

facts



Natural moisturising solutions
– gentle and effective

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Introduction

Despite the overall size and the broad segmentation of the personal care market, there are two prevailing claims in new product launches: moisturisation and naturalness. This can be observed when browsing the supermarket shelves and is confirmed by Innova product data: about one quarter of the entries within the categories “skincare”, “body care” and “hand, bath and shower” contain a natural claim. Besides, moisturising properties are indicated for more than half of these products. ^[1]

The increased awareness of consumers regarding the origin, safety and sustainability of ingredients also affects and poses challenges for the personal care market. And, obviously, consumers do not wish to compromise on quality: they demand both naturalness and functionality. However, conventional moisturisers such as glycerine and propylene glycol, which are partly of non-natural origin and which have other drawbacks, still dominate the market. Out of all personal care products that claim to have moisturising properties, around 56% contain glycerine and about 21% contain propylene glycol. ^[2]

Therefore, more exploration into alternative, green substances is required, in order to assess their moisturising potential. Jungbunzlauer offers a range of naturally-derived, ECOCERT/COSMOS-approved ingredients that are suitable for this purpose. In this article, we illustrate their potential for moisturising applications in leave-on and rinse-off formulations, as substantiated by an established test method. It will be demonstrated that the substances investigated compare well with glycerine, which shall be used as a benchmark, or even perform better.



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Inspired by nature

The human skin naturally provides two main barriers against excessive water loss. ^[3] Firstly, there is the structure of the outmost skin layer, the stratum corneum (SC), which creates a physical barrier. The staggered alignment of the SC cells, the corneocytes, and the intercellular lipid lamellae effectively extend the route water must travel before evaporating from the body. Secondly, the corneocytes themselves contain a specially designed medium consisting of a variety of hygroscopic, water-binding substances. This mixture, referred to as the natural moisturising factor (NMF), creates a biochemical barrier against skin dehydration. Among the constituents of the NMF we find amino acids and their derivatives, urea and lactates. Due to their natural occurrence, these substances are of particular interest to formulators of personal care products with moisturising properties. Apart from being directly employed in formulations, the constituents of the NMF also serve as a guideline to identify further suitable ingredients. For instance, hydrophilic compounds with hydroxyl or carboxyl moieties such as polyols or sugars are further promising candidates.

Evaluating moisturising performance

In order to assess the moisturising potential of cosmetic ingredients, a range of quantitative measurement techniques has been developed. ^[4] Common, non-invasive techniques for evaluating skin hydration rely on the physical properties of the skin. Conductivity and capacitance of the skin are linked to its state of hydration, thus providing an indirect measure of the efficiency of a moisturising agent. As a general rule, such methods are valuable tools for researchers in the cosmetic industry for improving their formulations, but they are also indispensable for substantiating the efficacy claims of the final product as required by European legislation (cosmetics regulation (EC) 1223/2009).

For our experiments we chose to use the so-called Corneometer®. ^[5, 6] This device is capacitance-based and highly surface-specific (depth of penetration: 10–20 µm), meaning that only the relevant top layer of the skin contributes to the measured values.



The performance tests were carried out using model formulations containing Jungbunzlauer moisturisers. Leave-on formulations (lotion) were prepared using one of the following: ERYLITE® (INCI: erythritol), sodium lactate, glucono-delta-lactone (INCI: gluconolactone) or sodium lactate/sodium gluconate (1:1). In our rinse-off formulations (shower gel) we included ERYLITE®, sodium lactate, potassium lactate, calcium lactate gluconate (INCI: calcium lactate, calcium gluconate) or sodium lactate/sodium gluconate (1:1). All tests were carried out against glycerine as a benchmark and against a control (untreated skin area). The formulations were applied daily by ten adult women of different ages and skin types for two weeks (ERYLITE® leave-on study: 100 volunteers). Skin hydration was measured immediately before and after this test period.



Results of leave-on studies

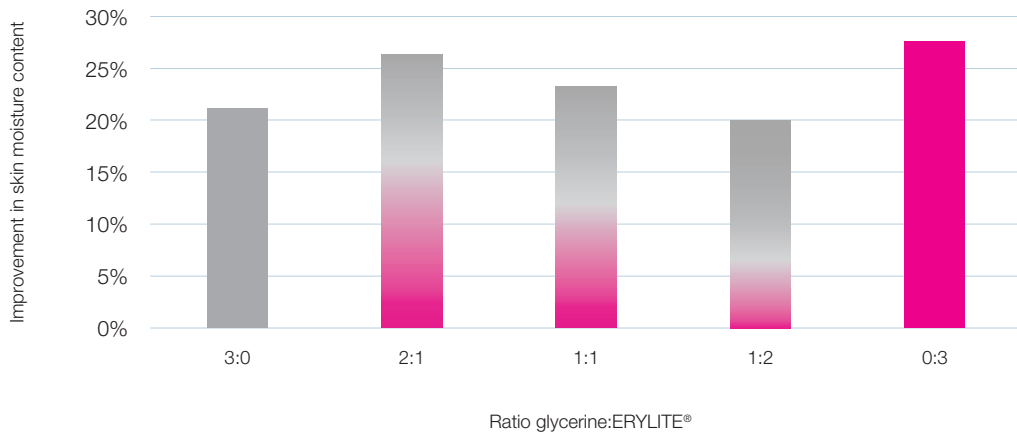
Efficacy tests for leave-on applications were carried out in two separate studies. Firstly, a large panel test with 100 participants was performed. Here, model formulations containing ERYLITE®, glycerine and mixtures of the two components were examined. The results are displayed in figure 1. While the control (untreated skin) did not exhibit a measurable variation in the skin's hydration state, both glycerine and ERYLITE® led to a significant improvement. ERYLITE® even performs better than glycerine (enhancement of the moisturising effect by almost 30%).

Regarding combinations of both ingredients, we find a distinct improvement in skin hydration as well. In addition, the use of ERYLITE® is accompanied by a better skin feel. While the participants reported a sticky, unpleasant skin feel with only-glycerine formulations, the mixtures and sole ERYLITE® test emulsions were perceived as smooth and pleasant. Generally, ERYLITE® proved to be very gentle, causing no irritation or other side effects, even in the case of dry or sensitive skin.

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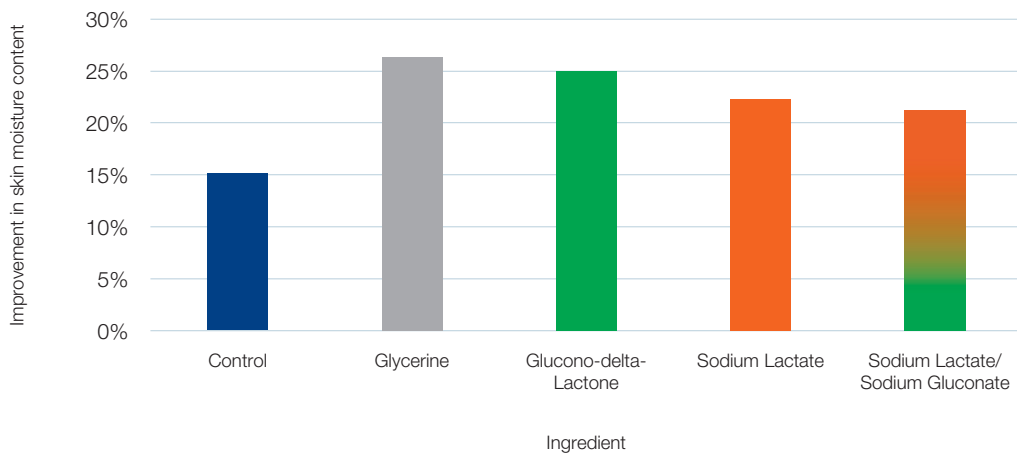
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Figure 1: Increase in skin moisture using different combinations of glycerine and ERYLITE®, leave-on formulations; concentration of active substance is kept constant at 3%



In a second leave-on study we focused on further ingredients, including glucono-delta-lactone, sodium lactate and a 1:1 mixture of sodium lactate with sodium gluconate. As shown in figure 2, all tested substances resulted in a considerable improvement in skin moisture. Compared to glycerine as a benchmark, the alternatives perform equally or almost as well, and in each case there is a significant improvement against the control. Finally, we again found clear sensory differences. Both gluconate- and lactate-based formulations impart a pleasant skin feel, while the use of glycerine is associated with stickiness.

Figure 2: Increase in skin moisture using different ingredients, leave-on formulations; concentration of moisturiser is kept constant at 3% of the commercially available product (meaning 1.8% of active substance for lactate being sold as 60% solution)

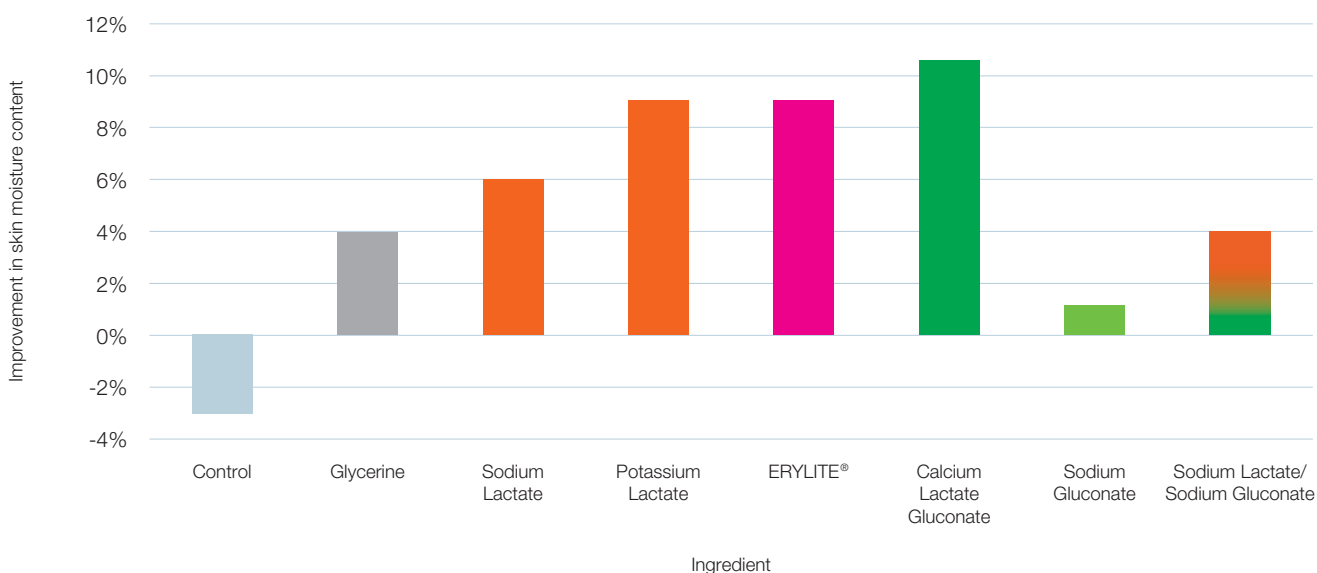




Results of rinse-off study

In the rinse-off moisturiser study, we included multiple Jungbunzlauer products. The corresponding data from Corneometer® measurements after two weeks of treatment with shower gel are presented in figure 3. At first glance, all tested substances show a positive effect on skin hydration, while the skin area treated with a placebo (control, shower gel formulation without moisturiser) shows loss of moisture. Furthermore, we see that almost all moisturisers are more effective than glycerine, surpassing the value of glycerine by factors of up to more than two. Potassium lactate, ERYLITE® and calcium lactate gluconate were the highest performing ingredients. Sodium gluconate had the least effect, but it brings an additional benefit to personal care formulations as it has very good chelating properties. Overall, all tested products containing Jungbunzlauer moisturising ingredients resulted in a pleasant skin feel (in contrast to glycerine leaving an impression of stickiness) and did not cause any detrimental effects to the skin such as irritations or allergic reactions.

Figure 3: Increase in skin moisture using different ingredients, rinse-off formulations; concentration of moisturiser is kept constant at 5%



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Conclusion

Naturalness is one of the predominant trends in today's personal care market – in line with consumer expectations and demand for biobased and sustainable solutions. Furthermore, skin moisturisation is a key function of modern-day cosmetic products. Commonly employed moisturisers such as glycerine or propylene glycol, which are partly of non-natural origin or have sensory disadvantages, do not always satisfy all needs in terms of naturalness, efficiency and comfort. Herein, we proposed natural and safe alternatives whose excellent performance is substantiated by state-of-the-art testing.

We conducted sophisticated cosmetic studies where the participants applied model formulations containing Jungbunzlauer's natural moisturising ingredients. As a positive standard we used glycerine. The skin's hydration state was assessed before and after treatment using a Corneometer®. One of the major outcomes of these measurements was that for both leave-on and rinse-off formulations, our products compare extremely well with glycerine. Notably, several Jungbunzlauer ingredients even outperform this benchmark by a great margin, in particular in the rinse-off scenario. Furthermore, the skin feel after treatment with Jungbunzlauer products is described as smooth and pleasant, while glycerine leaves a sticky sensation. Finally, some of the ingredients bring additional benefits, for instance the lactates' being part of the skin's natural moisturising factor (NMF), or the gluconates' chelating properties.

Jungbunzlauer moisturisers are obtained naturally by fermentation of GMO-free renewable resources. They are safe, readily biodegradable and approved by ECOCERT/COSMOS as raw materials for use in personal care. Therefore, Jungbunzlauer moisturisers represent an ideal combination of efficiency and sustainability, of naturalness and convenience.

References

- [1] Data from Innova Market Insights, www.innovadatabase.com, search criteria: worldwide, period: one complete year (8/2016-7/2017), sub-categories: Body Care, Hand, Bath & Shower, Skin Care
- [2] Data from Innova Market Insights, www.innovadatabase.com, search criteria: worldwide, period: one complete year (8/2016-7/2017), category: Personal Care
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About Jungbunzlauer

Jungbunzlauer is one of the world's leading producers of biodegradable ingredients of natural origin. We enable our customers to manufacture healthier, safer, tastier and more sustainable products. Due to continuous investments, state-of-the-art manufacturing processes and comprehensive quality management, we are able to assure outstanding product quality. Our mission "From nature to ingredients®" commits us to the protection of people and their environment.

Jungbunzlauer ingredients for moisturising are produced by fermentation of natural, renewable resources and are therefore a good alternative to synthetic chemicals used in personal care applications. They are efficient in (re)hydrating dry skin, leave a smooth skin feel and are compatible with most other components in common formulations. Jungbunzlauer lactates are available as different concentrated aqueous solutions. ERYLITE®, sodium gluconate, calcium lactate gluconate and glucono-delta-lactone are provided in dry form.

All of these ingredients are approved by ECOCERT/COSMOS as raw materials for use in personal care.



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