Inovação, sustentabilidade e desempenho: como traduzir tendências e conceitos em aplicações práticas para cuidados com os cabelos

Seek Together™

General Business

Agenda

- Hair Care Market needs, challenges and top claims
- Ucare™ Extreme Polymer
- Demistifying silicones in hair care
- Hydroxyshield™ Polymer
- New generation of Dowsil™ Silicone Gum Blends

Hair Care Market needs, challenges and top claims

Consumer desires

- High levels of product **performance**
- Make **socially responsible** choices
- **Naturally** derived products
- **Sustainable** products

Formulator challenges

- Added **value** to consumers
- Greater use of **natural-based**, sustainable ingredients
- Multifuntional product that delivers **all benefits** expected

Top claims of products launched for hair care LAA (2016 – 2020)

Source: Mintel and Dow analysis

UCARE™ Extreme Polymer

Go beyond conditioning with our new bio-derived & biodegradable cellulose technology

Seek Together™

UCARE™ Extreme Polymer

Product overview

- It is a cationic cellulosic polymer
- It contains a **more hydrophobic backbone** compared to traditional UCARE™ Polymers – offering **unique performance** benefits
- Can be used as the **principal conditioning agent** or **in combination with silicones or natural oils**

UCARE™ Extreme Polymer	
INCI	Polyquaternium-10
Product form	Powder
Solubility in water	Soluble
Recommended use level	0.1-0.3%
% Nitrogen	1.50 – 2.20
Bio-based carbon content (%)	48%
Shelf life	2 years
Recommended applications	**Rinse-off conditioners,** leave-in conditioners, shampoos
China regulatory status	Listed in the Catalogue of Cosmetic Ingredients
Cellulose origin	GMO-free wood
Source of certification	PEFC*
Degradability	Biodegradable**

* Program for the Endorsement of Forest Certification
** Inherent primary biodegradability with pre-adaptation according to OECD 302B test(s) guidelines (reaches > 20% biodegradation in OECD test(s))

UCARE™ Extreme Polymer – benefits from this new technology

For formulators

- High weight efficiency – low use level
- Improves natural content in formula
- Soluble in water
- Viscosity enhancer
- Good compatibility with broad range of surfactants and thickeners
- Allows versatility in formulation format
- Listed in the Catalogue of Cosmetics Ingredients in China

In application – consumer benefits

For rinse-off conditioners

- No compromise on performance – it can feel like a silicone* on wet/dry hair (reduction in combing force especially on damaged hair)
- Reduces hair breakage
- Restores hydrophobicity - healthy hair
- Improves hair manageability & enables extreme alignment in comparison to silicone

For leave-in conditioners

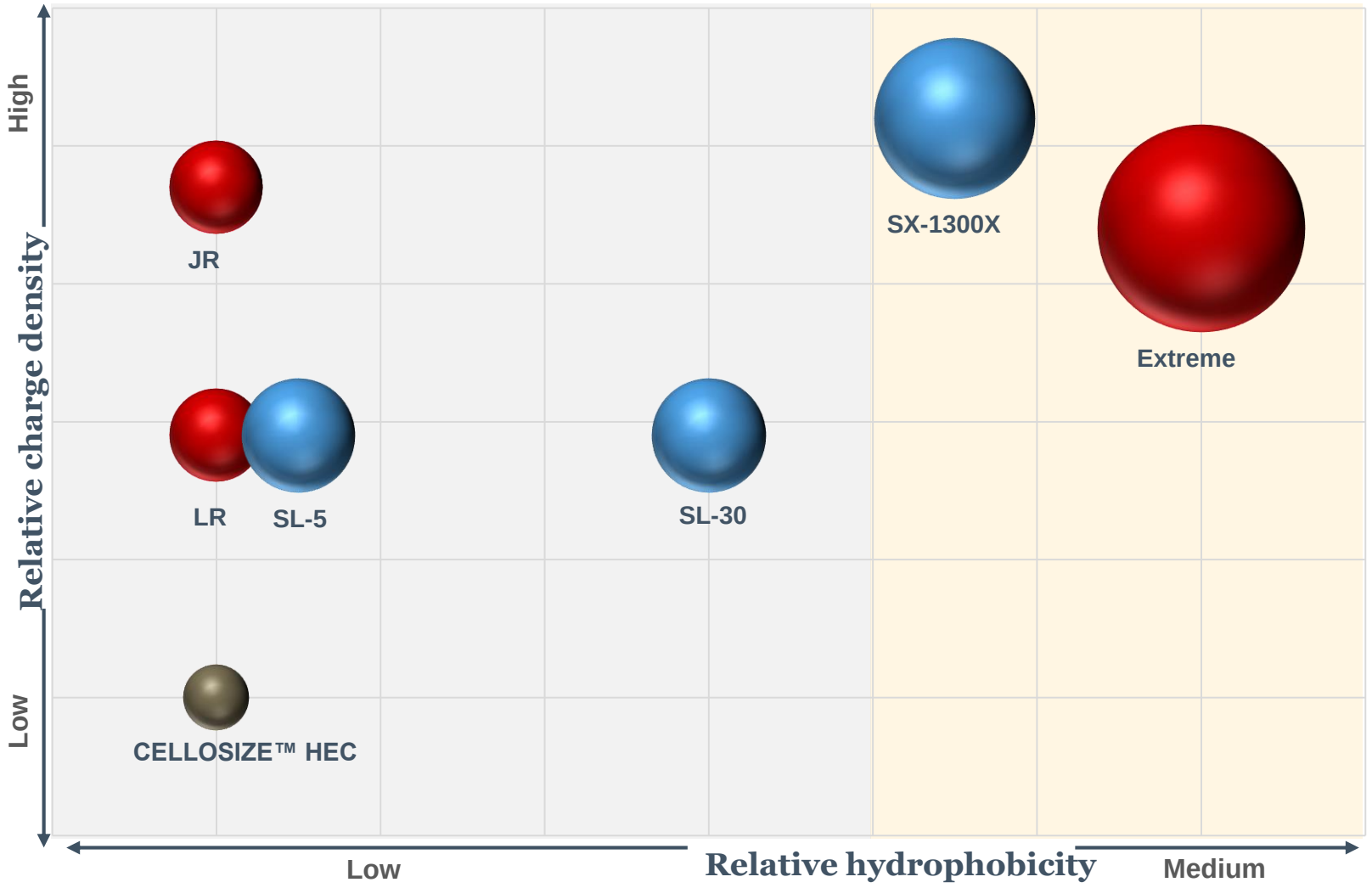
- Conditioning (reduction in combing force)
- Provides natural soft styling (i.e. curl retention)
- Heat protection

For shampoos

- Versatility in conditioning (with or without silicones)

* Aminofunctional silicone

Understanding UCARE™ Extreme Polymer – Rinse-off conditioner



UCARE™ Polymer (PQ-10)

SoftCAT™ Polymer (PQ-67)

The size of the ball indicates the conditioning level in rinse-off conditioner application.

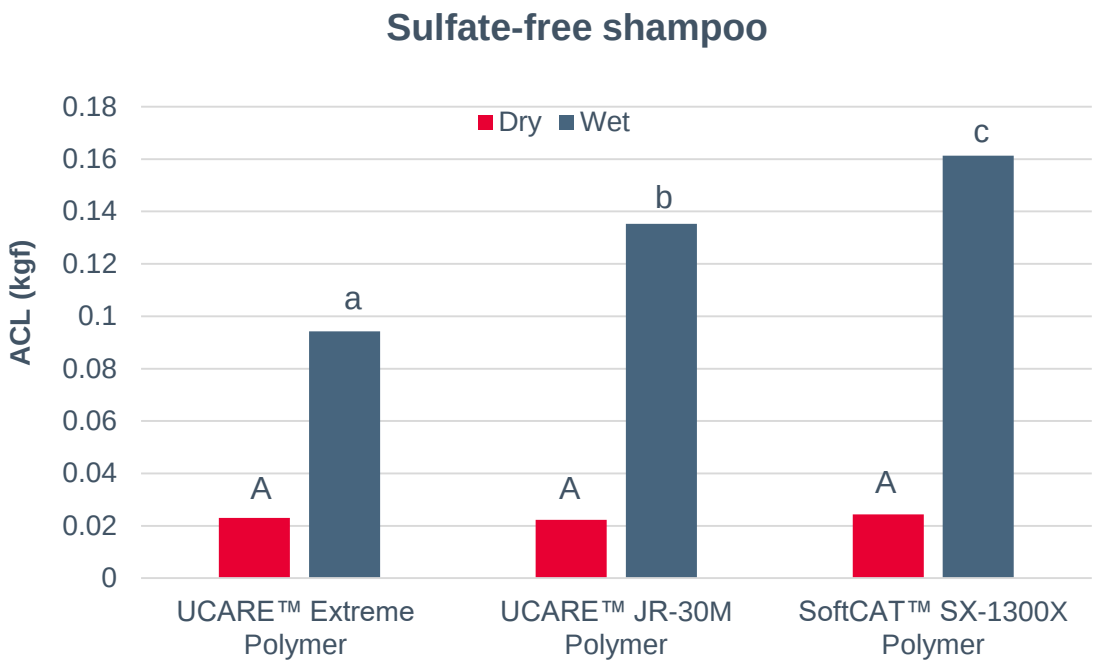
Hair type: bleached Caucasian hair
Treatment: Rinse-off conditioner (0.3% cationic polymer)

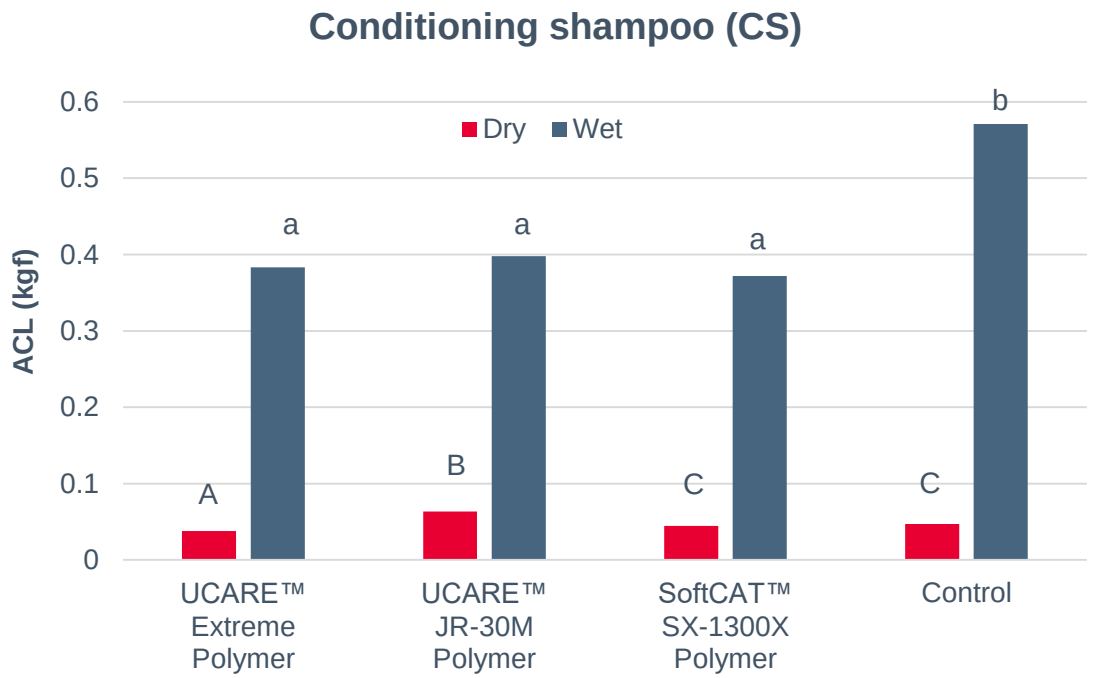
Note: CELLOSIZE™ HEC contains no charge density or hydrophobicity.

Conditioning shampoo & sulfate-free shampoo

Enhanced combability

UCARE™ Extreme Polymer provides **dry and wet combability in different shampoo** chassis, including **clear formulations.**



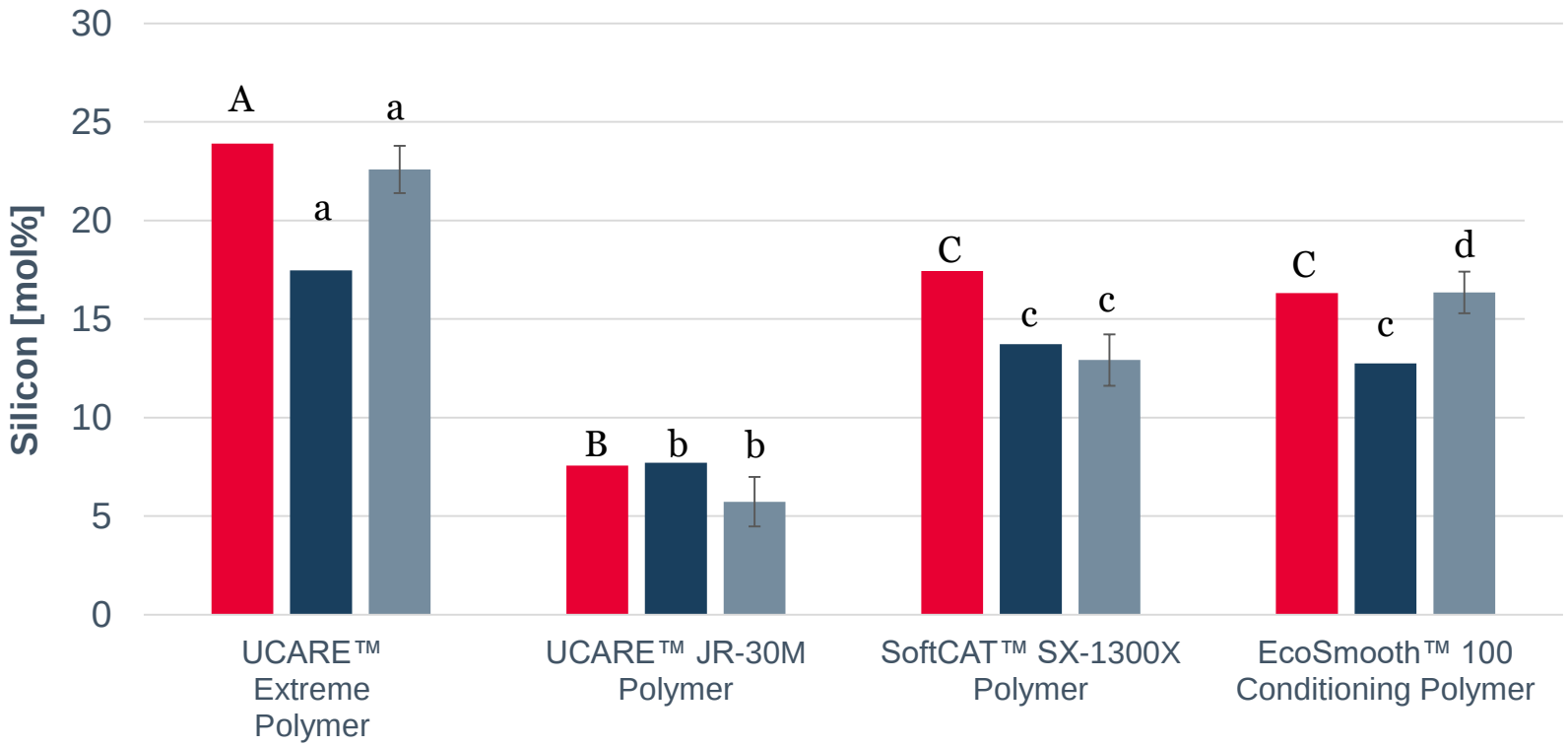


Sulfate-free and Conditioning shampoo with UCARE™ Extreme Polymer

Treatment: 0.4 g / g hair on bleached Caucasian hair, shampoo containing 0.3% cationic polymer
Measured using Instron tensile tester
Control: conditioner without silicone or cationic polymer
Statistics: Different letters show a statistical difference at 95% confidence

Efficient deposition of silicones

UCARE™ Extreme Polymer (0.3%) **can be used as an efficient deposition aid for silicones** as it shows a **higher deposition level** compared to Dow and competitive cationic polymers.



DOWSIL™ CE-1785 BA Emulsion
DOWSIL™ HMW 2220 Non-Ionic Emulsion
XIAMETER™ MEM-2664 Emulsion

Treatment: 0.4 g / g hair on bleached Caucasian hair, shampoo (SLES 3EO) containing 0.3% cationic polymer and 1% silicone
Silicone deposition measurement using XPS

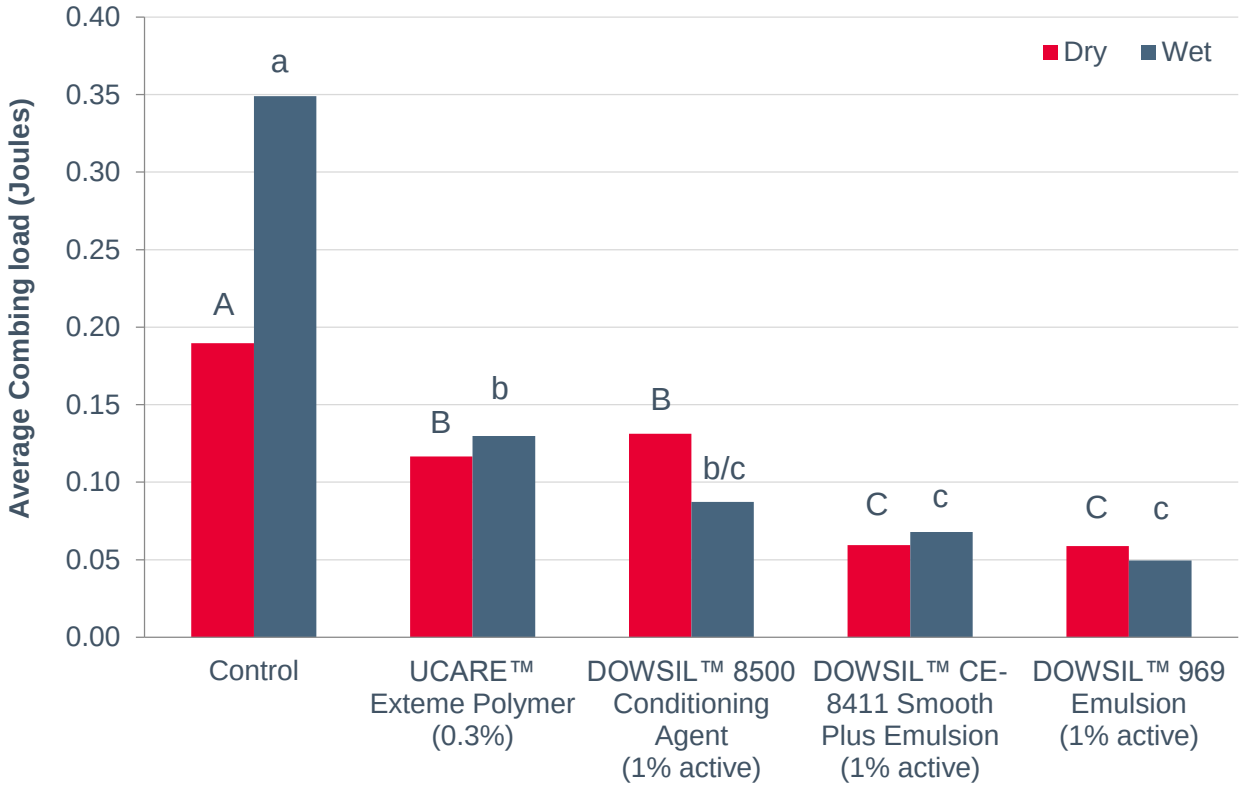
Statistics: Different letters show a statistical difference at 95% confidence

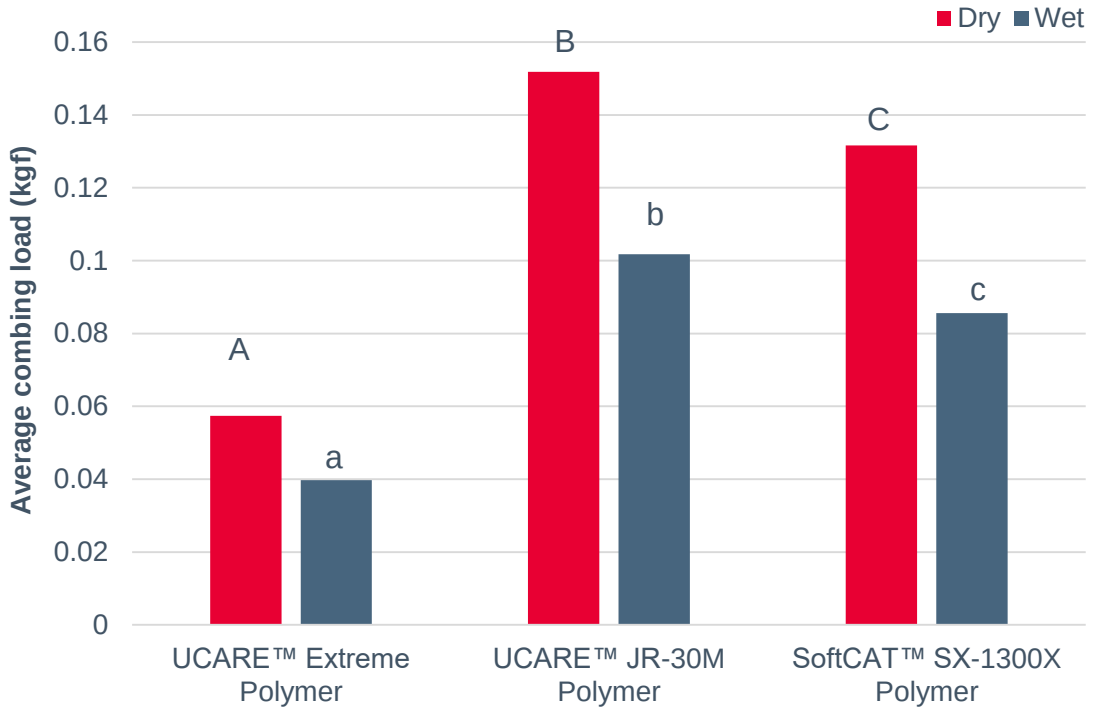
Rinse-off conditioner

Enhanced combability

Comparison with silicones and cationic polymers

UCARE™ Extreme Polymer provides **better performance than other Dow cationic polymers. The performance of UCARE™ Extreme Polymer at 0.3 wt.% is close to amodimethicone at 1 wt.%.**

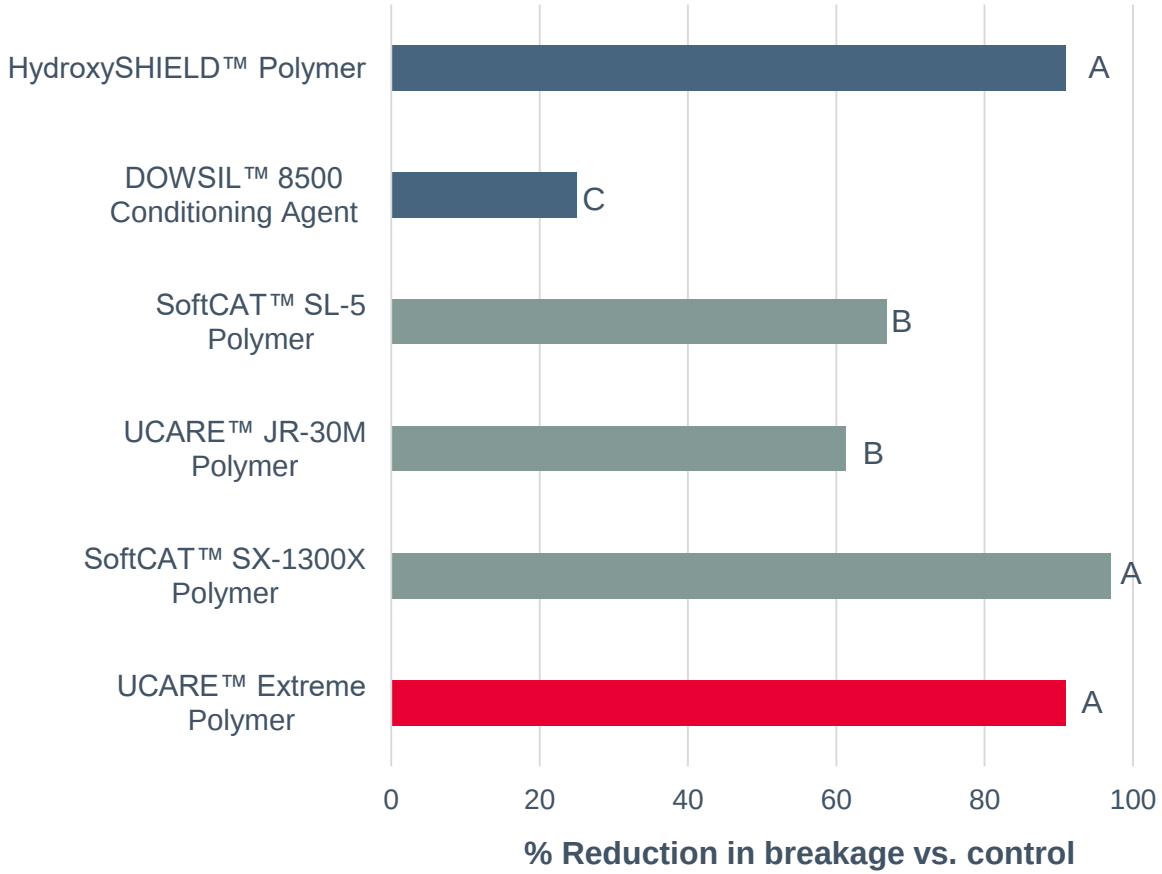


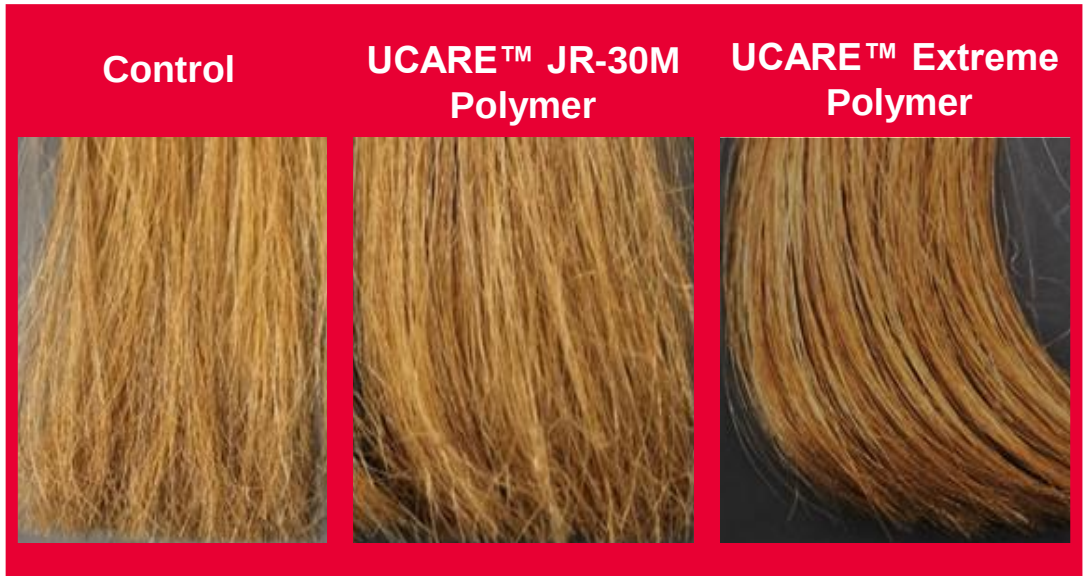


Treatment: 0.4 g / g hair on bleached Caucasian hair, 0.3% cationic polymer or 1% active silicone
Measured using Diastron MTT175 (left graph) and Instron tensile tester (right graph)
Statistics: Different letters show a statistical difference at 95% confidence

Reduced breakage

UCARE™ Extreme Polymer **provides up to 90% reduced breakage** compared to the control, 66% compared to DOWSIL™ 8500 Conditioning Agent and 30% compared to UCARE™ JR-30M Polymer.

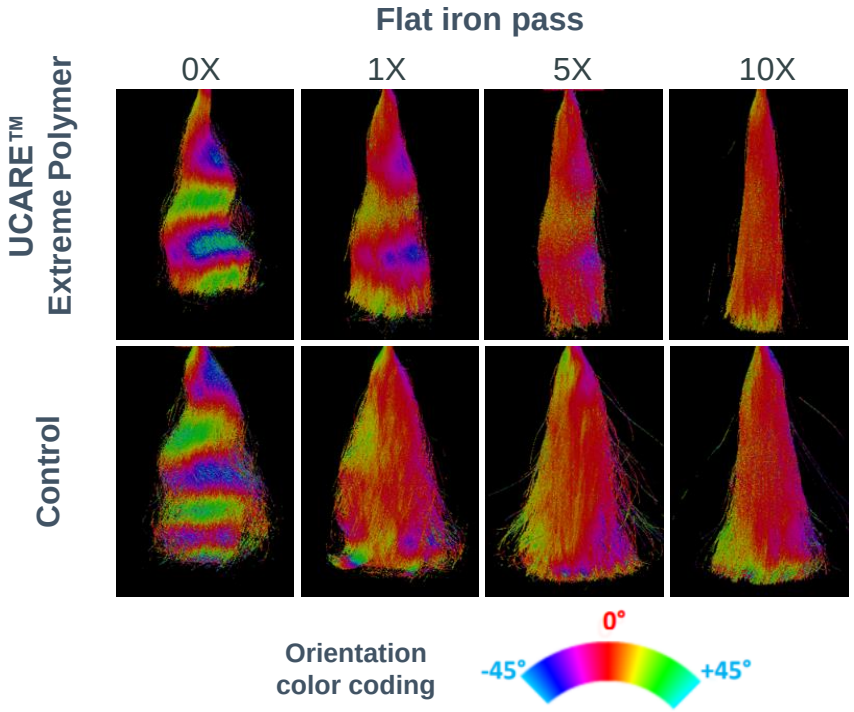


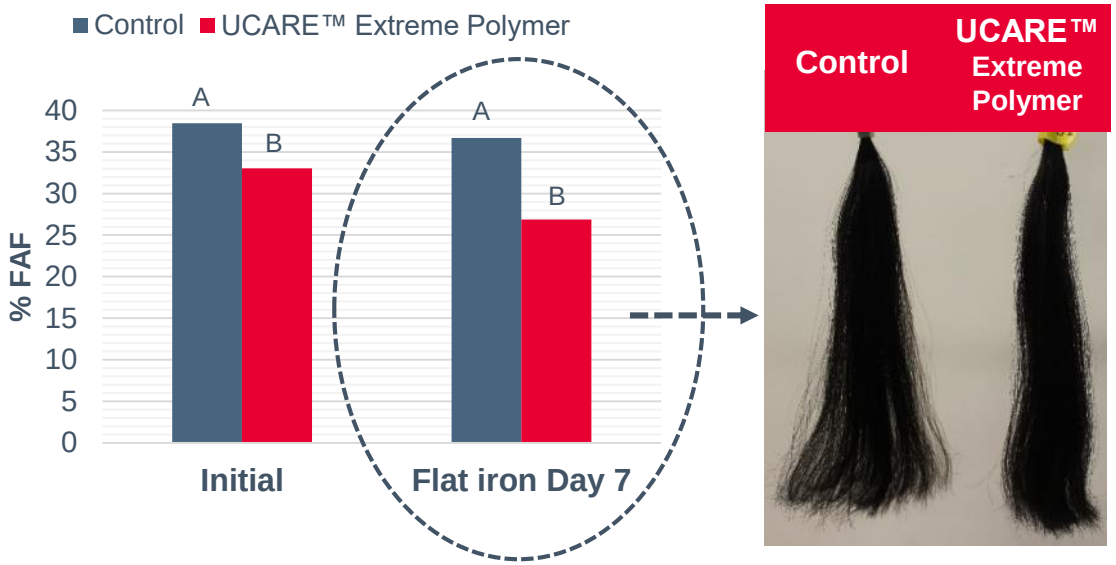


Treatment: 0.4 g / g hair on bleached Caucasian hair, 0.3% cationic polymer or 1% active silicone
Method: measured using repeated combing instrument.
3 tresses/product; 10,000 comb strokes; speed: 20 cycles/min
(80 comb stokes/tress/min); broken hair fibers weighed and % reduction calculated
Control: conditioner without silicone
Statistics: Different letters show a statistical difference at 95% confidence

Improved hair alignment

UCARE™ Extreme Polymer **improves hair manageability and hair alignment.** Less flat iron passes may result in **less heat damage.**





% FAF = fly-away frizz (3D measurement using Bolero)

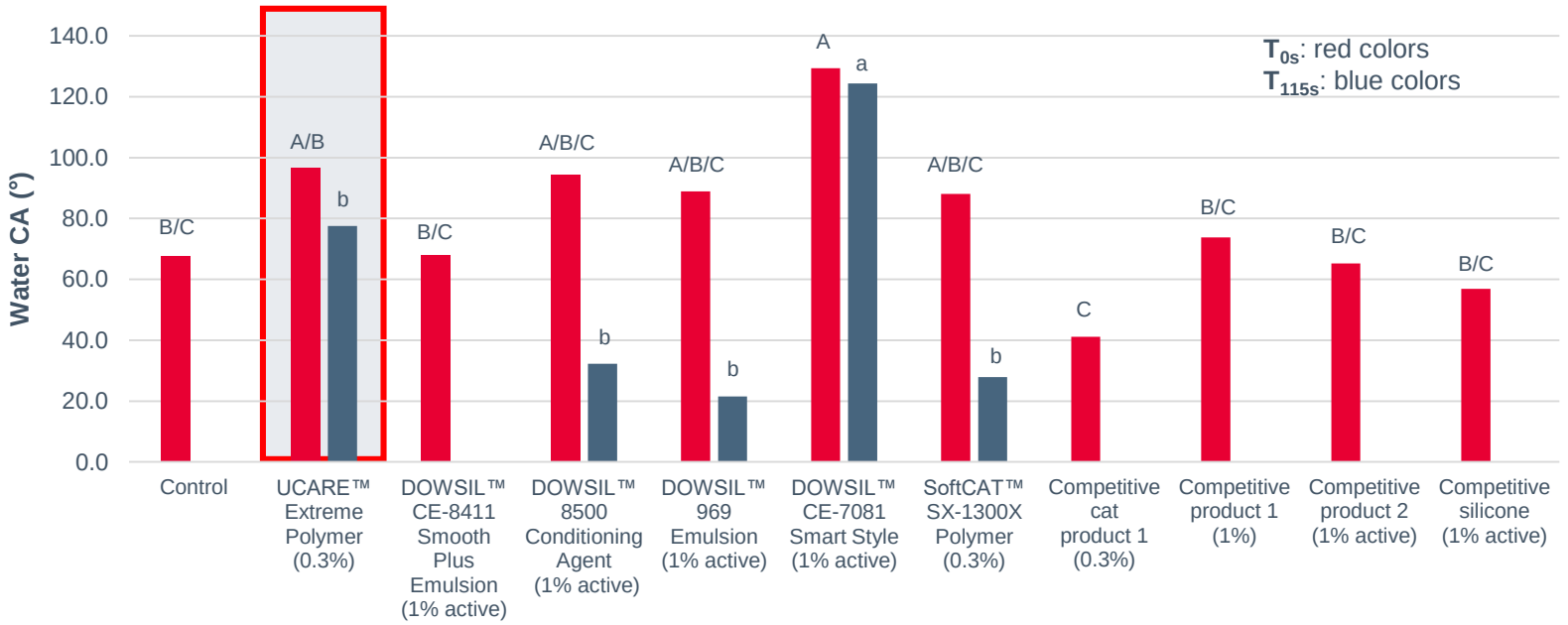
After 1 week at 25°C and 50% RH

- Tress treated with UCARE™ Extreme Polymer reached maximum alignment after 6 passes.
- Less frizzy after one week at room temperature and 50% RH.

Treatment: 0.4 g / g hair on frizzy hair type A (Brazilian) hair, 0.3% modified HEC; flat iron at 200°C, 10s each, for a total of 10 passes
Measured using RUMBA (hair alignment) and BOLERO (frizz)
Control: conditioner without UCARE™ Extreme Polymer
Statistics: Different letters show a statistical difference at 95% confidence

Restored hydrophobicity

Hair treated with UCARE™ Extreme Polymer **retains a high degree of hydrophobicity.** The higher the contact angle, the more hydrophobic, the healthier the hair.

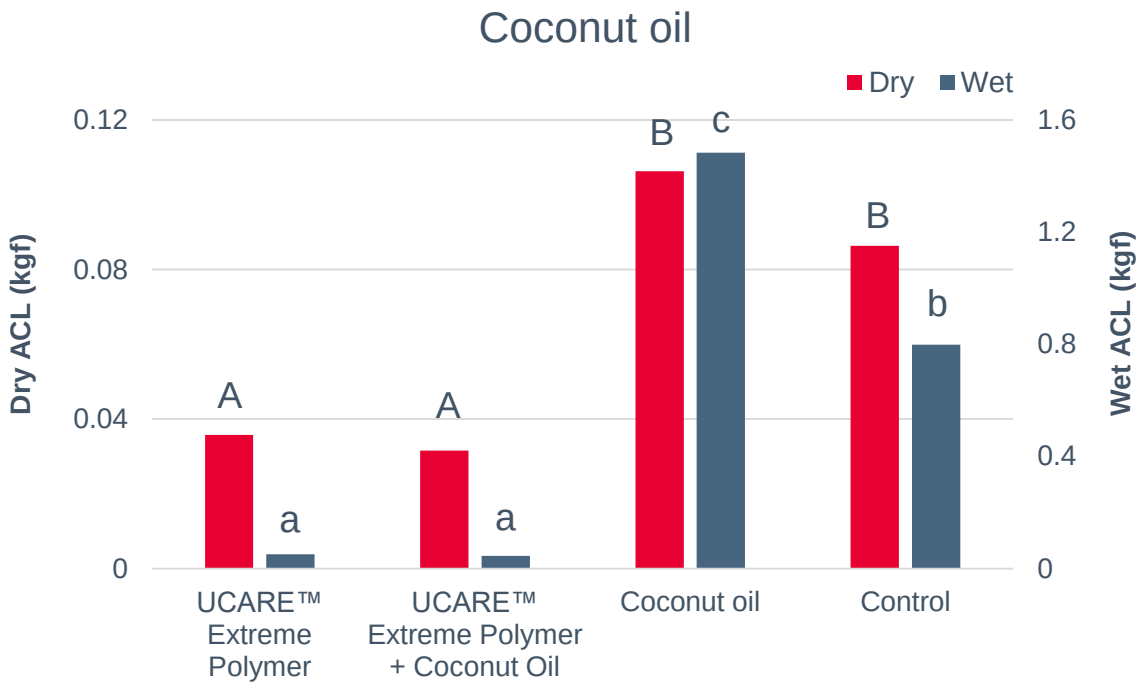


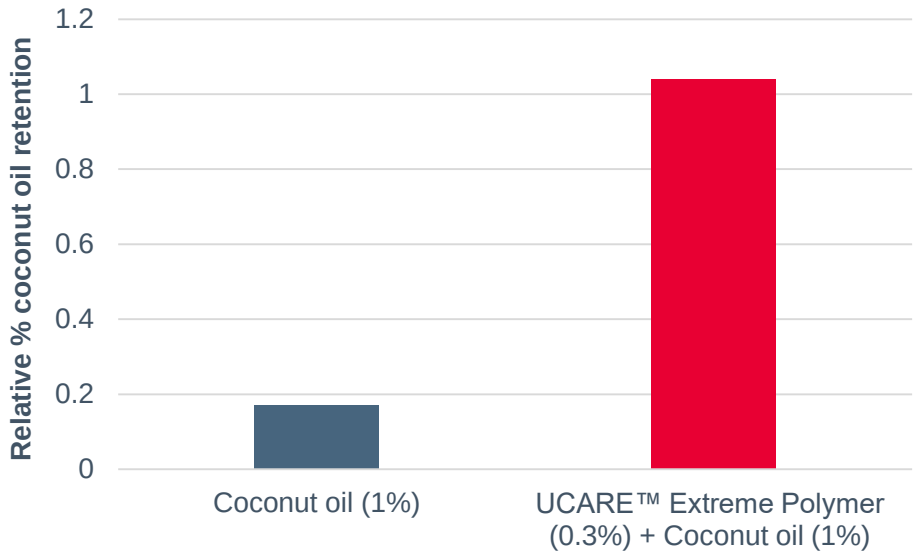
Treatment: 0.4 g / g hair on bleached Caucasian hair, 0.3% cationic polymer or 1% active silicone
Control: conditioner without silicone or cationic polymers
Test condition: 30 µL of water on bleached hair treated with different types of cellulose or silicone; picture taken immediately

Competitive cat product 1	Guar Hydroxypropyltrimonium Chloride
Competitive product 1	Hydrolyzed Wheat Protein
Competitive product 2	Orbignya Speciosa Kernel Oil (and) Hydrogenated Soybean Oil (and) Cocos Nucifera (Coconut) Oil (and) Linum Usitatissimum (Linseed) Seed Oil
Competitive silicone	Amodimethicone/ Morpholinomethyl Silsesquioxane Copolymer (and) Trideceth-5 (and) Glycerin

Efficient deposition aid for natural oil

UCARE™ Extreme Polymer is **compatible with natural oil** and **improves its deposition on hair**.





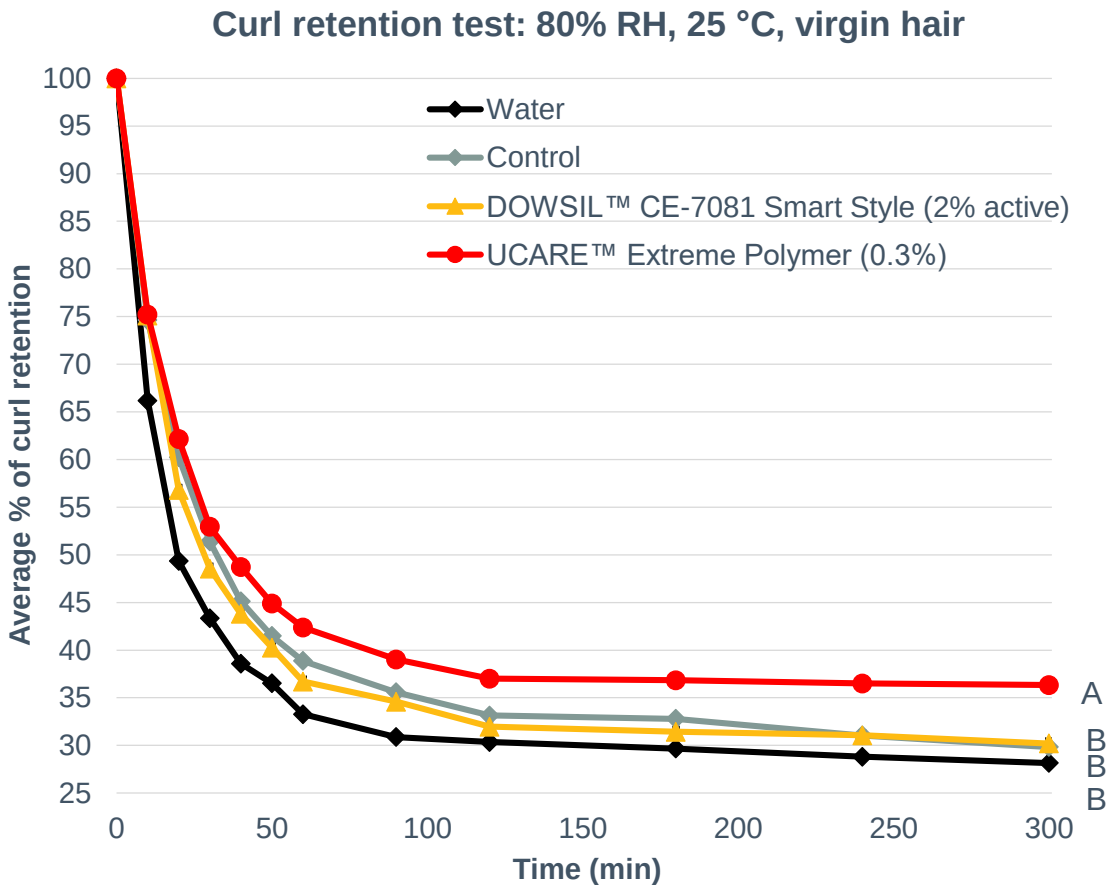
Treatment: 0.4 g / g hair on bleached Caucasian hair, 0.3% UCARE™ EP and/or 1% coconut oil (CNO) and/or 1% silicone in rinse-off conditioner
Measured using Instron tensile tester
Control: conditioner without silicone, cationic polymer or natural oil
Oil Retention Measurement: GC/MS method based on methanol transesterification
Statistics: Different letters show a statistical difference at 95% confidence

Leave-in conditioner

Curl retention

UCARE™ Extreme Polymer provides **better curl retention** compared to the control, untreated hair, and DOWSIL™ CE-7081 Smart Style with six times less active level of product, translating into natural and soft styling.

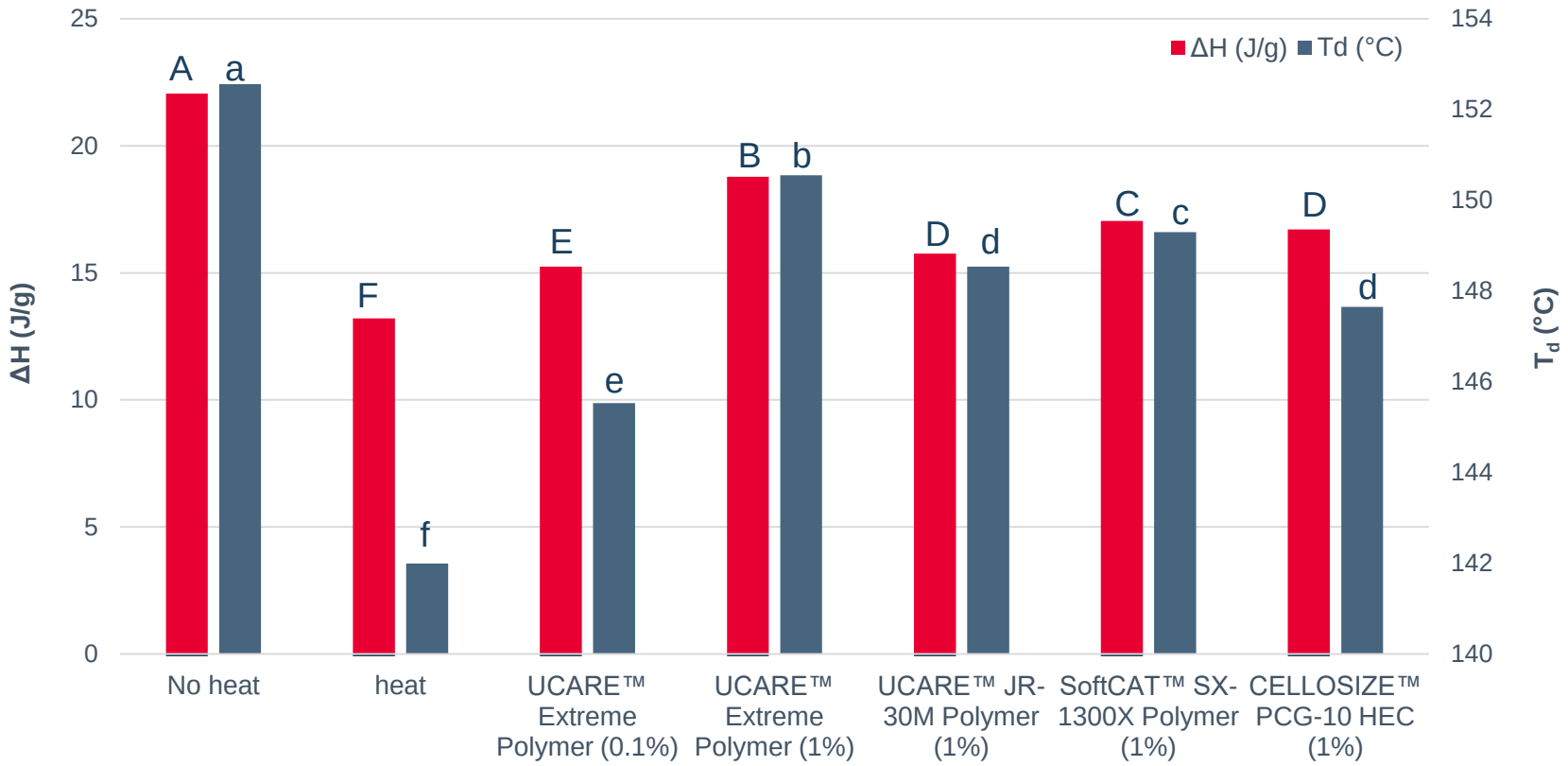
After 3h at 80% RH and 25°C



Treatment: 100µL on virgin Caucasian hair, 0.3% cationic polymer or 2% active silicone
Control: conditioner without silicone or cationic polymer
Statistics: Different letters show a statistical difference at 95% confidence

Heat Protection

Pretreatment of hair with UCARE™ Extreme Polymer provides thermal protection to the hair surface resulting in an improved denaturation enthalpy and temperature.



Treatment: 0.15g/g of virgin Caucasian medium brown hair. Flat iron at 232 °C for 10s with a total of 30 passes, with a 9% SLS wash and polymer retreatment after 10 passes. The process was repeated for 3 cycles with shampooing in between.
Analyses: DSC
Statistics: Different letters show a statistical difference at 95% confidence

- UCARE™ EP provided the highest level of thermal protection as indicated by the highest ΔH and Td.
- 0.1% UCARE™ is recommended for use as it provides a soft and natural feel with an adequate thermal protection level.

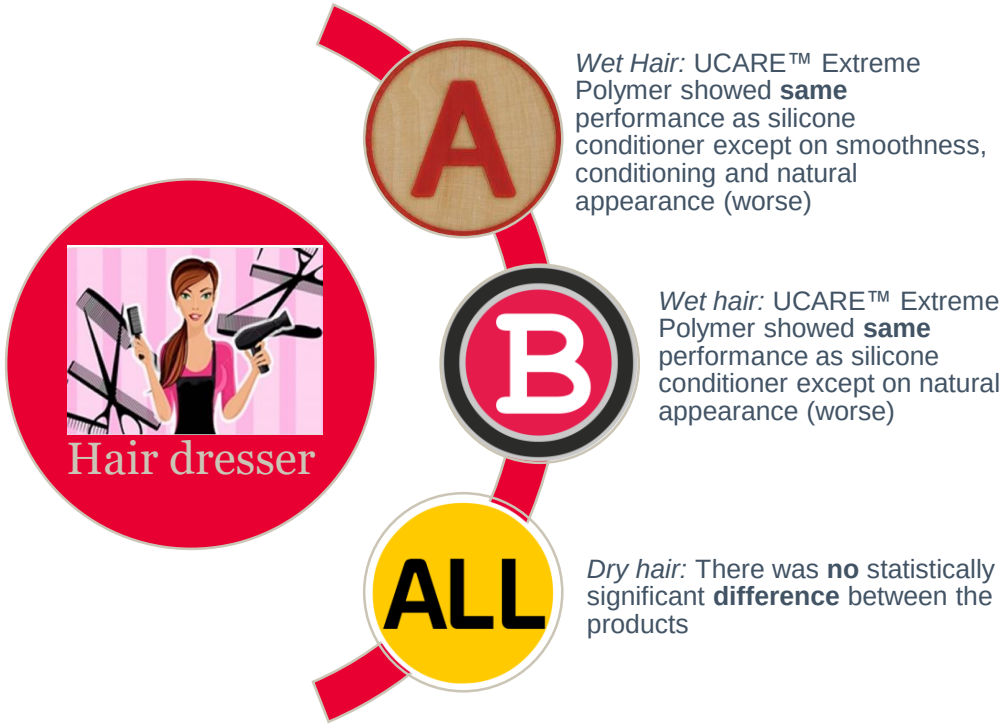
- **Denaturation enthalpy (ΔH) - Energy uptake for the unfolding of the protein during denaturation**
- **Denaturation temperature (Td) - Characterize thermal stability of the proteins in hair**

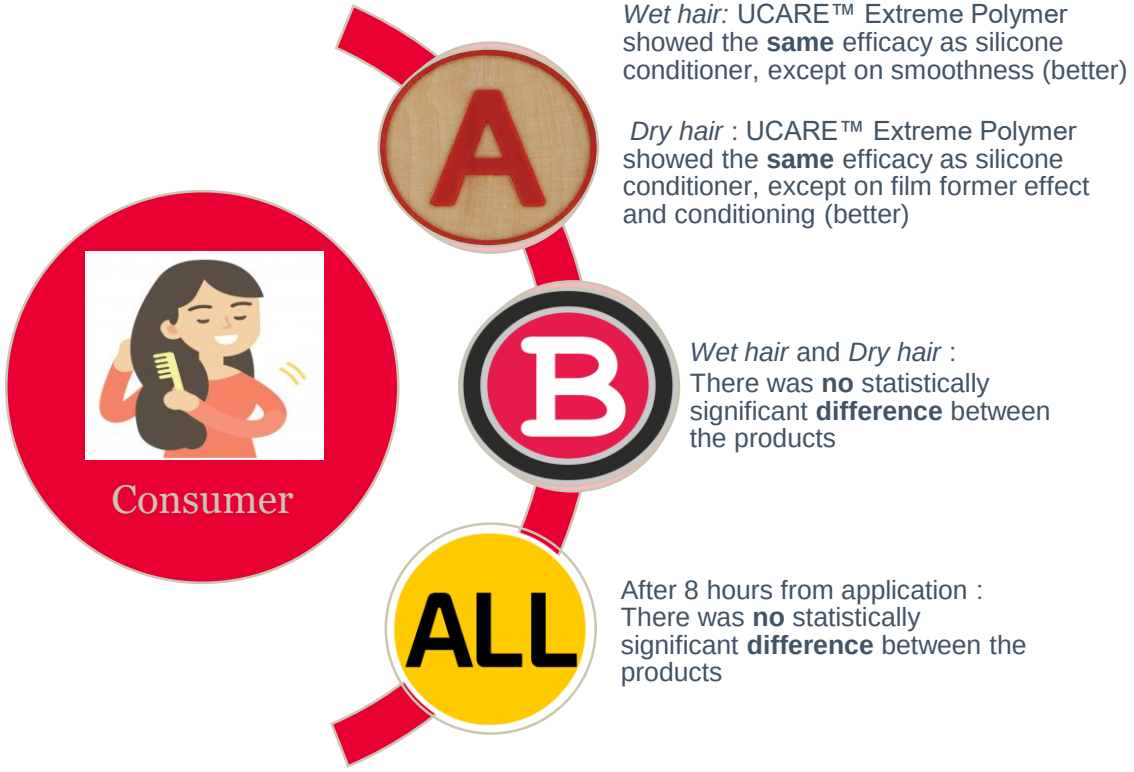
Consumer in vivo trial

Consumer test – “Salon” test

Group A - 15 women with straight hair (31 years old +/-6 years)
Group B – 15 women curly hair (36 years old +/-7 years)

Comparison: Conditioner with silicone (DOWSIL™ 2-8566 Amino Fluid) at 1% active VS conditioner with UCARE™ Extreme Polymer (0.3%)

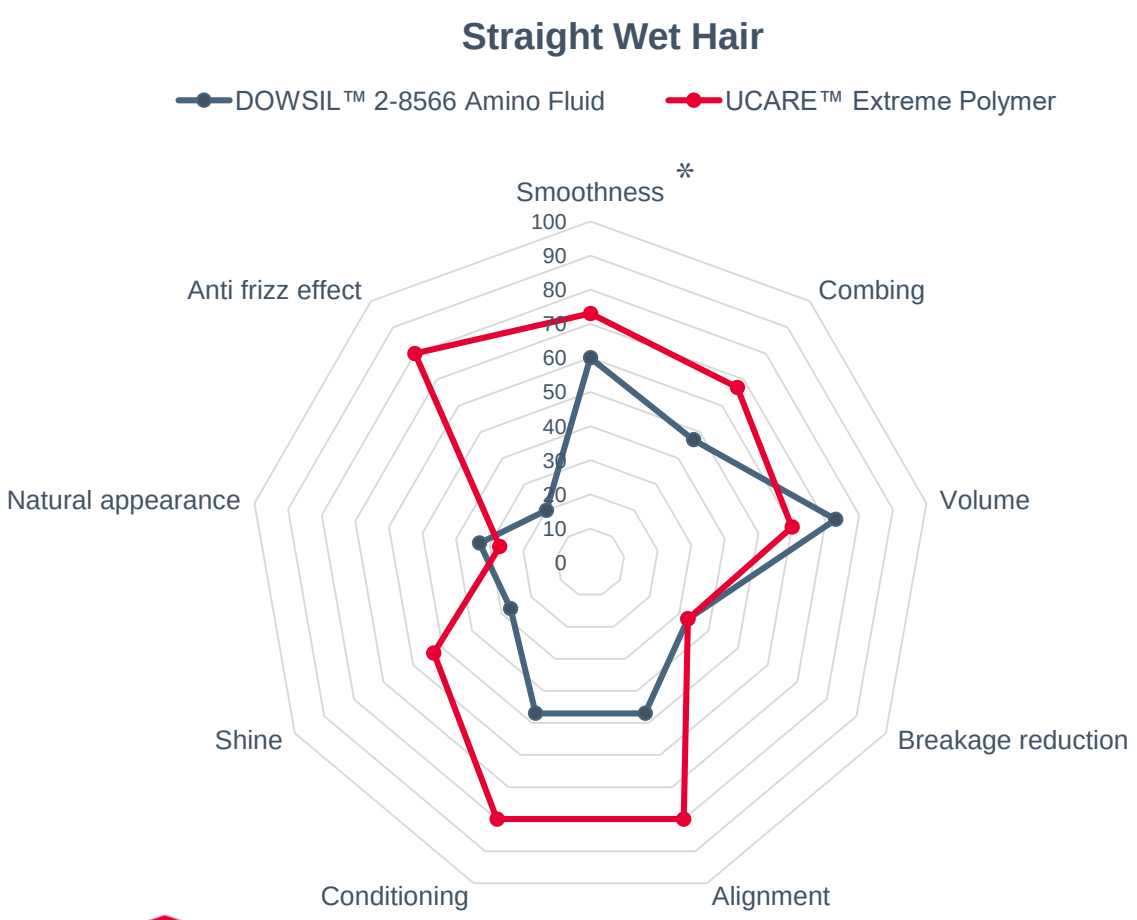


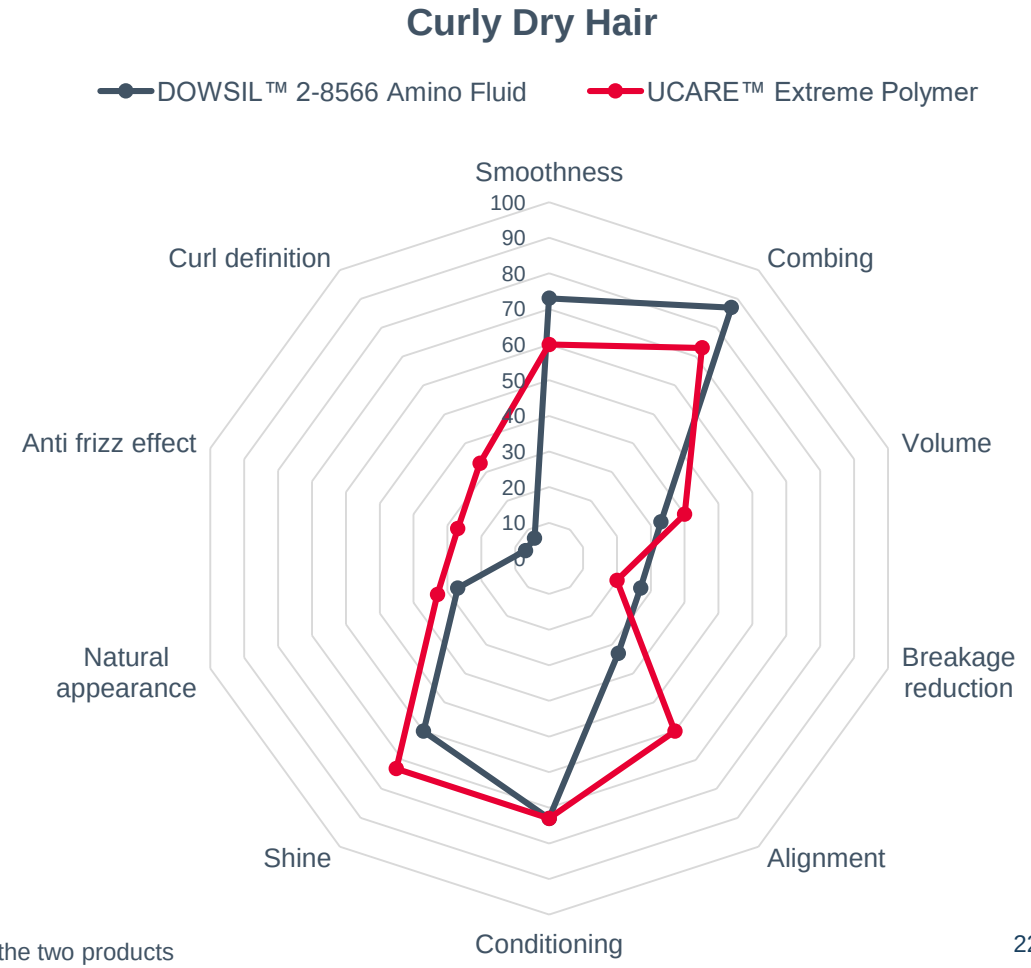


Research: May 2020, Kosmoscience

"Salon" test – Consumers' impression

- A majority of **consumers with straight hair** finds that UCARE™ Extreme Polymer provides **smoothness** (statistical difference), **ease of combing**, hair **alignment**, **shine**, **anti-frizz** effect and **overall conditioning on wet hair**
- A majority of **consumers with curly hair** finds that UCARE™ Extreme Polymer provides hair **alignment**, **anti-frizz** effect and **curl definition on dry hair**





For each parameter, charts disclose a % of research subjects having a preference for one of the two products
*: statistical difference at 95% confidence

The Power of Silicone in Beauty

The science behind an ingredient delivering performance in personal care

Seek Together™

General Business

Personal Care

Multifunctional conditioning and styling benefits

Healthy look and feel

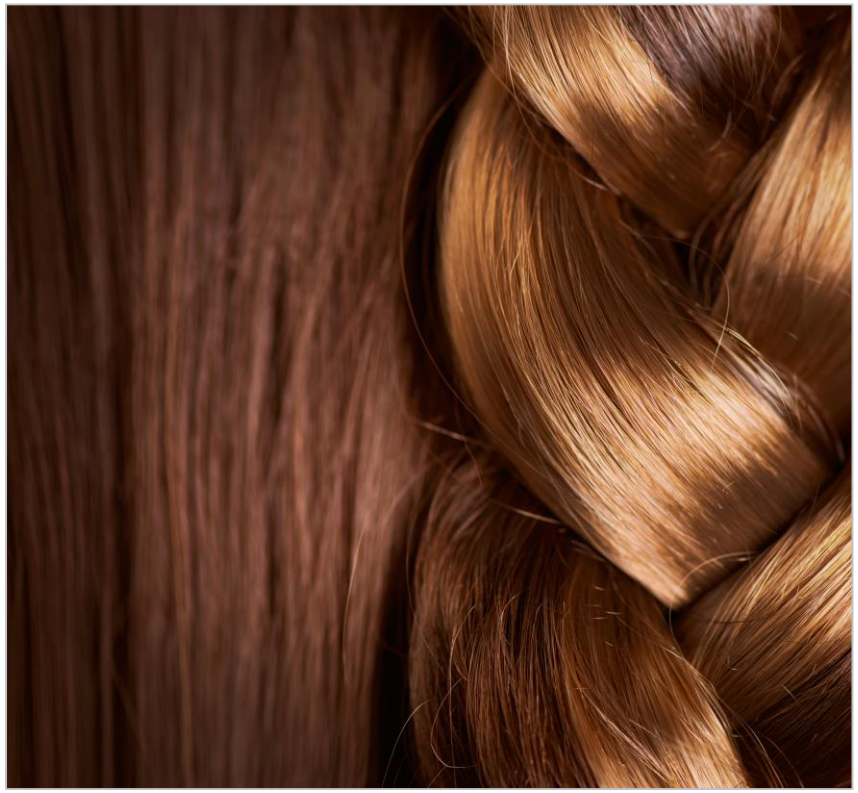
Because of their low surface energy, silicones easily spread over the surface of the hair, providing conditioning benefits and an overall healthy look and feel to hair. A very low level of silicone can make hair feel soft and smooth, provide detangling and ease of combing, reduce breakage, enhance shine and preserve cuticle integrity[16].

Frizz control and curl retention

Silicones provide a broad range of hair styling benefits including frizz control, hair alignment, curl retention and improved definition.

Silicones can facilitate heat styling, reducing the time needed to straighten hair with an iron and maintaining hair shape under high humidity conditions

Healthy look - lustrous colours and shine



Hair health/smoke and UV protection

Silicones have been shown to reduce the effects of daily exposure to urban pollution and UV on hair aesthetics, maintaining a healthy look and feel by enhancing combability and shine, reducing static and restoring hydrophobicity.

Color protection, enhanced color and shine

Silicones can protect hair that has been colored to retain its vibrant, ‘just colored look’ after repeated washes. In most hair colorant systems, silicone is widely used during the process to restore softness, smoothness and shine of hair[17].

Protection from heat damage or blow drying

Protection from heat damage

Hair dryers and other heat appliances soften the keratin of the hair. If the appliances are too hot, they can cause water in the hair to boil, forming minute bubbles of steam inside the softened hair shaft, weakening the fiber and potentially leading to total fracture. Silicones are thermally stable and spread easily on the hair, forming a protective film to help prevent breakage caused by heat styling tools[12].

Fast Drying

At high humidity levels, or even in the shower, silicone repels water and can provide a fast-drying effect causing less damage due to blow drying.[12]

Build-Up

O QUE É? | O SILICONE | ESTUDOS | O SEGREDO É A PREVENÇÃO

"É a sensação de uma cobertura indesejada, deixando os cabelos pesados, opacos, rigídos e sem vida, como resultado do uso repetido de produtos capilares"

E o que pode causar Build-Up?
Qualquer coisa que não for removida adequadamente no processo de lavagem dos cabelos; como sebo, sujeira, poluição, produtos mal removidos, etc.

Estudos bem documentados demonstraram que:

- Condicionantes catiônicos podem depositar e resistir ao enxágue
- Condicionantes catiônicos podem se combinar com agentes de limpeza e formar depósitos.
- Ceras e óleos podem depositar no cabelo
- Água com dureza alta pode formar depósitos sobre os cabelos.
- Agentes de modelagem podem contribuir com o build-up.

Build-Up

O QUE É? | O SILICONE | ESTUDOS | O SEGREDO É A PREVENÇÃO

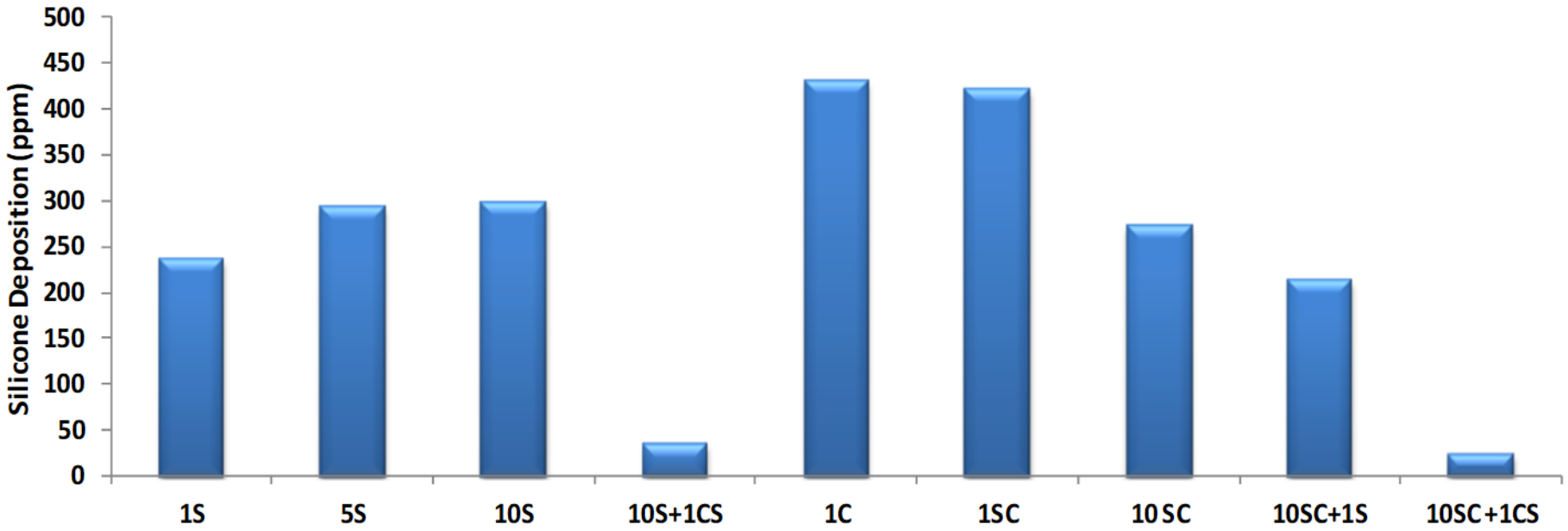
Não se pode afirmar que o silicone é o ingrediente causando build-up.

Nossos estudos mostram que:

- A deposição de silicone depende do produto.
  - Em alguns casos, as deposições de silicone aumentaram com o uso repetido de produtos de consumo
- Silicones são facilmente removidos após 1 aplicação de shampoo clareador/anti-resíduos.

Build-Up

O QUE É? | O SILICONE | ESTUDOS | O SEGREDO É A PREVENÇÃO



S= Shampoo; C=Condicionador , SC=Shampoo + Condicionador
CS= Shampoo clareador/anti-resíduo (sem silicone)

Build-Up

O QUE É? | O SILICONE | ESTUDOS | PREVENÇÃO

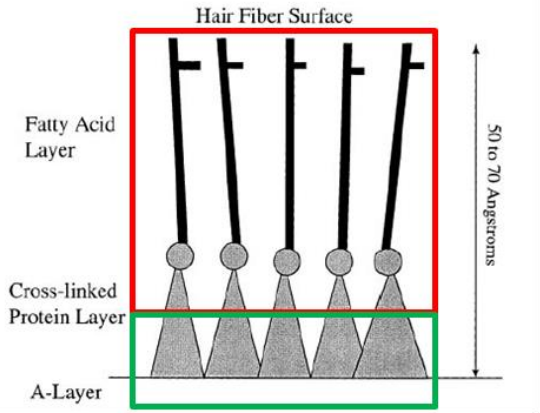
Escolha correta de produtos para o seu tipo de cabelo!

A escolha equivocada dos produtos é uma das maiores causas de build-up.

A limpeza e remoção eficiente dos resíduos é uma rotina adequada e deve ser adotada sempre que possível.

Afinidade com a Água

O Cabelo Natural é **HIDROFÓBICO** ou **HIDROFÍLICO?**



Cada fio de cabelo nasce com uma **proteção de lipídeos** ligados quimicamente à fibra.

Esse lipídeos conferem **proteção e repelência** à diversos agentes agressores, incluindo água e agentes de limpeza.

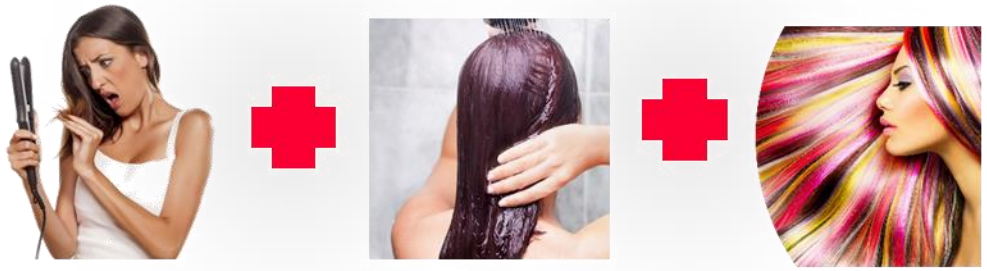
Cabelo danificado, perda dos lipídeos protetores cabelo fica HIDROFÍLICO

Cabelo saudável, lipídeos protetores preservados cabelo HIDROFÓBICO

Eles têm essa ação protetora porque são compostos HIDROFÓBICOS

Afinidade com a Água

1 aplicação de tintura = 80% menos lipídeos



Devido às **agressões diárias**, como lavagem, penteado, temperatura e químicos (coloração, peróxidos, etc), essa proteção natural do cabelo vai **desaparecendo**.

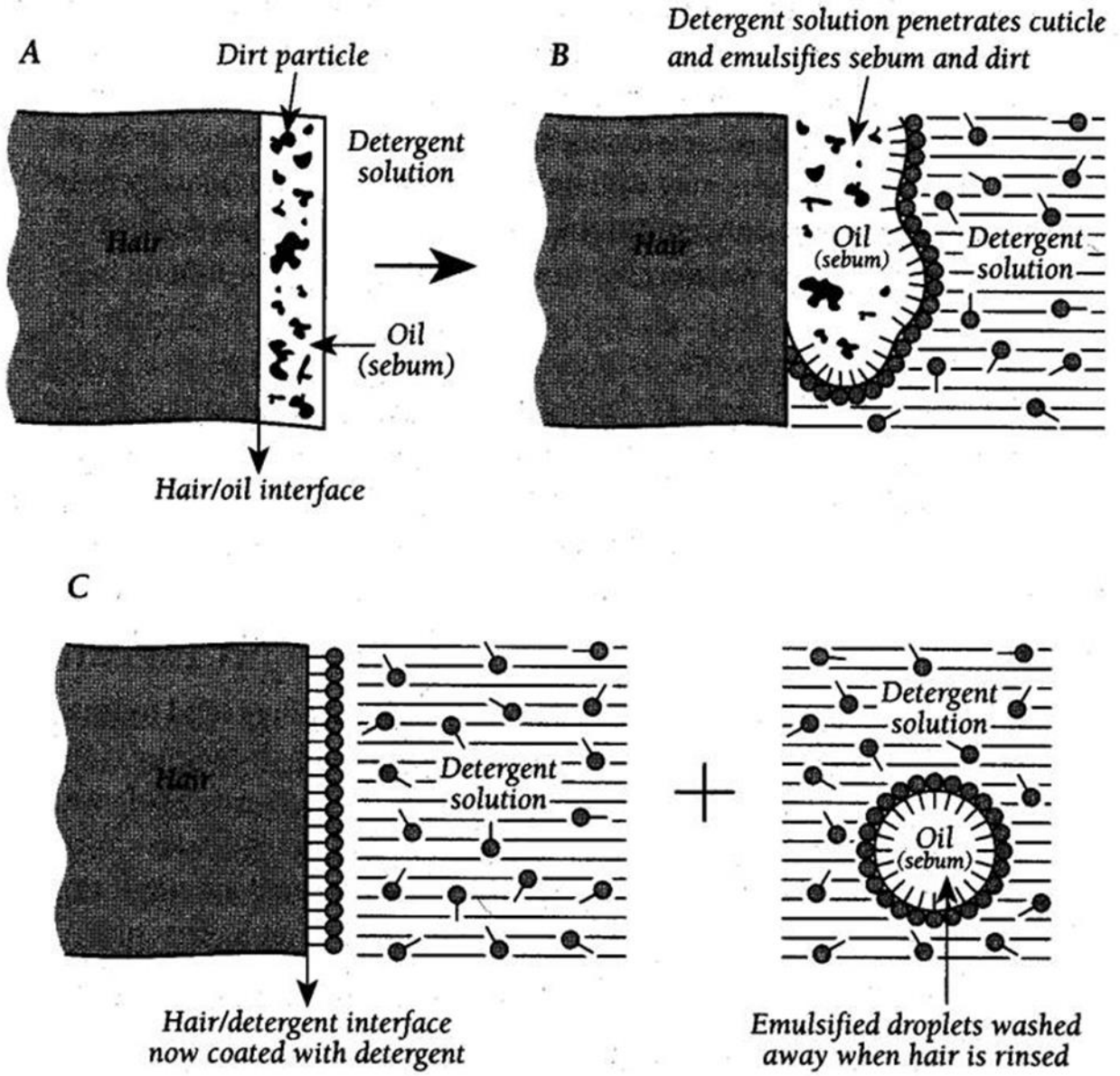
O cabelo fica desprotegido e muito **HIDROFÍLICO**, susceptível à maiores danos.

Com isso, faz-se necessário restaurar essa proteção utilizando ingredientes que formam filmes HIDROFÓBICOS dentro das formulações (silicones, óleos, etc).

Remoção de Ingredientes Hidrofóbicos

Ingredientes Hidrofóbicos

podem ser removidos por lavagem?



Considerações Finais

Em resumo, **os silicones são:**

✓materiais **presentes em nossas vidas**, em diferentes áreas/produtos

✓são obtidos do **quartzo**, que é um mineral abundante

✓**amplamente utilizados** na indústria cosmética – em cabelos desde a década de 80 (quase 40 anos de história)

✓um dos ingredientes cosméticos mais **seguros e estudados**

✓responsáveis por entregar uma **grande quantidade de benefícios** aos cabelos (brilho, proteção, reparação, sensorial, anti-frizz, etc)

✓**removíveis do cabelo** através do uso de produtos adequados para este fim

DOW®

HydroxySHIELD™ Polymer

Beyond hair protection

Seek Together™

Personal Care

New HydroxySHIELD™ Polymer

A disruptive new conditioning ingredient platform

HydroxySHIELD™ Polymer

- a novel **Hydroxy** functional amino polymer that can create next generation formulations to meet consumer cleansing and conditioning needs.
- Provides a **SHIELD** of multifunctional benefits for hair from heat, color and damage.
- Delivers healthy hair that is improved with each step of your hair care routine.

Terminal hydroxyl aminosiloxane

- Siloxane – provides softness and silky feel
- Amino - anchors polymer to hair
- Hydroxyl – provides perceived moisturization

Product name: **HydroxySHIELD™ Polymer**

INCI: Bis-Diisopropanolamino-PG-Propyl Disiloxane/Bis-Vinyl Dimethicone Copolymer

Polymer is 90% active in 10% butyloctanol

Butyloctanol is readily biodegradable

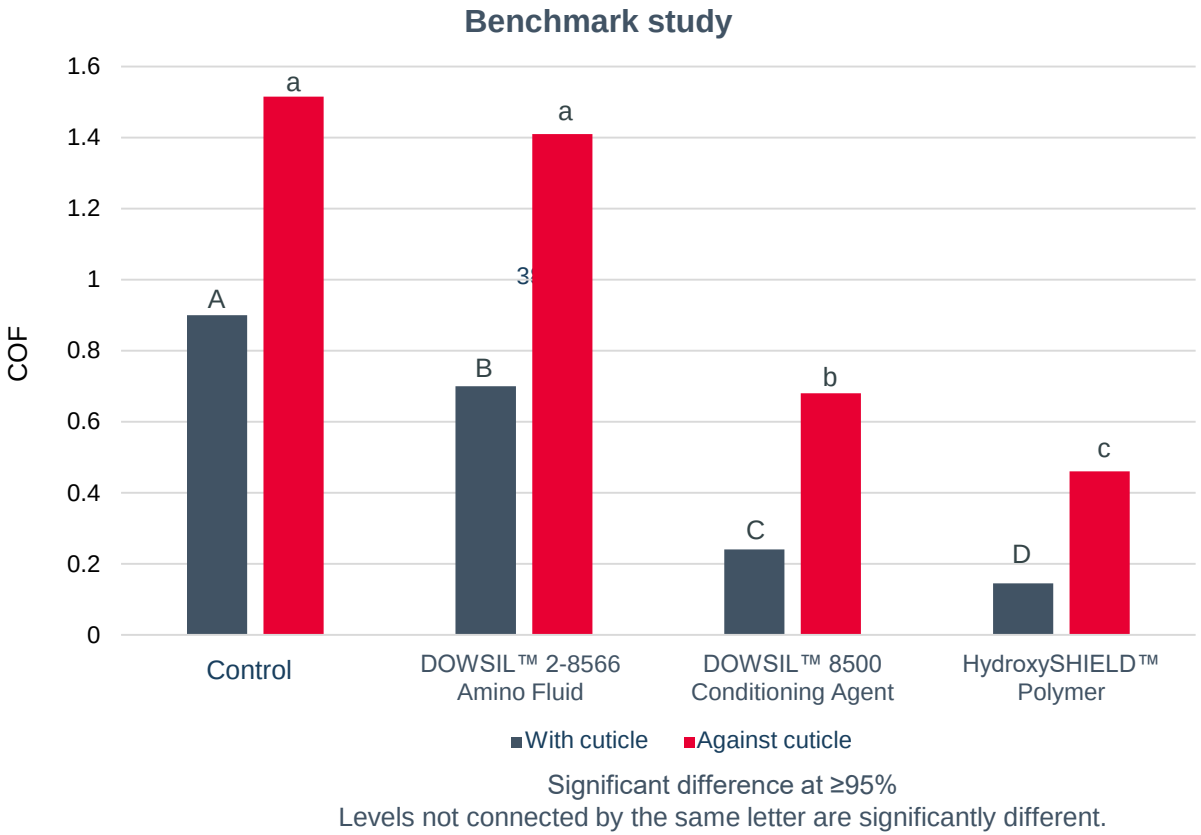
Appearance	Clear to slightly hazy fluid
Use level	1-2%
Viscosity	4000-15000 cSt
Shelf life	24 months
Cyclic concentration	< 0.1% D4, D5, D6
Approved for use in China	In progress

These are typical properties, not to be construed as specifications.

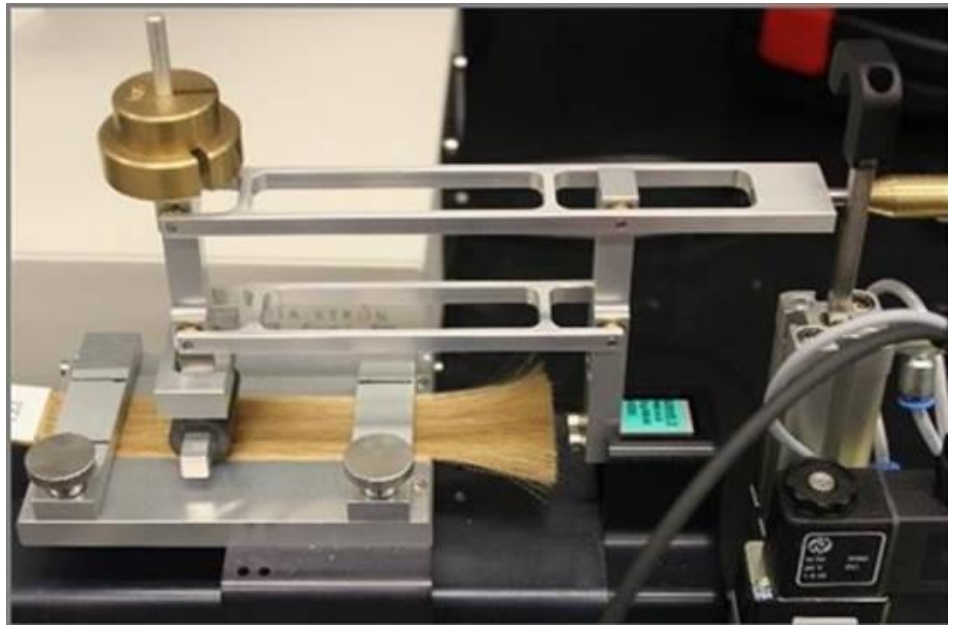
Reduced friction

Rinse-off conditioner

HydroxySHIELD™ Polymer significantly reduces friction on the surface of hair in comparison to the control and other aminosilicone benchmarks.



Significant difference at ≥95%
Levels not connected by the same letter are significantly different.

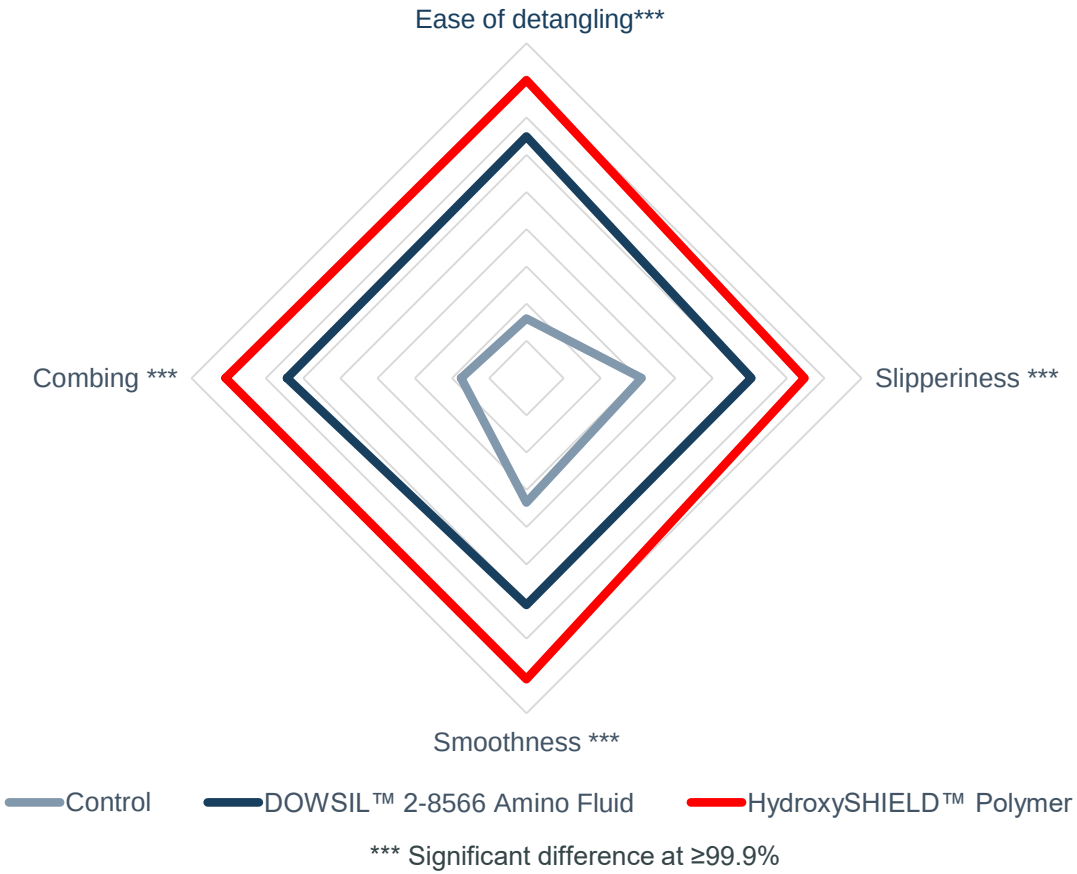


Treatment: 0.4 g / g hair on bleached Caucasian hair, 1% silicone
Method: Measured using Diastron MTT175 miniature tensile tester
Control: Conditioner without silicone

Dry sensory benefits

Rinse-off conditioner

HydroxySHIELD™ Polymer provides enhanced combing and feel compared to aminosilicone benchmark.



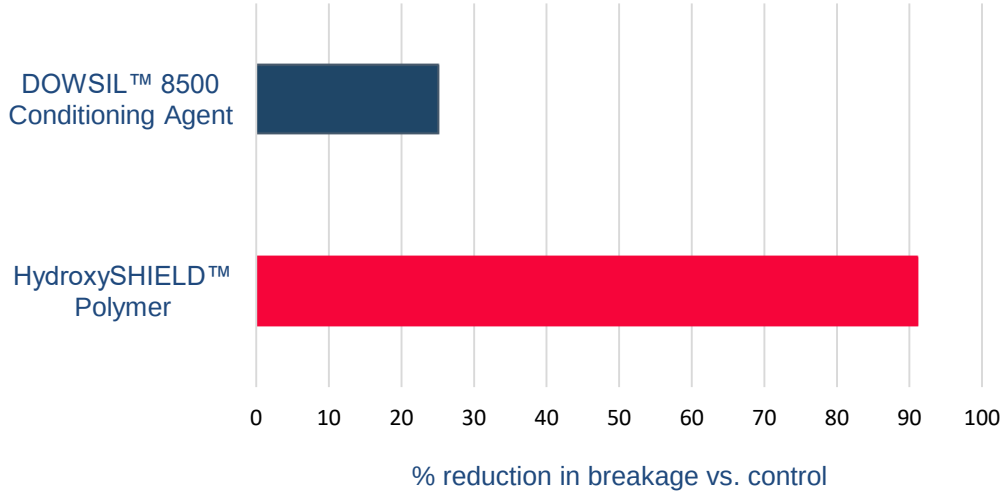
*** Significant difference at ≥99.9%

Treatment: 0.4 g / g hair on bleached Caucasian hair, 1% silicone
Control: Rinse off conditioner with no silicone
 # Participants: 18

Reduced breakage

Rinse-off conditioner

HydroxySHIELD™ Polymer reduces breakage by 91% compared to the control and 66% compared to aminosilicone benchmark.



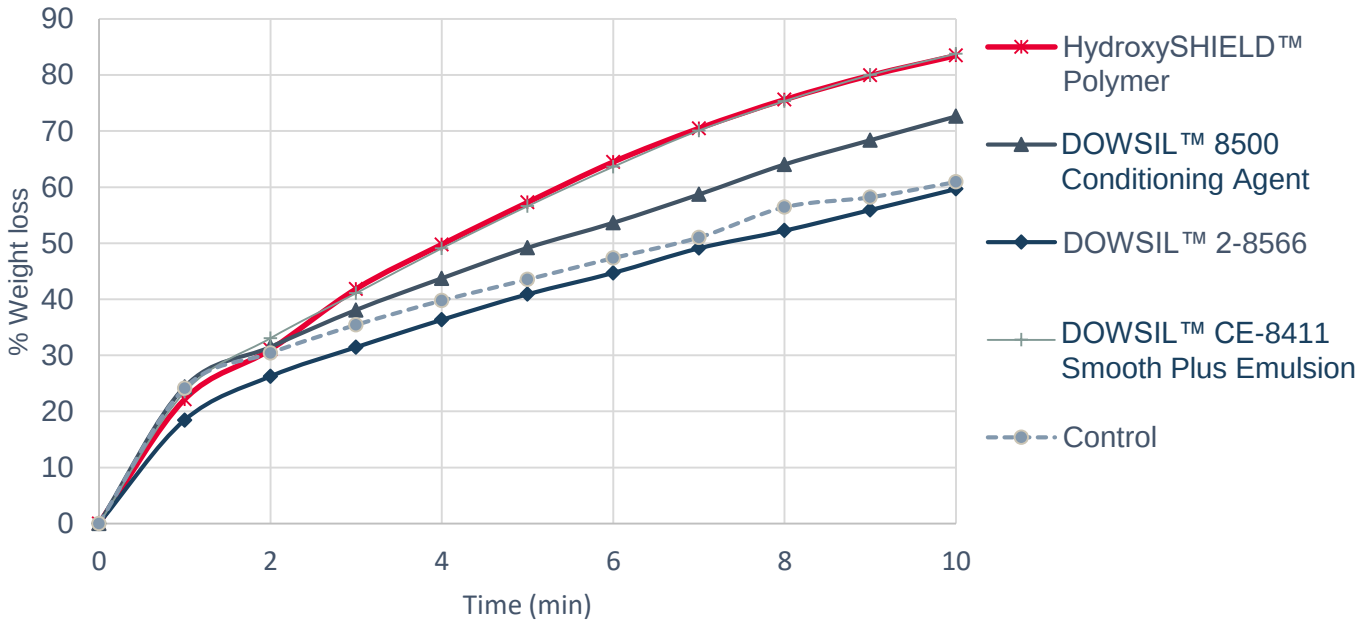
Treatment: 0.4 g / g hair on bleached Caucasian hair, 1% silicone
Method: Measured using repeated combing instrument. 3 tresses/product; 10,000 comb strokes; speed: 20 cycles/min (80 comb stokes/tress/min); broken hair fibers weighed and % reduction calculated
Control: Conditioner without silicone

Repeated combing 10,000 cycles

Speed-up blow drying

Rinse-off conditioner

HydroxySHIELD™ Polymer provides up to 35% faster drying in comparison to the control and amodimethicone.



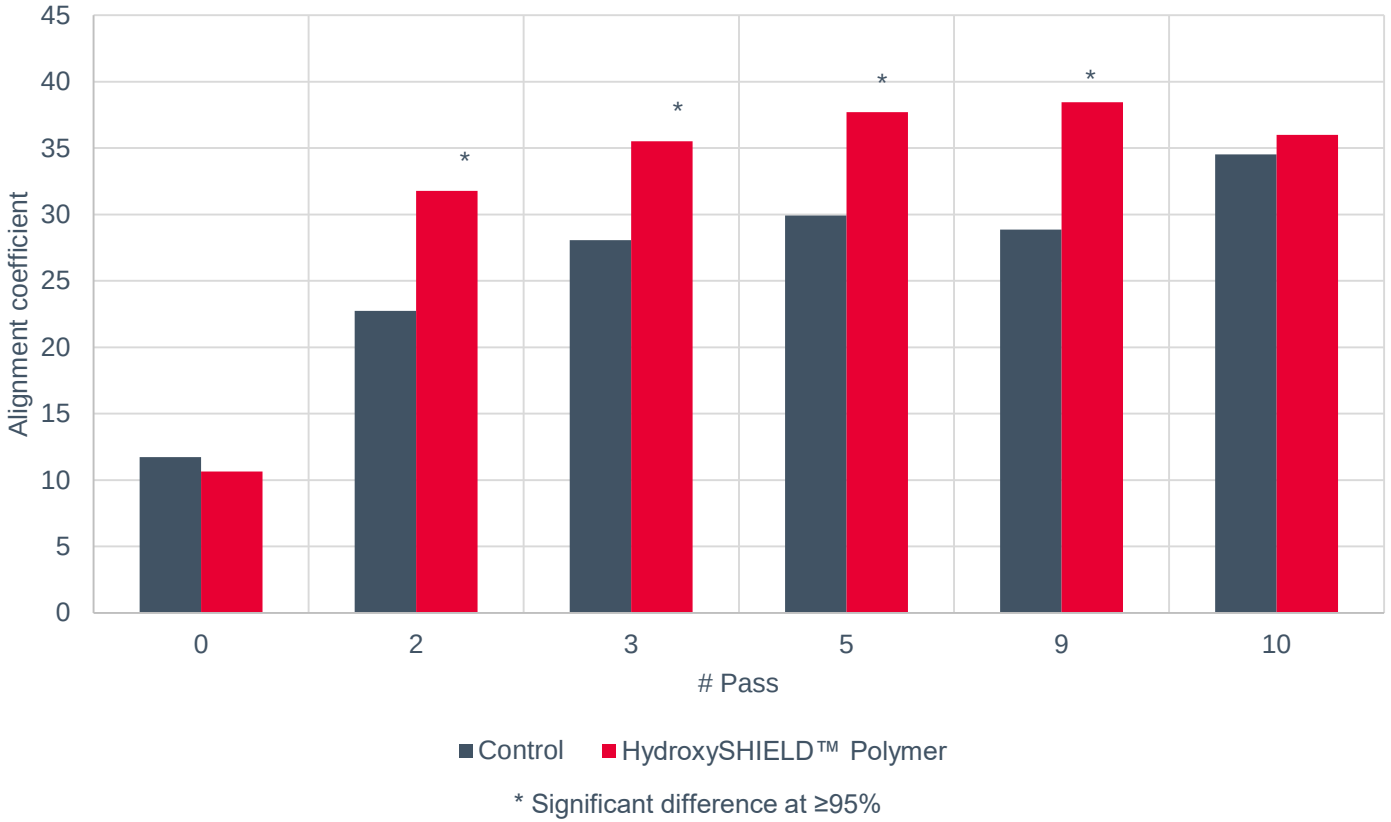
Treatment: 1% active silicone, 0.4 mL/g hair
Method: After rinse-off conditioner application, the tress was blow dried on a low heat/low speed for 10 minutes. The weight loss measurement was taken every minute.
Control: Rinse-off conditioner without silicone

% weight loss =
(initial wet wt. – treated wet wt.) x 100
(initial wet wt. – initial dry wt.)

Increased alignment

Rinse-off conditioner

HydroxySHIELD™ Polymer improves hair alignment during heat styling with maximum hair alignment achieved after three passes.



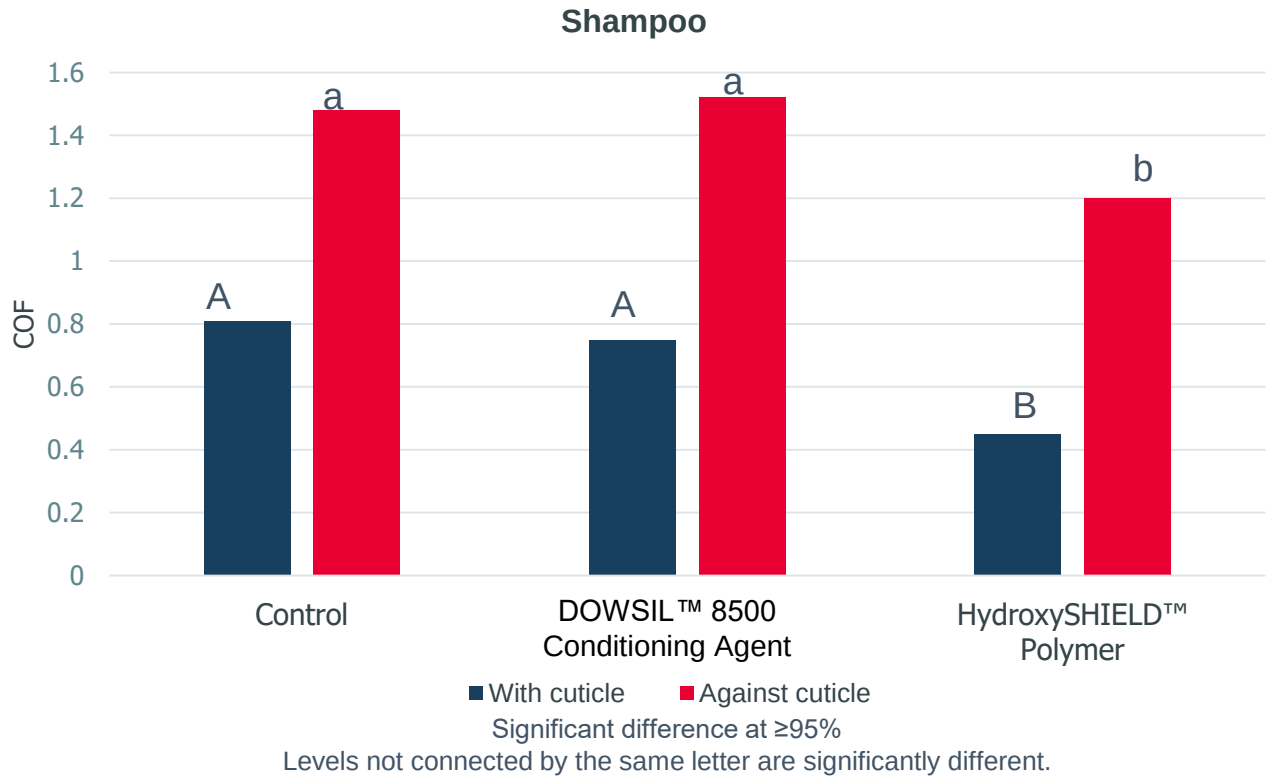
* Significant difference at ≥95%

1 week after using flat iron

Treatment: 0.4 g / g hair on virgin frizzy hair, conditioner containing 1 % silicone; Flat iron at 204°C, 10 seconds each
Method: Measured using RUMBA
Control: Conditioner without silicones

Top performer for reduced friction

Standard shampoo



Significant difference at ≥95%

Levels not connected by the same letter are significantly different.

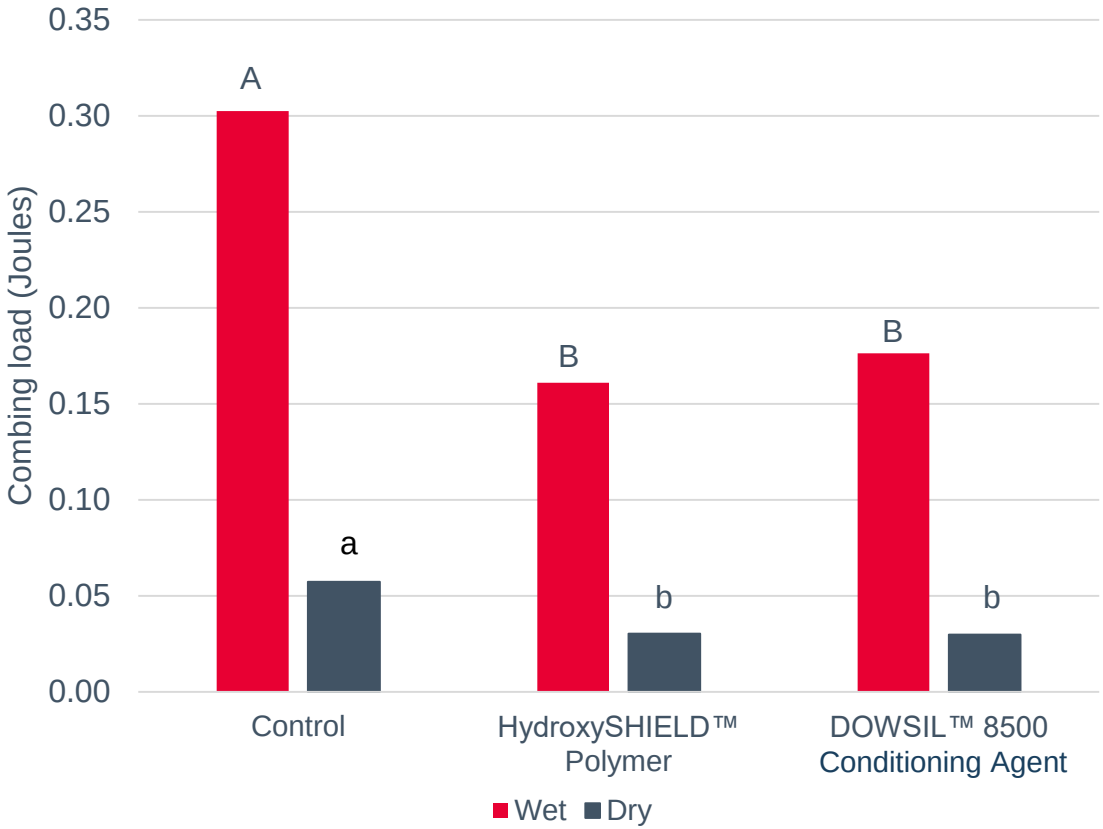
HydroxySHIELD™ Polymer provides up to 45% reduced friction compared to the control and 40% compared to aminosilicone benchmark.

Treatment: 0.4 g / g hair on bleached Caucasian hair, 1% silicone
Method: Measured using Diastron MTT175 miniature tensile tester
Control: Shampoo without silicone

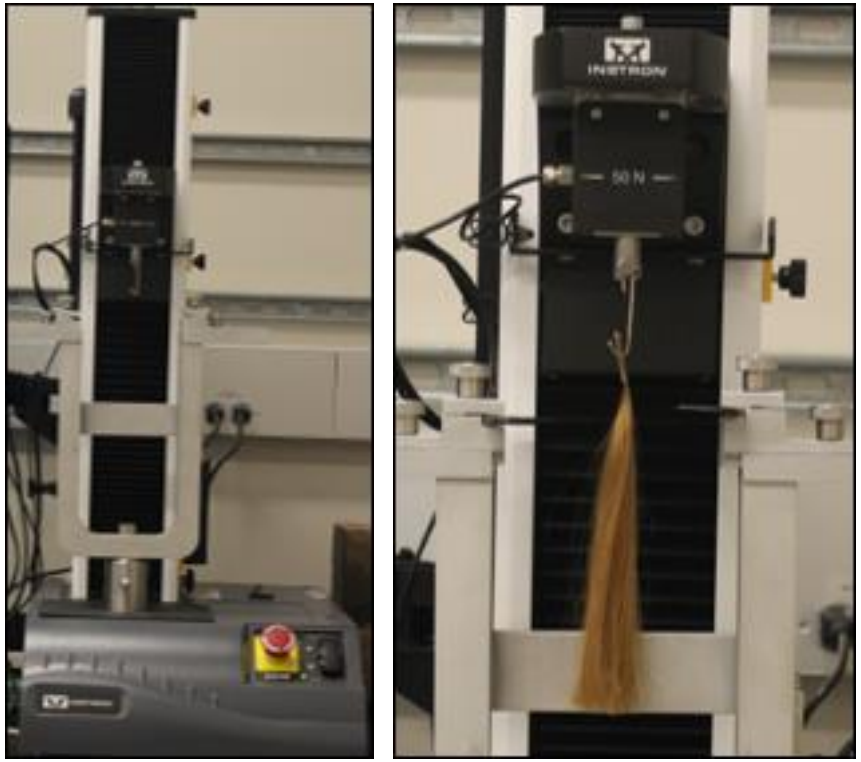
Enhanced combing

Standard shampoo

HydroxySHIELD™ Polymer improves dry and wet combability compared to a control and similar performance to the aminosilicone benchmark.



Levels not connected by the same letter are significantly different

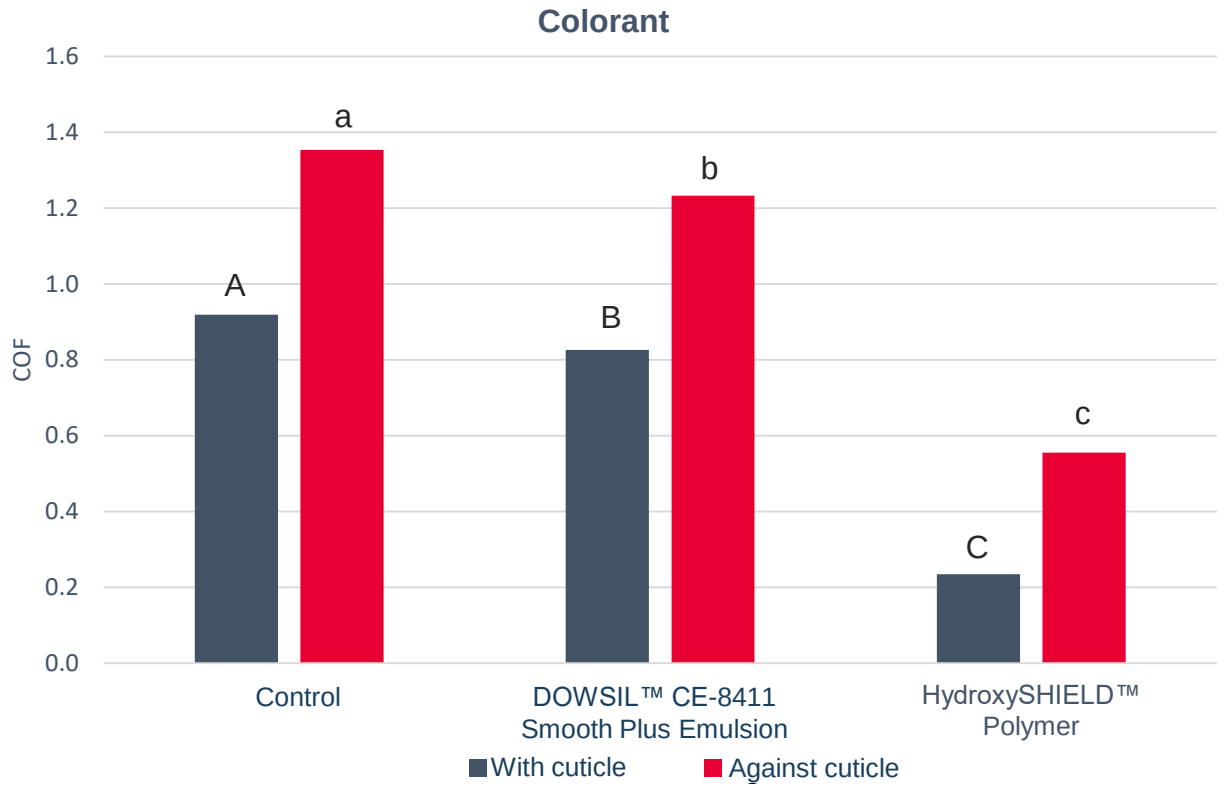


Treatment: 0.4 g / g hair on bleached Caucasian hair, 1% silicone
Method: measured using Instron tensile tester
Control: shampoo without silicone

Top performer for reduced friction

Permanent colorant

HydroxySHIELD™ Polymer provides approximately 70% improvement in reduced friction in comparison to a control and aminosilicone benchmark, even after typical colorant damage inherent from peroxide in a developer.



Significant difference at ≥95%
Levels not connected by the same letter are significantly different

Treatment: 0.4 g / g hair on bleached Caucasian hair, 5% silicone
Method: Measured using Diastron MTT175 miniature tensile tester. A commercial coloration (Syoss Professional) was used in this study. The color blend (developer, color cream, and test emulsion) was applied on the tress and left for 30 min prior to evaluation.
Control: Colorant without silicone

Summary of comparative benefits

Category	HydroxySHIELD™ Polymer	DOWSIL™ 2-8566 Amino Fluid	DOWSIL™ 8500 Conditioning Agent	DOWSIL™ CE-8411 Smooth Plus Emulsion
Wet combing	***	*	***	***
Dry combing	***	**	***	***
Improved sensory	****	**		
Reduced breakage	****	**	***	***
Reduced friction (conditioner)	****	*	***	***
Reduced friction (shampoo)	***	*	**	****
Fast drying	****	*	***	****
Color protection	**		**	
Heat protection	**	**	**	****
Non-yellowing	****	*	***	****
Low cyclics (<0.1%)	****	*	****	*

NOTE: Cells left blank indicate this product was not tested against HydroxySHIELD™ Polymer for this attribute.

New generation of DOWSIL™ Silicone Gum Blends

Seek Together™

Introducing Dow's new gum blend platform

A collection of four versatile gum blends, enabling you and your brand to create products that your consumer will appreciate and feel the difference

- Each new gum blend contains a silicone gum in a different carrier
- Each carrier was chosen to create a new sensorial experience with no need to compromise on hair conditioning and smoothness
- All four new gum blends are compliant with key cosmetic regulations across the world and INCI names are listed on the China Catalog of Cosmetics Ingredients

New gum blends overview

Offering dimethiconol gum from XIAMETER™ PMX-1501 Fluid **in alternative carriers:**

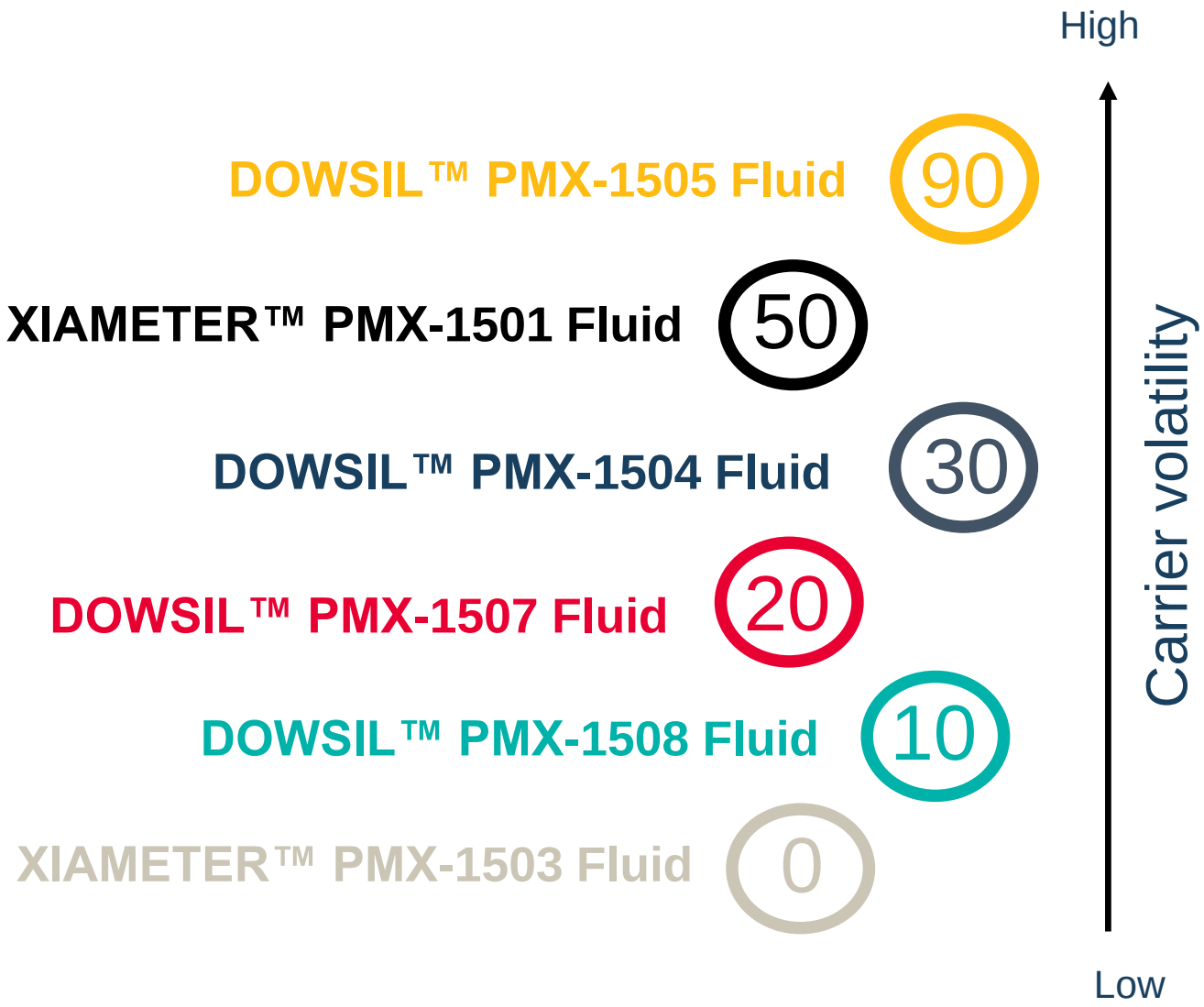
- Choice in volatility, manufacturing process, sustainability profile
- Even more flexibility with the ability to combine blends built around the same gum

Name	Gum	Carrier	% Active gum	Blend volatility (vs XIAMETER™ PMX-1501 Fluid)	Blend viscosity in cPs (vs XIAMETER™ PMX-1501 Fluid)	Carrier
DOWSIL™ PMX-1504 Fluid	Dimethiconol	C11-13 Isoparaffin, Isohexadecane	27	Similar	Higher [25,000-35,000]	• Non-silicone • Volatility close to D5 • Readily biodegradable
DOWSIL™ PMX-1505 Fluid	Dimethiconol	Isododecane	15	Higher	Lower [500-1,500]	• Non-silicone • High volatility • Readily biodegradable
DOWSIL™ PMX-1507 Fluid	Dimethiconol	PDMS (2 cSt)	18.5	Slightly lower	Similar [5,200-8,400]	• Silicone • Volatile
DOWSIL™ PMX-1508 Fluid	Dimethiconol	C13-15 Alkane	20.5	Lower	Similar [5,200-8,400]	• Non-silicone • Inherently primary biodegradable • 96% natural origin content (ISO 16128)

Volatility factor

VF

New gum blends complement already existing range, now offering **an extended choice in carrier volatility**



Look on hair tresses

Comparison versus XIAMETER™ PMX-1501 Fluid and XIAMETER™ PMX-1503 Fluid

Untreated

XIAMETER™ PMX-1501 Fluid

XIAMETER™ PMX-1503 Fluid

DOWSIL™ PMX-1504 Fluid

DOWSIL™ PMX-1505 Fluid

DOWSIL™ PMX-1507 Fluid

DOWSIL™ PMX-1508 Fluid

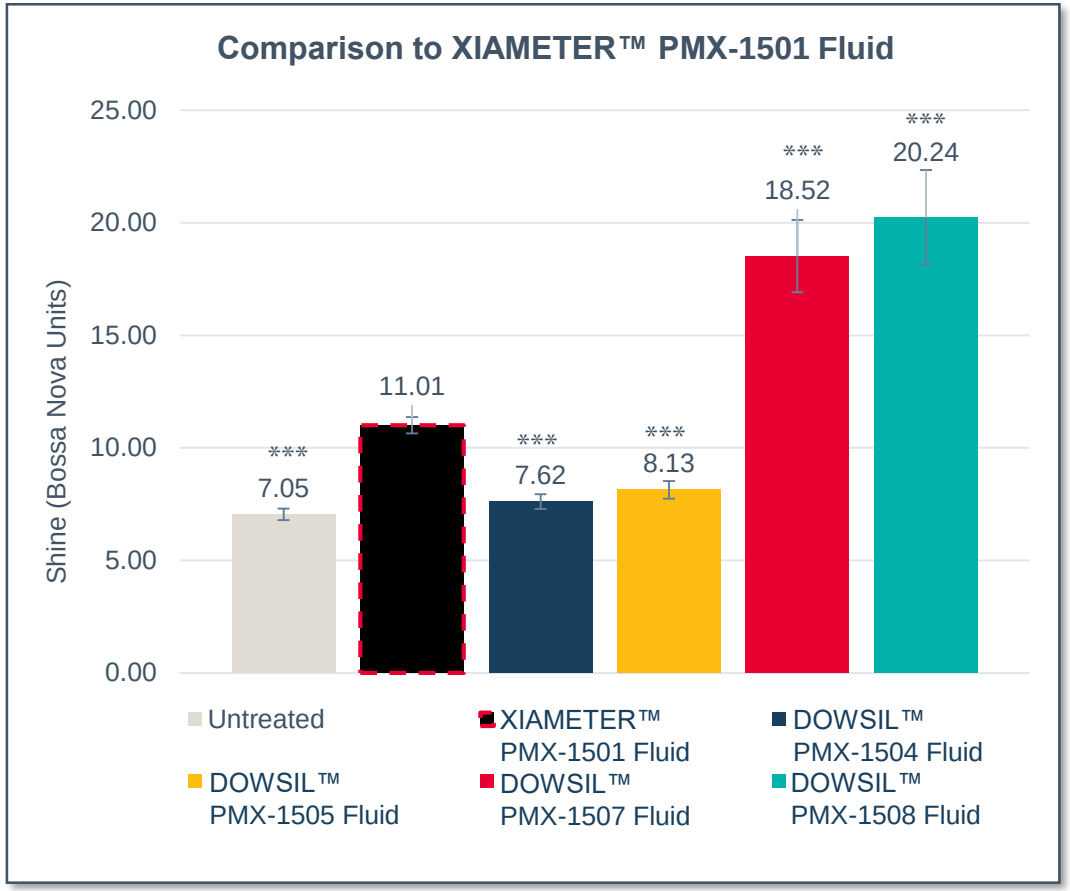
- **Carrier has a significant influence** on the overall hair aspect
- DOWSIL™ PMX-1504 Fluid has a significantly **more natural look**
- Gum blends with non-volatile carriers (i.e., XIAMETER™ PMX-1503 Fluid) look less natural compared to others

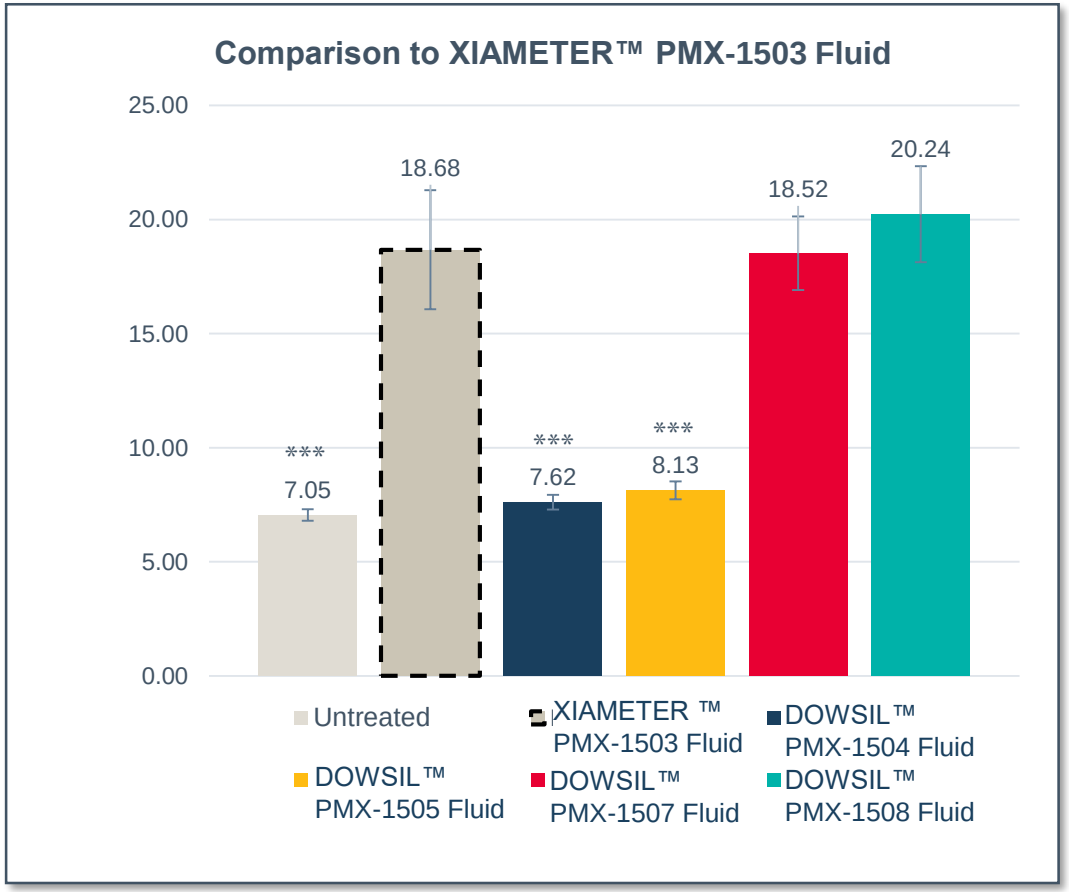
Protocol:
Hair: slightly bleached Caucasian hair
Treatment: 0.1 g/g hair, 9% silicone active, triplicates
Untreated washed with 9% SLES solution

Shine

SAMBA Hair from Bossa Nova Vision

DOWSIL™ PMX-1507 Fluid and DOWSIL™ PMX-1508 Fluid **provide the highest level of shine**.
Shine is impacted by carrier volatility level.





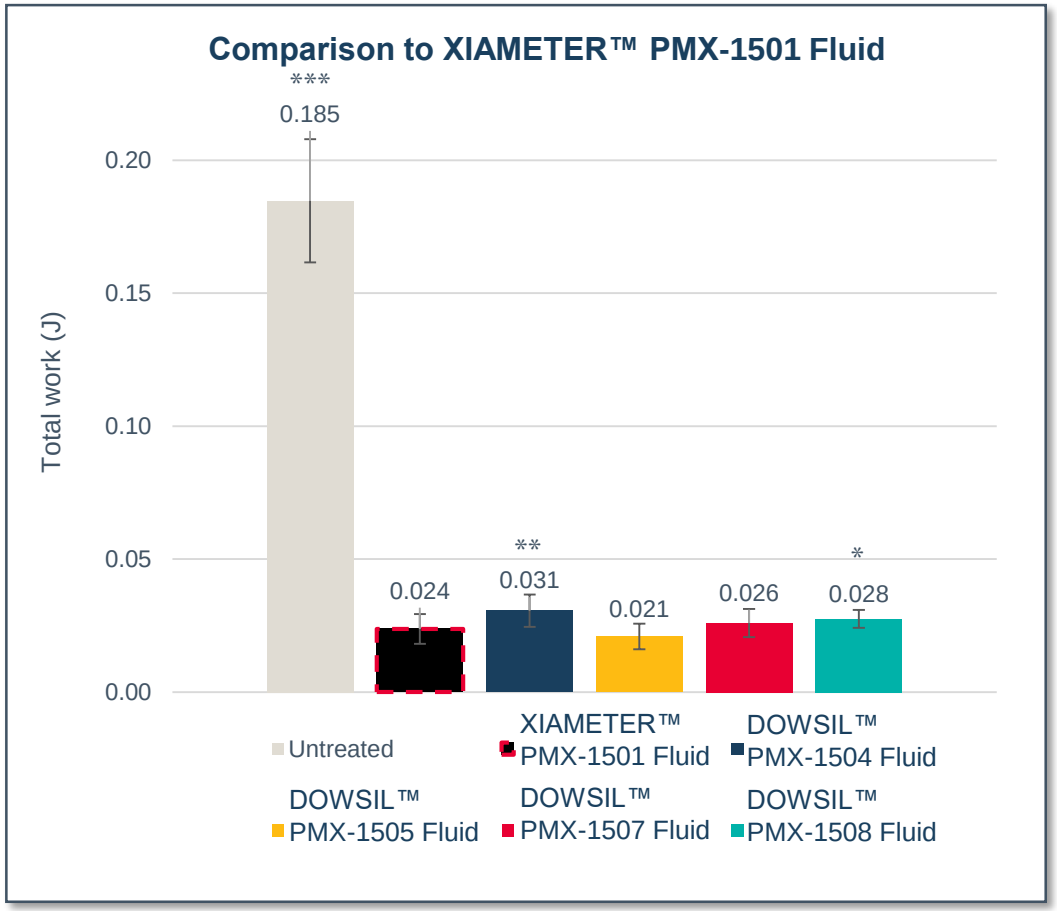
Protocol and statistics:
Hair: Slightly bleached Caucasian hair

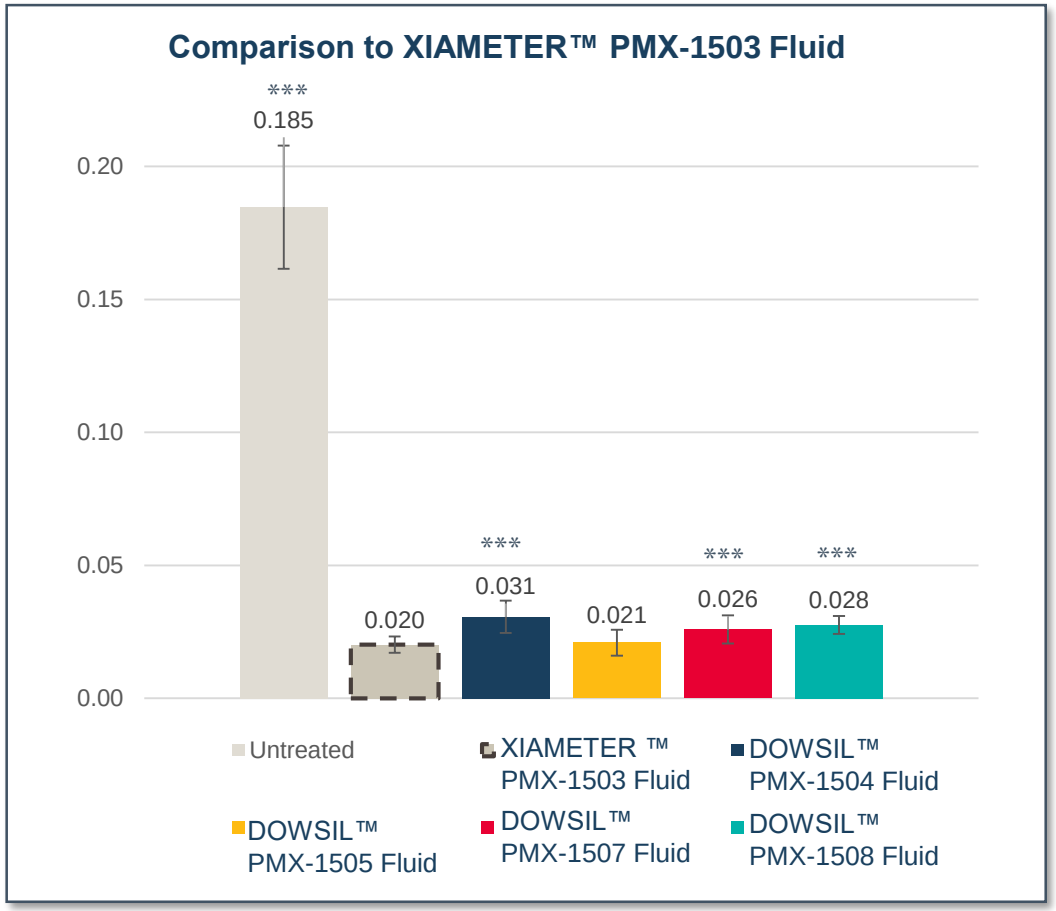
Treatment: 0.1 g/g hair, 9% gum active, triplicates
Significant difference (vs PMX-1501 Fluid/PMX-1503 Fluid) : *** ≥99.9%

Dry combing

Dia-Stron MTT175 with combing device

All gum blends significantly decrease total combing work compared to untreated hair (up to 90% reduction). Even though there are significant differences among gum blends, those are unlikely to be consumer perceivable.





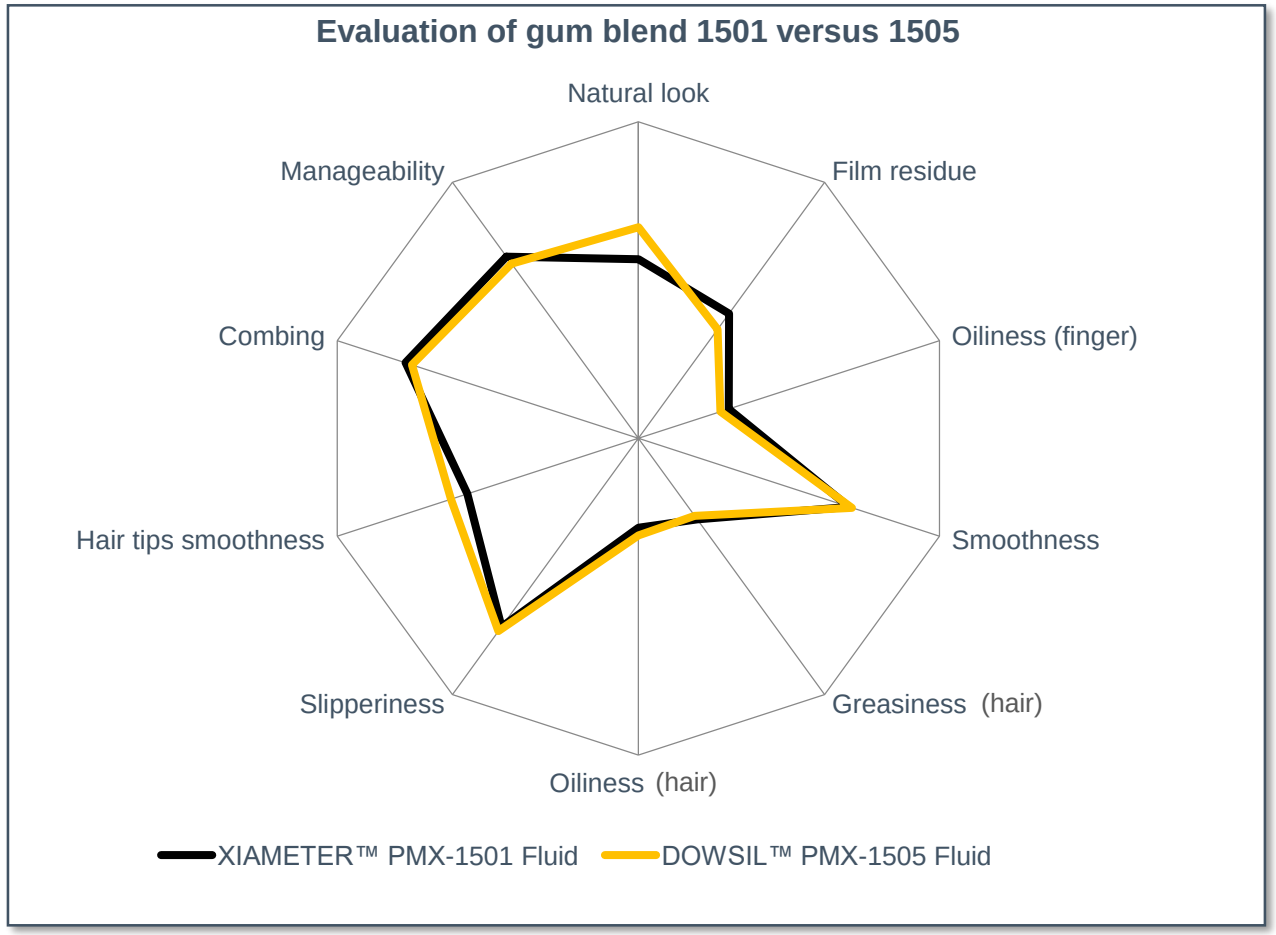
Protocol and statistics:
Hair: Slightly bleached Caucasian hair

Treatment: 0.1 g/g hair, 9% gum active, triplicates
Significant difference (vs. PMX-1501 Fluid/PMX-1503 Fluid) : * ≥95%, ** ≥99%, *** ≥99.9%

Sensory profile on hair

Paired comparison with internal experienced panel

DOWSIL™ PMX-1505 Fluid and XIAMETER™ PMX-1501 Fluid have **similar sensory profiles**.

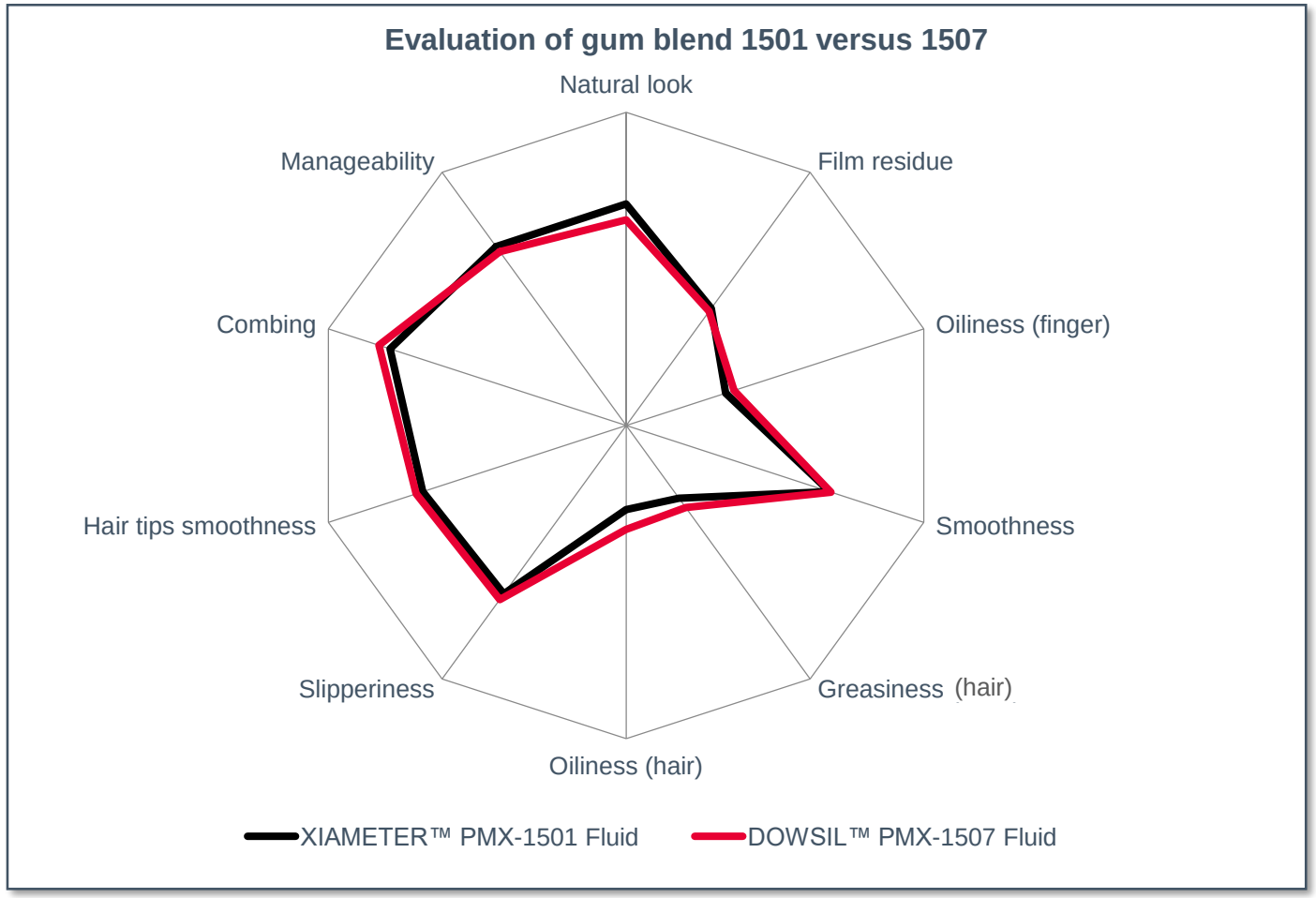


Protocol:
Hair: slightly bleached Caucasian hair
Treatment: 0.1 g/g hair, 9% active gum, 18 panelists
Statistics: Paired comparison t-test

Sensory profile on hair

Paired comparison with internal experienced panel

DOWSIL™ PMX-1507 Fluid and XIAMETER™ PMX-1501 Fluid have **similar sensory profiles**.

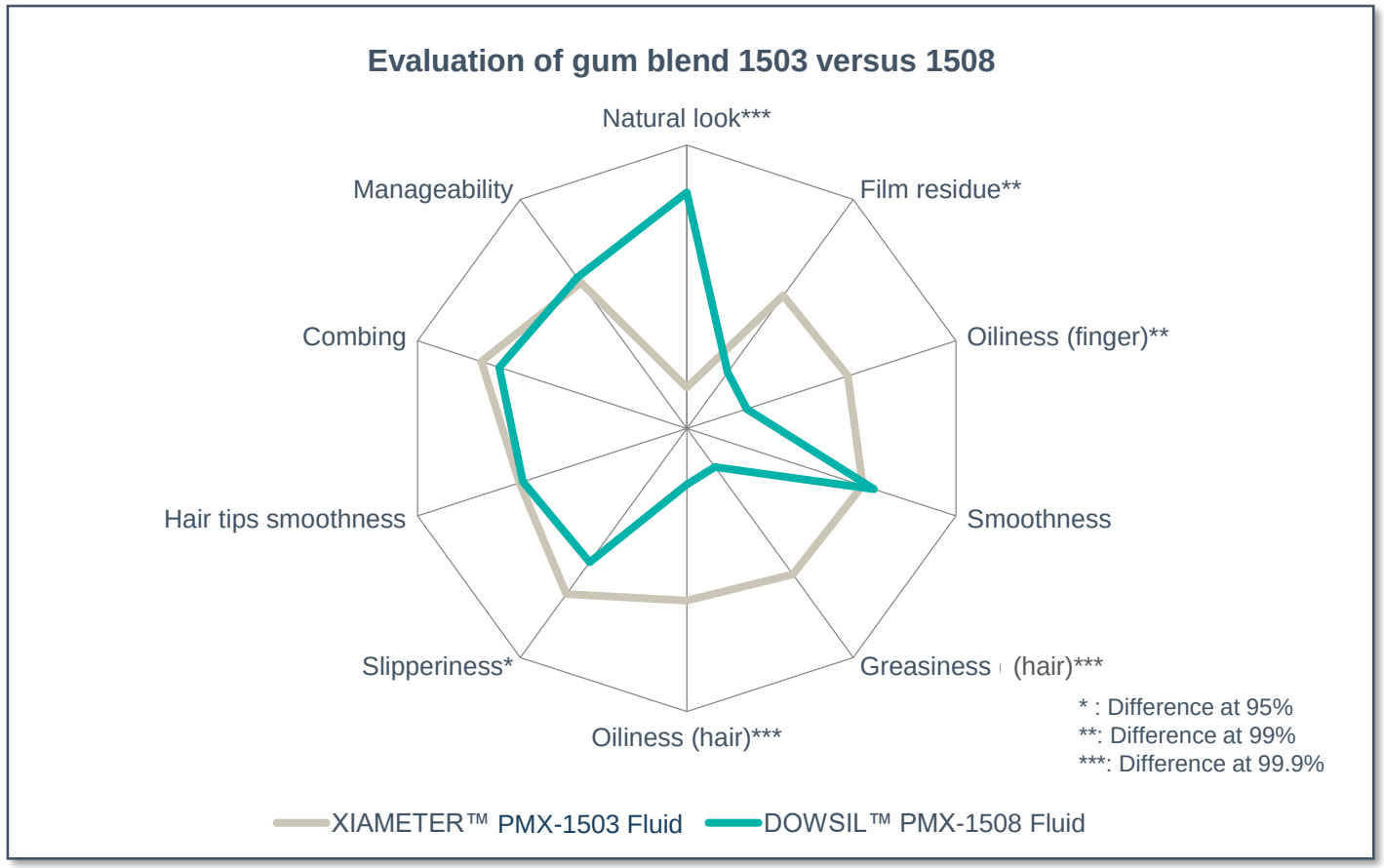


Protocol:
Hair: slightly bleached Caucasian hair
Treatment: 0.1 g/g hair, 9% active gum, 18 panelists
Statistics: Paired comparison t-test

Sensory profile on hair

Paired comparison with internal experienced panel

DOWSIL™ PMX-1508 Fluid delivers **less film residue and decreased greasiness, oiliness and slipperiness**, when compared to XIAMETER™ PMX-1503 Fluid.

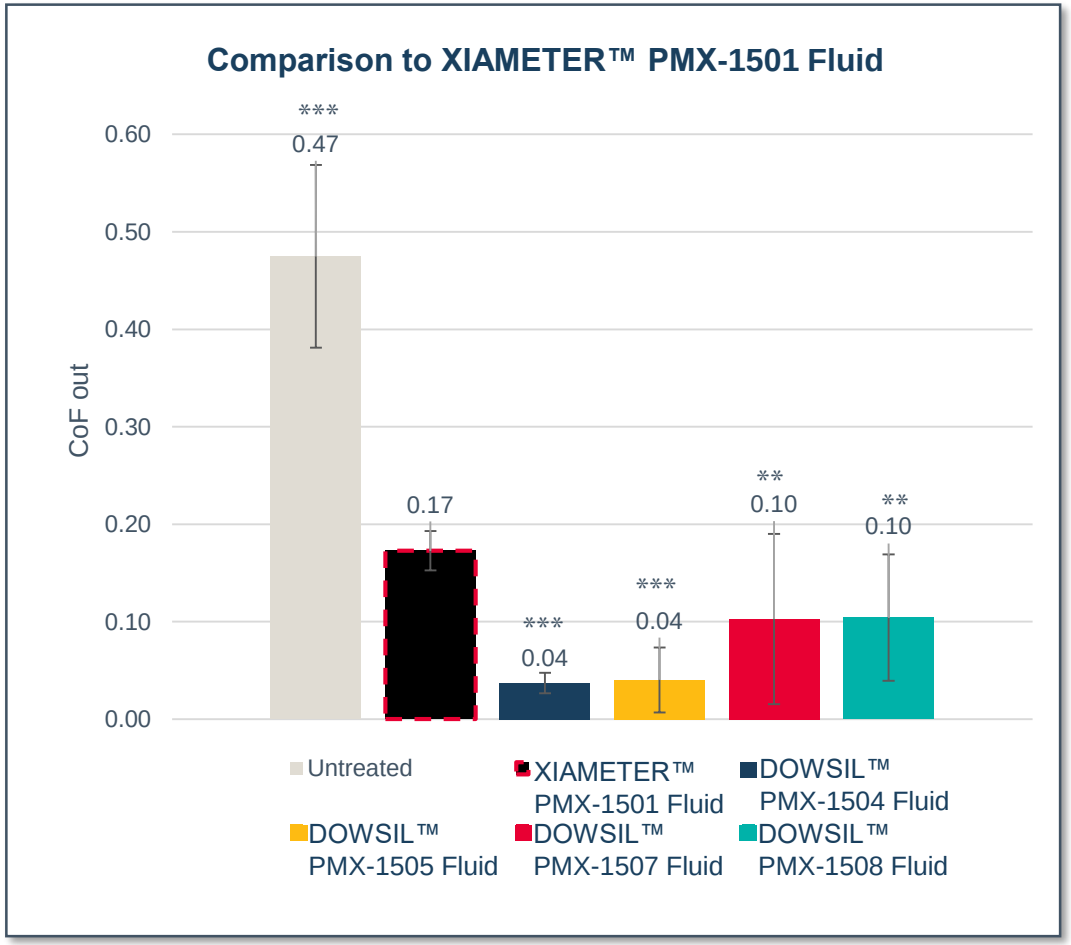


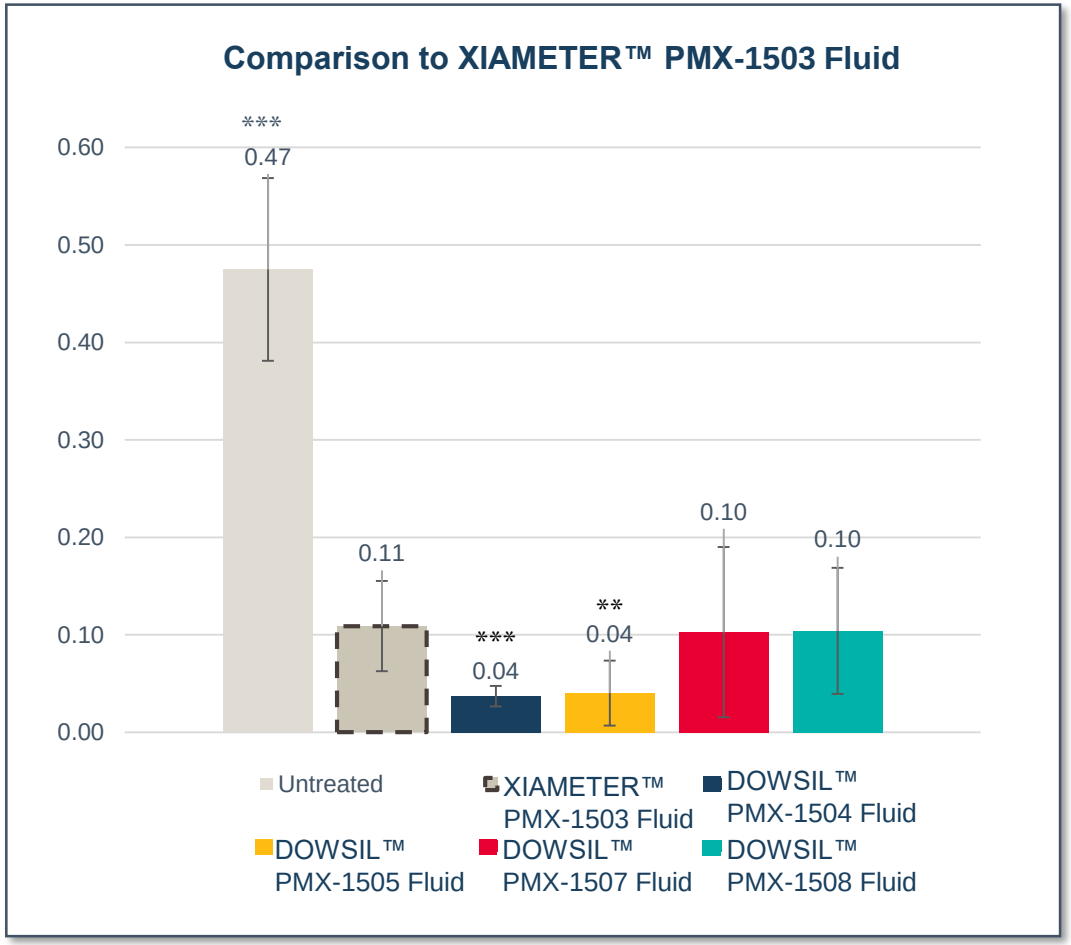
Protocol:
Hair: slightly bleached Caucasian hair
Treatment: 0.1 g/g hair, 9% active gum, 18 panelists
Statistics: Paired comparison t-test

Coefficient of friction (CoF)

Dia-Stron MTT175, test performed along cuticles

New-generation gum blends deliver low CoF, potentially translating into smooth hair.





Protocol and statistics:
Hair: Slightly bleached Caucasian hair Treatment: 0.1 g/g hair, 9% gum active, triplicates Significant difference (vs. PMX-1501 Fluid/PMX-1503 Fluid) : ** ≥99%, ***≥99.9%

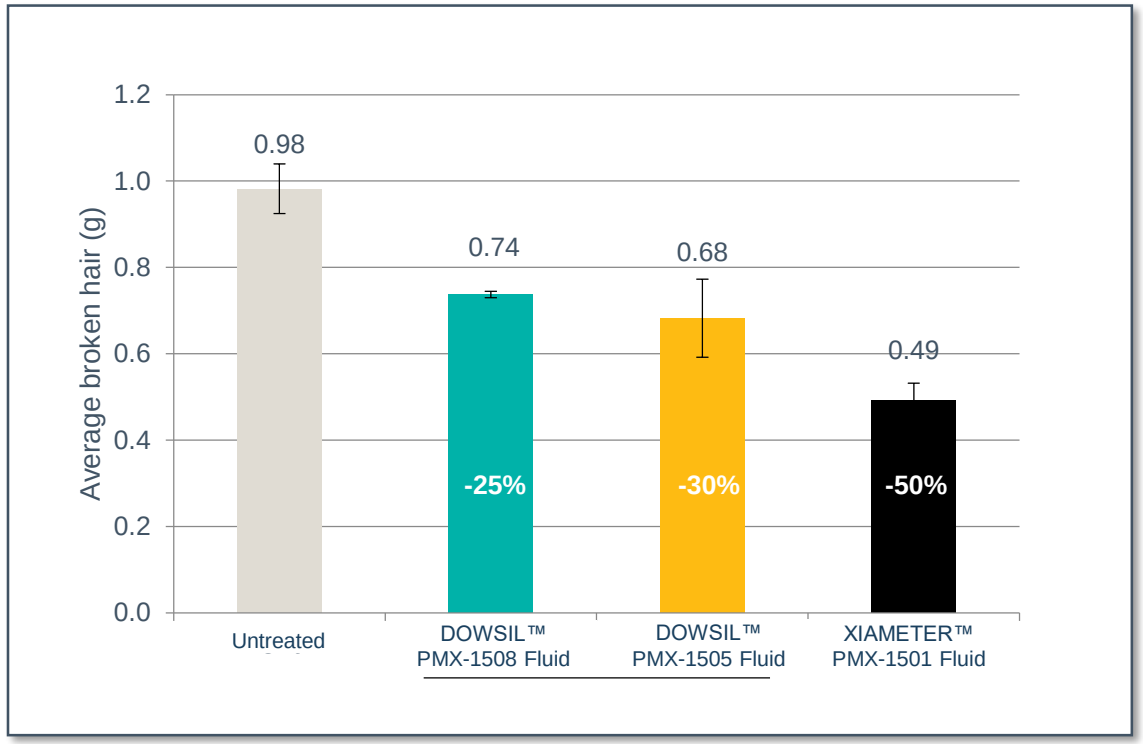
Volume control

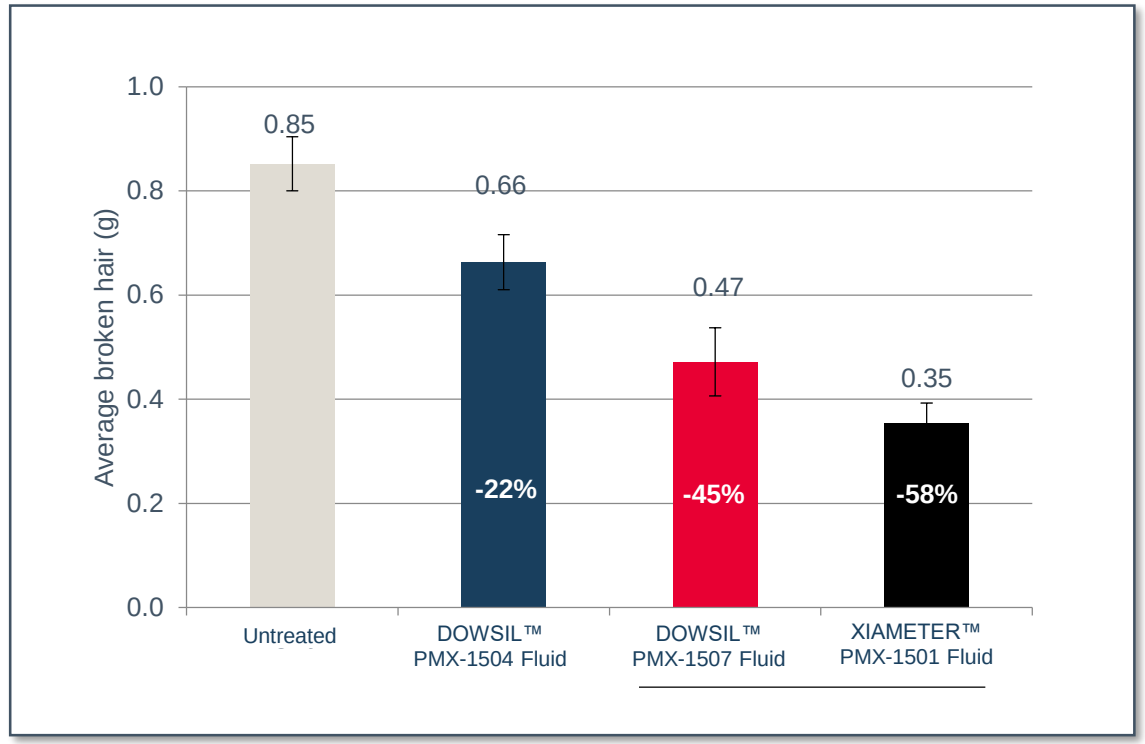
BOLERO, from Bossa Nova Vision

DOWSIL™ PMX-1508 Fluid leads to significantly decreased volume compared to untreated hair.

Heat protection

All new gum blends demonstrate heat protection benefits, with DOWSIL™ PMX-1507 Fluid performing best.





Protocol & Statistics:
Hair: slightly bleached Caucasian hair
Treatment: 0.1 g/g hair, 4% active gum (dilution in cyclopentasiloxane), triplicates
Hair damaged during 100 sec. at 130-230°C
Statistics: bar indicates no statistical difference at 95% confidence

Seek

Together™