

Abstract

Unlike formaldehyde based hair systems, **AC Kerazyme®** is an all-natural ingredient that is capable of modifying the shape of the hair while protecting it from styling damage, in particular, heat. This unique ingredient consists of a blend of hydrolyzed keratin and *Trametes versicolor* extract. *Trametes versicolor* is a type of mushroom that contains an oxidative enzyme called laccase. **AC Kerazyme®** also helps strengthen hair while protecting it from styling damage. The enzyme is capable of annealing disulphide bonds which help enhance hair strength. The hydrolyzed keratin further enriches and conditions the hair to further optimize its integrity. The purpose of this assay is to analyze the heat protection benefits of **AC Kerazyme®**.

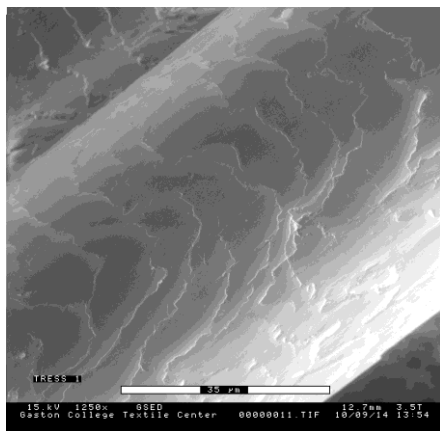
Materials and Methods

To demonstrate the strengthening and protecting benefits of **AC Kerazyme®**, a study was conducted using four Tresses of hair which were viewed using Scanning Electron Microscopy (SEM) imaging. In this study, real life conditions were mimicked by subjecting hair swatches to daily hair treatment rituals which included washing and combing the hair, as well as using a blow dryer and flat iron at 380 - 450°F (193 - 232°C) to style the hair. This treatment cycle was repeated 30 times to simulate styling damage over the course of a month.

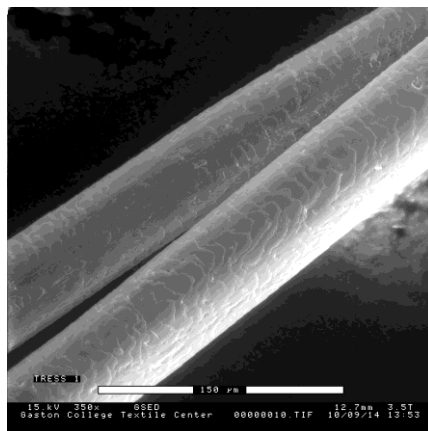
Two different types of applications were conducted for this assay. Initially, comparison SEM images were taken of virgin, undamaged hair: Tress 1 was virgin, undamaged hair and left untreated; Tress 2 was virgin, undamaged hair with a single application of 2% **AC Kerazyme®**. The first Tress of virgin, untreated hair is compared against Tress 2 to show how the product adheres to the hair and creates a film.

Secondly, we conducted an assay to demonstrate the heat protective benefits of **AC Kerazyme®**. Tresses 3 and 4 were washed with "Herbal Essences Hello Hydration" Moisturizing Shampoo and rinsed with warm water. Each Tress was then combed five times and blown dry. Tress 3 was used as the untreated, processed hair control. Tress 4 received an application of 2% **AC Kerazyme®** and was then combed five times again. Tress 4 was then flat ironed ten times. The protocol was repeated thirty times to simulate a month's worth of hair maintenance, as previously stated. Please note that the bright white areas are points where structural damage has occurred.

Results



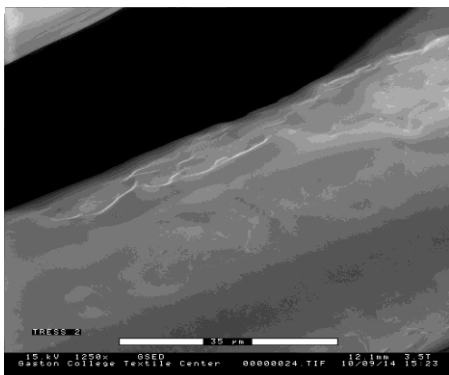
1250x



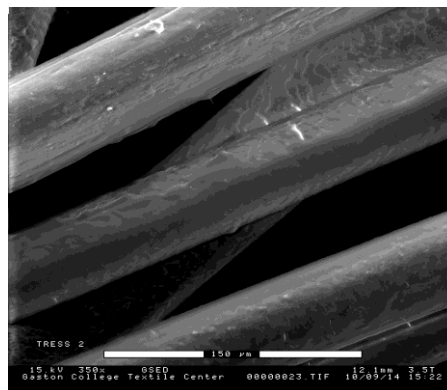
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Figure 1: Tress 1 of virgin, undamaged hair left untreated

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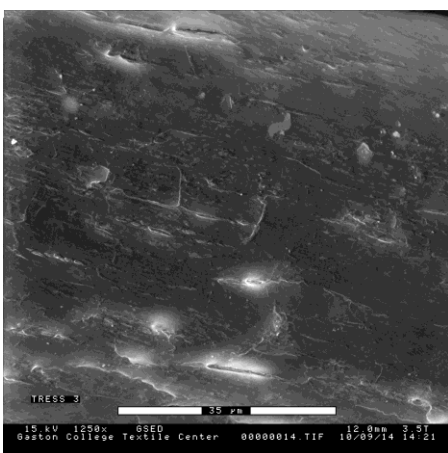


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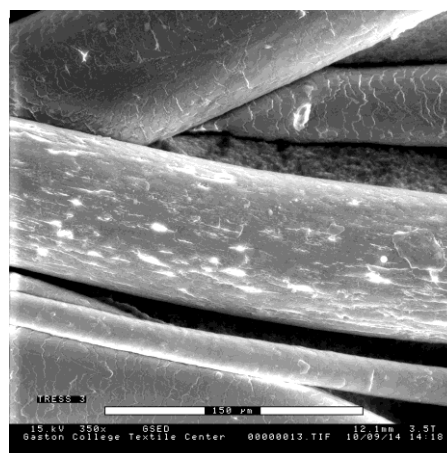


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Figure 2: Tress 2 of Virgin, undamaged hair with a single application of 2% AC Kerazyme®

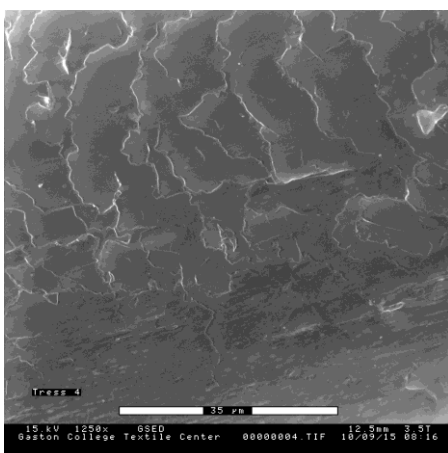


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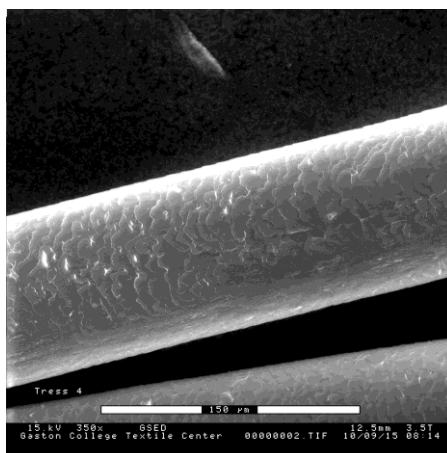


350x

Figure 3: Tress 3 of Processed Hair - Untreated



1250x



350x

Figure 4: Tress 4 Processed Hair – Treated with 2% AC Kerazyme®

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AC Kerazyme[®]

Heat Protection Assay

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Analysis and Discussion

- Tress 1 shows hair fibers with no perceivable damage
- Tress 2 shows undamaged hair fibers, however it is clear that **AC Kerazyme[®]** forms a film around the hair. This film confirms that the product evenly deposits along the hair shaft.
- Compared to Tress 1, after a month's worth of processing, Tress 3 is severely damaged. The cuticle is highly degraded and the bright white areas are points where structural damage has occurred.
- The SEM images for Tress 4 are similar to Tress 1. Clearly this illustrates that **AC Kerazyme[®]** imparts protective & reparative properties that allow for the cuticle to remain intact & undamaged.
- Tresses 1 and 4 are very similar to each other. Tress 1 is virgin, undamaged hair and Tress 4 is processed hair that was treated with 2% **AC Kerazyme[®]** during the processing cycle.
- These findings confirm that **AC Kerazyme[®]** is capable of delivering strong protective benefits which will help to minimize damage that typically results from regular washing and styling regimens.
- In order to maintain optimal enzyme activity, **AC Kerazyme[®]** should be incorporated into a formulation during the cooling phase or at temperatures below 70°C. For optimal results, we recommend using this novel material for leave-in applications, such as conditioners, creams and serums.

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