggered by cosmetics (seborrheic dermatitis, rosacea, adult acne, irritative contact dermatitis, etc.)
- atopic dermatitis
- “asphyxial” (dull) skin
- “pores“
- blackheads
- Post-inflammatory hyperpigmentation

A larger number of skin types/conditions not only do not improve, despite the use of cosmetic products, but show the appearance of dryness and flaking. Possible causes of these diseases can be various:

- Wrong use of cosmetics
- excessive or incongruous use of cosmetics
- mismanaged hygiene/cosmetic routine
- use of cosmetic products not containing dermo-compatible vehicles
- use of cosmetic products not containing dermo-compatible ingredients
- disregard for the vehicle of the active ingredients
- failure of the dermatologist on the management and treatment of skin

Often dermatologists do not know the complete formulation of the products, and are informed only about active ingredients. Many ingredients, while being non-toxic and non-allergenic (and even with reassuring toxicological profiles), reveal on the long run hardly to be „dermo-compatible“; at the same time, these ingredients are not environmentally friendly (mineral oils and silicones).

### AN ALTERNATIVE EXISTS AND IS REPRESENTED BY „NATURAL“

However, today „natural“ in many cases, is riding the wave of collective emotion, and is often formulated and produced with little scientific rational, with no tests and clinical trials and frequently is not true „natural“. It is not regulated by criteria or standard or a regulation in the Single European Act. The dermatologist is not used to reading the INCI of products, or to considering the long-term effects, or used to verifying the ‘vehicle’ that contains the active ingredients. But dermatologists need to be aware of what happens to the ‘ecosystem’ of skin after prolonged use of oils and silicones (if a large percentage is included in a formula). Consider that according to the law, the INCI list (International Nomenclature of Cosmetic Ingredients) does not consider as ingredients:

1. impurities in the raw materials used;
2. the secondary technical materials used in the manufacturing process, but which are not present in the composition of the finished product;
3. materials used in strictly necessary quantities such as solvents or as carriers for perfume and flavoring compounds.

These substances do not constitute a significant source of danger, due to their low concentration. However, in eco-dermo compatible cosmetics, these substances should be taken into evaluation. The attention paid by the legislator to ingredients is based upon the precise intention to protect consumers from possible negative effects due to the presence of specific substances or compounds with intrinsic dangerous properties. Although completed cosmetics, namely those packaged and

offered for sale, are constantly changing and very difficult to monitor, cosmetic ingredients that are commonly used to make a cosmetic, are some hundreds and mostly well known. Many of these substances have been used for decades and their biochemical and toxicological characteristics are known, such as the DL50, toxicity, percutaneous absorption, mutagenicity, phototoxicity, the Carcinogenicity, etc. like any other drug ingredient. If a new ingredient, is wanted to be marketed, it must first be submitted to the Scientific Committee on Consumer Non-Food Products, who will proceed with its classification, considering the pharmacological and toxicological studies conducted on the ingredient. However, there is no indication of the biodegradability and the eco-compatibility of ingredients themselves, as there is also the evaluation of skin effects on the long term. An example is set by the use of continuous and occlusive film-forming products (silicones and oil), which favor the appearance of pores and „asphyxiated“ skins.

Speaking of eco-dermo cosmetics means to speak of an eco-compatible and dermo-compatible cosmetic, strictly scientific and technologically advanced. Eco-dermo cosmetics means, for example, the limitation of the following ingredients:

- petrolatum, paraffinum liquidum, mineral oil
- silicone (Cyclomethicone, Dimethicone, etc.)
- Polyethylene glycol (PEG) containing ethylene oxide that can form dioxane
- mold of formaldehyde: diazolydinyl urea, imidazolidinyl urea, DMDM hydantoin, bronopol, etc.
- Amines (DEA, MEA, TEA, MIPA): risk training nitrosamines
- EDTA – toxic for the sea environment
- nonoxynol, poloxamer and nonylphenol (hormonal-endocrine disturbances)
- triclosan – antibacterial toxic
- e-trimonium dimonium: non-biodegradable, toxic for aquatic species, etc.

## VASELINE, PARAFFIN, MINERAL OIL

The Directive on dangerous substances of the EEC N.67/548/CEE and following amendments provides for a clear rating of petroleum derivatives, including carcinogens and non. Vaseline (soft paraffin) is classified as a carcinogen cat.2, unless there is evidence that the base oil from which it derives does not contain any impurities. Suppliers of paraffin and vaseline for cosmetic use should guarantee not to trade Category 2 vaseline (carcinogenic due to impurities), and in compliance with the law 2003/15/EC, they must certify to produce base oils that do not contain more than 3% of dangerous impurities.

## VASELINE IN COSMETICS

Category 2 Carcinogenic substances should not be used in cosmetic products. In compliance with the European Pharmacopoeia, suppliers need to guarantee with absolute certainty that their raw materials are not carcinogenic according to the Dangerous Substances Directive.

Currently

- Vaseline is classified as a cat. 2 carcinogen, so it should be banned for cosmetic use.
- The guiding Directive allows a subterfuge that says: „.... unless the whole process of refining is known and it can be proven that the substance from which it is produced is not a carcinogen“.
- Cosmetics manufacturers can use vaseline for their formulations containing impurities (carcinogenic) up to 3%.

## NEW DIRECTIVE

A new directive has been recently published ordering that from 1/12/2010, all the ingredients classified as cat. 2 are prohibited in cosmetic products. Unless the Scientific Committee on Consumer Safety gives a positive opinion, the use of substances classified as carcinogenic, mutagenic or toxic to reproduction of category 1A, 1B and 2 is prohibited in cosmetic products.

A substance classified in category 2 can be used in cosmetics if previously submitted to the CSSC (Scientific Committee on Consumer Safety) and found acceptable for use in cosmetic products. There are therefore two possibilities:

- a. The supplier guarantees to be knowledgeable of the process of refining of the raw materials used in the production of vaseline, and provides the relative certificates of analysis and evidence.
- b. Or the product must be obtained from substances belonging to the two non-carcinogenic groups of substances (highly refined oils, paraffin waxes and hydrocarbons).

Skin problems related to vaseline are: occlusivity and its ability to alter the microbiological balance, and its non-biodegradability. It suggests the use of vaseline, which currently is almost always in the highest position of INCI in cosmetics, only with clear indications, and in precise locations. Polydecens can be a cosmetic alternative.

Another alternative, also for cosmetic purposes, would be to use vegetable oils and butters. In recent times, a growing number of „vegetal vaseline“ have been marketed, that in rheological properties are quite similar to vaseline, but not produced from hydrocarbons, but from plants. These fats provide our skin with valid cosmetic substances.

## SILICONES

- Emollient silicones: Cyclopentasiloxane, cyclohexasiloxane, cyclomethicone. Have gliding and silky effect, they can be spread in a very thin layer without getting oily.
- Dimethicone, cetyl dimethicone, stearyl dimethicone – heavier.
- Phenyl dimethicone, diphenyl dimethicone, phenyl trimethicone.

Silicones have:

## SKINECO IS DIFFERENT

Fabrizio Zago is the technical expert for Ecolabel developing criteria of the UEAPME (Union européenne des artisan, petite et moyenne entreprise). He summarized the positive aspects of Skineco as follows:

- Evaluates the dermatological effects of cosmetic products.
- Suggests to perform in vivo and in vitro tests, in order to confirm the real effectiveness of cosmetics.
- Checks the presence of questionable substances in terms of ecology.
- Performs a mathematical calculation of the pollution potential of the product.
- Helps formulators and collaborates with them to choose the best solutions.
- Skineco is the one and only Eco-cosmetic Scientific Association where the aspect of dermatology is „central“.
- Skineco can calculate the WUR (calculation of the relationship between content and container) in order to reduce the waste arising from packaging.

Finally, Skineco increases significantly the value of any eco dermo certification currently available on marketed products.

- Lasting properties over a wide temperature range (they do not get thicker with cold and do not become more liquid with the heat, are not degraded by heat, like most vegetable oils).
- Low surface tension (pull down the foam, are often used in small quantities in creams for this property, increase the soaking capacity of the products in which they are included).
- High degree of fluency, especially on organic substrates (on the skin they give the well-known „gliding effect,“ typical, imitated in nature only by phytosterols found in some vegetable butters).
- High degree of water-repellency (they are greasy, and the greasiest ones are used in barrier creams for hands because they prevent the water from reaching the skin).
- Physiological inertia.

However, in the long term:

- They can improve dryness.
- They tend to „keep“ the other ingredients to the surface of the skin.
- Not totally inert (for example, silicones used for hypertrophic scars), and finally
- some volatile silicones are under investigation.

Eco-dermo-technology can provide a real alternative to these products. Research and technology are needed in order to produce increasingly eco-compatible dermo-cosmetics, but at present the priorities of the cosmetic companies are going towards the direction of skin tolerance and rheology-sensory characteristics. Also, it is certainly more difficult to produce a good eco-dermo-cosmetic, technologically advanced.

## FREQUENT SKIN PROBLEMS

The latest statistics indicate how there are more and more patients with irritations, status cosmeticus syndrome, asphyxiated skin, dryness. The number of atopic syndromes is increasing, as well as the Red-face syndrome (rosacea and DS). This is also due to the presence of other ingredients unsuitable for dermatologically valuable cosmetics (including ingredients of topical medications and „medicated“ cleansers).

In the near future, all cosmetics will be eco-dermo compatible. And chemistry will finally become, more and more „Friendly“ to the skin.

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