HYDRO-UREA® Moisturizing Agent

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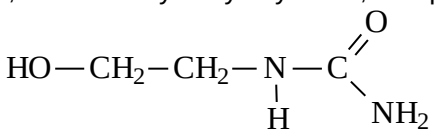
INCI: Hydroxyethyl Urea

Moisturizing Agent with Excellent Aesthetic Properties

INTRODUCTION

The use of benefit agents in skin care applications is forecasted to grow for the foreseeable future because consumers are demanding that their skin care products reduce fine lines and facial wrinkles, improve elasticity and firmness of skin, and provide higher levels and longer lasting skin hydration. HYDRO-UREA® moisturizing agent provides excellent moisturization, increases skin elasticity, and enhances tactile sensory properties of formulations. HYDRO-UREA® moisturizing agent has broad compatibility, offering cosmetic chemists the freedom to formulate over a wide pH range and with a large variety of raw materials.

HYDRO-UREA® moisturizing agent, based on Hydroxyethyl Urea, is supplied as an aqueous solution.



Hydroxyethyl Urea

APPLICATION AREAS

Facial, body, hand, and foot creams and lotions, moisturizing products, anti-aging products, shower and bath products, facial cleansers, sun protection products, self-tanning products, color cosmetics, depilatories, antiperspirants and deodorants, foot care, hair styling products, hair shampoos and conditioners, hair treatments, hair color products

FEATURES / BENEFITS

- Moisturization equal to glycerin
- Non-tacky feel
- Excellent aesthetics
- Nonionic – broad compatibility
- Preservative free
- Little to no impact on formula viscosity

SUGGESTED USE LEVELS, AS SUPPLIED

Leave-On Moisturizing Products (Creams, Lotions, Gels, etc.):	1 - 10%
Rinse-Off Products (Shampoo, Conditioner, Bodywash):	1 - 20%
Sun Protection Products:	1 - 10%
Color Cosmetics:	1 - 10%

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Suggested pH Range of final formulations: 5 - 8

Some formulations may require the use of a stabilization system, to prevent the formulation from drifting to higher pH during stability testing. Potential stabilization systems include:

- Low molecular weight esters, especially triethyl citrate
- Cyclic esters or lactones
- Buffer systems, especially lactates and phosphates

More detailed information on these stabilization systems can be found in the Formulating with HYDRO-UREA Moisturizing Agent paper.

FORMULATION GUIDELINES

HYDRO-UREA Moisturizing Agent is easily incorporated into water, or the water phase of an emulsion, at ambient or elevated temperature conditions.

PERFORMANCE PROPERTIES

Moisturization Efficacy Measured by Corneometer

Moisturizing efficacy is measured by the ingredient's ability to increase the water content in the stratum corneum. This is usually measured using a Corneometer. The measuring principle of the Corneometer is based on capacitance measurements of the dielectric medium. Any change in the dielectric constant due to skin surface hydration variation alters the capacitance. The dielectric constant of the *stratum corneum* increases with increasing water content. The Corneometer measures the difference in *stratum corneum* hydration before and after application of a cosmetic product or other skin treatment.

Through Corneometer testing, it has been confirmed that HYDRO-UREA moisturizing agent increases the water content of the *stratum corneum*.

Gels with 5% active level of either HYDRO-UREA moisturizing agent or glycerin were applied on a 4cm square area on the volar forearm of panelists with dry skin. Moisture levels of the *stratum corneum* were measured prior to application of the gel and 15 minutes, 1, 2, 4, and 6 hours after application. The moisture level of the treated areas was normalized to untreated skin at each time interval. The moisture level of untreated skin did not fluctuate considerably over the period of the evaluation. (Figure 1)

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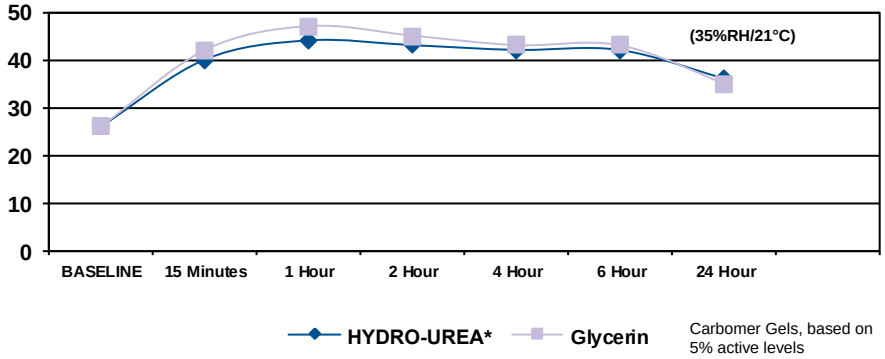
Figure 1
Moisturizing Efficacy by Corneometer



This study demonstrates that HYDRO-UREA moisturizing agent delivers moisturization efficacy comparable to glycerin. Based on statistical analysis of the data, there is no significant difference between these two ingredients in this study.

Moisturization Efficacy Measured by Gas Bearing Electrodynamometer
A Gas Bearing Electrodynamometer (GBE) measures the pliability or surface elasticity of the *stratum corneum* in vivo and has been shown to correlate directly with the water content of the skin. Through GBE testing, it has been confirmed that HYDRO-UREA moisturizing agent increases the elasticity of the *stratum corneum*. Glycerin is known to be an effective plasticizer of the *stratum corneum*. A clinical study compares HYDRO-UREA moisturizing agent with glycerin.

Gels, with either 5% active level of HYDRO-UREA moisturizing agent or glycerin, were applied to the volar forearm of panelists with dry skin. Skin elasticity was measured via a GBE prior to application and 15 minutes, 1, 2, 4, and 8 hours after application. The results are reported as a percent improvement in the skin's Dynamic Spring Rate (DSR) after application of the moisturizing gels.

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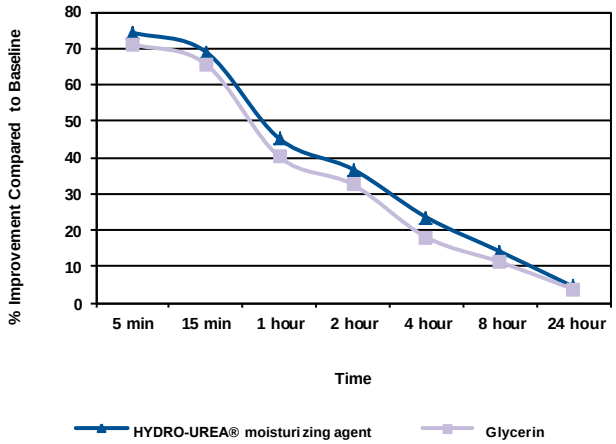
Figure 2
Skin Flexibility/Suppleness by Gas Bearing Electrodynamometer DSR (gm/mm)



HYDRO-UREA moisturizing agent has efficacy comparable to glycerin for skin elasticity. Based on statistical analysis, there is no significant difference between the two ingredients in this study. (Figure 2)

Long Term Moisturization

A Long Term Clinical Moisturization study measures the ability of an ingredient to improve the overall condition of skin with extended, consistent use. This clinical study is made up of three individual evaluations: Clinical Grading by trained dermatologists, Corneometer testing, Image Analysis for Skin Dryness.

Five panelists were used to evaluate the long-term moisturization of HYDRO-UREA moisturizing agent compared to glycerin. Aqueous solutions, with 5% active level of either HYDRO-UREA moisturizing agent or glycerin, were tested. The panelists applied the test products to the dry skin on the outside of the assigned leg between the knee and ankle area, twice a day for three weeks. All evaluations were performed pre-treatment, at weeks 2 and 3 of treatment, and after a one week regression period. The one week regression evaluates the skin properties after 3 weeks of treatment and 1 week of no treatment to determine if effects are sustained without continued treatment

Clinical Grading

Trained dermatologists assigned a clinical grade to the skin based on the appearance and condition of the skin at each evaluation point. The clinical grading was assigned on a scale from 0, no dryness, to 3, severe dryness. The mean clinical grading for each evaluation point is presented in Figure 3.

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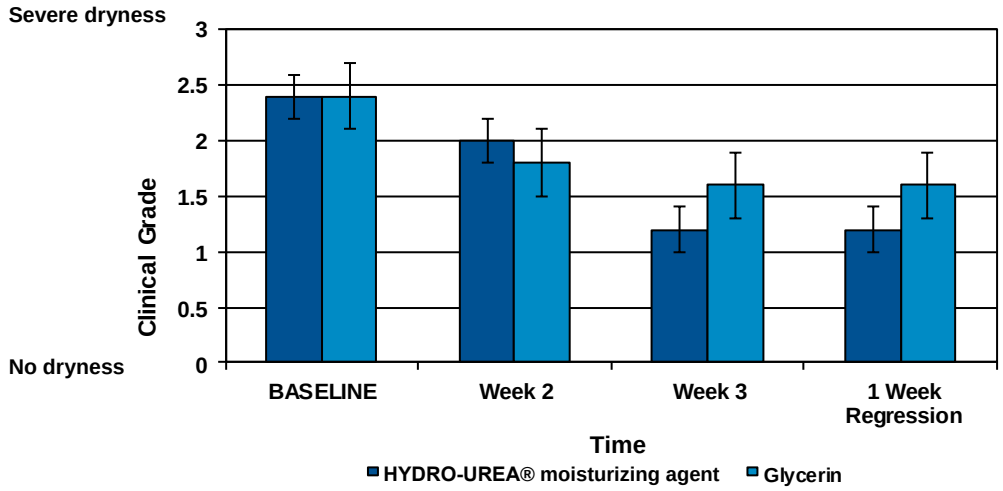
Figure 3
Clinical Evaluation of Dryness Mean Values

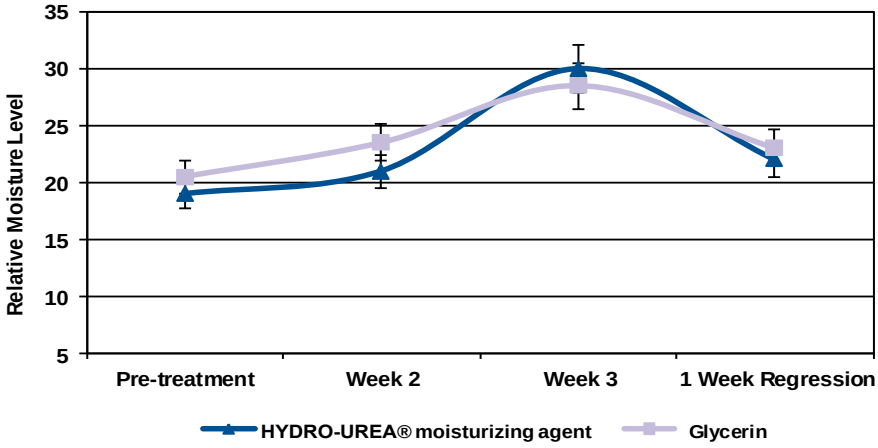


The clinical grading results show a significant improvement in dryness for both HYDRO-UREA moisturizing agent and glycerin. Both ingredients show that an improvement in skin moisturization is sustained one week after the treatment ended. No significant difference is observed between HYDRO-UREA moisturizing agent and glycerin in this study.

Moisturization Evaluation by Corneometer

A Corneometer measured the relative moisture levels in the skin throughout the Long Term Moisturization study. The mean moisture level for each evaluation point are shown in Figure 4.

Figure 4
Moisturizing Efficacy by Corneometer
Long Term Moisturization Study



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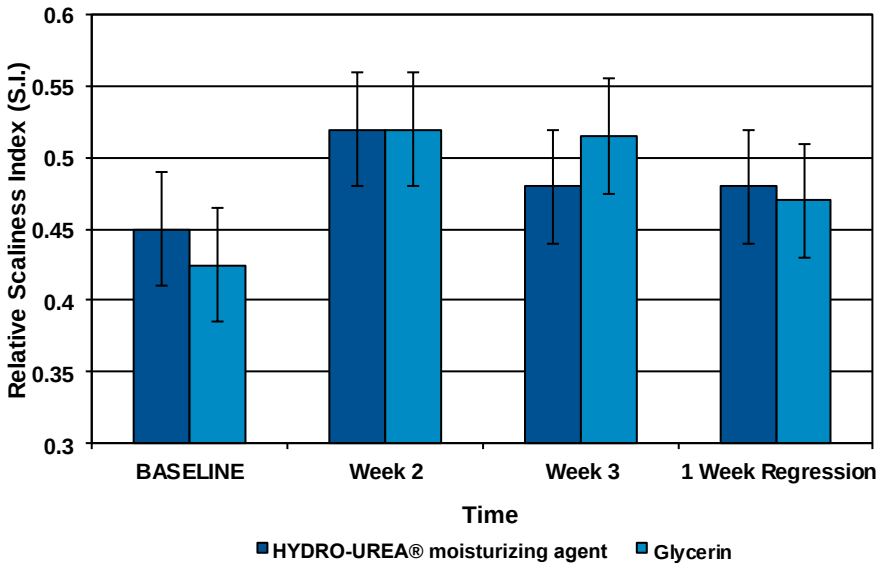
The Corneometer data shows that HYDRO-UREA moisturizing agent has efficacy comparable to glycerin for skin moisturization. The maximum moisturization level for both ingredients is achieved after 3 weeks of treatment. The one week regression results are similar to those obtained after 2 weeks of treatment. There is no significant difference in skin moisturization efficacy between these two ingredients at any point during the study.

Image Analysis for Skin Dryness

Image Analysis is used to assess skin dryness, reported as the scaliness index (S.I.) of skin. The skin is first defatted and then a D-Squame adhesive disc is applied with standard pressure. The D-Squame disc is removed from the skin with the attached scales. This sample is used for image analysis to determine the S.I. of skin, which is calculated on the assumption that the whiteness of the scales is proportional to their thickness. A thicker, and therefore, whiter scale has a higher S.I. value and shows increased hydration of the *stratum corneum.* Higher S.I. values mean better moisturization efficacy.

Figure 5
D-SQUAME Analysis of Dryness



This image analysis study demonstrates that HYDRO-UREA moisturizing agent and glycerin provide a similar Scaliness Index at each point of the Long Term Moisturization study. There is no significant difference between the two ingredients in this study.

The results of the Clinical Grading, Corneometer Measurements, and Image Analysis show that HYDRO-UREA moisturizing agent provides similar Long Term Moisturization to glycerin.