

Tradename: PhytoCycle® Orange

Code: 16925

CAS #: 7732-18-5 & 84012-28-2 & 1686112-36-6 (or) 68333-16-4

Test Request Form #: 7067

Lot #: N200818K

Sponsor: *Active Concepts, LLC; 107 Technology Drive Lincolnton, NC 28092*

Study Director: *Maureen Danaher*

Principal Investigator: *Parisa Mehrzadeh*

Test Performed:

Hair Hydration via Gravimetric Analysis

Introduction

Thermogravimetric Analysis (TGA) is used to study the thermal stability of a material. A common method of TGA is to weigh a sample with a balance before and after heating the sample for a set amount of time. Mass loss may occur due to evaporation of water or solvent, decomposition, or reaction of the material applied to the sample. The weight of a sample can be calculated to give information about the material that was applied. This method can be applied to hair care products that claim protective abilities for the hair such as moisture retention. By applying the cosmetic material to a tress of hair, information about water loss can be quantified.

Accordingly, a Gravimetric Analysis was performed to determine the hair hydrating properties of **PhytoCycle® Orange**. Additionally, AC Keratin Hydrolysate 30 PF was included to provide comparison to animal-derived keratin.

Assay Principle

Human hair tresses were tested to understand the moisturizing capability of a cosmetic product. Tresses are weighed before and after application of the testing materials then subjected to heat treatment for a set period of time to allow for potential evaporation of the products. After heat treatment tresses are reweighed and moisture loss is calculated for each tress.

Materials

- A. **Hair Samples:** Human Virgin Brunette Hair Tresses
- B. **Incubation Conditions:** Yamato Constant Temperature Oven DKN402C at 105°C
- C. **Equipment:** Mettler Toledo Precision Balance ME103TE; Medium Size Weigh Trays
- D. **Software:** Excel Analysis ToolPak (Microsoft)

*Or suitable alternatives, subject to change without notice based off vendor availability

Methods

Four hair tresses were collected, weighed, and then treated with DI water, 5.0% **PhytoCycle® Orange**, 5.0% AC Keratin Hydrolysate 30 PF, or left as an Untreated Control. After treatment, hair tresses were weighed again, and then placed into a constant temperature-drying oven for 1 hour at 105°C. When removed from the oven, the hair was given time to cool in a humidity-controlled chamber, and then weighed. Hair hydration was determined by calculating the percent moisture per hair tress. Assays were repeated three separate times and averages from all three experiments are displayed. Data was analyzed using a one-way ANOVA with statistical significance accepted at $p \leq 0.05$.

Results

The data obtained from this study met criteria for a valid assay and the Untreated Control and DI water performed as anticipated. Compared to the Untreated Control and DI water, hair treated with **PhytoCycle® Orange** demonstrated superior hair hydration properties. The hydration properties between **PhytoCycle® Orange** and AC Keratin Hydrolysate 30 PF were comparable.

Table 1. Percent Moisture by Gravimetric Analysis of Hair Tresses

	Untreated Control	DI water	5.0% AC Keratin Hydrolysate 30 PF	5.0% PhytoCycle® Orange
Initial Mass	0.880	0.843	0.874	0.892
Initial Mass + Test Product	0.880	1.712	1.717	1.782
Final Mass	0.796	0.765	0.929	0.952
Percent Moisture (%)	-9.5%	-4.6%	3.4%	3.2%

Table 2. Results from one-way ANOVA Statistical Analysis of Hair Percent Moisture. Results represent p-values between the two conditions compared. * indicates significance ($p \leq 0.05$) between the two conditions compared.

	Untreated Control vs DI Water	DI Water vs 5.0% PhytoCycle® Orange	5.0% AC Keratin Hydrolysate 30 PF vs 5.0% PhytoCycle® Orange
P-value	> 0.05	< 0.001*	> 0.05

Discussion

A gravimetric analysis was performed to determine the hair hydrating properties of **PhytoCycle® Orange**.

As demonstrated in Table 1, the Untreated Control and DI Water reduced moisture in hair by 9.5% and 4.6%, respectively (Table 2). Conversely, hair tresses treated with 5.0% **PhytoCycle® Orange** demonstrated a 3.4% increase in moisture, an increase significantly greater than DI Water. Moreover, 5.0% AC Keratin Hydrolysate 30 PF experienced a 3.2% increase in moisture which is comparable to **PhytoCycle® Orange**. This data indicates **PhytoCycle® Orange** exerts superior moisture retention on hair and is comparable to animal-derived keratin.

Taken together, these results indicate **PhytoCycle® Orange** enhances moisture retention in virgin brunette hair when added to personal care applications at recommended use levels and does so comparably to animal-derived keratin. Collectively, **PhytoCycle® Orange** demonstrates hair hydration properties which improves protective functions and contributes to the appearance of healthier looking hair.