AURIST™ AGC

Welcome to the future of hair conditioning

Piera Pericu, Business Segment Leader, Personal Care, IFF

HAIR CARE NEEDS TO GO BEYOND CLEAN

ENVIRONMENTALLY FRIENDLY CLAIM IS A KEY DRIVER OF INNOVATION IN HAIR CARE

In Brazil
41% of haircare buyers say natural/organic ingredients is a most important attribute when buying haircare products

In LATAM, **90%**
Interest for hair care "Supported by Science"[2]

In Colombia **83%**
of consumers try to act in a way that is not harmful to the environment[3]

Innovations in hair products continue to tap into **environmentally friendly**, health/wellness and diversity trends[1].

The "Skinification" of hair care:

Consumers want to see their favorite skin care ingredients in their hair care routine.

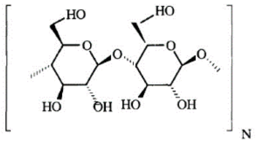
Consumers' expectations on natural and eco-friendly products are growing, but they will not compromise on efficacy.

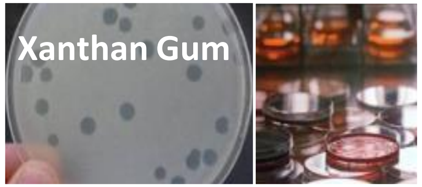
Sources:
1 Mintel, 2022
2 LATAM, IFF Consumer Tracker/78% USA
3 The Holistic consumer-Global 2023

POLYSACCHARIDES AS SOLUTION

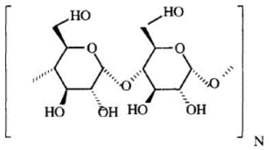
Existing polysaccharides have limitation to fulfill consumer expectations

Cellulose
β(1,4) linkage



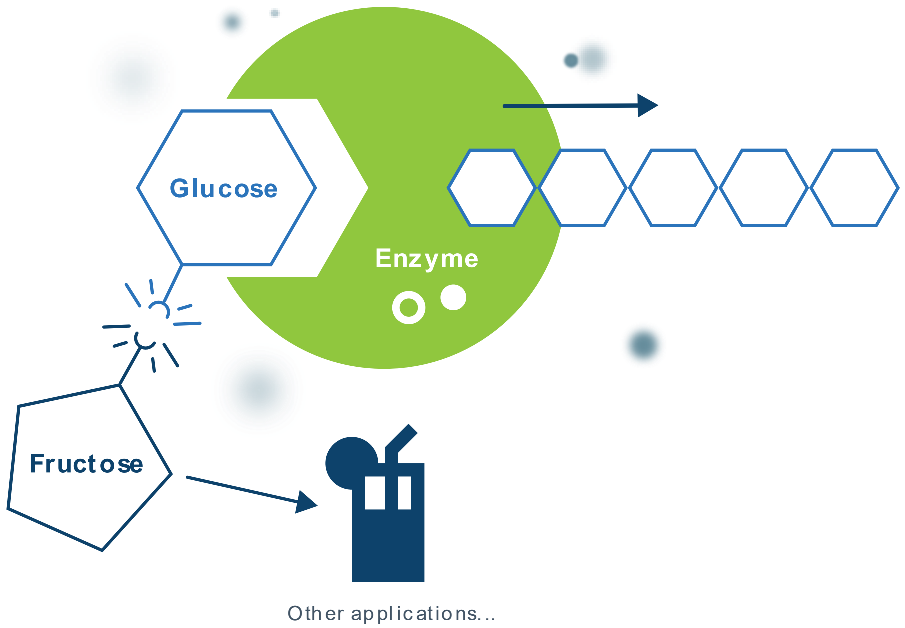


Starch
α(1,4) linkage



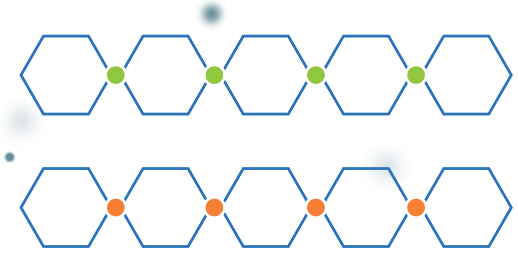
DESIGNED ENZYMATIC BIOPOLYMERS (DEB)

Breaking the tradeoff between sustainability and performance

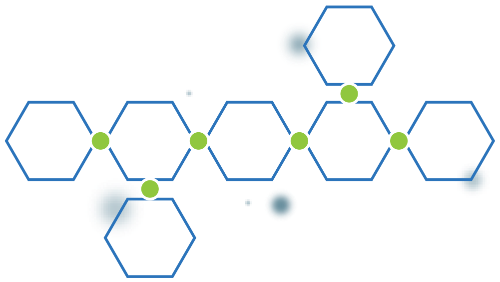


1 DEB enables the development of tailored polysaccharides, giving rise to a new-to-the-world class of alpha- glucan polysaccharides from the enzymatic polymerization of glucose from sucrose.

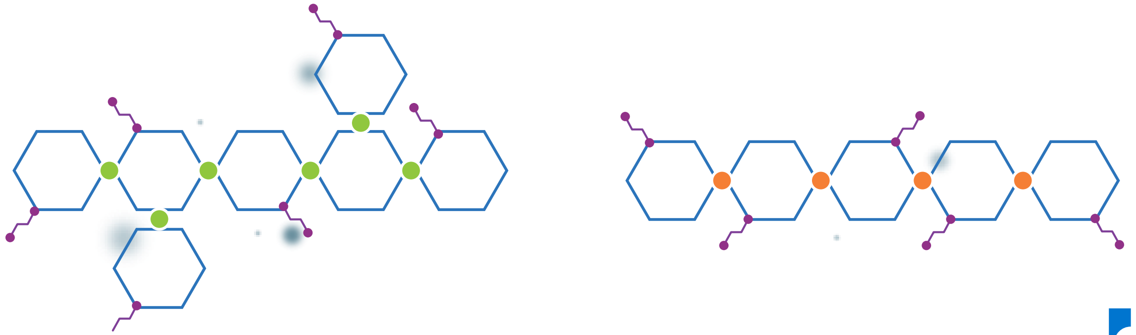
2 The alpha-glucan molecule has high purity, and the enzymatic polymerization processes enable a multitude of tailored morphologies and functional modifications.



Customized Linkages



Branching



Derivatization

AURIST™ AGC

INCI: Water and alpha-glucan hydroxypropyl trimonium chloride and Propylene glycol

Improved hair combability

Easy to Formulate

Transformational Science

Readily Biodegradable

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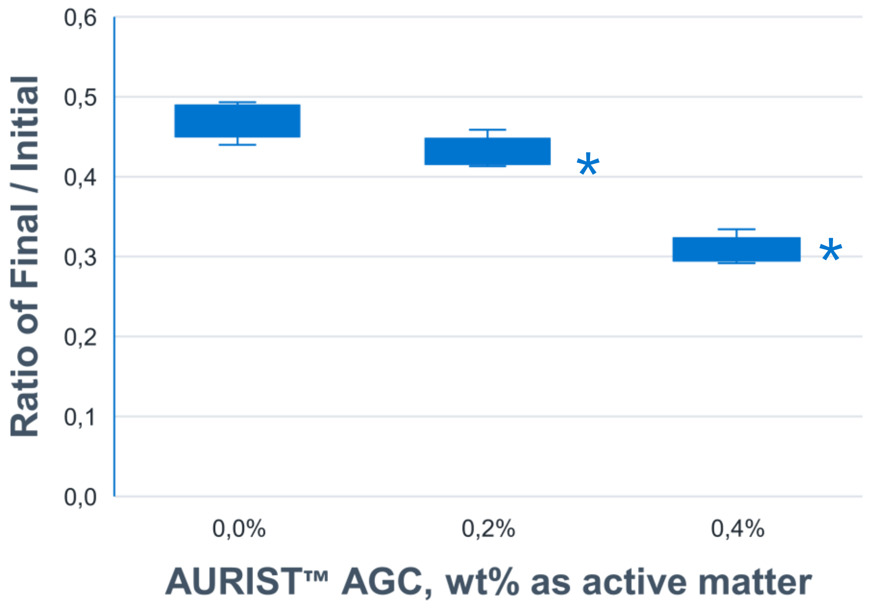
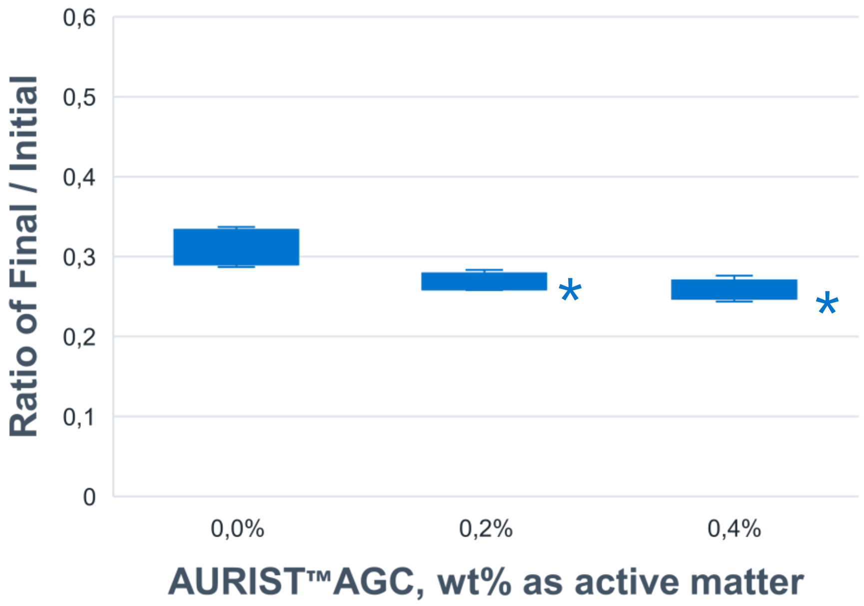
AURIST™ AGC WET AND DRY COMBABILITY

Improved in SLES/CAPB shampoo base on virgin straight (1b) hair

Wet combability



Dry combability



* Significant difference (95%) vs 0%

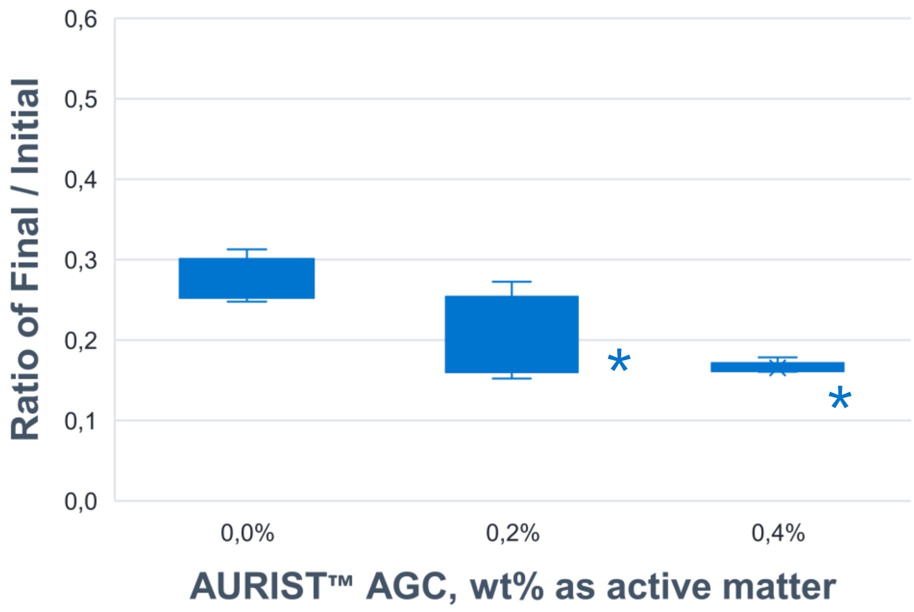
Ratio of Final / Initial : Ratio of combing energy between treated and untreated hair tresses.
Treated means application of shampoo then wash off.7

Hair combability test, Kosmoscience, IFF014, 2022

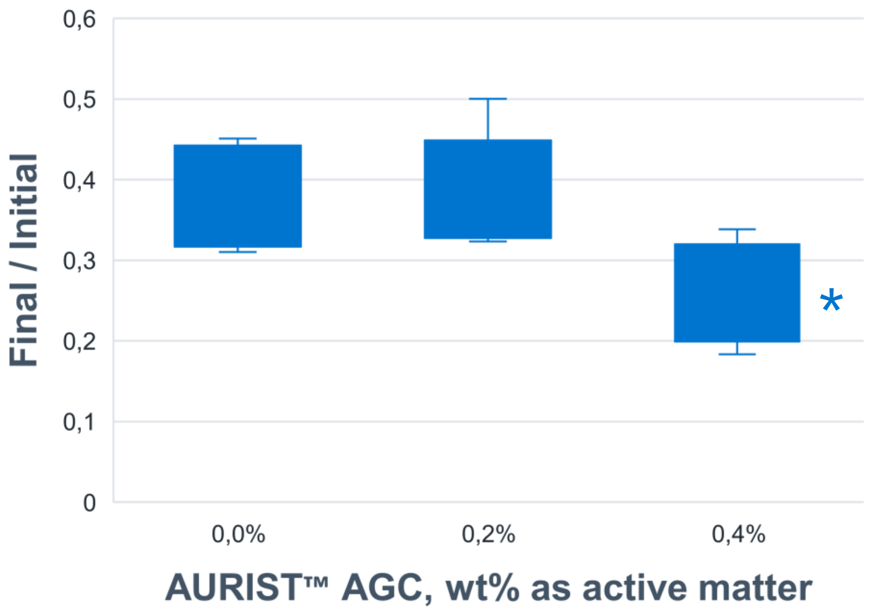
AURIST™ AGC WET AND DRY COMBABILITY

Improved in SLES/CAPB shampoo base on Kinki (4a) hair

Wet



Dry



* Significant difference (95%) vs 0%

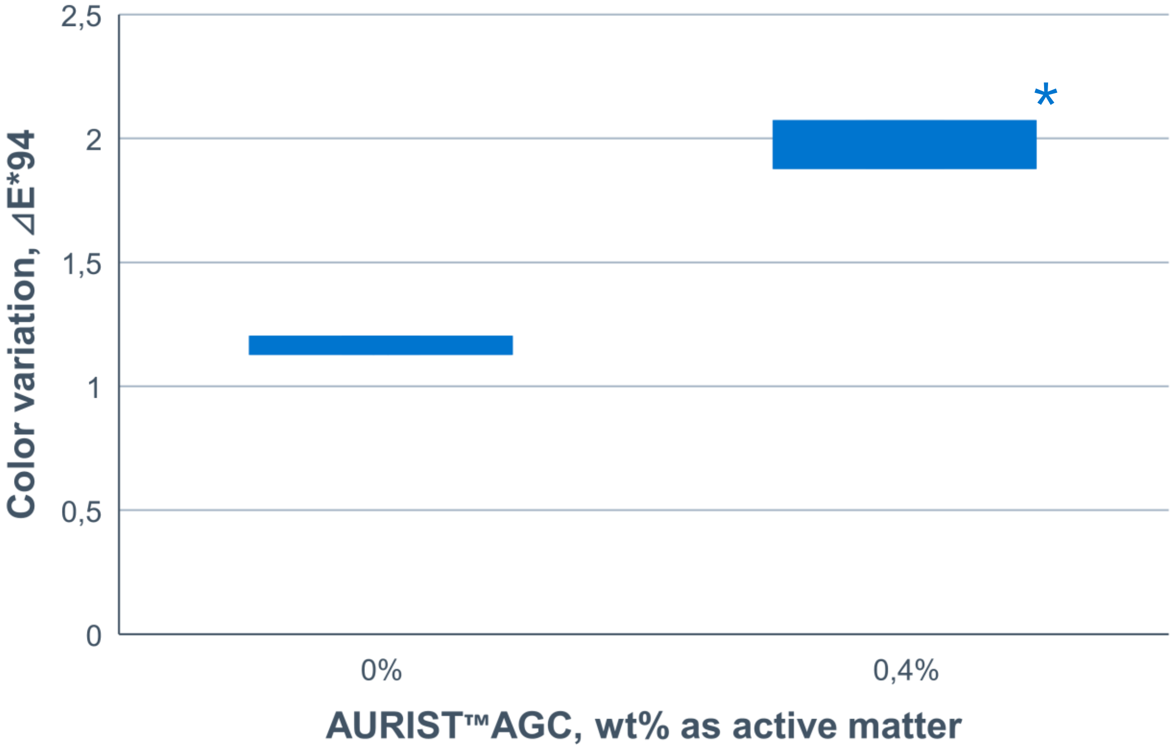
Ratio of Final / Initial : Ratio of combing energy between treated and untreated hair tresses.
Treated means application of shampoo then wash off.

Hair combability test, Kosmoscience, IFF033, 2022

AURIST™ AGC MODE OF ACTION

Deposits on virgin Caucasian hair (type 1b) washed by SLES/CAPB type shampoo

Deposition of Direct Red 80 dye



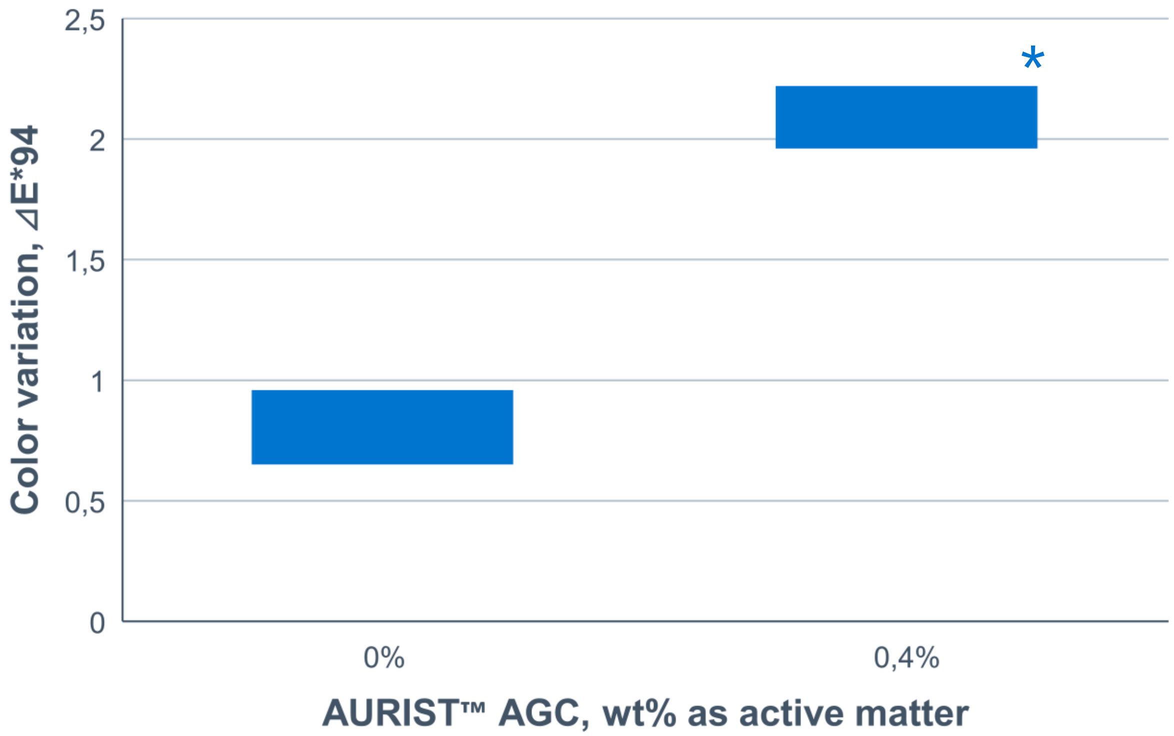
* Significant difference (95%) vs 0%

Substantivity of human hair by colorimetric analyses, Kosmoscience, IFF036, 2022

AURIST™ AGC MODE OF ACTION

Deposits on bleached Caucasian hair washed by SLES/CAPB type shampoo.

Deposition of Direct Red 80 dye



* Significant difference (95%) vs 0%

Substantivity of human hair by colorimetric analyses, Kosmoscience, IFF036, 2022

AURIST™ AGC

Conditioning, Naturally Better!

Improves Combability

Easy to Formulate

Transformational Science

Readily Biodegradable

AURIST™ AGC

Naturally inspired biodegradable cationic biopolymer for haircare formulas

Conditioning, Naturally Better!	
Trade name	AURIST™ AGC
INCI name	Water (and) Alpha-Glucan Hydroxypropyltrimonium Chloride (and) Propylene Glycol
Appearance	Amber liquid
Dosage	0.6-3%
pH	3-12
Application	Hair care rinse off, leave on
Package	22 kg pails/1 tote

AURIST™ AGC SUSTAINABILITY

Readily biodegradable cationic biopolymer

Naturalness

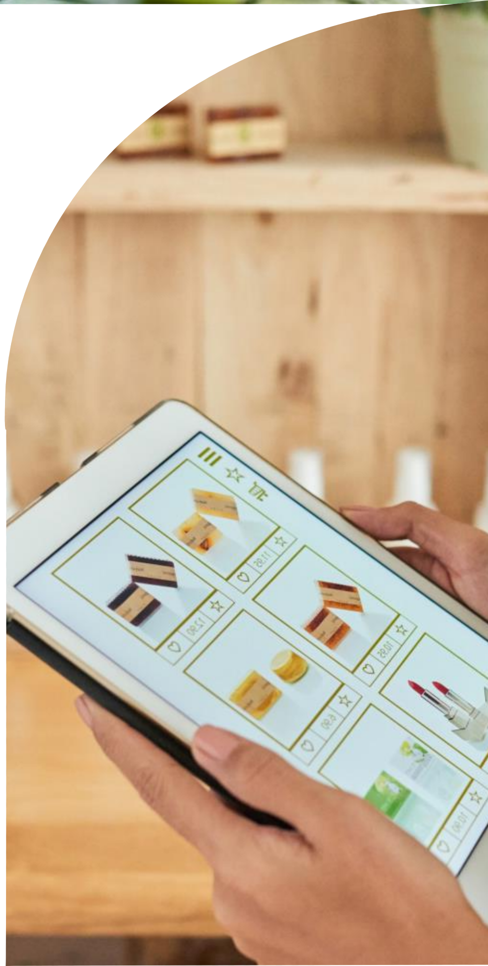
- Highly purified blend
- ISO 16128 : 64%

Sourcing

- Sucrose
- No GM source
- CITES compliant

Environmental Footprint

- Ecotoxicological data
  - Non-hazardous to the aquatic environment
- Readily Biodegradable



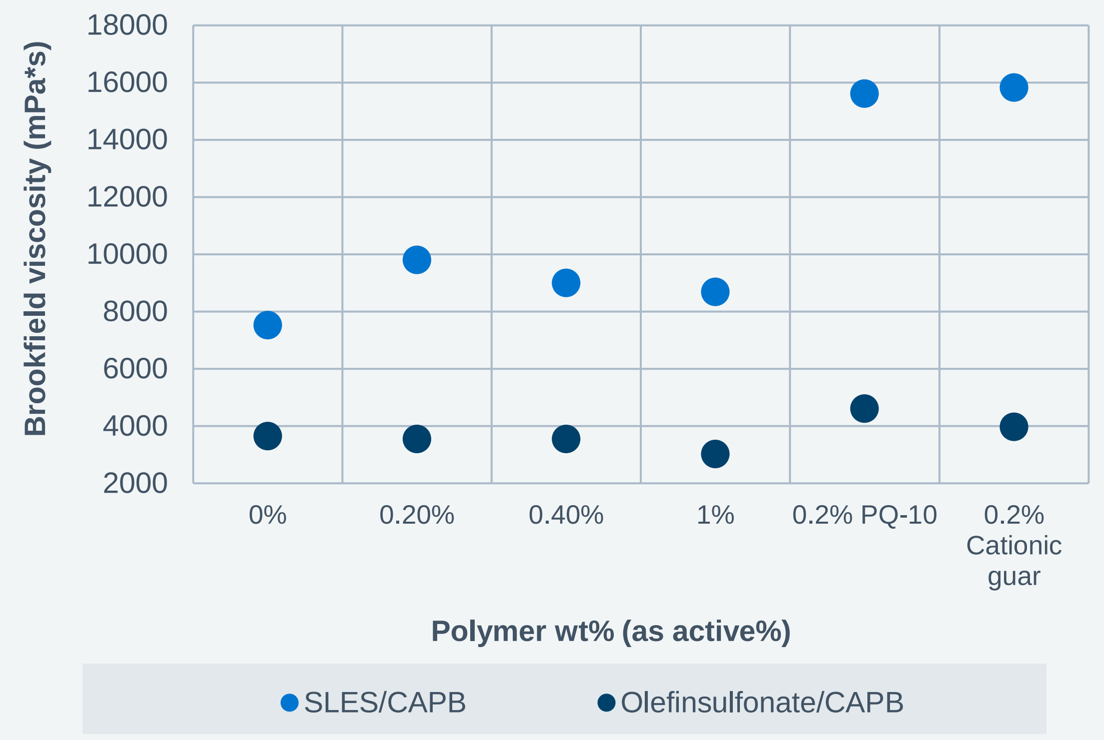
AURIST™ AGC IS EASY TO FORMULATE WITH

- Does not have viscosity impact
- Does not require premix or pH adjustment
- Odorless
- Can be used to make clear formulations

AURIST™ AGC VISCOSITY IMPACT

No viscosity increase with AURIST™ ACG on a basic shampoo formula

- AURIST™ AGC does not impact the viscosity of the final formula
- Conventional PQ-10 and cationic guar gum change viscosity for SLES/CAPB.



	SLES/ CAPB	Olefinsulfonate/ CAPB
Polymer	see graph	
Cocamidopropyl Betaine	2.0	
Sodium Laureth Sulfate	12.0	0.0
Sodium C14-16 Olefin Sulfonate	0.0	12.0
Sodium Chloride	1.5	3.5
Citric Acid Anhydrous	0.03	0.01
Disodium EDTA	0.1	
Phenoxyethanol	0.8	
Water	Up to 100	

Brookfield Viscosity (RV, S04, 20°C, 10 rpm, 30")

AURIST™ AGC COMPATIBILITIES

No major incompatibilities

General properties:

- It possesses a relatively high viscosity.
- Warming the neat raw material makes it easier to handle due to decreased viscosity.
- No odour.
- Quick dissolution time in cold water without the need for high-shear mixing.
- Addition into warm water speeds up dissolution
- Order of addition does not impact the product

pH range:

3-12

High Compatibility

Generally compatible with:

- GENENCARE line
- Surfactant
- Polymers, Cationic polymers
- Chelates and electrolytes
- Salts
- Hair care actives s.a. proteins
- Typical preservatives

Low Compatibilities

Ethanol (max 40%)

Xanthan gum

Possibly acrylics (see suggestion to wash off formula)

Quartz Formulation Collection

CLEAR, COLORLESS CONDITIONER

Unlock the potential of a transparent formulation that could condition just as well as the standard conditioners on the market.

This hair conditioner formulation applies beautifully and provides easy combing and excellent hair feel. It features high naturality ingredients while maintaining complete transparency and opens up a world of different customization options in a market that is dominated by white, opaque products.

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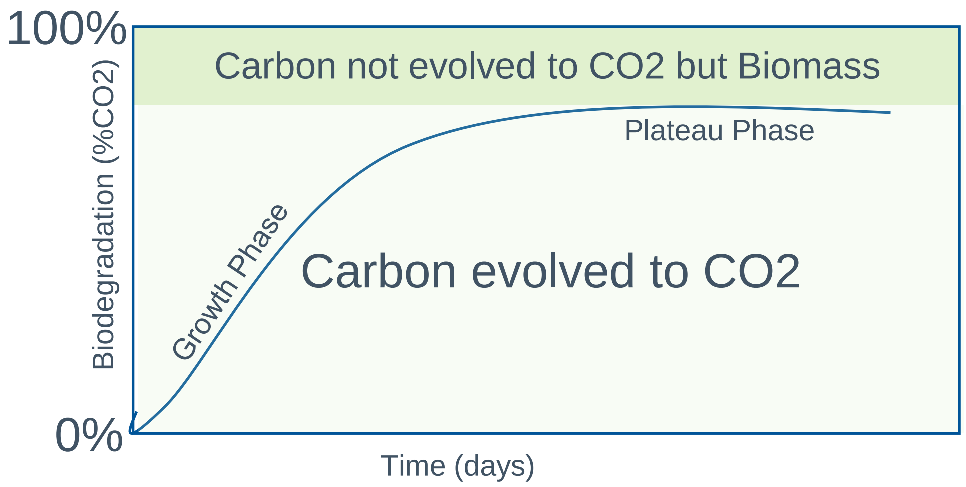
WHAT BIODEGRADABILITY MEANS

Biodegradation vs. Biodegradability

Biodegradation is a process whereby microorganisms utilize carbon substrates for growth and cellular maintenance:

O_2 + Carbon => CO_2 + H_2O + Microbial Biomass

Note: In absence of oxygen, carbon is converted to CO2 and Methane and Biomass



Biodegradability is a material property whereby biodegradation data from standard test methods are interpreted against set criteria (timeframe and thresholds) and typically indicates potential for substance to mineralize (i.e., completely degrade). Biodegradability is further subdivided:

Primary- Degradation of only the parent compound to metabolites that are at most partially mineralized

Ultimate- Complete mineralization of carbon to CO2 and biomass with no metabolites remaining

BIODEGRADABILITY DEFINITIONS TODAY

Readily biodegradable:

>60% biodegrades in 28-days in a qualified test (OECD 301B, C, D or F)

10/14 day-window criterion not applied to polymers

Inherently and Ultimately Biodegradable:

>60% biodegrades within 60-days in qualified test or (OECD 301B, C, D or F);

>70% within 60 days (OECD 301B, C, D or F or OECD 302); or

Mineralization half-life <60 days in high-tier simulation studies (e.g., OECD 309)

Note: IFF criteria may differ from other regulatory criteria. IFF does not acknowledge primary biodegradability for marketing claims but is useful in regulatory assessment of persistency

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SUGAR AS SOURCE

The foundation of engineered polysaccharides from IFF is natural, renewable and sustainable

- The material can be made from cane or beet sugar (sucrose)

- Both are globally traded, fungible commodities*

Example - European beet sugar: leading carbohydrate production system regarding land use & water consumption

*Society uses less than 1/3 of arable land globally to grow food. only 0.01% of arable land is used to make biomaterials

ENGINEERED POLYSACCHARIDES

Innovative science at scale supply

- Utilize IFF's core competencies in enzyme development, material science and commercialization
- Operative production plant

QUESTIONS?

Visit us at Booth B50