

Tradename: FSS ExoRoot

Code: FSS60202

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Test Request Form #: 14283

Lot #: S260129H

Sponsor: *Formulator Sample Shop, LLC; 125 Technology Drive Lincolnton, NC 28092*

Study Director: *Odalys Gonzalez*

Principal Investigators: *Kylee Ball*

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 **FSS ExoRoot** in a serum on wet and dry hair.

Study Principle

Initial photographs of participants hair were obtained. Following baseline images, participants had their whole head washed with a Base Shampoo and Base Conditioner. After their hair was washed and conditioned, half of their hair treated with a control Base Serum, while the other half of their hair was treated with the test material, 2.0% **FSS ExoRoot** in a Base Serum. Participants completed a wet and dry sensory analysis assessments and final photographs were obtained after participant's hair was completely dry.

Materials

- A. **Materials:** Dyson Blow-Dryer; 1.5" Round Brush
- B. **Products:** Base Shampoo and Base Conditioner (Table 1) ; Base Serum (Table 2)
- C. **Software:** Excel Analysis ToolPak (Microsoft)

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 Olivat
	Lactobacillus Ferment

Table 2. Ingredient List (INCI Names) of Base Serum

Base Serum
Water
Trisodium Ethylenediamine Disuccinate
Pentylene Glycol
Propanediol
Hydroxyethylcellulose
Cetearyl Alcohol
Cetyl Esters
Polyglyceryl-3 Distearate (and) Glyceryl Stearate Citrate
Cocos Nucifera (Coconut) Fruit Extract
Caprylic Capric Triglyceride
Fragrance

Methods

Five volunteers between the ages of 25 and 38 participated in this study. Each participant had the left half and right half of their head assigned to a specific condition and were blinded to the treatment (Table 3). Baseline photographs were taken of participants' hair prior to washing, conditioning, and product application. First, participants had their whole head washed with the Base Shampoo and Base Conditioner. Then, the left half of their head was treated with the Base Serum alone. Conversely, the right half of their head was treated with 2.0% **FSS ExoRoot** in the Base Serum. After each participant's hair was blown dry with a round brush, final photographs were taken, and participants were asked to complete a wet and dry sensory analysis of the serum treatment.

Table 3. Descriptions of the Conditions and Treatments for each Test Site

Hair Test Site	Condition	Treatment / Test Article Application Description
1	Base Serum	Base Serum
2	2.0% FSS ExoRoot	2.0% FSS ExoRoot in Base Serum

The sensory analyses were implemented to evaluate multiple perceived hair benefit parameters of each 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 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 Serum, using the following equation:

$$\text{Percent Change (\%)} = \frac{\text{Rating}_{2.0\% \text{ FSS ExoRoot}} - \text{Rating}_{\text{Base Serum}}}{\text{Rating}_{\text{Base Serum}}} \times 100$$

Table 4. 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
	Dry Combability	Ability to brush hair easily without pulling while the hair is dry
Dry Assessment	Anti-Frizz	Ability to make hair fall uniformly while also decrease the amount of flyaways
	Overall Feel	Satisfaction of hair feel
	Hydration	Ability to make hair look clean and feel soft

Results

The data obtained met criteria for a valid study as the Base Serum performed as anticipated. The addition of 2.0% FSS ExoRoot in Base Serum improved the perceived benefits in wet and dry hair compared to the Base Serum alone.

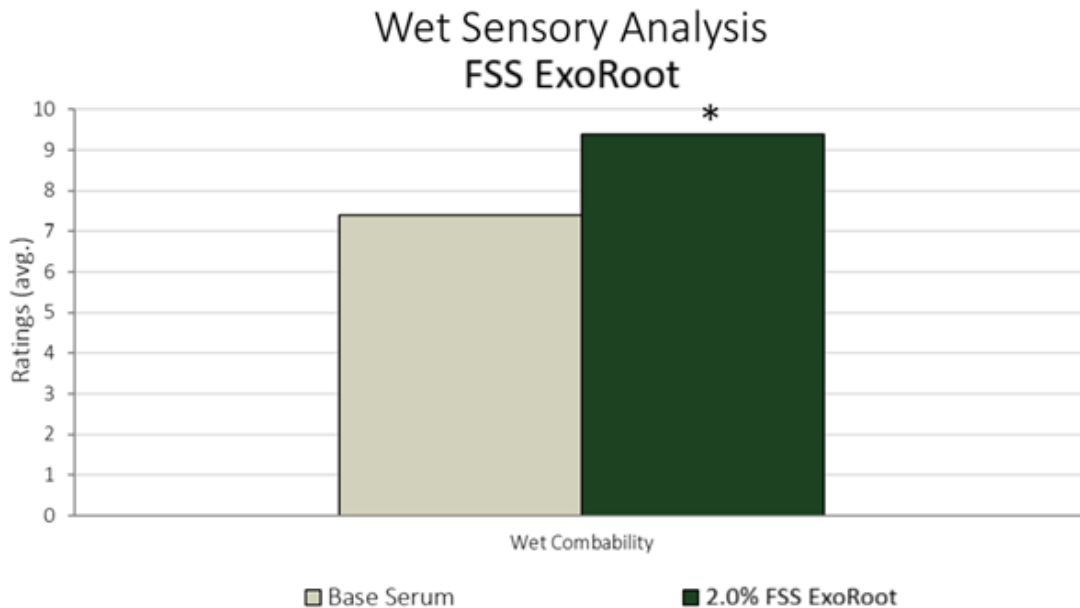


Figure 1. Results of the Wet Sensory Analysis After Serum Treatments. Analyses were completed using a scale from 1 to 10, with 1 indicating the lowest perceived benefit and 10 representing the highest perceived benefit. * indicates significance ($p \leq 0.05$) between conditions.

Table 5. Results from the T-test Analysis of the Wet Sensory Analysis Parameters between Base Serum and 2.0% FSS ExoRoot. * indicates significance ($p \leq 0.05$) between conditions.

	Wet Combability
P-value	$< 0.001^*$

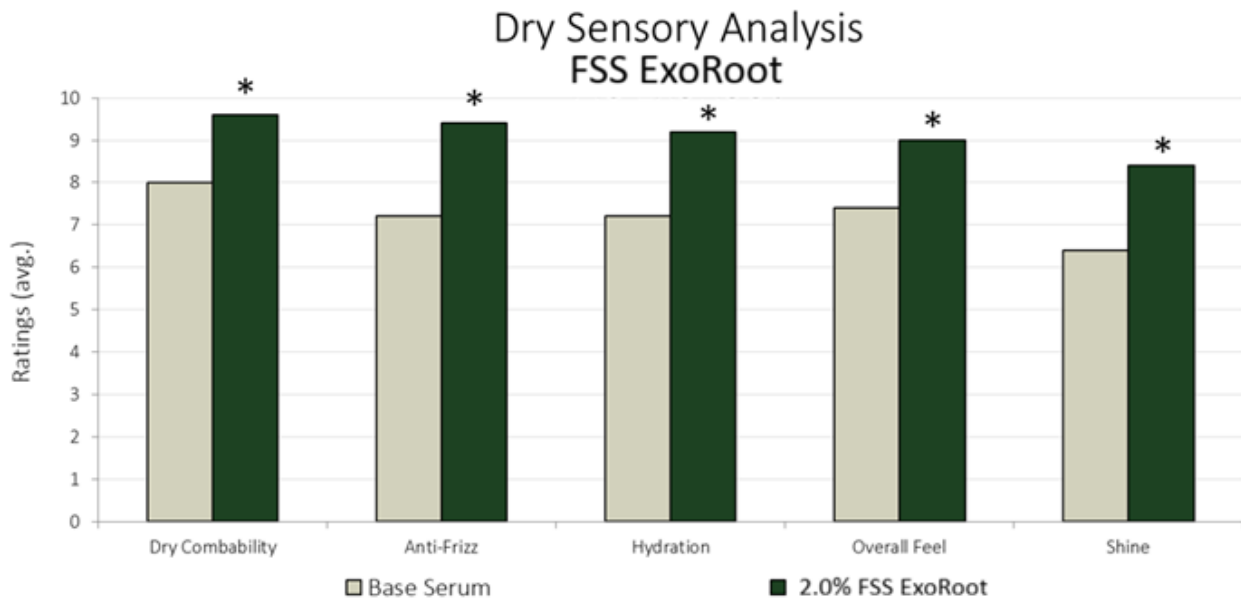


Figure 2. Results of the Dry Sensory Analysis After Serum Treatments and Hair was Blown Dry. Analyses were completed using a scale from 1 to 10, with 1 indicating the lowest perceived benefit and 10 representing the highest perceived benefit. * indicates significance ($p \leq 0.05$) between conditions.

Table 6. Results from the T-test Analysis of the Dry Sensory Analysis Parameters between the Base Serum and 2.0% FSS ExoRoot. * indicates significance ($p \leq 0.05$) between conditions.

	Dry Combability	Anti-Frizz	Hydration	Overall Feel	Shine
P-value	0.020^*	0.010^*	0.005^*	0.002^*	0.009^*



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



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



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% **FSS ExoRoot** in a serum on wet and dry hair.

Wet sensory analysis of the Base Serum demonstrated perceived hair benefits were above average for Wet Combability (Figure 1). However, the addition of 2.0% **FSS ExoRoot** to the Base Serum significantly improved perceived benefits of Wet Combability by 27% (Figure 1; Table 5). These results demonstrate **FSS ExoRoot** increases the perceived ability to brush wet hair easily when added to a serum.

After hair was blown dry with a round brush, dry sensory analysis of the Base Serum 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% **FSS ExoRoot** to the Base Serum significantly improved perceived benefits of Dry Combability by 20%, Anti-Frizz by 31%, Hydration by 28%, Overall Feel by 22%, and Shine by 31% in dry hair (Figure 3; Table 7). These results demonstrate **FSS ExoRoot** 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 serum.

Furthermore, participants of all hair types experienced visual hair benefits when treated with 2.0% **FSS ExoRoot**. Specifically, hair treated with 2.0% **FSS ExoRoot** is visibly smoother, shinier, and more hydrated with less frizziness compared to hair treated with the Base Serum (Images 1, 2, 3, 4, 5). These results demonstrate **FSS ExoRoot** elicits visual hair benefits when added to a serum.

Taken together, these results indicate **FSS ExoRoot** improves the perceived benefits with wet and dry hair when added to a serum at recommended use levels. Collectively, **FSS ExoRoot** demonstrates visual and perceived hair characteristics which contribute to a healthier looking hair appearance.