TRI-K

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Fision KeraVeg18

A VEGETABLE ALTERNATIVE TO ANIMAL KERATIN

AT A GLANCE

The structure of our hair is composed of three basic parts: the cuticle, cortex and medulla. The cuticle is the outermost layer and serves to protect the hair fiber. The middle layer, known as the cortex, constitutes 80% of the hair mass and is responsible for its strength, elasticity and flexibility. The medulla is the innermost layer of the hair fiber. The hair itself consists predominantly of keratin, which is responsible for its structural properties, including strength and elasticity. This specialized fibrous protein is composed of 18 amino acids. Keratin derivatives are important ingredients used in hair care formulations to help improve the overall quality of hair, usually derived from porcine, ovine or bovine sources.

Fision KeraVeg18 is a vegetable-based alternative to animal keratin that has properties comparable to, and in some cases better than, hydrolyzed animal keratin. It can be used in any hair care formulations as a more sustainable product offering. **Fision KeraVeg18** is a cohesive solution containing wheat and soy amino acids, with additional pure amino acids (of fermented vegetable origin) that are carefully selected to mimic the functional ratios of amino acids in human hair.

RESEARCH METHODS:

- Amino Acid Distribution
- Strengthening Studies
- Elasticity Studies
- Wet & Dry Combing Studies
- Sensory Study
- Antioxidant Capacity

INCI:

Wheat Amino Acids, Soy Amino Acids, Arginine HCl, Serine, Threonine

RECOMMENDED USAGE LEVEL:

2-5%

PRODUCT FEATURES	KEY BENEFITS	SUGGESTED APPLICATIONS
• Alternative to hydrolyzed animal keratin • Vegetable-based • Natural • Paraben-free • Formaldehyde-free	• Mimics the functional ratios in human hair amino acids • Increases hair strength • Enhances hair elasticity • Helps protect hair from harsh salon processes & environmental stressors • Makes hair look more shiny & healthy • Improves combability of hair • Reduces static & frizz	• Shampoos • Conditioners • Leave-on hair treatments • Styling products

AMINO ACID COMPOSITION

Fision KeraVeg18 contains wheat amino acids and soy amino acids, in addition to three individual amino acids; arginine, serine and threonine. These three amino acids were chosen to help mimic the composition of human hair keratin. Arginine is widely known to help reinforce and strengthen hair fibers. Arginine has strong affinity to the hair, thereby delivering strong conditioning & hydrating properties. Serine acts as a precursor to ceramides and delivers conditioning benefits to the hair. Threonine is an essential amino acid that helps to maintain protein balance in the body.

Amino Acid Distribution Chart Comparison

Amino Acid	Hydrolyzed Keratin	Fision KeraVeg18
Alanine	5.30	2.72
Arginine	11.41	10.51
Aspartic Acid	8.70	6.44
Cysteine	2.00	0.20
Glutamic Acid	16.27	22.19
Glycine	7.55	8.31
Histidine	1.10	1.28
Isoleucine	2.55	2.73
Leucine	5.60	4.91
Lysine	3.95	2.87
Methionine	0.55	0.86
Phenylalanine	2.40	3.52
Proline	8.21	6.61
Serine	10.46	11.75
Threonine	7.20	9.80
Tyrosine	1.10	2.35
Valine	5.65	2.95
Total	100.00	100.00

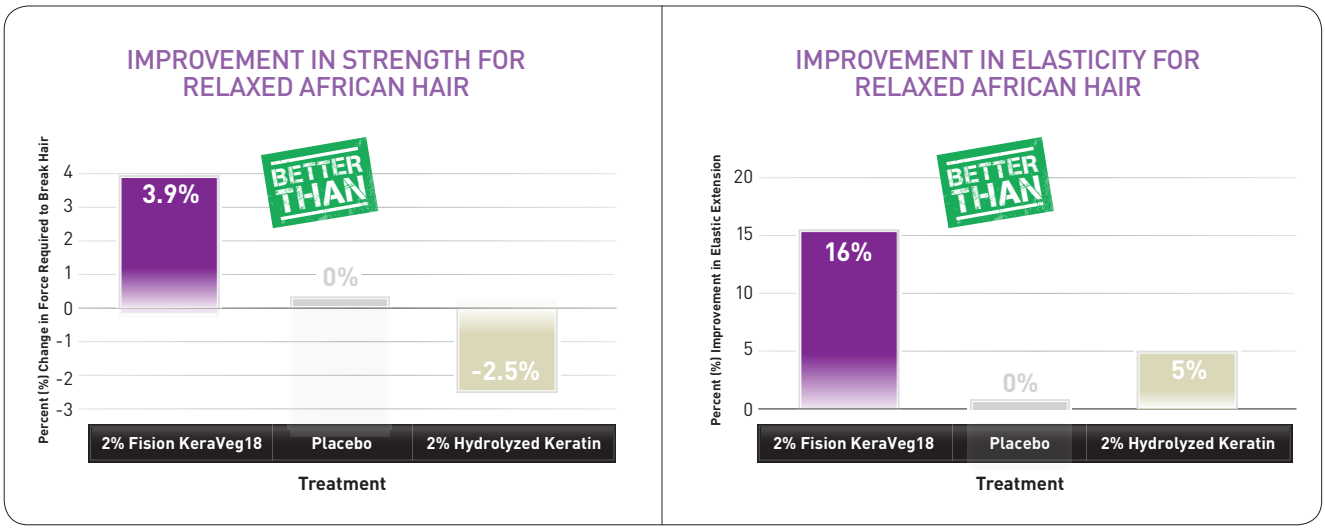
Values reported for hydrolyzed keratin are average values of 2 commercially available hydrolyzed keratins from different suppliers

ARGININE

Arginine helps strengthen & hydrate the hair.

STRENGTH & ELASTICITY

Strength and elasticity are two of the defining qualities of healthy hair. Strong hair can better withstand frequent combing and styling forces that can otherwise damage or break hair. Increasing the elastic nature of the hair fiber can improve its resiliency and allow it to stretch during styling without becoming damaged.



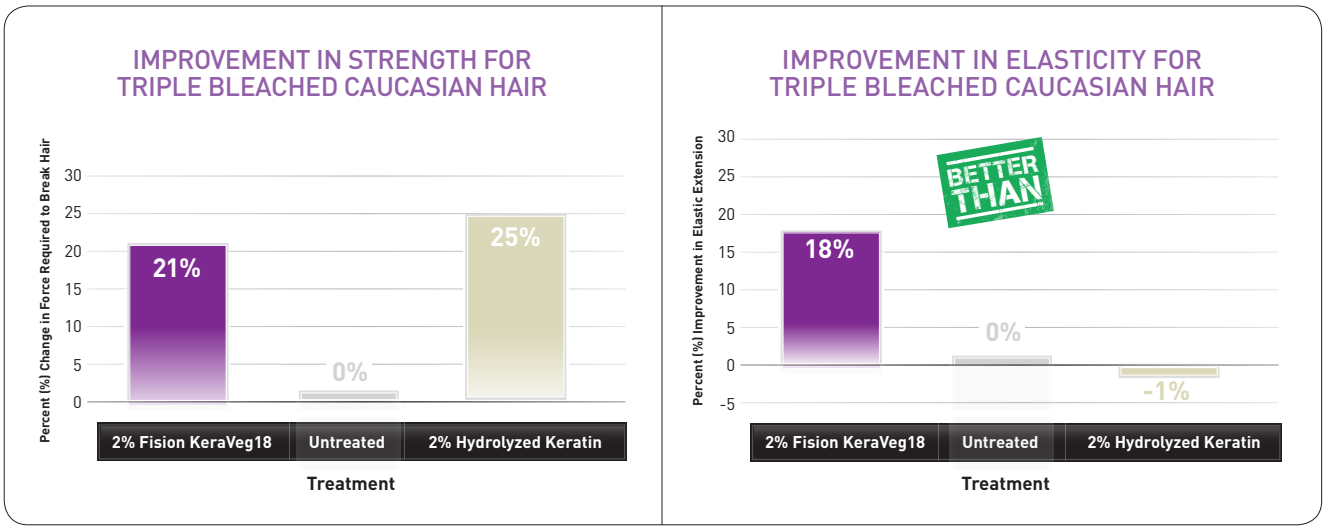
STUDY 1
African Hair Strength & Elasticity Studies

Objective:
To observe benefits **Fision KeraVeg18** can deliver when compared to hydrolyzed animal keratin by measuring the elastic extension and total work required to break individual hair fibers.

Study:
- 90 hair fibers from no-lye relaxed African hair (originally curl type VII) were divided into 3 groups (30 fibers/treatment)
- **Group 1:** 2% **Fision KeraVeg18** in commercial shampoo & conditioner
- **Group 2:** 2% Hydrolyzed keratin in commercial shampoo & conditioner
- **Group 3:** Commercial shampoo & conditioner (placebo)

Hair was relaxed using Soft Sheen Carson Healthy Gloss 5 kit, per manufacturer's instructions. After relaxing, hair was treated with 5 cycles of shampoo (1 minute) and conditioner (2 minutes). Hair dried for 24 hours under ambient conditions. Brass crimps were added to the ends of the fibers following Dia-Stron's methods.

Results:
In these tests, **Fision KeraVeg18** is shown to help counteract hair concerns by improving elasticity and strength. Improving both elastic extension and strength will make the hair healthier and less prone to damage and breakage from styling. In these tests, **Fision KeraVeg18** appeared to be more effective than hydrolyzed keratin.



STUDY 2
Caucasian Hair Strength & Elasticity Studies

Objective:
To observe benefits **Fision KeraVeg18** can offer when compared to hydrolyzed animal keratin by measuring the elastic extension and total work required to break individual hair fibers.

Study:
- 90 triple bleached Caucasian hair fibers taken from the same swatch

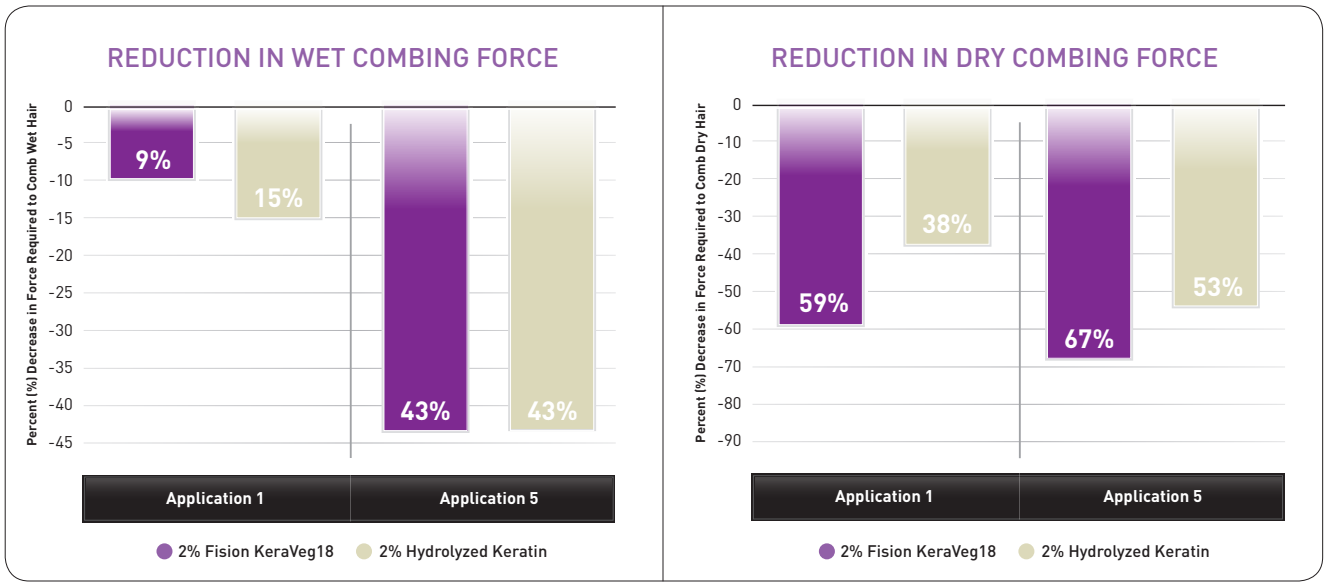
- **Group 1:** 2% **Fision KeraVeg18**
- **Group 2:** 2% Hydrolyzed keratin
- **Group 3:** Untreated

Hair was soaked a total of 3 times in treatment solutions for 30 minutes. For the first and second treatments, hair was allowed to dry for 24 hours under ambient conditions. After the last treatment, hair equilibrated for an hour prior to testing. Brass crimps were then added to the ends of the individual hair fibers following Dia-Stron's methods. Elasticity and tensile strength were then determined on the individual hair fibers.

Results:
Overall, the studies performed on both African and Caucasian hair show **Fision KeraVeg18** is effective on a variety of hair types and can help improve properties such as elasticity and tensile strength. In addition to leaving hair stronger and more resilient, these results also suggest **Fision KeraVeg18** may help repair damage caused by chemically processing the hair.

WET & DRY COMBING

Hair is weakest when wet and is more susceptible to breakage. Dry hair may be difficult to comb towards the ends, thus requiring the use of excess force that can create split ends and breakage over time.



STUDY 3
Wet & Dry Studies

Objective:
To show improvements in manageability (wet & dry combing) that **Fision KeraVeg18** can provide after multiple applications compared to the placebo. Results for hydrolyzed animal keratin are also shown for comparison.

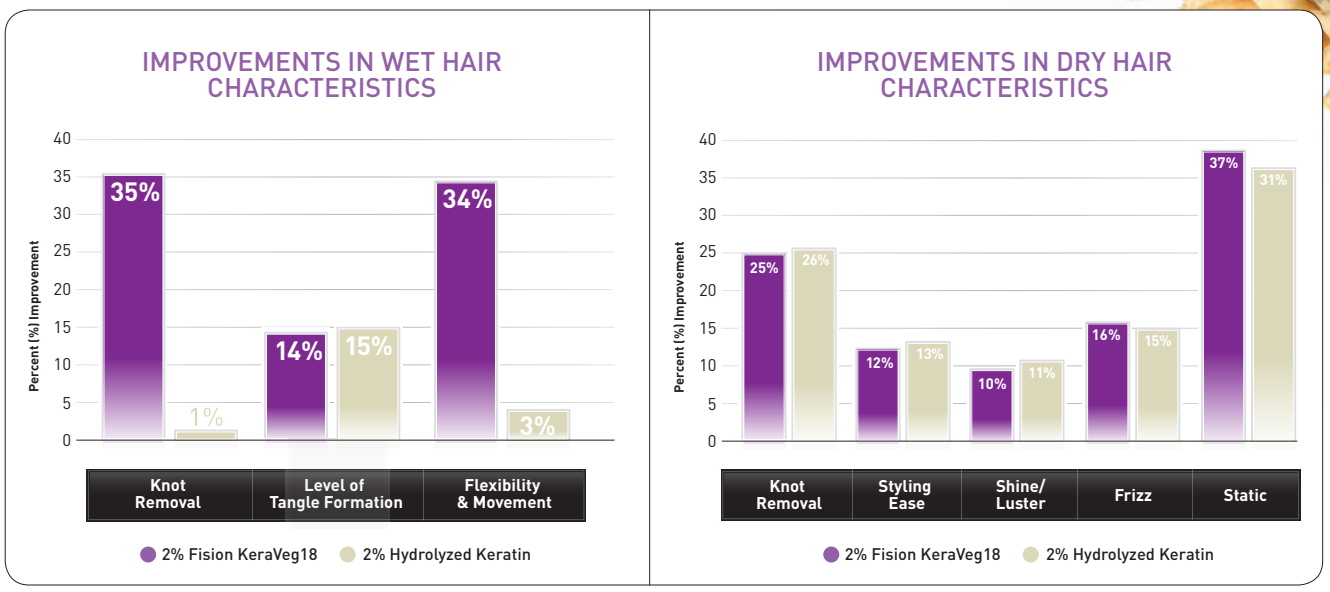
Study:
- 9 single bleached brown Caucasian hair swatches approximately 15 cm in length (3 swatches per test material)

- **Group 1:** 2% **Fision KeraVeg18** in shampoo & conditioner
- **Group 2:** 2% Hydrolyzed keratin in shampoo & conditioner
- **Group 3:** Shampoo & conditioner (placebo)

The force required to comb the hair was measured using the Dia-Stron MTT175 Miniature Tensile Tester. A pre-treatment of 10% SLES was used to clarify the hair swatches. After pre-treatment, swatches were dried under ambient conditions for 24 hours. Hair was then treated with the respective shampoos and conditioners for a total of 5 cycles. After treatments, the wet combing force was measured. Hair was allowed to dry for 24 hours under ambient conditions before measuring the dry combing force. For both studies, combing forces were measured after 1 and 5 applications. All treatments were tested in triplicate.

Results:
The data indicates **Fision KeraVeg18** effectively improves manageability by making hair easier to comb. In addition to improving the overall styling experience of both wet and dry hair, **Fision KeraVeg18** may help limit further damage. The results also confirm that **Fision KeraVeg18** is a good alternative to hydrolyzed animal keratin by delivering equal combing benefits to wet hair and greater benefits to dry hair. Improvements in combability are also an indication of a smoother, healthier cuticle.

SENSORY STUDY



STUDY 4
Sensory Study

Objective:
To show perceivable improvements in hair after 4 applications of **Fision KeraVeg18** by evaluating parameters such as knot removal, styling ease, flexibility, shine/luster, frizz and static.

Study:
- 5 females of various descents to evaluate mannequin heads with Caucasian hair

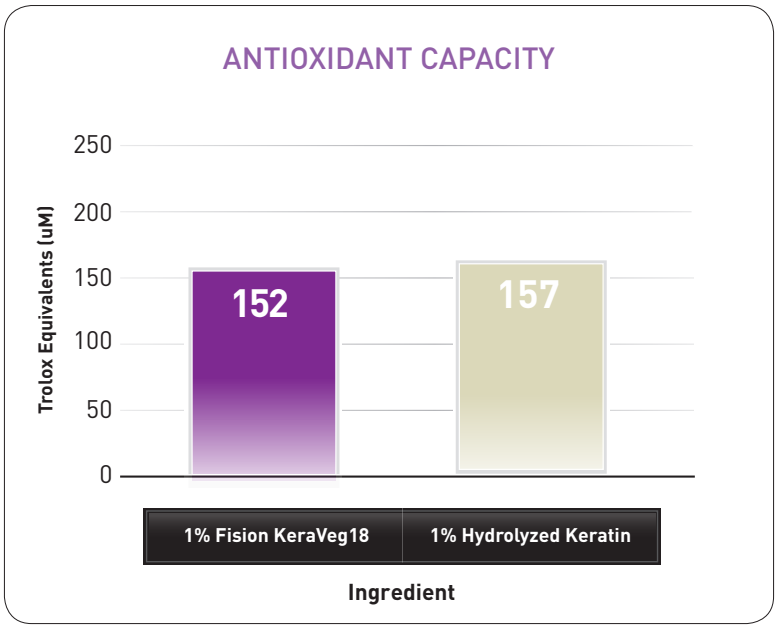
- **Treatment 1:** 2% **Fision KeraVeg18** in commercial shampoo & conditioner
- **Treatment 2:** 2% Hydrolyzed keratin in commercial shampoo & conditioner

A pre-treatment of 10% SLES was used to clarify the head. Evaluators rated the condition of wet & dry hair based on parameters referenced above. In this half-head study, hair was divided down the middle. Heads were shampooed and conditioned for a total of 4 cycles with the respective treatment. Subjects rated improvements in wet hair first. Hair was allowed to dry under ambient conditions for 24 hours prior to performing the dry hair evaluations. Evaluations were determined on an 11-point scale from 0 (worst) to 10 (best).

Results:
In the wet hair evaluation, panelists favored **Fision KeraVeg18** for its ability to improve hair flexibility and allow for easier knot removal. In the dry hair study, panelists rated **Fision KeraVeg18** as delivering equal performance benefits to hydrolyzed keratin. Improving the appearance of hair by increasing shine and reducing frizz will leave hair looking healthier. These results further demonstrate the multiple benefits **Fision KeraVeg18** can deliver to refortify and rejuvenate the hair.

ENVIRONMENTAL STRESSORS

Hair is continuously exposed to many types of oxidative damage, which includes Reactive Oxygen Species (ROS) that act as free radicals that can damage the hair and scalp. ROS are generated by UV and heat treatments, and can accelerate the aging of hair, weaken hair fibers and irritate the scalp. In addition, hair is extremely sensitive to oxidation when wet and can be more easily damaged. Conversely, hydrolyzed proteins and amino acids can help limit oxidative stress to help prevent further damage.



STUDY 5
Antioxidant Capacity

Objective:
To measure the antioxidant protection **Fision KeraVeg18** and hydrolyzed keratin can offer against peroxyl radicals compared to trolox (a water-soluble Vitamin E analogue.)

Study:
Oxygen Radical Absorbancy Capacity (ORAC) that measures the ability of a material to limit the oxidative degradation of fluorescein

- **Ingredient 1:** 1% **Fision KeraVeg18**
- **Ingredient 2:** 1% Hydrolyzed keratin

Results:
Based on the ORAC protection study, **Fision KeraVeg18** has comparable antioxidant protection to hydrolyzed keratin to help limit oxidative damage to the hair and scalp.

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KEY BENEFITS

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- Helps protect hair from harsh salon processes & environmental stressors
- Makes hair look more shiny & healthy
- Improves combability of hair
- Reduces static & frizz

SUGGESTED APPLICATIONS

- Shampoos
- Conditioners
- Leave-on hair treatments
- Styling products

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