Active ingredients | Dermosoft Decalact Sebum by Dr. Straetmans, a naturally-derived multi-functional blend, reduces sebum secretion, bacterial infection, skin redness and skin imperfections at a low dosage.

Dr. Straetmans’ experience in alternative cosmetic preservation, especially with the company’s Dermosoft Antimicrobials, led to the development of the range Dermosoft Decalact, a series of cosmetic raw materials with proven efficacies against skin disorders caused by certain microorganisms. The first product launched was Dermosoft Decalact, a naturally-derived anti-dandruff agent with an in vivo-proven efficacy. The next one was Dermosoft Decalact Deo, the first certified naturally-derived active with an in vivo-proven 24-hour deodorant effect.

The range is now being completed with a naturally-derived active ingredient blend that combats the signs of blemish-prone skin. This multi-functional blend combines the antimicrobial efficacy characteristic to all the products of the range with the multiple efficacies of a selection of active, natural-
ly-derived raw materials. Proven in vivo, the blend reduces sebum secretion, bacterial infection, skin redness and skin imperfections such as comedones in a very mild manner at a low dosage. The new blend Dermosoft Decalact Sebum is an efficient, cost-effective, natural cosmetic-compliant, safe alternative to conventional actives on the market.

**Blemish-prone skin**
Blemish-prone skin and skin imperfections are often associated with an out-of-balance microflora of the skin. The naturally-occurring microorganisms, essential for the well-being of the skin, are replaced by a group of in part harmful bacteria. One of the etiological factors of acne is the gram-positive bacteria Propionibacterium acnes.

Microbiological challenge testing revealed the good antimicrobial performance of the active Dermosoft Decalact** within our blend and its potential to serve as an unrestricted alternative to traditional actives, such as salicylic acid and triclosan, in the cosmetic treatment of blemish-prone skin (Fig. 1*). In an aqueous solution containing 1% of the surfactant Dermofeel G10L*** (pH 4.5) and including either of the respective antimicrobial actives, Propionibacterium acnes was shown to be reduced in vitro testing. However, it is well-known that targeting bacterial infections alone means to ignore the many factors that lead to blemish-prone skin. In most cases it starts with out-of-control sebum production of the skin (a) and the subsequent initiation of further adverse factors (b-d).

**Excessive sebum production**
a) A moderate amount of sebum secreted by the sebaceous glands of the skin’s hair follicles keeps our skin flexible and moist. However, a multitude of adverse factors disrupts this fragile balance of the skin’s sebum production, resulting in excessive, out-of-control sebum excretion. Besides the immediate aesthetic consequence of oily and shiny skin, such overproduction can lead to a series of further skin imperfections and to even more severe adverse conditions of the skin.

**Visibly dilated pores**
b) Similar to a flood causing a riverbed to expand, excessive sebum production can result in dilation of skin pores. The result is an uneven skin surface, visible to the naked eye and even more so through the lens of a camera.

**Comedones**
c) Large amounts of sebum in the upper part of the hair follicles carries the risk to glue dead skin cells together, to solidify, and to finally block the exit of the pores. As a result, the continuous flow of sebum is held

"SUITABLE FOR LONG-TERM PREVENTION AND THE IMMEDIATE TREATMENT OF IMPURE SKIN"
inside the pores causing the formation of comedones.

**Bacterial growth and irritated skin**

d) Once blocked, the anaerobic conditions inside the follicles favour the growth of anaerobic bacteria such as Propionibacterium acnes. This bacterium feeds on the fatty acids of the sebum and damages the cells of the follicles. Additionally, their metabolic by-products can trigger the production and release of pro-inflammatory cytokines, leading to irritated, red skin. Further, oxidative stress promotes the inflammation of the comedones, resulting in pimples or even pustules and skin lesions, common characteristics of acne vulgaris.

**How the active ingredient works**

The causes of blemish-prone skin are tightly connected. They enable and reinforce each other and their relative impact might differ widely between individuals. Hence, to be effective, cosmetic treatments should ideally address all factors at once.

To this end, the selection of ingredients for our blend focussed on complete functional coverage and functional reliability according to scientific data, comparative in vitro and in vivo in-house screenings and cosmetic formulation know-how.

After application to the skin, the very mild surfactant in the blend, Dermafeel G10L**, removes excess sebum from the stressed skin without causing additional side effects such as irritation or dryness. In order to reduce and contain excessive sebum production from happening again after cleansing, components of saw palmetto (Serenoa serrulata) extract in the blend interact with the regulation of cellular sebum production. According to scientific literature, topical application of the main components of saw palmetto extract successfully inhibit 5 alpha-reductase; its enzymatic activity inside the sebaceous glands regulates sebum production.

A successful sebum reduction also helps to fight bacterial infections inside skin pores. By lowering the amount of sebum, the blend reduces the bacteria’s nutritional basis in addition to actively fighting P. acnes. The consequential normalisation of the skin’s natural microflora is a prerequisite for the recovery of the skin and
for the future prevention of inflammation processes, which ultimately might result in acne formation. In addition, the common juniper extract (Juniperus communis) in the blend supports the regeneration of stressed skin with its antimicrobial and antioxidative properties.

**In vivo evaluation**

In order to confirm the multitalented properties and proposed active principle of the active ingredient, an in vivo, half-side comparative evaluation was conducted in cooperation with the division of Cosmetic Science at the University of Hamburg. Twenty-five volunteers between the age of 15–36 years were asked to apply two hydrogel formulations, one containing 2% of our active ingredient and one a control formulation, twice a day over a course of 28 days on one half of their face, respectively. During the course of this in vivo evaluation, the active ingredient generated significantly decreased sebum secretion, contributed to a more even skin surface, reduced skin redness, decreased bacterial growth and lowered the total number of comedones.

**Advantages of the active ingredient**

1. **Reduction of sebum production:** Sebum production of the skin was quantitatively measured using sebum collector foils (Sebufix) at the beginning of the in vivo testing and on day 28 on both sides of the volunteer’s faces. The quantification (Visioscan) of sebum from inside the pores revealed a significant reduction of 28% after 28 days in comparison to the control formulation. Figure 2* shows sebum of the forehead’s skin pores transferred to foil before (t0) and after treatment for 28 days. Overproduction of sebum by the skin’s sebaceous glands leads to an enlarged sebaceous canal and to visibly dilated pores. Clusters of visible pores were particularly seen at the beginning of the in vivo evaluation, indicating oily and blemish-prone skin. After 28 days of treatment, pores were less visible and skin texture was refined (Fig. 3). In total, a significant improvement of 8% over the control due to Dermosoft Decalact Sebum was measured.

Moreover, panellist perception and scientific evaluation via clinical scoring underscored the technically measured data. Asked about their skin, panellists noticed a significant improvement over the control formulation regarding the greasiness and shine of their skin. In addition, clinical scoring regarding the number of visibly dilated pores revealed a mean improvement of 17% after 28 days, due to the active ingredient in the hydrogel formulation.

2. **Reduction of bacterial growth:** Visualisation of bacterial growth was performed via fluorescence imaging of porphyrins, metabolic bacterial excretions lodged inside infected pores. After treatment for 28 days, images revealed that on average, bacterial infection inside the pores was significantly reduced by a margin of 12% in comparison to the control formulation, due to the active ingredient (Fig. 4).

3. **Reduction of skin redness:** Red skin might be a sign of irritated and inflamed skin caused by the excretion products of bacterial infection and oxidative stress. The in vivo evaluation confirmed that...
the active ingredient in a hydrogel formulation was able to reduce the intensity of red spots on the skin to provide a more even appearance (Fig. 5). Overall, total skin redness was reduced by 12% over the control formulation.

4. Reduction of comedones: As comedones are the result of a series of factors, eliminating these causes combined with an effective cleansing with the help of *Dermosoft Decolact Sebum* should result in an overall reduction of comedones. Precisely this was observed during the in vivo evaluation. Comedones were visibly reduced in number on the face of the volunteers (Fig. 6) and clinical scoring identified an average reduction of 11% over the vehicle control formulation.

5. Working in a mild way: Even oily and blemish-prone skin needs moisture. It prevents stressed skin from becoming even more irritated. But without proper treatment, including a moisturiser, blemish-prone skin easily dries out, which leads to cellular damage of the outer layer of the skin and an increase in trans-epidermal water loss (TEWL). At the same time, many cosmetic treatments of blemish-prone skin with the aim to fight comedones and pimples are often accompanied by irritating side effects; surfactants are a particular culprit, tending to damage the epidermis and hence increase water loss even more. With this in mind, we only included very mild surfactants and actives in our ingredient blend. The surfactant *Dermofeel G10L* in the blend was analysed in our application laboratory and was proven to be very mild, with very little and moreover quickly-reversible effects on the TEWL level of the skin. The designed mildness of our blend was confirmed during the in vivo evaluation. At the end of the in vivo evaluation, *Corneometer* measurements revealed a general improvement of skin moisture after application of the hydrogel formulation without any detrimental effects on TEWL.

**All-in-one solution**

Our naturally-derived active blend is a convenient all-in-one solution free of preservatives and alcohol, which in addition provides a good performance for consumers. With the help of this blend, various natural or conventional cosmetic concepts for oily or blemished skin can be created that fulfil a multitude of marketing claims. The easy-to-use composition and its low overall dosage facilitate the formulator’s work. Thanks to its mildness, it can be used for both long-term prevention and immediate treatment of impure skin. This adds to the large number of options for different uses in all sorts of product types with only one raw material.

*These figures and additional information can be found on the Internet – see download panel
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***Polyglyceryl-10 Laurate
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DR ALEXANDER THIEMANN
Dr Straetmans
For blemish-free skin