

# HYDROVANCE<sup>®</sup> Moisturizing Agent

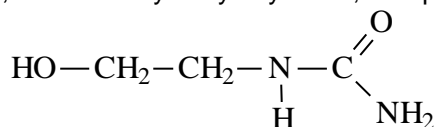
## HYDROVANCE<sup>®</sup> Moisturizing Agent INCI: Hydroxyethyl Urea

### 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. HYDROVANCE<sup>®</sup> moisturizing agent provides excellent moisturization, increases skin elasticity, and enhances tactile sensory properties of formulations. HYDROVANCE 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.

HYDROVANCE 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 HYDROVANCE Moisturizing Agent paper.

### FORMULATION GUIDELINES

HYDROVANCE 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

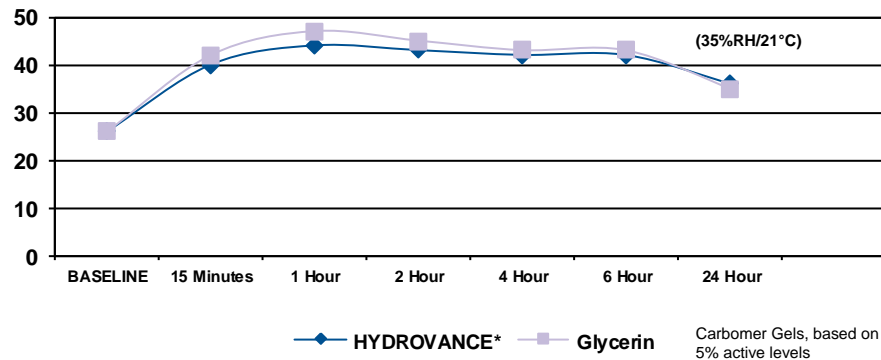
Moisturizing efficacy is measured by the ingredient's ability to increase the water content in the stratum corneum. This is usually measured using a Corneometer. The measuring principle of the Corneometer is based on capacitance measurements of the dielectric medium. Any change in the dielectric constant 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 HYDROVANCE moisturizing agent increases the water content of the *stratum corneum*.

Gels with 5% active level of either HYDROVANCE 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 HYDROVANCE 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.

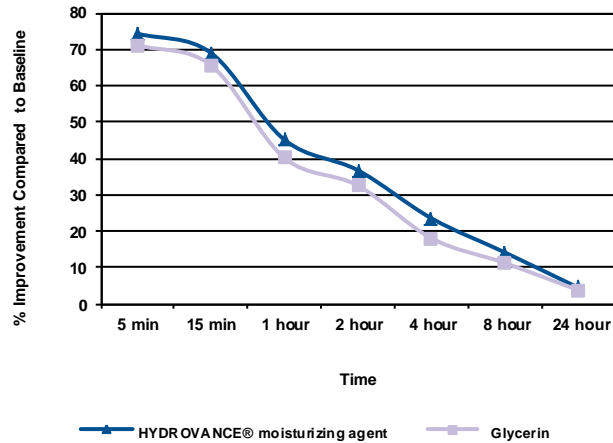
### Moisturization Efficacy Measured by Gas Bearing Electrodynamicometer

A Gas Bearing Electrodynamicometer (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 HYDROVANCE 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 HYDROVANCE moisturizing agent with glycerin.

Gels, with either 5% active level of HYDROVANCE 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)**



HYDROVANCE 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.

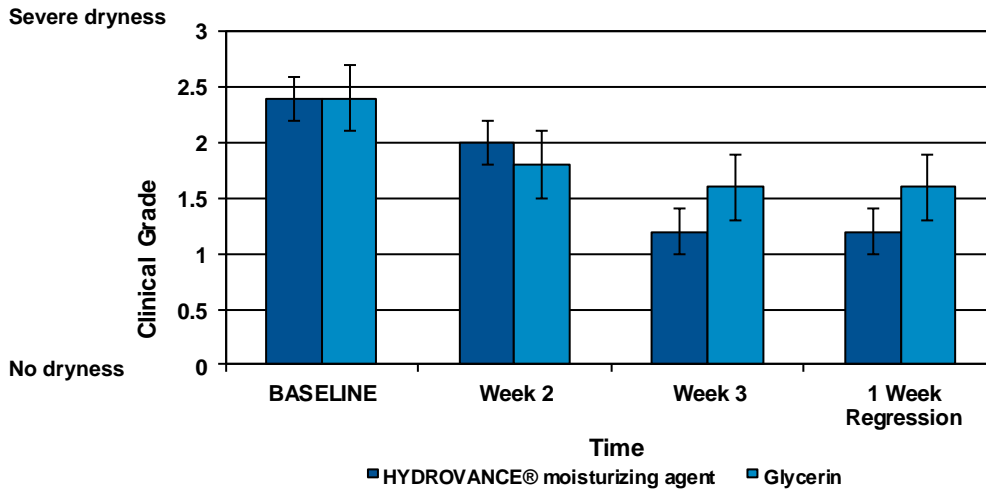
Five panelists were used to evaluate the long-term moisturization of HYDROVANCE moisturizing agent compared to glycerin. Aqueous solutions, with 5% active level of either HYDROVANCE moisturizing agent or glycerin, were tested. The panelists applied the test products to the dry skin on the outside of 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**

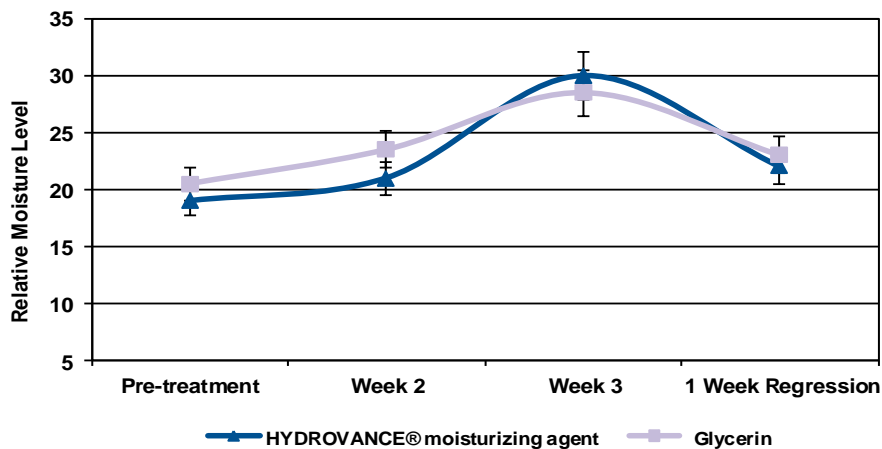


The clinical grading results show a significant improvement in dryness for both HYDROVANCE moisturizing agent and glycerin. Both ingredients show that an improvement in skin moisturization is sustained one week after the treatment ended. No significant difference is observed between HYDROVANCE moisturizing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

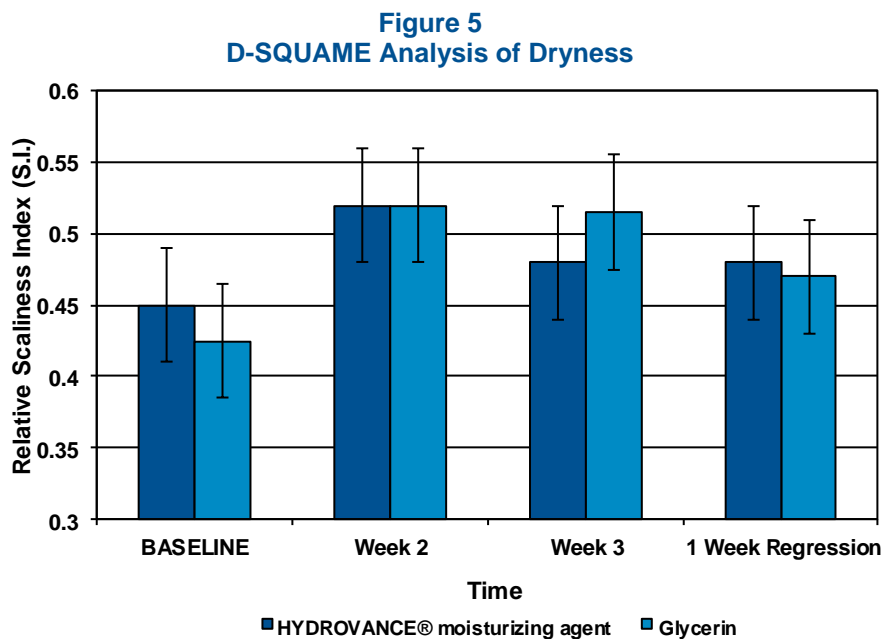


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The Corneometer data shows that HYDROVANCE moisturizing agent has efficacy comparable to glycerin for skin moisturization. The maximum moisturization level for both ingredients is achieved after 3 weeks of treatment. The one week regression results 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.



This image analysis study demonstrates that HYDROVANCE 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 HYDROVANCE moisturizing agent provides similar Long Term Moisturization to glycerin.

### Expert Sensory Evaluation of Raw Materials

Sensory Evaluation involves the detection and description of a product's sensory characteristics. For this study, an expert panel assessed the skin sensory characteristics of personal care moisturizing ingredients

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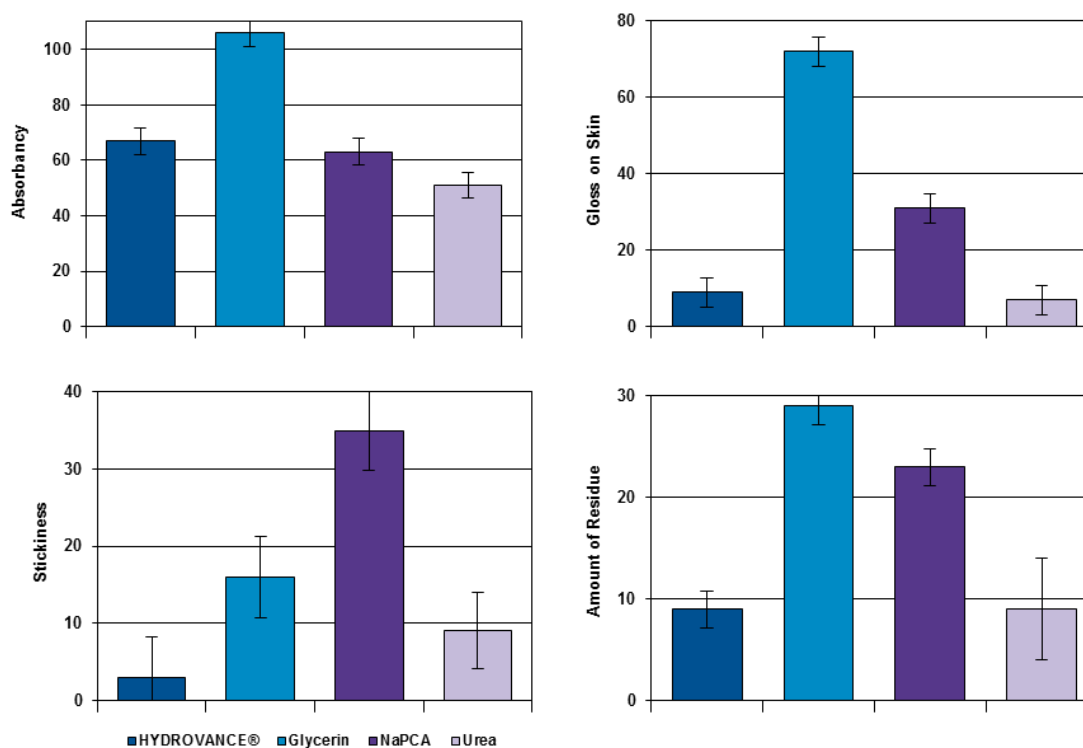
as supplied under controlled conditions on a scale from 0 (no presence of a particular attribute) to 100 (very strong presence of a particular attribute). The expert panelists identified statistical differences among the sensory attributes of the test samples.

The moisturizing agents assessed were HYDROVANCE moisturizing agent (50% aqueous solution), glycerin (99.5% aqueous solution), sodium pyrrolidone carboxylic acid (Na PCA) (50% aqueous solution), and urea (45% aqueous solution).

The conclusion from this study shows that these raw materials provide different rubout and afterfeel experiences. Compared to the other raw materials, HYDROVANCE moisturizing agent and urea are higher in wetness and spreadability during rubout. At afterfeel, they are lower than untreated skin for gloss, have little to no stickiness, and provide slipperiness similar to untreated skin. The thickness and amount of residue are very low for these two raw materials.

Figure 6 displays the results of the evaluation for absorbency, gloss, stickiness, and amount of residue at the immediate afterfeel. In all of these attributes, HYDROVANCE moisturizing agent is rated significantly better than glycerin and better than or equal to the other moisturizing agents tested.

Figure 6



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### STORAGE AND HANDLING

HYDROVANCE moisturizing agent should be protected from freezing. Avoid extreme temperatures during storage. Good industrial hygiene practices should be followed when working with this polymer. Please read the MSDS before working with this or any other chemical. This product is best used within 18 months of manufacture.

### HEALTH AND SAFETY

A health and safety summary for HYDROVANCE moisturizing agent is available on request. Information on HYDROVANCE moisturizing agent relating to EU Cosmetics Directive 76/768/EEC is also available upon request.

The suitability of the final formulations should be confirmed in all respect by appropriate evaluation. The marketer is advised to evaluate the final formulation with regard to performance and health and safety.

### BIODEGRADABILITY

The CO<sub>2</sub> Evolution Modified Strum Test (OECD 301B) demonstrated the HYDROVANCE moisturizing agent is readily biodegradable.

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