Tradename: AC Vegan Keratin OS

Code: 20964

CAS #: 68650-44-2 & 90063-40-4 & 92113-26-3 & 225234-01-5

Test Request Form #: 9299

Lot #: 9230600

Sponsor: *Active Concepts, LLC; 107 Technology Drive Lincolnton, NC 28092*
Study Director: *Maureen Danaher*
Principle Investigator: *Hannah Duckett*

Test Performed:
Transepidermal Water Loss (TEWL) Assay

Introduction

An *in-vivo* study was conducted over a period of 24 hours to evaluate the ability of **AC Vegan Keratin OS** to enhance barrier function through reduction in Transepidermal Water Loss (TEWL). Results indicate that this material is capable of efficiently reducing TEWL which allows moisture retention.

The Transepidermal Water Loss Assay was conducted to assess the moisture retention capabilities of **AC Vegan Keratin OS.**

Materials

A. Equipment: DermaLab Skin Combo (Transepidermal Water Loss Probe)

Methods

Transepidermal water loss is measured by the DermaLab Combo based on Nilsson's Vapor Pressure Gradient method. This method involves an open chamber with minimal impact on the skin, and therefore, a very low bias. Two temperature and humidity sensor sets are mounted in a chamber at different heights above the surface of the skin. The evaporation rate of the skin follow's Fick's Law of Diffusion:

$$Rate = P \times [c_1 - c_2] / T$$

Where P = permeability coefficient of membrane, (c_1-c_2) = concentration gradient, and T = thickness of membrane).

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20 volunteers M/F between the ages of 23 and 45 and who were known to be free of any skin pathologies participated in this study. A DermaLab Combo was used to measure TEWL on the subject's volar forearms.

The instrument consists of a probe that is based upon the vapor gradient with an open chamber. This open chamber design maintains the free natural evaporation from the skin without interfering with the environment over the measurement area. This ensures unbiased and accurate readings. Operation of the water loss module is fully menu drive, allowing for pre-setting and standard deviation or measurement time. Baseline TEWL readings were taken at the start of the study.

Following initial measurements, all subjects were asked to apply 2 milligrams of each test material on their volar forearms once during the 24 hour test period. Measurements were taken at four time increments after the application of test materials. The test material consisted of 5.0% **AC Vegan Keratin OS** in a base lotion.

Results

AC Vegan Keratin OS showed very effective moisture retention capabilities at a 5.0% concentration. Please note, each value is an average of three consecutive readings per test site.

Percent change in TEWL is calculated by the following formula:

$$Percent\ (\%)\ Change = \frac{Average\ TEWL\ Value_{T=24\ hours.etc} - Average\ Baseline\ Value_{T=0}}{Average\ Baseline\ Value_{T=0}}\ x\ 100$$

Averages	T = 0	T = 15 Minutes	T = 1 Hour	T = 8 Hours	T = 24 Hours
Experimental (5.0% AC Vegan Keratin OS + Base Lotion)	5.12	2.87	2.72	3.74	3.68
Base Lotion	6.02	5.17	5.24	6.52	5.50
Untreated	6.01	6.14	6.40	6.90	5.47

Table 1. Average Transepidermal Water Loss of Individual Test Sites

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Percent (%) Change	T = 0 vs 15 Minutes	T = 0 vs 1 Hour	T = 0 vs 8 Hours	T = 0 vs 24 Hours
Experimental (5.0% AC Vegan Keratin OS + Base Lotion)	-43.94%	-46.93%	-26.99%	-28.16%
Base Lotion	-14.11%	-12.98%	8.32%	-8.71%
Untreated	2.20%	6.41%	14.82%	-9.04%

**Table 2.** Comparative Transepidermal Water Loss Results Between Individual Test Sites

Percent (%) Difference	T=0	T = 15 Minutes	T = 1 Hour	T = 8 Hours	T = 24 Hours
Experimental (5.0% AC Vegan Keratin OS + Base Lotion) vs Base Lotion	16.08%	57.15%	63.31%	54.17%	39.55%
Experimental (5.0% AC Vegan Keratin OS + Base Lotion) vs Untreated	15.93%	72.55%	80.67%	59.39%	39.05%
Base Lotion vs Untreated	0.16%	17.18%	19.90%	5.67%	0.52%

Table 3. Difference in Transepidermal Water Loss Results between Test Sites at each Time

Transepidermal Water Loss
Average TEWL Readings
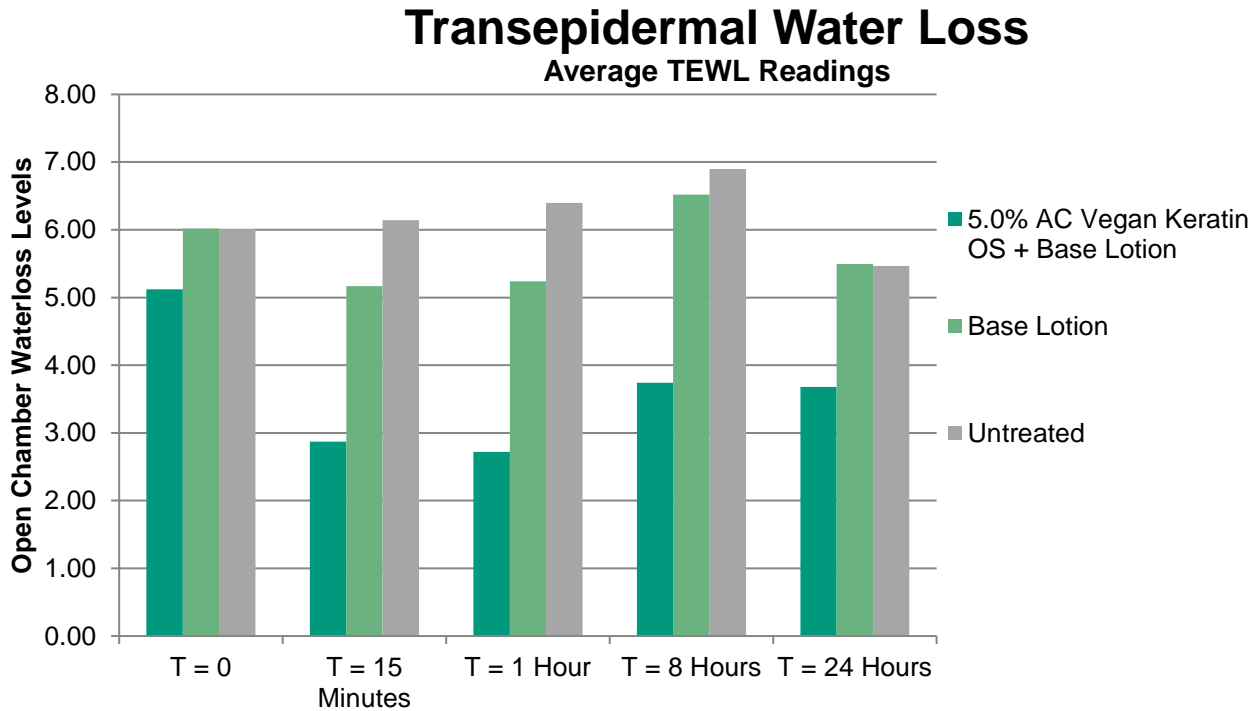
Figure 1. TEWL Measurements Taken at Individual Test Sites

Transepidermal Water Loss
Percent Change
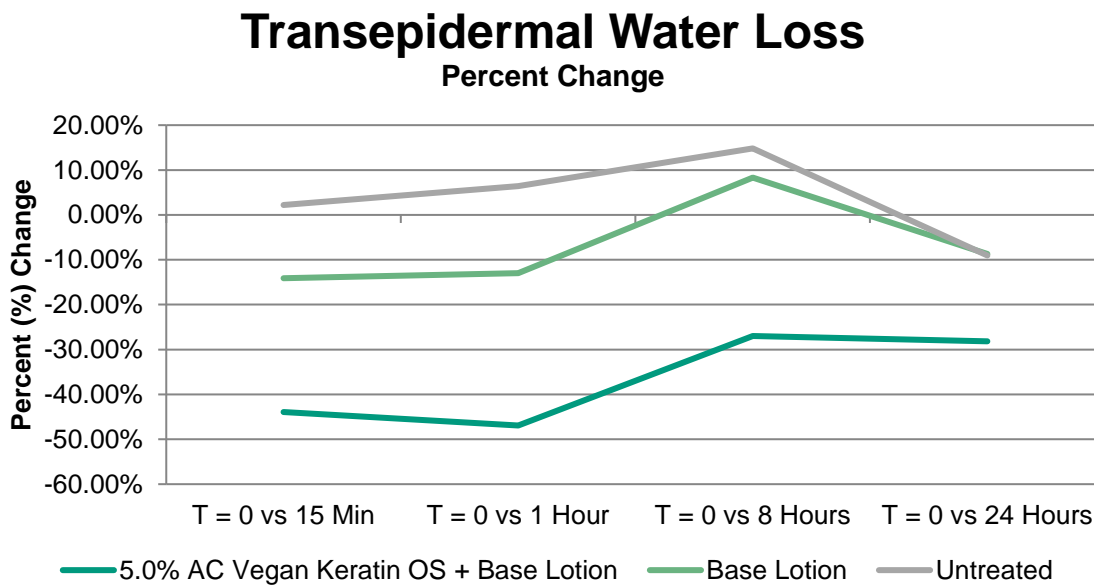
Figure 2. Percent Change in Water Loss Averages from Baseline (T=0) to Each Time in Study (T=15 minutes, T=1 Hour, T=8 Hours, T=24 Hours)

Discussion

As evidenced in a 24 hour efficacy study of **AC Vegan Keratin OS** on the skin, it can be used to effectively reduce transepidermal water loss with better results over time. When compared to the base lotion and untreated control, **AC Vegan Keratin OS** had lower transepidermal water loss values by 39.55% and by 39.05%, respectively, after 24 hours. After 1 hour, **AC Vegan Keratin OS** reduced transepidermal water loss by 46.93%, while the base lotion alone only reduced values by 12.98% when compared to the baseline levels. Results indicate that **AC Vegan Keratin OS** in a lotion formulation is capable of reducing transepidermal water loss to a greater degree when compared to the base lotion and untreated sites alone.

With the present study, we can confirm that **AC Vegan Keratin OS** is capable of providing moisture retention benefits when added to personal care applications at recommended use levels.