



A BETTER WAY TO FORMULATE

VERSAGEL®

## VERSAGEL® HEAT PROTECTION STUDY

The Versagel® line of gelled emollients offer silicone replacements in hair serums while providing multifunctional performance benefits. Versagel provides the flexibility to create customized solutions for various hair types and textures.

### OBJECTIVE

Compare the Thermal Glow formulation featuring Versagel ML (C12-15 Alkyl Benzoate) to leading silicone-based commercial benchmarks (B1) and (B2) as well as untreated bleached hair for 450 °F heat protection.

### STUDY DETAILS

#### SEM Imaging

Three treatment groups of type 1 bleached hair (untreated, treated with benchmark, and treated with TG) were observed using an electron microscope at 1500x magnification to show the amount of heat protection after exposure to 450 °F flat iron.

#### Keratin Denaturation Temperature

Tests were performed on virgin European brown hair using instrumental DSC (Differential Scanning Calorimetry) method. The Versagel formulation (TG) was compared to a commercial benchmark (B2) and an untreated control heat damaged hair tress.

#### Refractive Index

The hair shine/gloss was measured for Thermal Glow (TG), and two silicone-based benchmarks (B1 and B2) using comparative refractive indexes.

Download a digital copy of this brochure which includes our product formulation.



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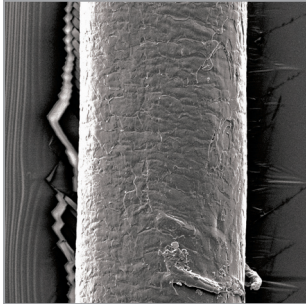
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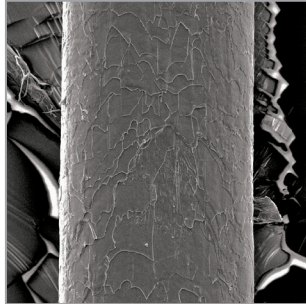
# VERSAGEL® HEAT PROTECTION STUDY

## FINDINGS

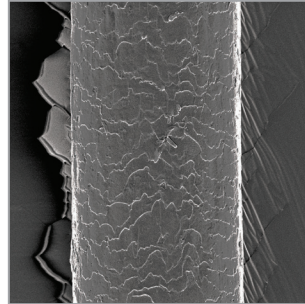
### SEM Imaging (1500X)



**Untreated Bleached Hair**  
Extensive damage evident and cuticle demarcations removed



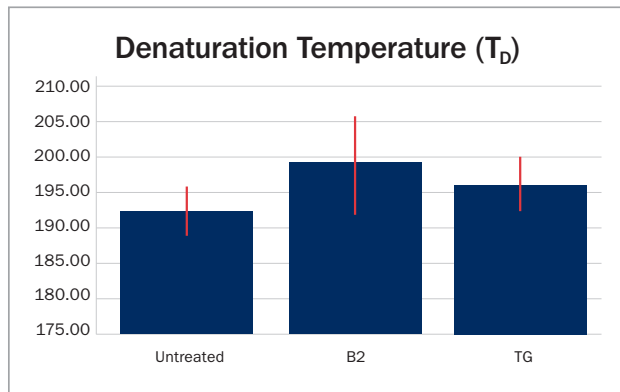
**Benchmark (B1)**  
Some scratching, cracking, and smudging of cuticle layers observable



**Thermal Glow**  
Clear cuticle delineation showing minimal abrasion and disruption

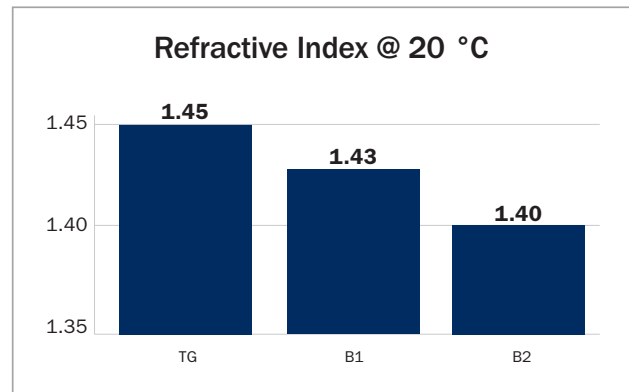
The results demonstrate that the silicone-free Versagel® formulation (TG) protects the hair equally or better than a leading silicone-based commercial benchmark (B1) at 450 °F.

### Keratin Denaturation



Further evidence of TG's heat protection benefit was increasing keratin denaturation temperature (T<sub>D</sub>) nearly as much as another leading silicone-based heat protection hair serum benchmark (B2).

### Shine/Gloss



Refractive Index, related to shine/gloss imparted by the product onto the hair surface, was measured for TG, B1, and B2. The Versagel formulation (TG) showed a slightly higher predicted shine compared to the 2 benchmark products.

## CONCLUSION

This study demonstrates how the Versagel line of gelled emollients can provide multifunctional performance benefits as rheology modifiers and silicone replacements in hair serums.

Study #: 2023-0001

# THERMAL GLOW HAIR SERUM

## PRODUCT FORMULARY

**Thermal Glow** is a silicone-free hair serum that combines Versagel® ML with natural oils for a light and luxurious hair serum with a subtle refreshing fragrance. This treatment is designed to provide heat protection up to 450 °F.

PHASE	INGREDIENT	INCI NOMENCLATURE	W/W%
1	<b>Versagel ML750T</b> (105,000 cPs at 25 °C)	C12-C15 Alkyl Benzoate (and) Ethylene/Propylene/Styrene Copolymer (and) Butylene/Ethylene/Styrene Copolymer/ Pentaerythrityl Tetra-di-t-butyl Hydroxyhydrocinnamate	5.00
1	Panalane L2E	Hydrogenated Polyisobutene	62.25
2	Sunflower Oil	Helianthus Annuus (Sunflower) Seed Oil	10.00
2	Sweet Almond Oil	Prunus Amygdalus Dulcis (Sweet Almond) Oil	10.00
2	Crodabond CSA	Hydrogenated Castor Oil/Sebacic Acid Copolymer	2.50
2	PhytoVie Defense	Brassica Campestris/Aleurites Fordi Oil Copolymer	1.50
2	MeadowEstolide	Meadowfoam Estolide	7.50
3	Vitamin E	Tocopheryl Acetate	0.50
3	Fragrance: Coral Reef	Fragrance	0.75

### MIXING INSTRUCTIONS

- Add Phase 1 ingredients sequentially then heat to less than 70 °C with gentle stirring.
- Add Phase 2 ingredients sequentially while maintaining heat to less than 70 °C with gentle stirring.
- Cool to 40 °C with continued gentle stirring then add Phase 3 ingredients sequentially.

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