Active Concepts
Tomorrow's Vision... *Today!*®

# AC Phytocoll PF Efficacy Data

**Code:** 16564
**INCI Name:** Yeast Extract
**CAS #:** 8013-01-2
**EINECS #:** 232-387-9

| Type of Study | Results |
|---|---|
| **Cellular Viability Assay** | **AC Phytocoll PF** exhibited positive results by increasing cell metabolism. The increase in fluorescent signal indicates an increase in cellular metabolism and viability post **AC Phytocoll PF** treatment. For these reasons, we can assume **AC Phytocoll PF** is suitable for cosmetic applications designed to increase cell viability and metabolism. |
| **ORAC Assay** | **AC Phytocoll PF** exhibited antioxidant activity comparable to 200µM Trolox®. The antioxidant capacity of **AC Phytocoll PF** increased as the concentration increased, as a result we can assure that its ability to minimize oxidative stress is dose dependent. |
| **Moisturization Assay** | As evidenced in a 4-week efficacy study of **AC Phytocoll PF** on the skin, moisture levels were improved by 43% after 24 hours and by 87.8% after 4 weeks when compared to the base lotion. The results indicate that **AC Phytocoll PF** is capable of increasing moisturization when compared to the untreated control and the base lotion. The present study confirms that **AC Phytocoll PF** is capable of providing moisturizing and skin hydrating benefits when added to cosmetic applications. |



info@activeconceptsllc.com • +1 (704)-276-7100 • Fax:+1 (704)-276-7101

Active Concepts

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

# Cellular Viability Assay Analysis

**Tradename:** AC Phytocoll PF

**Code:** 16564

**CAS #:** 8013-01-2

**Test Request Form #:** 369

**Sponsor:** *Active Concepts, LLC; 107 Technology Drive Lincolnton, NC 28092*
**Study Director:** *Erica Segura*
**Principle Investigator:** *Meghan Darley*

**Test Performed:**
Cellular Viability Assay

## Introduction

The cellular viability assay is useful for quantitatively measuring cell-mediated cytotoxicity, cell proliferation and mitochondrial metabolic activity. Increased metabolism in a cell indicates ample cellular respiration and adenosine triphosphate (ATP) production. ATP is the molecular energy of cells and is required in basic cell function and signal transduction. A decrease is ATP levels indicates cytotoxicity and decreased cell function while an increase in ATP levels indicates healthy cells.

The cellular viability assay was conducted to assess the ability of **AC Phytocoll PF** to increase cellular metabolic activity in cultured dermal fibroblasts.

## Assay Principle

The assay utilizes a nonfluorescent dye, resazurin, which is converted to a fluorescent dye, resorufin, in response to chemical reduction of growth medium from cell growth and by respiring mitochondria. Healthy cells that are in a proliferative state will be able to easily convert resazurin into resorufin without harming the cells. This method is a more sensitive assay than other commonly used mitochondrial reductase dyes such as MTT. An increase in the signal generated by resazurin-conversion is indicative of a proliferative cellular state.

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

## Materials

| | | |
|---|---|---|
| **A.** | **Kit:** | PrestoBlue™ Cell Viability Reagent (Invitrogen, A13261) |
| **B.** | **Incubation Conditions:** | 37°C at 5% $CO_2$ and 95% relative humidity (RH) |
| **C.** | **Equipment:** | Forma humidified incubator; ESCO biosafety laminar flow hood; Light microscope; Pipettes |
| **D.** | **Cell Line:** | Normal Human Dermal Fibroblasts (NHDF) (Lonza; CC-2511) |
| **E.** | **Media/Buffers:** | Dulbecco's Modified Eagle Medium (DMEM); Penicillin-Streptomycin (50U-50mg/mL); Fetal Bovine Serum (FBS); Phosphate Buffered Saline (PBS) |
| **F.** | **Culture Plate:** | Falcon flat bottom 96-well tissue culture treated plates |
| **G.** | **Reagents:** | PrestoBlue™ reagent (10X) |
| **H.** | **Other:** | Sterile disposable pipette tips |

## Methods

Human dermal fibroblasts were seeded into 96-well tissue culture plates and allowed to grow to confluency in complete DMEM. A 10-fold serial dilution was performed resulting in **AC Phytocoll PF** concentrations on 1%, 0.1%, and 0.01% in complete DMEM and incubated with fibroblasts for 24 hours.

Ten microliters of viability reagent was added to 90µL of cell culture media in culture wells.

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

## Results

The data obtained from this study met criteria for a valid assay and the controls performed as anticipated.

**AC Phytocoll PF** at all concentrations is able to increase cellular metabolism compared to the control.

Cellular metabolism results are expressed as a percentage of the control.

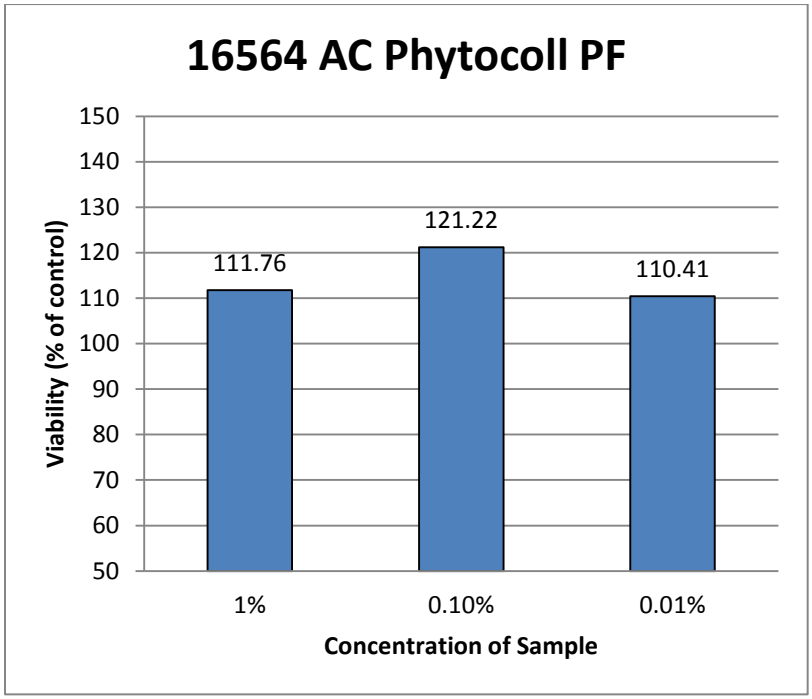


**Figure 1:** Cellular Metabolism of **AC Phytocoll PF**-treated fibroblasts expressed in terms of percent of control.

## Discussion

As shown in figure 1, **AC Phytocoll PF** exhibited positive results by increasing cell metabolism. The increase in fluorescent signal indicates an increase in cellular metabolism and viability post **AC Phytocoll PF** treatment. For these reasons, we can assume **AC Phytocoll PF** is suitable for cosmetic applications designed to increase cell viability and metabolism.

# Oxygen Radical Absorbance Capacity (ORAC) Assay

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

**Tradename:** AC Phytocoll PF

**Code:** 16564

**CAS #:** 8013-01-2

**Test Request Form #:** 245

**Lot #:** 23308

**Sponsor:** *Active Concepts, LLC; 107 Technology Drive Lincolnton, NC 28092*
**Study Director:** *Erica Segura*
**Principle Investigator:** *Meghan Darley*

**Test Performed:**
Oxygen Radical Absorbance Capacity (ORAC)

## Introduction

Reactive oxygen species (ROS) are generated by normal cellular processes, environmental stresses, and UV irradiation. ROS are detrimental to cellular structures and functional molecules (i.e DNA, proteins, lipids) as they act as strong oxidizing agents or free radicals. The oxygen radical absorbance capacity (ORAC) assay is a standard method used to assess antioxidant capacity of physiological fluids, foods, beverages, and natural products. The assay quantitatively measures a sample's ability to quench free radicals that have the potential to react with and damage cellular components.

Oxygen Radical Absorbance Capacity (ORAC) assay was conducted to assess the antioxidant capacity of **AC Phytocoll PF**.

## Assay Principle

This assay is based upon the effect of peroxyl radicals generated from the thermal decomposition of 2, 2'-azobis-2-methyl-propanimidamide dihydrochloride (AAPH) on the signal intensity from the fluorescent probe, fluorescein, in the presence of an oxygen radical absorbing substance. The degree of change is indicative of the amount of radical damage and the presence of antioxidants results in an inhibition in the free radical damage to the fluorescein. The antioxidant protection of the sample can be calculated by comparing it to a set of known standards. Trolox®, a water soluble vitamin E analog, with known antioxidant capabilities is used in this ORAC assay as the standard for measuring the antioxidant capacity of unknown substances. ORAC values, expressed in µM of Trolox® equivalents (TE), are calculated using the area under the curves (AUC) of the test product, Trolox®, and the control materials. Trolox equivalency is used as the benchmark for antioxidant capacity of mixtures since it is difficult to measure individual components.

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

## Materials

| | |
|---|---|
| **A. Equipment:** | Synergy H1 Microplate reader (BioTek Instuments, Winooski, VT); Gen5 software (BioTek Instuments, Winooski, VT); Pipettes |
| **B. Buffers:** | 75mM Potassium Phosphate (pH 7.4); Deionized $H_2O$ |
| **C. Reagents:** | 2,2′-Azobis(2-methylpropionamidine) dihydrochloride (AAPH) (153mM); 6-Hydroxy-2,5,7,8-tetramethylchromane-2-carboxylic acid (Trolox®); Fluorescein Sodium Salt (4nM) |
| **D. Preparation:** | Pre-heat (37°C) Synergy H1 Microplate reader; Prepare Trolox® standards, sample dilutions, fluorescein solution, and AAPH. |
| **E. Microtitre Plates:** | Corning 96 Well Black Side/Clear Bottom Microplates |

## Methods

Solutions of **AC Phytocoll PF** and Trolox® (positive control) were prepared in 75mM potassium phosphate buffer. Materials were prepared at three different concentrations/dilutions. Trolox® was used as a reference for antioxidant capacity and prepared at a concentrations ranging from 12.5µM to 200µM in 75mM potassium phosphate buffer.

For the ORAC assay, 25µL of test material and Trolox® were combined with 150µL of fluorescein in 75mM potassium phosphate buffer and incubated in the Synergy HT Microplate reader at 37˚C for 30 minutes. At the end of the incubation period, 25µL of AAPH were pipetted into each well. Fluorescent measurements were then taken every 2 minutes for approximately 2 hours at an excitation wavelength of 485nm and an emissions wavelength of 520nm.

The AUC and Net AUC values of the standards and samples were determined using Gen5 2.0 Data Reduction Software using the below equations:

$$AUC = 0.5 + \frac{R2}{R1} + \frac{R3}{R1} + \frac{R4}{R1} + \cdots + \frac{Rn}{R1} \rightarrow Where\ R\ is\ fluorescence\ reading$$

$$Net\ AUC = AUC_{sample} - AUC_{blank}$$

The standard curve was obtained by plotting the Net AUC of different Trolox® concentrations against their concentration. ORAC values of samples were then calculated automatically using the Gen5 software to interpolate the sample's Net AUC values against the Trolox® standard curve. ORAC measurements for the test material were expressed in micro moles Trolox® equivalents (µMTE), where 1 ORAC unit is equal to 1 µMTE.

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

## Results

**AC Phytocoll PF** began exhibiting antioxidant activity at a 0.05% concentration.

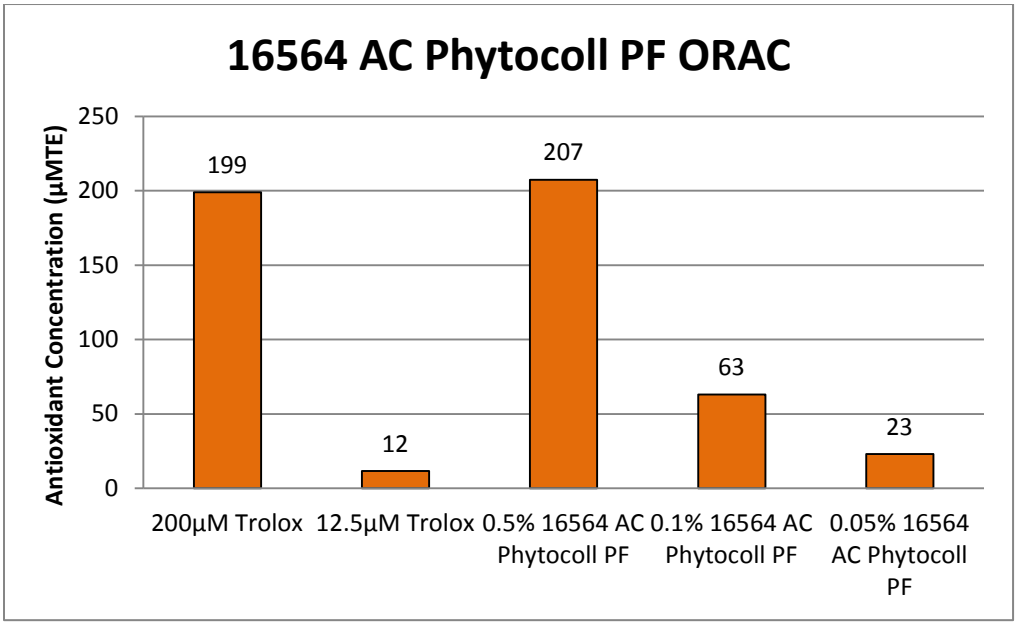


**Figure 1**: Antioxidant capacities

## Discussion

As shown in figure 1, **AC Phytocoll PF** exhibited antioxidant activity comparable to 200µM Trolox®. The antioxidant capacity of **AC Phytocoll PF** increased as the concentration increased, as a result we can assure that its ability to minimize oxidative stress is dose dependent.

**AC Phytocoll PF** was designed to have hair and skin moisturizing and conditioning properties. With the present study we can confirm that this unique ingredient is not only capable of providing functional benefits but it is also capable of providing potent antioxidant benefits when added to cosmetic applications.

Active Concepts

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

# Moisturization/Hydration Assay

**Tradename:** AC Phytocoll PF

**Code:** 16564

**CAS #:** 8013-01-2

**Test Request Form #**: 65

**Sponsor:** *Active Concepts, LLC; 107 Technology Drive Lincolnton, NC 28092*
**Study Director:** *Erica Segura*
**Principle Investigator:** *Meghan Darley*

**Test Performed:**
Moisturization/Hydration Assay

## Introduction

An *in-vivo* study was conducted over a period of three weeks to evaluate the moisturization benefits of **AC Phytocoll PF**. 10 M/F subjects between the ages of 23-45 participated in the study. Results indicate that this material is capable of significantly increasing moisturization compared to the control.

The moisturization assay was conducted to assess the moisturizing ability of **AC Phytocoll PF.**

## Materials

A. Equipment: DermaLab Skin Combo (Hydration/ Moisture Pin Probe)

## Methods

The moisture module provides information about the skin's hydration by measuring the conducting properties of the upper skin layers when subjected to an alternating voltage. The method is referred to as a conductance measurement and the output is presented in the unit of uSiemens (uS). A moisture pin probe is the tool used to gather hydration values.

10 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 Corneometer was used to measure the moisture levels on the subject's volar forearms. The Corneometer is an instrument that measures the amount of water within the skin. The presence of moisture in the skin improves conductance therefore results in higher readings than dry skin. Therefore the higher the levels of moisture, the higher the readings from the Corneometer will be. Baseline moisturization readings were taken on day one of the study.

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

Following initial measurements, all subjects were asked to apply 2 mg of each test material on their volar forearms. Measurements were taken immediately after application of test materials and then weekly for 4 weeks. The test material consisted of 2% **AC Phytocoll PF** in a base lotion.

For added perspective, measurements of an untreated test site and a site treated with a base lotion (Cetaphil Moisturizing for All Skin Types) were recorded.

## Results

**AC Phytocoll PF** showed very high moisturizing capabilities at a 2.0% concentration. Please note each value is an average of three consecutive readings per test site.

**Individual Raw Data:**

| | T=0 | T=24 | 1 week | 2 weeks | 3 weeks | 4 weeks |
|---|---|---|---|---|---|---|
| **Subject 1**-Test | | | | | | |
| Experimental | 75 | 151 | 178 | 248 | 221 | 211 |
| Base Lotion | 65 | 100 | 119 | 125 | 145 | 169 |
| Untreated Control | 43 | 49 | 47 | 53 | 51 | 50 |
| **Subject 2**-Test | | | | | | |
| Experimental | 43 | 91 | 136 | 141 | 155 | 173 |
| Base Lotion | 53 | 84 | 100 | 131 | 166 | 130 |
| Untreated Control | 35 | 55 | 57 | 75 | 115 | 57 |
| **Subject 3**-Test | | | | | | |
| Experimental | 39 | 71 | 82 | 88 | 94 | 78 |
| Base Lotion | 43 | 72 | 67 | 97 | 83 | 123 |
| Untreated Control | 65 | 98 | 131 | 96 | 95 | 126 |
| **Subject 4**-Test | | | | | | |
| Experimental | 47 | 97 | 111 | 130 | 149 | 164 |
| Base Lotion | 35 | 69 | 82 | 124 | 63 | 78 |
| Untreated Control | 31 | 61 | 62 | 119 | 57 | 66 |
| **Subject 5**-Test | | | | | | |
| Experimental | 65 | 64 | 136 | 122 | 135 | 133 |
| Base Lotion | 70 | 72 | 168 | 154 | 181 | 197 |
| Untreated Control | 45 | 46 | 96 | 100 | 91 | 81 |
| **Subject 6**-Test | | | | | | |
| Experimental | 39 | 83 | 90 | 101 | 100 | 79 |
| Base Lotion | 31 | 83 | 88 | 78 | 93 | 94 |
| Untreated | 58 | 95 | 113 | 127 | 124 | 138 |
| **Subject 7-**Test | | | | | | |
| Experimental | 33 | 75 | 112 | 113 | 153 | 163 |
| Base Lotion | 51 | 115 | 162 | 147 | 199 | 125 |
| Untreated Control | 27 | 40 | 41 | 59 | 94 | 57 |

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

| | T=0 | T=24 | 1 week | 2 weeks | 3 weeks | 4 weeks |
|---|---|---|---|---|---|---|
| **Subject 8**-Test | | | | | | |
| Experimental | 44 | 108 | 117 | 125 | 162 | 165 |
| Base Lotion | 30 | 77 | 104 | 101 | 115 | 96 |
| Untreated Control | 30 | 75 | 100 | 86 | 126 | 96 |
| **Subject 9-**Test | | | | | | |
| Experimental | 53 | 73 | 102 | 105 | 101 | 110 |
| Base Lotion | 45 | 68 | 92 | 105 | 106 | 95 |
| Untreated Control | 49 | 74 | 87 | 90 | 99 | 91 |
| **Subject 10-**Test | | | | | | |
| Experimental | 45 | 93 | 114 | 136 | 147 | 143 |
| Base Lotion | 49 | 106 | 126 | 161 | 161 | 166 |
| Untreated Control | 47 | 75 | 88 | 82 | 97 | 116 |
| **# of Subjects** | 10 | 10 | 10 | 10 | 10 | 10 |

**Results of Group:**

| | t=0 | t=24 | 1 week | 2 weeks | 3 weeks | 4 weeks |
|---|---|---|---|---|---|---|
| **Experimental (2.0% AC Phytocoll PF in Base Lotion)** | 9.7 | 31 | 35 | 38 | 38 | 45 |
| **Base Lotion** | 12 | 36 | 43 | 48 | 49 | 61 |
| **Untreated Control** | 2 | 4 | 6 | 7 | 8 | 11 |
| | | | | | | |
| **Base Lotion vs. Untreated** | 48.3% | 100.6% | 1178.% | 130.9% | 141.7% | 141.9% |
| **Experimental (2.0% AC Phytocoll PF in Base Lotion) vs. Untreated** | 47.2% | 97% | 110.8% | 122.3% | 131.2% | 127.3% |
| **Experimental (2.0% AC Phytocoll PF in Base Lotion) vs. Base Lotion** | 43% | 74.2% | 82.2% | 88.7% | 94.9% | 87.8% |

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

-

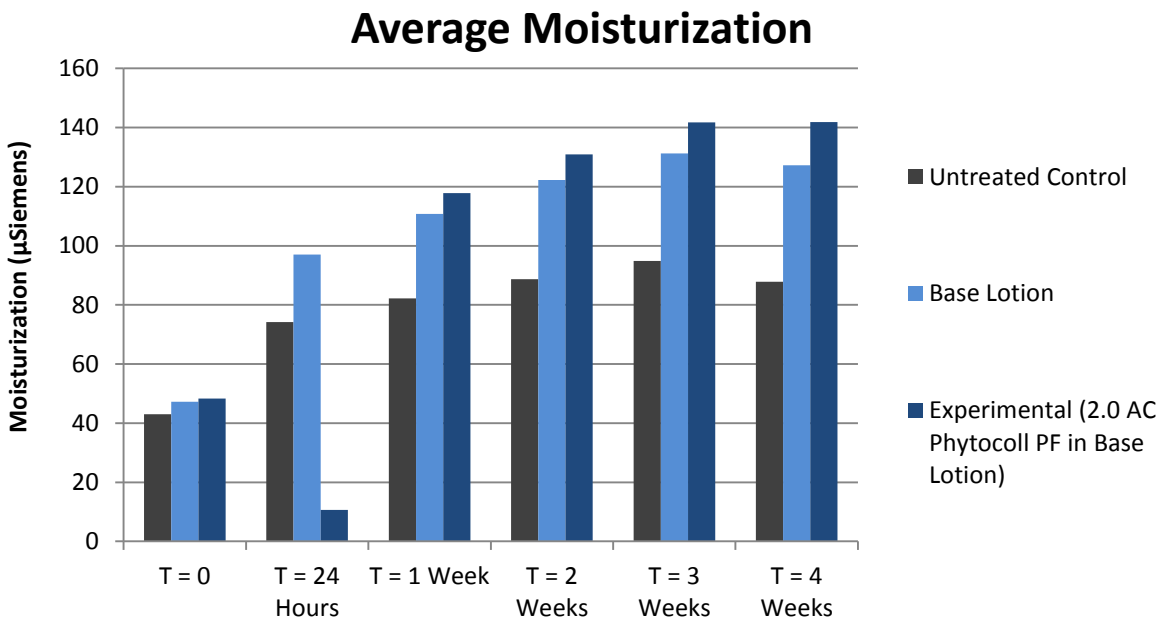


**Figure 1**: Moisturization Results.

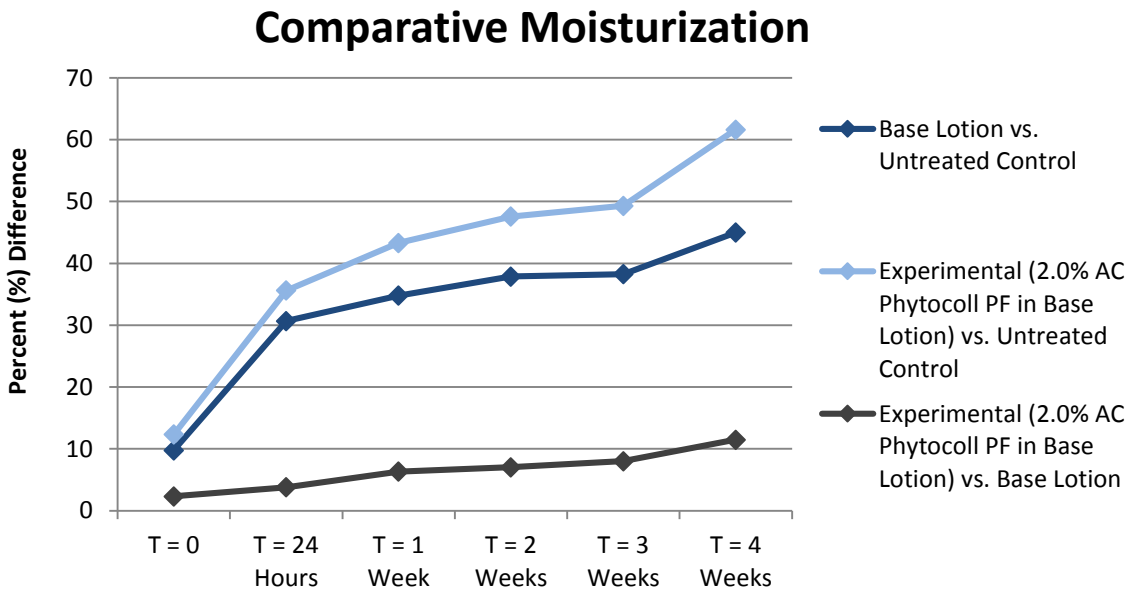


**Figure 2**: Comparative Moisturization Results.

info@activeconceptsllc.com • +1 (704)-276-7100 • Fax: +1 (704)-276-71

## Discussion

As evidenced in a 4-week efficacy study of **AC Phytocoll PF** on the skin, moisture levels were improved by 43% after 24 hours and by 87.8% after 4 weeks when compared to the base lotion. The results indicate that **AC Phytocoll PF** is capable of increasing moisturization when compared to the untreated control and the base lotion. The present study confirms that **AC Phytocoll PF** is capable of providing moisturizing and skin hydrating benefits when added to cosmetic applications.