

## IN VITRO STUDY OF HAIR MASK/ HAIR CONDITIONER CONTAINING GOODNESS OF NATURAL ORIGIN INGREDIENTS TO GET MAXIMUM BENEFITS

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### ABSTRACT

*Hair Care categories are well growing and consumers are always keen to try better and better alternatives in everyday life. There are different segments in category shelves for different usages. Now these are segmenting further in organic, natural origin and normal (Not claiming such). Main reason behind is consumer trends as the days passes on and on, consumers are well educated on natural trends and benefits of these products. Most of the consumers are happy to pay more to get high natural content containing products. Primary need is beautiful hair in less time. Today the consumer is too busy and they don't want to spare time in these routines. Anything can appeal them to spend money and give a try which is satisfying their need.*

*Common formats are, Hair Shampoos, Hair Conditioners, 2 in 1 Hair Shampoo and conditioner, Hair Masks. These ranges are rinse off as a main format types. There are leave on conditioners and hair masks also available in the market which is close to the hair cream and serums. The purpose is to help with good hair and scalp cleaning and conditioning to the consumer. The science is to use silicone, Cationic quaternary compounds and Triglycerides etc. to help get moistures entrapped. The Mechanism is very simple, wet hair carries negative charge and it helps cationic compound to stick with hair.*

*Natural hair mask for rinse off and leave on is one of the best product to offer to the consumers for their better hair and scalp health. It is full of natural origin goodness and contains fruit extracts, natural triglycerides, signature Vatika oil blends and quaternary compounds to help consumer embedding best ever experiences for day to day need.*

*This formula also help lock moisture for long and help keep hair prevent from frizzing. It also work to nourish scalp for best strong hairs.*

*Triglycerides help repair surface of the hair it also covers split ends. As triglycerides are sticking to the surface of hair it also helps lock moisturizer to give a good shine and softness to the hair. This packing help environmental damage too.*

*Shea butter helps scalp health and prevent surface inflammation, which works as a soothing agent.*

*The formula base is not containing any Mineral oil, Paraben, Phthalate, Silicone and Alcohol.*

**Keywords:** Hair mask, hair conditioner, natural origin ingredient, natural fruit extracts, triglycerides

## **INTRODUCTION**

There are so many variables which can impact hair in everyday life. Air Pollution, humidity, not enough care and stress are some of the main cause of hair fall. Some of the elements are related to vitamin and mineral deficiencies. Perhaps some of the elements are mainly dependent upon physical state of hairs. Also very much dependent on static charges and the bio-physical conditions of the hair; the environment factor results in breakage of hair from the shaft. Sometime it can worsen the hair texture, which impact long term hair roughness and hair loss. The product which we trial contains triglycerides, Fruit extracts and moisturizers to treat hair and make up the roughness to give it shine and perfect manageability. It also help to control frizz and smoothen the hair cuticles to trap all day long moisture. The overall blend in the formula works in very fastest way to help maintain hair in 2 minutes.

The formula composition also help nourish scalp. Give confidence to the user and prevent damaging to the hair from the root. The product is also works in leave on and can be used as a cream.

### **Study Design**

The objective of this study was to evaluate and compare in vitro efficacy of hair mask formulation with respect to sensorial attributes on hair tresses for products.

The test products is thick creamy like texture and smooth with fruity fragrance

### **Hair Tresses**

- Total 12 Indian natural black hair tresses.
- Glued weft Indian-natural hair
  - Length 20 cm
  - Width 2.5 cm
  - Weight 3.0 gm (approx.)

### **Product Application**

- The product application was done in 2 treatment groups.
- Group I: 0.3 ml of product was applied and allowed to rest on tresses for 2 minutes and then rinsed off.
- Group II: 0.3 ml of product was applied and allowed to rest on tresses for 3 minutes and then rinsed off.
- The evaluation was carried out under a controlled temperature and relative humidity (temperature:
  - 20°C to 25°C, hygrometry: 60 ±10%). The lighting is ensured by a ceiling lamp.
  - 6 hair tresses for each group were evaluated by each of 10 experts as sensory evaluator and
  - Dia-stron meter.

## Procedure

- Hair tresses from the same bundle were checked for uniformity and quality.
- Total 12 hair tresses (6 per group) were used for evaluation.
- Cleaned with 15 % SLES and dried hair tresses overnight.
- Baseline sensory analysis was performed.
- Product application- Product was dispensed onto a wet hair swatch. The procedure for wetting the swatch and the placement of the product on the swatch was kept constant.
- Product was allowed to rest on tresses for 2 minutes & 3 minutes respectively.
- Washed off the test product under running tap water.
- Gently combed individual tresses to remove major tangles.
- Allowed the tresses to dry overnight.
- Post application sensory analysis for parameters was assessed.
- 10 experts of panel to evaluate each of 6 hair tresses per group.

## Studied Parameters

- The evaluation was performed using a scale from 0 to 10.
- The parameters evaluated were manageability, shine, smoothness, moisture & frizz.

<b>Manageability</b>	Ease (Low	of High)	combing	hair	swatch*
<b>Shine</b>	Amount (Low	of High)	light reflected	off	hair swatch*
<b>Smoothness</b>	Amount of or lack of a rough/ harsh feeling along hair swatch* (Low High)				
<b>Moisture</b>	Amount of or lack of a hydration/ dryness feel along hair swatch* (Slightly Very)				
<b>Frizz</b>	Amount of or lack of a frizz i.e., fuzzy small tight curls along hair swatch* (LowHigh)				

\*As compared to baseline on visual scale

## Interpretation of results

- The significant difference in average grade signifies better effect of the product.

## Data Analysis & Statistic

The results include:

- Raw values for each subject at each examination.
- Differences, in relation to T0 for each subject during the study (Tn – T0).

- Means, medians, maximum, minimum and standard deviations of the raw values and of the differences in relation to T0 obtained by the entire panel.
- Numbers and percentages of subjects presenting an improvement.

### Comparison in time for product

The normality of the distributions is checked using Shapiro-Wilk test, threshold at 1%.

The statistical analysis of the evolution of the measured parameters during the study is performed using the Student test (normality of distributions checked) or with the Wilcoxon test (normality of the distributions rejected). The significance threshold is fixed at 5%.

## RESULTS

### Sensory Evaluation Analysis

The studied parameters are:

- Manageability
- Shine
- Smoothness
- Moisture
- Frizz

A significant difference in average grade for manageability, shine, smoothness, moisture & frizz shows an effect of the product in terms of improvement in above parameters.

### Observed Results for Group I (T+2 minutes after application)

Raw values

The following table presents the means and standard deviation of the raw values of the studied parameters on hair tresses treated with the test Product A at T0 (initial) and T1 (2 minutes after application), as well as the corresponding statistical analysis (Student t test, two-tailed for paired groups at 5%, after the checking the normality of the distributions by a Shapiro Wilk test at 1%).

		RAW VALUES (GROUP I)	
		T0	T+2 minutes after product application
Manageability	Mean	4.43	5.87
	Standard deviation	0.19	0.30
	Significant at 5 % (T0 vs Tn)		Yes
	p=		2.62E-03
	Test		Student t test (two-tailed)
Shine	Mean	5.30	6.80
	Standard deviation	0.22	0.36
	Significant at 5 % (T0 vs Tn)		Yes
	p=		<0.001
	Test		Student t test (two-tailed)
Smoothness	Mean	5.00	6.30
	Standard deviation	0.31	0.18
	Significant at 5 % (T0 vs Tn)		Yes
	p=		<0.001
	Test		Student t test (two-tailed)

Moisture	Mean	5.33	6.73
	Standard deviation	0.35	0.15
	Significant at 5 % (T0 vs Tn)		Yes
	p=		2.86E-03
	Test		Student t test (two-tailed)
Frizz	Mean	5.50	4.67
	Standard deviation	0.12	0.12
	Significant at 5 % (T0 vs Tn)		Yes
	p=		3.64E-04
	Test		Student t test (two-tailed)

Yes: Significant difference in favor of the product

### Evolutions (T1-T0):

The following table presents the means and the standard deviations of the evolutions (T1-T0) of the studied parameters, observed on the hair tresses treated with the test Product A.

		EVOLUTION OF THE PARAMETERS (Tn-T0)	
		T+2 minutes after product application- T0	
<b>Manageability</b>	Mean		<b>1.43</b>
	Standard deviation		0.48
<b>Shine</b>	Mean		<b>1.50</b>
	Standard deviation		0.39
<b>Smoothness</b>	Mean		<b>1.30</b>
	Standard deviation		0.22
<b>Moisture</b>	Mean		<b>1.40</b>
	Standard deviation		0.48
<b>Manageability</b>	Mean		<b>-0.83</b>
	Standard deviation		0.17

### Variations (T1-T0)/T0 %

The following table summarizes the average percentages of the variation (T1-T0)/T0 of the studied parameters, observed on the hair tresses treated with the test Product A, calculated from the average values.

VARIATIONS IN PERCENTAGES*	
(T+2 minutes after product application- T0) / T0	
Manageability	32.33%
Shine	28.30%
Smoothness	26.00%
Moisture	26.25%
Manageability	-15.15%

\*Calculated Based On Mean Value

### Analysis

- Manageability: Significant increase is noted in this parameter by 32.33%.
- Shine: Significant increase is noted in this by parameter by 28.30%.

- Smoothness: Significant increase is noted in this parameter by 26.00%.
- Moisture: Significant increase is noted in this parameter by 26.25%.
- Frizz: Significant decrease is noted in this parameter by -15.15%.

**Observed Results for Group II (T+3 minutes after application)**

**Raw values and Statistics**

The following table presents the means and standard deviation of the raw values of the studied parameters on hair tresses treated with the test Product A at T0 (initial) and T1 (3 minutes after application), as well as the corresponding statistical analysis (Student t test, two-tailed for paired groups at 5%, after the checking the normality of the distributions by a Shapiro Wilk test at 1%).

		RAW VALUES (GROUP II)	
		T0	T+3 minutes after product application
<b>Manageability</b>	Mean	<b>4.43</b>	<b>6.13</b>
	Standard deviation	0.19	0.27
	Significant at 5 % (T0 vs Tn)		<b>Yes</b>
	p= Test		1.05E-03 <i>Student t test (two-tailed)</i>
<b>Shine</b>	Mean	<b>5.30</b>	<b>7.10</b>
	Standard deviation	0.22	0.35
	Significant at 5 % (T0 vs Tn)		<b>Yes</b>
	p= Test		<0.001 <i>Student t test (two-tailed)</i>
<b>Smoothness</b>	Mean	<b>5.00</b>	<b>6.90</b>
	Standard deviation	0.31	0.32
	Significant at 5 % (T0 vs Tn)		<b>Yes</b>
	p= Test		<0.001 <i>Student t test (two-tailed)</i>
<b>Moisture</b>	Mean	<b>5.33</b>	<b>7.37</b>
	Standard deviation	0.35	0.36
	Significant at 5 % (T0 vs Tn)		<b>Yes</b>
	p= Test		<0.001 <i>Student t test (two-tailed)</i>
<b>Frizz</b>	Mean	<b>5.50</b>	<b>3.80</b>
	Standard deviation	0.12	0.36
	Significant at 5 % (T0 vs Tn)		<b>Yes</b>
	p= Test		1.05E-03 <i>Student t test (two-tailed)</i>

**Yes:** Significant difference in favor of the product

### Evaluations (T1-T0)

The following table presents the means and the standard deviations of the evolutions (T1-T0) of the studied parameters, observed on the hair tresses treated with the test Product

<b>EVOLUTION OF THE PARAMETERS (Tn-T0)</b>		
<b>T+3 minutes after product application- T0</b>		
<b>Manageability</b>	Mean	<b>1.70</b>
	Standard deviation	0.45
<b>Shine</b>	Mean	<b>1.80</b>
	Standard deviation	0.22
<b>Smoothness</b>	Mean	<b>1.90</b>
	Standard deviation	0.15
<b>Moisture</b>	Mean	<b>2.03</b>
	Standard deviation	0.07
<b>Manageability</b>	Mean	<b>-1.70</b>
	Standard deviation	0.45

### Variations (T1-T0)/T0 %:

The following table summarizes the average percentages of the variation (T1-T0)/T0 of the studied parameters, observed on the hair tresses treated with the test Product A, calculated from the average values.

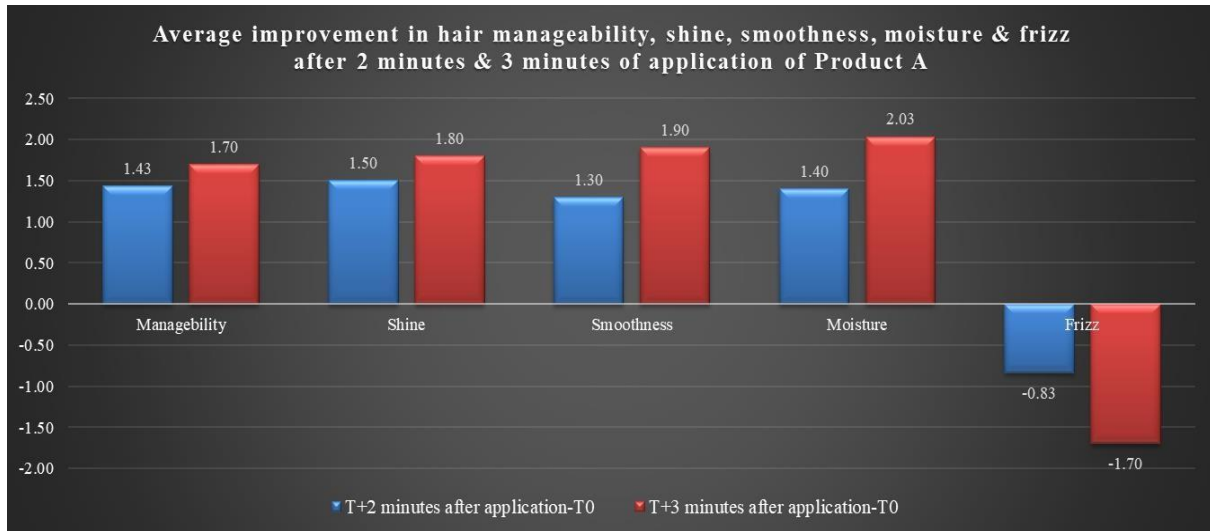
<b>VARIATIONS IN PERCENTAGES*</b>	
<b>(T+3 minutes after product application-T0) / T0</b>	
<b>Manageability</b>	38.35%
<b>Shine</b>	33.96%
<b>Smoothness</b>	38.00%
<b>Moisture</b>	38.13%
<b>Manageability</b>	-30.91%

\*Calculated Based On Mean Value

### Analysis

- Manageability: Significant increase is noted in this parameter by 38.35%.
- Shine: Significant increase is noted in this by parameter by 33.96%.
- Smoothness: Significant increase is noted in this parameter by 38.00%.
- Moisture: Significant increase is noted in this parameter by 38.13%.
- Frizz: Significant increase is noted in this parameter by -30.91%.

## Graphical Representation



## DISSCUSIONS

In the experimental conditions, we have demonstrated following for:

After 2 minutes of application of test product, significant difference observed in the average grade of all sensorial attributes, which shows effect of product in terms of improvement in hair manageability, shine, smoothness, moisture & frizz by 32.33%, 28.30%, 26.00%, 26.25% & -15.15% respectively.

After 3 minutes of application of test, significant difference observed in the average grade of all sensorial attributes, which shows effect of product in terms of improvement in hair manageability, shine, smoothness, moisture & frizz by 38.35%, 33.96%, 38.00%, 38.13% & -30.91% respectively.

## OBSERVATION AND CONCLUSION

1. Hair swatches treated with product is showing significance improvement in hair after use of hair mask/conditioner. Hair become more Manageable, Shines, Smooth and no frizz. Even if leave 2 minutes after application. This is very quick and instant solution.
2. Similarly at 3 minutes leave on after application is showing very good performance for hair Manageability, Shine, Smoothness and Frizzing.
3. The formula doesn't contain nasties like Mineral oil, Paraben, Silicone, Phthalate and Alcohol.
4. The product is worked as damage control for hair from environmental factors.
5. The product is full of goodness of natural origin ingredients. Having infused with natural fruit extracts.

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