

Hair Color Protection with CELQUAT® LS-50 Polymer

INTRODUCTION

Understanding the Market

- ▶ Hair color protection is a fast growing segment
 - From June 2006 to June 2007 there have been 172 new product launches claiming hair color protection
 - Both rinse-off and leave-on products have been launched claiming hair color protection
- ▶ Hair color protection product launches are seen globally
 - Majority of the products were launched in Europe followed by Latin America, Asia-Pacific and North America and lastly the Middle East and Africa
 - Products were launched by 46 companies in 31 countries

Test Methodology

- ▶ Hair swatch specifications
 - 5g, 7" light brown hair swatches bound flat
- ▶ Hair swatch preparation
 - Swatches dyed with Clairol® Herbal Essences Bold'N Brilliant Color #44 Radiant Ruby according to package instructions
- ▶ Post dye hair swatch treatment
 - Wet swatch, apply 1g of test product, dry swatch
 - Wash swatch with Color Vive® shampoo, dry
 - Evaluate color in light box vs. control hair palette
 - Above procedure was repeated for ten cycles
- ▶ Results are reported in percent retention:
 $\% \text{ Retention} = 100 - (\text{average of samples at given interval}/10 \times 100)$

Control Swatches



0 3 5 9 15

of washes in Color Vive® Shampoo



Advances In Hair Protection

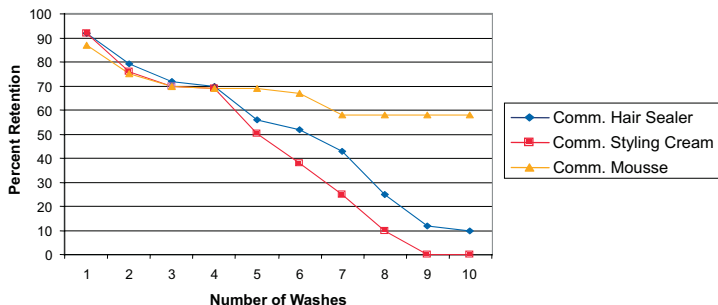
Hair Color Protection with CELQUAT® LS-50 Polymer

Improving Hair Color Protection

DATA

- ▶ Several polymers were evaluated for delivering hair color protection from a mousse product form
 - Film forming starches with high amylose content provide improved color protection when compared to other film forming technology (patent pending)
 - Linear structure of high amylose starches provides water resistant film formation
 - Good polymer film formation on the hair may protect hair color from fading

Commercial Product Benchmark Hair Color Retention



	Commercial Mousse	Commercial Hair Sealer	Commercial Styling Cream
% Color Retention	58%	10%	0%

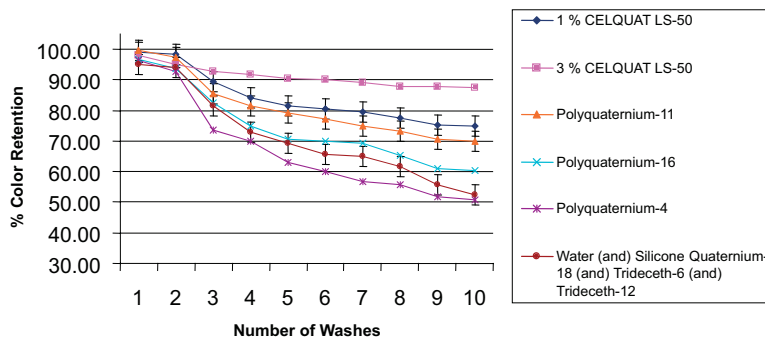
A Visible Difference*



Control (0 washes) 1% CELQUAT LS-50 1% PQ-16 1% PQ-11 Control (10 washes)
*After 10 wash cycles

Film Former Comparisons

Percent Color Retention



*Error bars represent the LSD intervals. Any values compared to each other that are greater than the LSD interval are considered significantly different at the 95% confidence level.



Hair Color Protection with CELQUAT® LS-50 Polymer

SOLUTION

CELQUAT LS-50 Polymer

- ▶ **CELQUAT LS-50 is an interpenetrating network of modified high amylose starch and cationic modified cellulose**
 - Launched in 2004 as a cost effective styling and conditioning polymer for mousse systems
 - The high amylose starch gives the water resistant, film forming property, which locks in the color
 - The cationic cellulose forms a strong bond with the anionic hair locking the polymers in place in addition to providing conditioning properties

INCI Designation: Polyquaternium-4/Hydroxypropyl Starch Copolymer
Recommended use level: 1-4%
Patent protected

CONCLUSION

Hair Color Protection

- ▶ **Hair color protection from a leave-on system is a growing opportunity within the hair care market**
- ▶ **CELQUAT LS-50 polymer delivered from a mousse provides superior color protection when compared to other available technology**
 - A naturally derived, cost effective conditioning polymer
 - Provides excellent film formation and dye protection



Advances In Hair Protection



Thermal Protection with DynamX® Polymer

INTRODUCTION

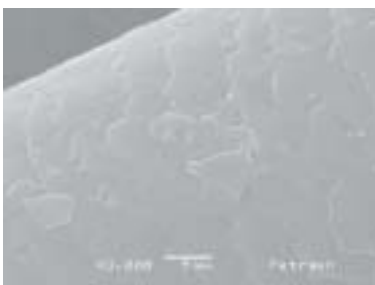
Understanding the Market

- ▶ 100 new hair care product launches claiming thermal protection between 2004-2007
 - 40 of these new product launches occurred in the past year
 - Products were launched in North America, Asia Pacific, Latin/South America, and Europe

Test Methodology

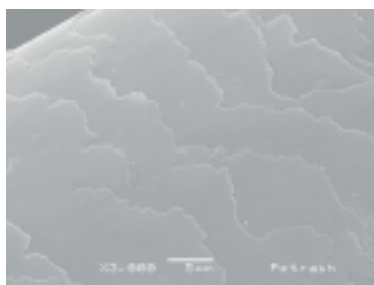
- ▶ Response to heat was evaluated on 3 samples
 - European virgin hair untreated (control)
 - European virgin hair heat treated
 - European virgin hair treated with a low VOC aerosol hairspray containing DynamX polymer and then heat treated
- ▶ Prior to the heating/application process each hair swatch sample was submerged in water for 5 minutes to completely hydrate the hair
- ▶ Heating process involved 12 cycles of:
 - Applying DynamX polymer spray
 - Applying heat via flat iron (set at highest setting) for 5 minutes
 - Washing the swatch with 1.5cc of Prell® shampoo
 - Drying the swatch in 45°C oven (15 minutes)
 - A control sample was run similarly without polymer applied
- ▶ Each sample evaluated for wetting force and SEM

Hair
Heat Treated



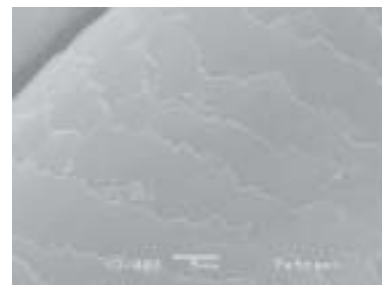
Significant cuticle damage with particulates of the cuticle found on random locations of the hair

Hair
No Heat Treatment



An overall smooth and healthy cuticle with no sign of damage

Hair Treated with DynamX® Polymer Hairspray*
& Heat Treatment



Mild damage on the cuticle, but significantly different from the damaged observed on heat treated hair without DynamX polymer hairspray

*55% VOC high alcohol spray

Advances In Hair Protection

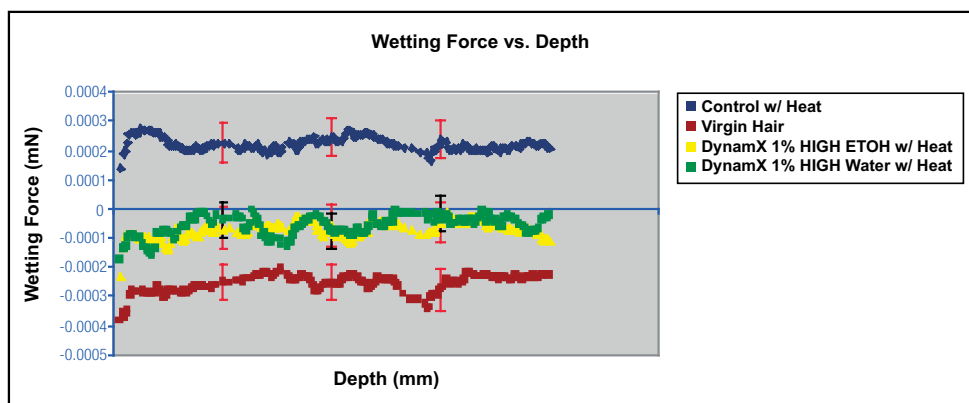
Thermal Protection with DynamX® Polymer



Improving Hair Thermal Protection

DATA

Data Analysis



- Each trend line represents the average wetting force of a single strand of fiber at a given depth
- Error bars represent LSD intervals at depths of 0.5 mm, 1.0 mm, and 1.5 mm.
 - Any values compared to each other that are greater than the LSD interval are considered significantly different at the 95% confidence level

- ▶ **Wetting Force Data Analysis**
 - Kruss K14 Tensiometer
 - Single hair fibers were dipped in water to determine the wetting force of the fiber
 - The larger the wetting force, the more damaged the hair fiber

DynamX Polymer

▶ Polymer Attributes

- Flexible film
- Low solution viscosity
- Crystal clear solution

▶ Polymer Benefits

- Durable, long lasting hold
- Style memory
- Curl definition
- Anti-frizz properties
- High gloss
- Low tack/fast drying

INCI Designation: Polyurethane-14
(and) AMP-Acrylates Copolymer

CONCLUSION

Thermal Protection

▶ Severe hair damage due to heat can be avoided when using a thermal protection styling product containing DynamX polymer

- Aerosol products should be applied to hair prior to heat treatment
- Protection benefits observed from both alcoholic and aqueous systems
- DynamX polymer film formation prevents damage from heat

SOLUTION