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Tradename: ABS White Willow Bark Extract Powder

Code: 10229

CAS #: 84082-82-6

Test Request Form #: S13

Lot #: NC150410-F, NC150410-G

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

Test Performed:
Salon Half-Head Study

Introduction
Hair appearance is reflective of an individual's self-esteem, mental-image, and well-being. The condition of an individual's hair significantly impacts how one views themselves as it relates to their physical appearance. Additionally, hair is often the initial feature that others observe about one's appearance. The vibrance and condition of hair is indicative of how another individual may perceive personality and self-confidence. In addition to promoting hair hygiene and health, a proper hair care routine that incorporates appropriate products may reduce the possibility of premature hair loss. Therefore, maintaining a healthy hair appearance can improve an individual's relationship with themselves and others as well as enhance their well-being.

Accordingly, a Salon Half-Head Study was conducted to evaluate the perceived hair benefits of **ABS White Willow Bark Extract Powder** in a shampoo and conditioner on wet and dry hair.

Study Principle
Initial photographs of participants hair were obtained. Following baseline images, participants had half of their hair washed with a control Base Shampoo and Base Conditioner, while the other half of their hair was washed with the test material in a Base Shampoo and Base Conditioner. Participants completed wet and dry sensory analysis assessments and final photographs were obtained after participant's hair was completely dry.

Materials
A. **Materials:** T3 Blow-Dryer; 1.5" Round Brush
B. **Products**: Base Shampoo and Base Conditioner (Table 1)
C. **Software:** Excel Analysis ToolPak (Microsoft)

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Table 1. Ingredient List (INCI Names) of Base Shampoo and Base Conditioner

Base Shampoo	Base Conditioner
Water	Water
Guar Hydroxypropyltrimonium Chloride	Polyquaternium-10
Sodium Methyl 2-Sulfolaurate	Glycerin
Cocamidopropyl Betaine	Cetrimonium Chloride
Lactobacillus Ferment	Behentrimonium Methosulfate
Lactobacillus	Cetearyl Alcohol
Coco Nucifera (Coconut) Fruit Extract	Butylene Glycol
	Hydrogenated Ethylhexyl Olivate
	Lactobacillus Ferment

Methods

Five volunteers between the ages of 20 and 41 participated in this study. Each participant had both halves of their head assigned to a specific condition and were blinded to the treatment (Table 2). The left half of their head was treated with the Base Shampoo and Base Conditioner alone. Conversely, the right half of their head was treated with 2.0% **ABS White Willow Bark Extract Powder** in the Base Shampoo and Base Conditioner. Baseline photographs were taken of participants' hair prior to washing. After the shampoo treatment was applied and washed out, participants completed a wet sensory analysis regarding the shampoo. Next, the conditioner treatment was applied, washed out, and a wet sensory analysis pertaining to the conditioner was completed. After each participant's hair was blown dry with a round brush, final photographs were taken, and participants were asked to complete a dry sensory analysis of the conditioner treatment.

Table 2. Descriptions of the Conditions and Treatments for each Test Site

Hair Test Site	Condition	Treatment / Test Article Application Description
1	Base Shampoo and Base Conditioner	Base Shampoo and Base Conditioner
2	2.0% **ABS White Willow Bark Extract Powder**	2.0% **ABS White Willow Bark Extract Powder** in Base Shampoo and Base Conditioner

The wet and dry sensory analyses were implemented to evaluate multiple perceived hair benefit parameters of each shampoo and conditioner treatment. Analyses were completed using a scale from 1 to 10, with 1 indicating the lowest perceived benefit and 10 representing the highest perceived benefit. Results from the wet and dry sensory analysis assessments were averaged for each parameter. Data is displayed as averages and was analyzed using paired t-tests with statistical significance accepted at $p \leq 0.05$. The percent change in each parameter was calculated relative to the Base Shampoo and Base Conditioner, using the following equation:

$$Percent\ Change\ (\%) = \frac{Rating_{2.0\%\ \boldsymbol{ABS\ White\ Willow\ Bark\ Extract\ Powder}} - Rating_{Base\ Shampoo\ and\ Base\ Conditioner}}{Rating_{Base\ Shampoo\ and\ Base\ Conditioner}} \times 100$$

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Table 3. Wet and Dry Sensory Analysis Parameter Descriptions

	Parameter	Description
Wet Assessment	Wet Combability	Ability to brush hair easily without pulling while the hair is wet
	Cleansing	Ability to leave hair feeling clean and remove product build-up
	Smoothing	Ability to make hair fall in the same direction with no visible knots
Dry Assessment	Dry Combability	Ability to brush hair easily without pulling while the hair is dry
	Anti-Frizz	Ability to make hair fall uniformly while also decrease the amount of flyaways
	Overall Feel	Satisfaction of hair feel
	Shine	Ability to make hair look bright and luminous
	Hydration	Ability to make hair look clean and feel soft

Results

The data obtained met criteria for a valid study as the Base Shampoo and Base Conditioner performed as anticipated. The addition of 2.0% **ABS White Willow Bark Extract Powder** in shampoo and conditioner improved the perceived benefits in wet and dry hair compared to the Base Shampoo and Conditioner.

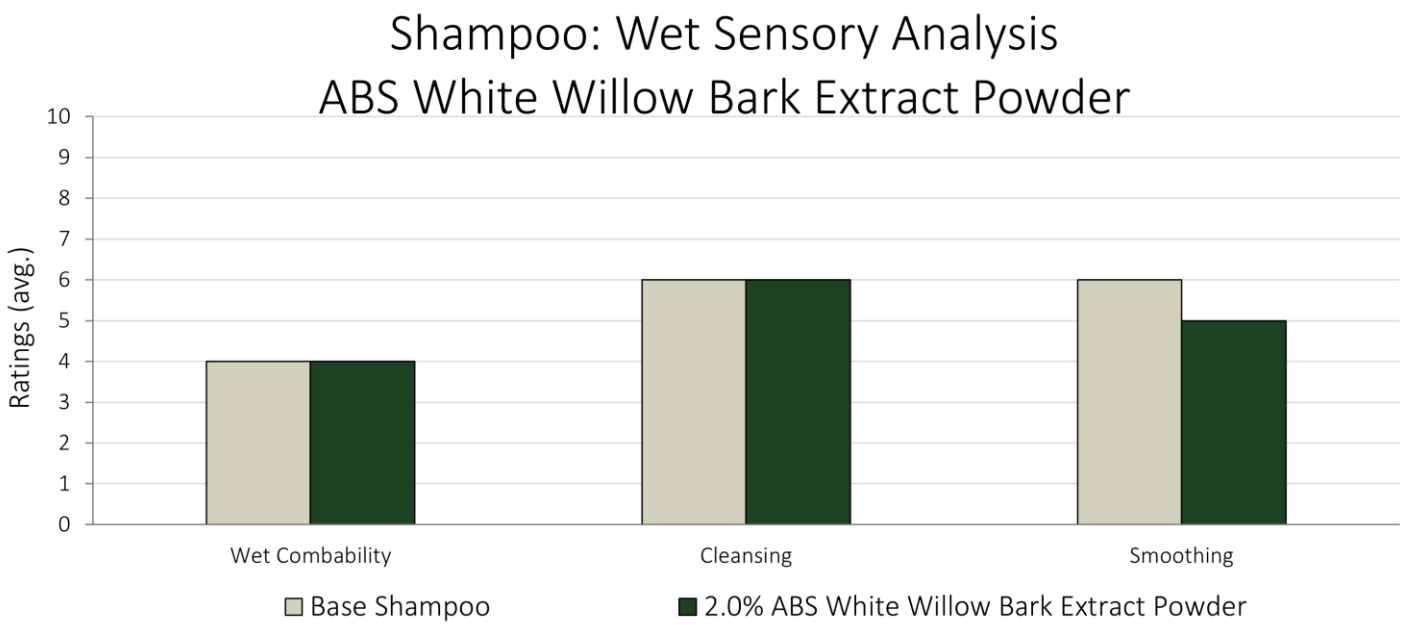

Figure 1. Results of the Wet Sensory Analysis After Shampoo Treatments. Analyses were completed using a scale from 1 to 10, with 1 indicating the lowest perceived benefit and 10 representing the highest perceived benefit. * indicates significance ($p \leq 0.05$) between conditions.

Table 4. Results from the T-test Analysis of the Wet Sensory Analysis Parameters between Base Shampoo and 2.0% **ABS White Willow Bark Extract Powder.** * indicates significance ($p \leq 0.05$) between conditions.

	Wet Combability	Cleansing	Smoothing
P-value	0.500	0.500	0.170

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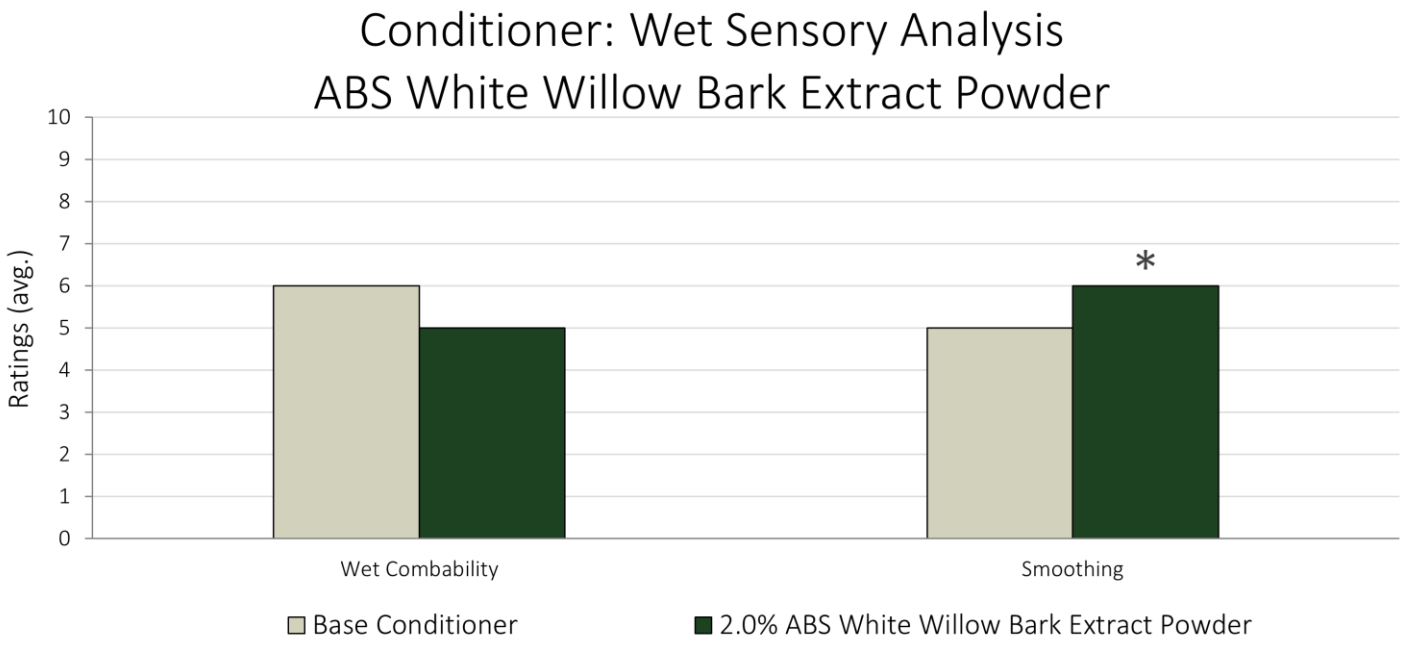

Figure 2. Results of the Wet Sensory Analysis After Conditioner Treatments. Analyses were completed using a scale from 1 to 10, with 1 indicating the lowest perceived benefit and 10 representing the highest perceived benefit. * indicates significance ($p \leq 0.05$) between conditions.

Table 5. Results from the T-test Analysis of the Wet Sensory Analysis Parameters between the Base Conditioner and 2.0% ABS White Willow Bark Extract Powder. * indicates significance ($p \leq 0.05$) between conditions.

	Wet Combability	Smoothing
P-value	0.342	0.050*

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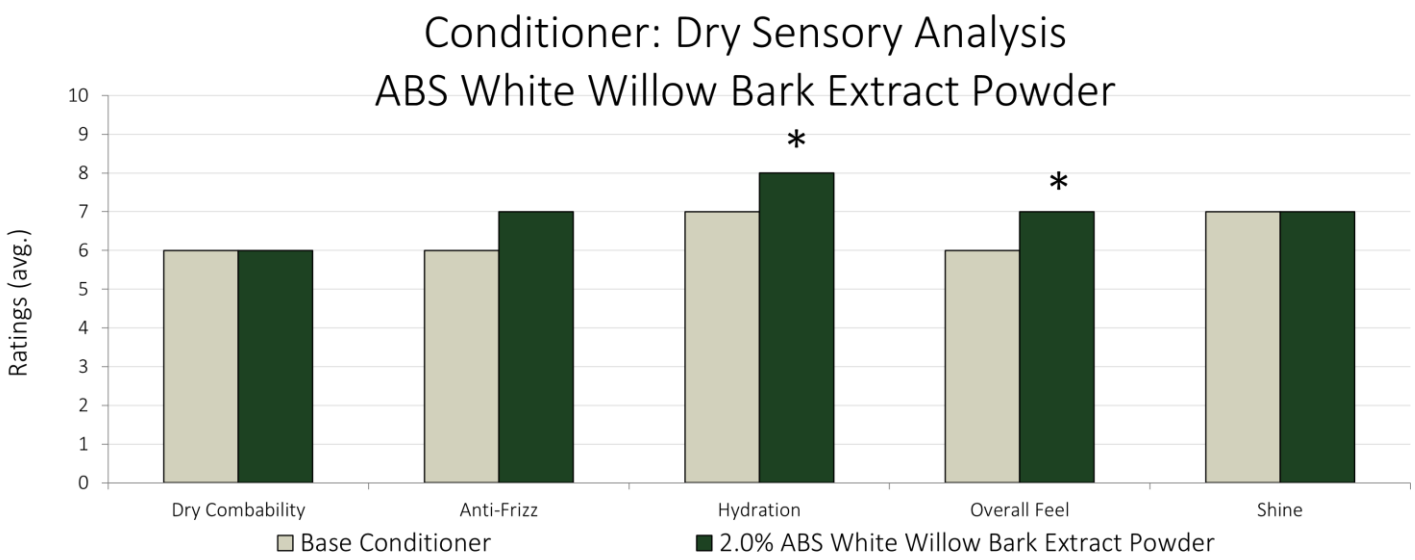

Figure 3. Results of the Dry Sensory Analysis After Conditioner Treatments and Hair was Blown Dry. Analyses were completed using a scale from 1 to 10, with 1 indicating the lowest perceived benefit and 10 representing the highest perceived benefit. * indicates significance ($p \leq 0.05$) between conditions.

Table 6. Results from the T-test Analysis of the Dry Sensory Analysis Parameters between the Base Conditioner and 2.0% ABS White Willow Bark Extract Powder. * indicates significance ($p \leq 0.05$) between conditions.

	Dry Combability	Anti-Frizz	Hydration	Overall Feel	Shine
P-value	0.545	0.112	0.041*	0.032*	0.500

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Image 1. Participant Images Before Shampoo and Conditioner Application and After Blow Drying

Image 2. Participant Images Before Shampoo and Conditioner Application and After Blow Drying

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Image 3. Participant Images Before Shampoo and Conditioner Application and After Blow Drying

Image 4. Participant Images Before Shampoo and Conditioner Application and After Blow Drying

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Image 5. Participant Images Before Shampoo and Conditioner Application and After Blow Drying

Discussion

A Salon Half-Head Study was conducted to evaluate the perceived hair benefits of 2.0% **ABS White Willow Bark Extract Powder** in a shampoo and conditioner on wet and dry hair.

Wet sensory analysis of the Base Shampoo demonstrated perceived hair benefits were slightly below average for Wet Combability, above average for Cleansing and for Smoothing (Figure 1). The addition of 2.0% **ABS White Willow Bark Extract Powder** to the Base Shampoo maintained perceived benefits for Wet Combability, Cleansing, and Smoothing in wet hair (Figure 1; Table 4). These results demonstrate **ABS White Willow Bark Extract Powder** maintains the perceived ability to brush wet hair easily, leaves wet hair feeling clean while removing product build-up, and helps wet hair fall in the same direction with no visible knots when added to a shampoo.

Similarly, wet sensory analysis of the Base Conditioner demonstrated perceived hair benefits were above average for Wet Combability and average for Smoothing (Figure 2). However, the addition of 2.0% **ABS White Willow Bark Extract Powder** to the Base Conditioner increased perceived benefits of Smoothing by 20% and maintained perceived benefits of Wet Combability in wet hair (Figure 2; Table 5). These results demonstrate **ABS White Willow Bark Extract Powder** augments the perceived ability to brush wet hair easily and helps wet hair fall in the same direction with no visible knots when added to a conditioner.

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After hair was blown dry with a round brush, dry sensory analysis of the Base Conditioner demonstrated perceived hair benefits were above average for Dry Combability, Anti-Frizz, Hydration, Overall Feel, and Shine (Figure 3). However, the addition of 2.0% **ABS White Willow Bark Extract Powder** to the Base Conditioner maintained perceived benefits of Dry Combability and Shine, increased perceived benefits of Anti-Frizz by 17%, significantly increased perceived benefits of Hydration by 14%, and Overall Feel by 17% in dry hair (Figure 3; Table 6). These results demonstrate **ABS White Willow Bark Extract Powder** enhances the perceived ability to brush dry hair easily, helps hair fall uniformly while reducing flyaways, improves the satisfaction of hair feel, increases the brightness and luminous appearance of hair, and improves the appearance of clean hair with a soft feel when added to a conditioner.

Furthermore, participants of all hair types experienced visual hair benefits when treated with 2.0% **ABS White Willow Bark Extract Powder**. Specifically, hair treated with 2.0% **ABS White Willow Bark Extract Powder** is visibly smoother, shiner, and more hydrated with less frizziness compared to hair treated with the Base Shampoo and Conditioner (Images 1, 2, 3, 4, 5). These results demonstrate **ABS White Willow Bark Extract Powder** elicits visual hair benefits when added to a shampoo and conditioner.

Taken together, these results indicate **ABS White Willow Bark Extract Powder** improves the perceived benefits with wet and dry hair when added to shampoo and conditioner at recommended use levels. Collectively, **ABS White Willow Bark Extract Powder** demonstrates visual and perceived hair characteristics which contribute to a healthier looking hair appearance.