# Hair Hydration via Gravimetric Analysis

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**Tradename:** ACB Rice Water SF

**Code:** 16932

**CAS #:** 68553-81-1 & 68333-16-4 (or) 1686112-36-6

**Test Request Form #:** 9080

**Lot #:** N220303D

**Sponsor:** *Active Concepts, LLC; 107 Technology Drive Lincolnton, NC 28092*
**Study Director:** *Maureen Danaher*
**Principal Investigator:** *Grant Tyler*

**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 **ACB Rice Water SF**.

## 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.

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## Materials

A. **Hair Samples:** Human Virgin Brunette and Bleached Blonde 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

Eight hair tresses (four bleach blonde and four virgin brunette) were collected, weighed, and then treated with DI water, Unfermented Rice Water, 5.0% **ACB Rice Water SF**, 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, DI water and Unfermented Rice Water, hair treated with **ACB Rice Water SF** demonstrated superior hair hydration properties.

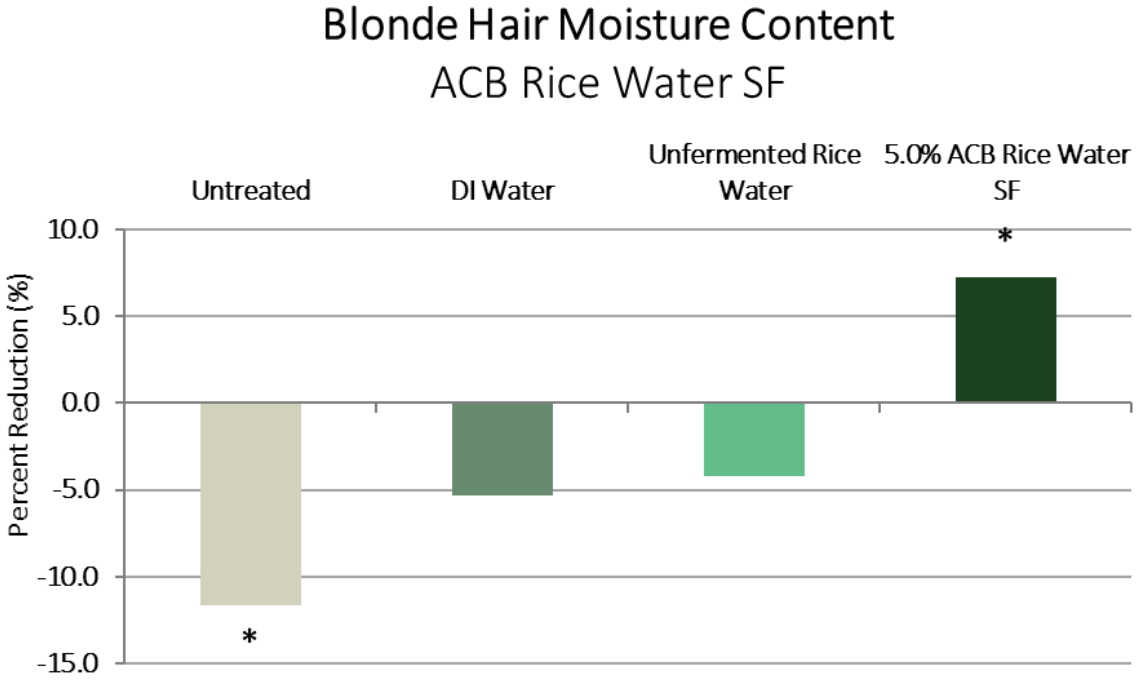


**Figure 1.** Bleach Blonde Hair Moisture Loss. * indicates significance ($p \leq 0.05$) compared to DI Water.

**Table 1.** Results from one-way ANOVA Statistical Analysis for Bleach Blonde 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 Unfermented Rice Water | DI Water vs 5.0% **ACB Rice Water SF** |
|---|---|---|---|
| **P-value** | < 0.001* | > 0.05 | < 0.001* |

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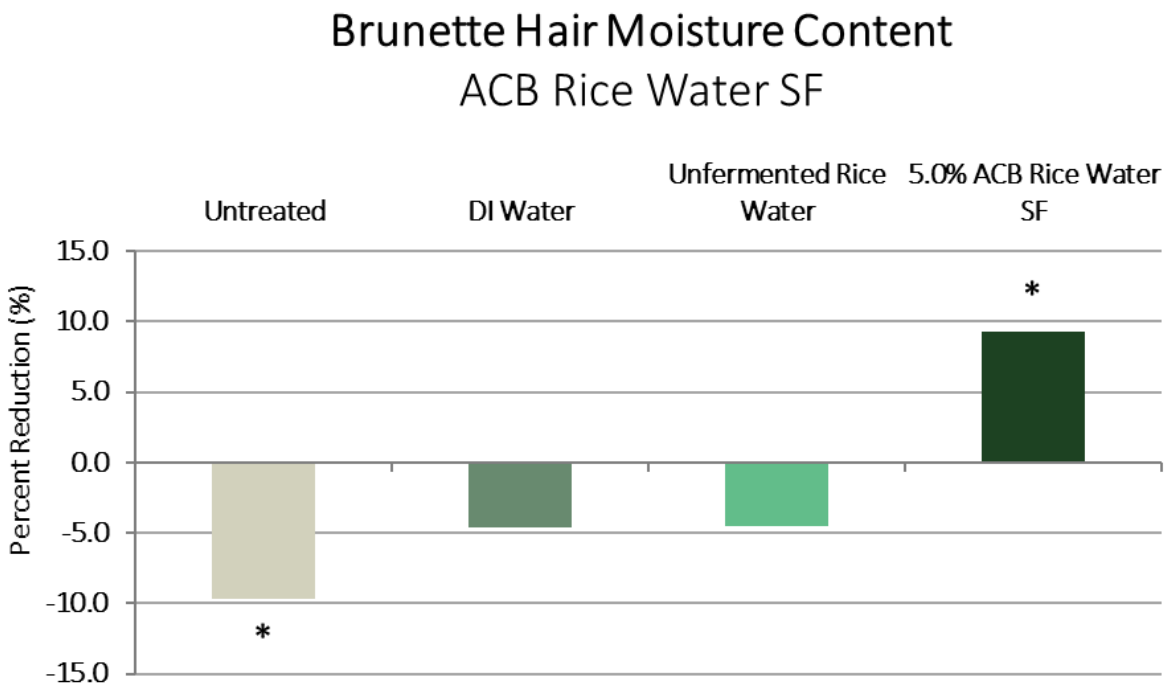


**Figure 2**. Virgin Brunette Hair Moisture Loss. * indicates significance ($p \leq 0.05$) compared to DI Water.

**Table 2.** Results from one-way ANOVA Statistical Analysis for Virgin Brunette 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 Unfermented Rice Water | DI Water vs 5.0% **ACB Rice Water SF** |
|---|---|---|---|
| **P-value** | < 0.001 | > 0.05 | < 0.001* |

## Discussion

A gravimetric analysis was performed to determine the hair hydrating properties of **ACB Rice Water SF**.

As demonstrated in Figure 1, the Untreated Control, DI Water, and Unfermented Rice Water reduced moisture in bleach blonde hair by 12%, 5%, and 4%, respectively. Conversely, bleach blonde hair tresses treated with 5.0% **ACB Rice Water SF** demonstrated a 7.2% increase in moisture, an increase significantly greater than DI Water (Table 1). This data indicates **ACB Rice Water SF** exerts superior moisture retention with bleach blonde hair compared to water alone.

With respect to virgin brunette hair tresses, the Untreated Control, DI Water, and Unfermented Rice Water reduced hair moisture by 8%, 5%, and 5%, respectively (Figure 2). Conversely, 5.0% **ACB Rice Water SF** induced a 9% increase in virgin brunette hair hydration, an increase significantly greater than DI Water (Table 2). This data demonstrates **ACB Rice Water SF** elicits augmented moisture retention with virgin brunette hair compared to water alone.

Taken together, these results indicate **ACB Rice Water SF** enhances moisture retention in bleach blonde hair and virgin brunette hair when added to personal care applications at recommended use levels. Collectively, **ACB Rice Water SF** demonstrates hair hydration properties which improves protective functions and contributes to the appearance of healthier looking hair.