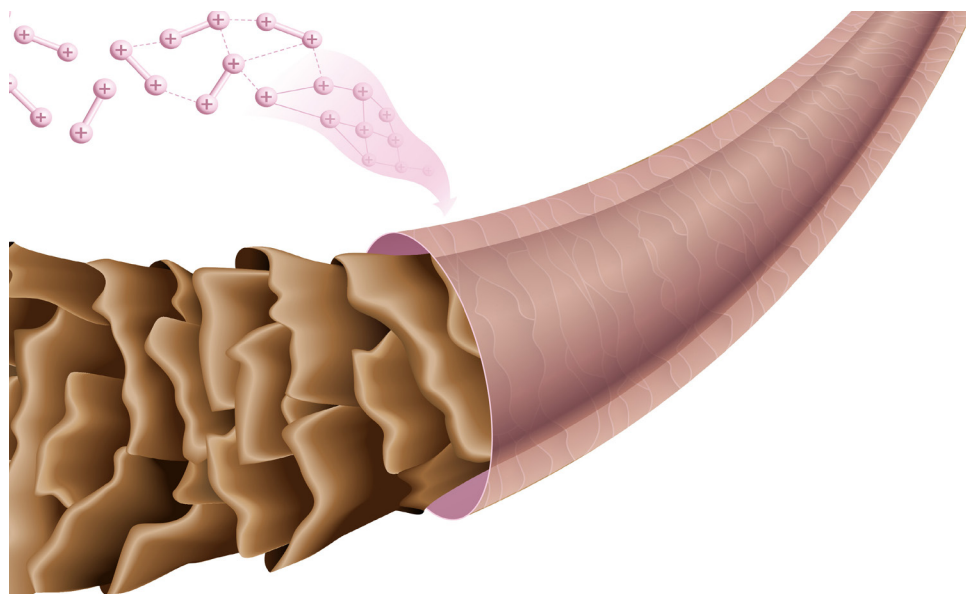


# ProCutiGen® Hold



**Proactive. Protection. ProBonding.**

Bivalent Cationic Lipopeptide  
**Repair Beyond the Bond!**

• support + protect hair cuticle  
 ProBonding, bamboo derived  
 biomimetic neo-cuticle  
 style retention!

## BACKGROUND

The "Plex Phenomenon" has swept the global haircare industry – resulting in a myriad of products focused on bond multiplying or re-bonding. As the market is currently saturated with formulations claiming to re-bond the hair, **Active Concepts** has taken a *proactive* approach towards technology that *protects* the hair. Active Concepts is shifting the focus to *proactively protect* the hair shaft through "**ProBonding**". **ProCutiGen® Hold** is an incredible scientific breakthrough that is slated to shake the foundations of how we consider preventative hair care – repair beyond the bond.

**ProCutiGen® Hold** is capable of modifying hair shape while *protecting* it from styling damage. Rather than focusing on repairing broken bonds that occur during physical and chemical stress, **ProCutiGen® Hold** consists of bivalent cationic peptides that create a *de novo* cuticle on the hair to prevent damage from happening in the first place.

Cuticle preservation is essential to prevent hair damage. The cuticle is the outermost layer of the hair, composed of overlapping cells that shield the cortex, while holding moisture and *protecting* hair from the environment. Damage to the cuticle compromises the structural integrity of the hair shaft, making hair prone to breakage. Utilizing the concept of synthetic biology, **ProCutiGen® Hold** is a bivalent cationic lipopeptide that self-assembles into a neo-cuticle on the hair. The formation of this biomimetic cuticle helps to retain style while offering *protection* from harsh styling treatments to *promote* healthy hair.

**Code Number: 20831**

**INCI Name:** Phyllostachys  
 Bambusoides Extract &  
 Leuconostoc/Radish Root Ferment  
 Filtrate

**INCI Status:** Conforms

**REACH Status:** Complies

**CAS Number:** 999999-99-4 &  
 686112-10-6 (or) 9015-54-7

**EINECS Number:** 310-127-6 & N/A (or)  
 295-635-5

**Origin:** Botanical

**Processing:**

GMO Free  
 No Ethoxylation  
 No Irradiation  
 No Sulphonation

**Additives:**

Natural Antimicrobial: Leuconostoc/  
 Radish Root Ferment Filtrate  
 Preservatives: None  
 Antioxidants: None  
 Other additives: None

**Solvents Used:** Water

**Appearance:** Clear to Slightly  
 Hazy Liquid

**Soluble/ Miscible:** Water Soluble

**Ecological Information:**

91.20% Biodegradability

**Microbial Count:** < 100 CFU/g,  
 No Pathogens

**Suggested Use Levels:** 1.0% - 10.0%

**Suggested Applications:**

ProBonding, Hair Protection,  
 Nourishing, Support, Style Retention

**Benefits of ProCutiGen® Hold:**

- Protects and Strengthens Hair
- Great for All Hair Types
- Style Retention

# ProCutiGen® Hold

## SCIENCE

Given the nature of the hair, it can be rather difficult to straighten or curl the hair for long periods of time without inflicting damage. This is because keratins found in hair are very strong and insoluble fibrous alpha-helical proteins. Damage that occurs to hair after chemical treatment is a result of the structural integrity of the cuticle being compromised. When the structure of the hair cuticle is degraded, hair is more susceptible to breakage. Hair needs a solid foundation to prevent damage, and the building block of hair is *protein*. Our hair is full of *protein*, which is necessary to strengthen and restore the hair fiber. Bamboo gets its strength from being rich in *protein*, silica, and various vitamins and minerals – which can help restore the strength of the hair. **ProCutiGen® Hold** is a lipopeptide derived from bamboo protein, harnessing the natural strength of bamboo for hair *protection*.

The bivalent cation of **ProCutiGen® Hold** is the anchor to secure the neo-cuticle, as hair is naturally anionic. The specific amino acid composition, the structural material of the anchor, allows these properties which differentiate the bio-films formed by the **ProCutiGen®** line. Film-forming properties are a popular claim in hair care, however this is boring and usually misleading. A film can loosely be defined as a thin layer of something, by that definition, water on the skin is a film. A bio-film is of much more interest; a polymeric chain forming a conglomeration of *proteins*, amino acids and polysaccharides that creates a complex, supporting, interwoven matrix on the hair cuticle. A major benefit of the bio-film is its action as a scaffolding rather than a true barrier. Able to support and *protect* hair, this bio-film allows for hair that is strong enough to hold style longer. It is this bio-film that promotes the exhibition of properties such as moisturization, pH balance, barrier *protection*, and additionally, *protection* from hair styles falling flat after a prolonged period.



## BENEFITS

Bond repair is so last year. **ProCutiGen® Hold** utilizes the concept of synthetic biology to self-assemble into a biomimetic neocuticle on the hair. The formation of this biomimetic cuticle helps to retain style while offering *protection* from styling damage to *promote* healthy hair. **ProCutiGen® Hold** is an ideal ingredient for use in a wide range of hair care applications to improve styling retention while *protecting* hair from damage. Incorporate **ProCutiGen® Hold** into shampoo, conditioner, and styling applications to offer revolutionary *ProBonding protection*!

## EFFICACY DATA

A style retention assay was conducted to determine the retention properties of **ProCutiGen® Hold** on styled hair. Two swatches of virgin hair were analyzed, one of the swatches was treated with the unloaded vehicle (water) and the second swatch was treated with the vehicle containing 2.0% **ProCutiGen® Hold**. Both hair swatches were then curled with a curling iron. After completing the respective hair treatment, the tresses were hung on the support stand in the humidity chamber calibrated to 25°C and 90% Relative Humidity. The length and width was measured of each swatch. Pictures were taken immediately after hanging the swatches, 6 hours, 8 hours, and 24 hours later. Figures 1 through 4 show the results of the style retention study.



# ProCutiGen® Hold



Figure 1. Curled Hair at T=0  
L-Untreated, R-Treated with  
2.0% **ProCutiGen® Hold**.



Figure 2. Curled Hair at T=6hrs  
L-Untreated, R-Treated with  
2.0% **ProCutiGen® Hold**.



Figure 3. Curled Hair at T=8hrs  
L-Untreated, R-Treated with  
2.0% **ProCutiGen® Hold**.



Figure 4. Curled Hair at T=24hrs  
L-Untreated, R-Treated with  
2.0% **ProCutiGen® Hold**.

Swatch	Percent Difference Style Retention 6hrs	Percent Difference Style Retention 8hrs	Percent Difference Style Retention 24hrs
Untreated Curled	17.1%	19.9%	21.6%
2.0% <b>ProCutiGen® Hold</b> + Curled	9.6%	18.1%	18.6%

Figure 5. Percent difference in style retention calculated based on length of tresses at T=0.

Based on the results, it is clear from viewing the swatches that **ProCutiGen® Hold** is capable of retaining curls better than the unloaded vehicle comparison. In fact, 2.0% **ProCutiGen® Hold** retained curls by two times better in a 6 hour period. **ProCutiGen® Hold** held significantly better in the 6 hours time period and held evenly for the remaining 24 hours. It is important to also note, not only the percent difference calculation, but how the hair took the curl initially took. It is evident that the treated swatch curled better with a more uniform, tame curl. As time lapsed, the untreated swatch does increase in width demonstrating that **ProCutiGen® Hold** may also protect against frizz in humid environments. For this reason, it can be concluded that **ProCutiGen® Hold** is an ideal ingredient to add to hair care applications designed to provide curl retention over a longer period of time.

# ProCutiGen® Hold

A Standard Electron Microscopy (SEM) study was conducted to determine if **ProCutiGen® Hold** is capable of modifying hair shape while protecting it from styling damage. As seen in Figures 6-8, the SEM imaging demonstrates that, untreated hair is already prone to damage from everyday stressors, showing characteristic signs of breakdown. Treating hair with **ProCutiGen® Hold**, makes a difference at the microscopic level. The SEM images depict how the outermost layer of the hair, the cuticle, is affected by curling the hair. When the untreated images are compared to both the **ProCutiGen® Hold** treated swatches, a significant decrease in damage of the cuticle is exhibited.

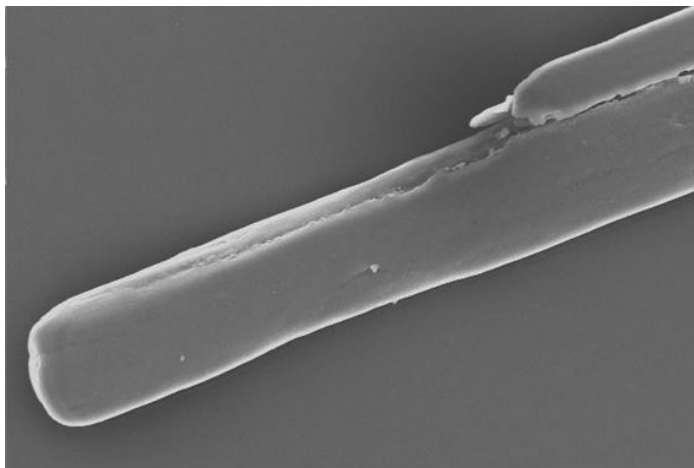


Figure 6. Untreated Virgin Hair.

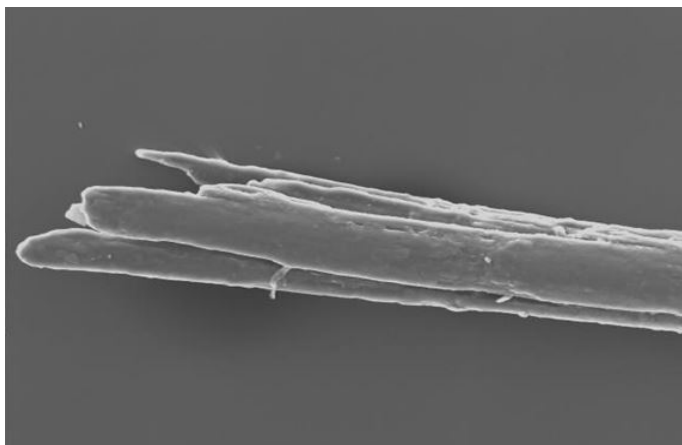


Figure 7. Water Treated and Curled.

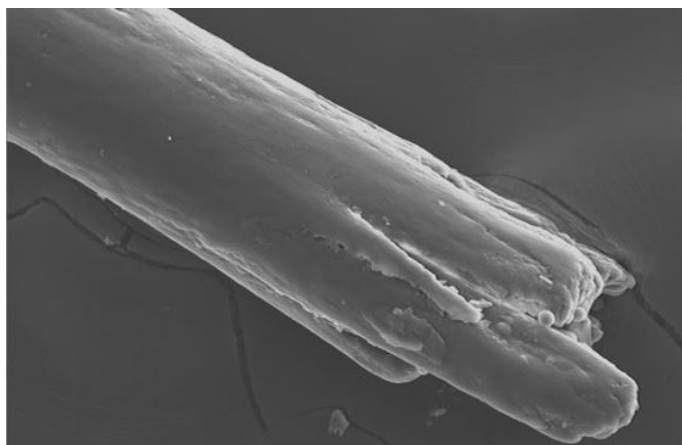
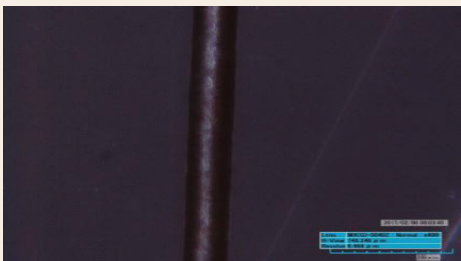
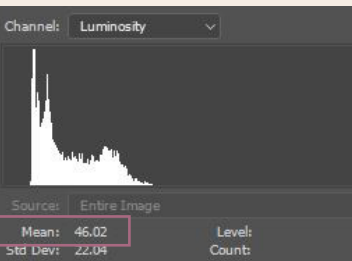
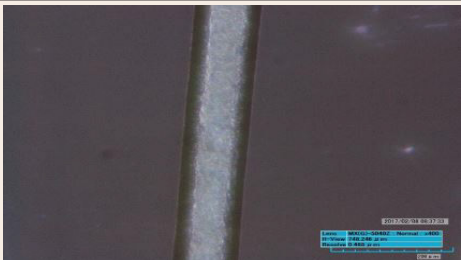
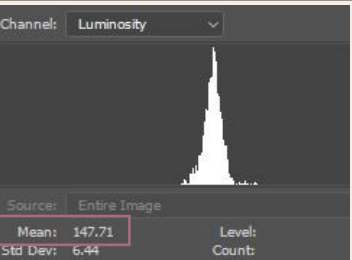
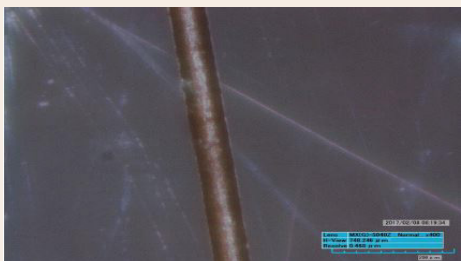
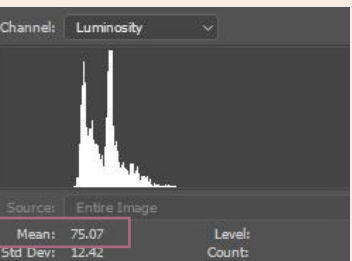


Figure 6. 2.0% **ProCutiGen® Hold** and Curled



# ProCutiGen® Hold

Hirox 3D Microscopic Examination is a test method for microscopic examination of hair samples. Damage of the hair fiber can be seen within these images in which the damaged areas of the fiber fluoresce. The more fluorescence a fiber exhibits, the more damaged. Within the images above significant less damage can be viewed on both the Untreated Virgin swatch and **ProCutiGen® Hold** treated swatch. Whereas the water treated swatch exhibits significantly more damage visually. In addition to the visual evidence, the photos were quantified via histograms based on luminance. The values denoted clearly depict the ability of **ProCutiGen® Hold** to protect the hair fiber reducing overall damage to the fiber.

Swatch	HIROX Image	Histogram Quantification
Untreated Virgin Hair		Channel: Luminosity  Source: Entire Image Mean: 46.02 Std Dev: 22.04 Level: Count:
Water Treated & Curled		Channel: Luminosity  Source: Entire Image Mean: 147.71 Std Dev: 6.44 Level: Count:
2.0% ProCutiGen® Bond & Curled		Channel: Luminosity  Source: Entire Image Mean: 75.07 Std Dev: 12.42 Level: Count:

**Figure 7.** HIROX Results for Curled Hair.