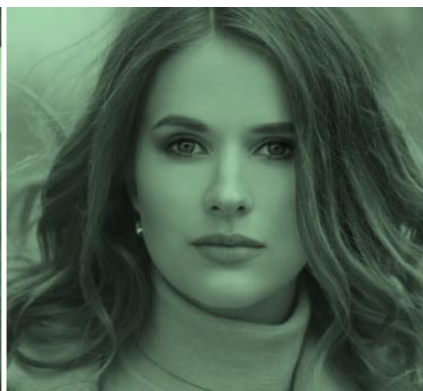


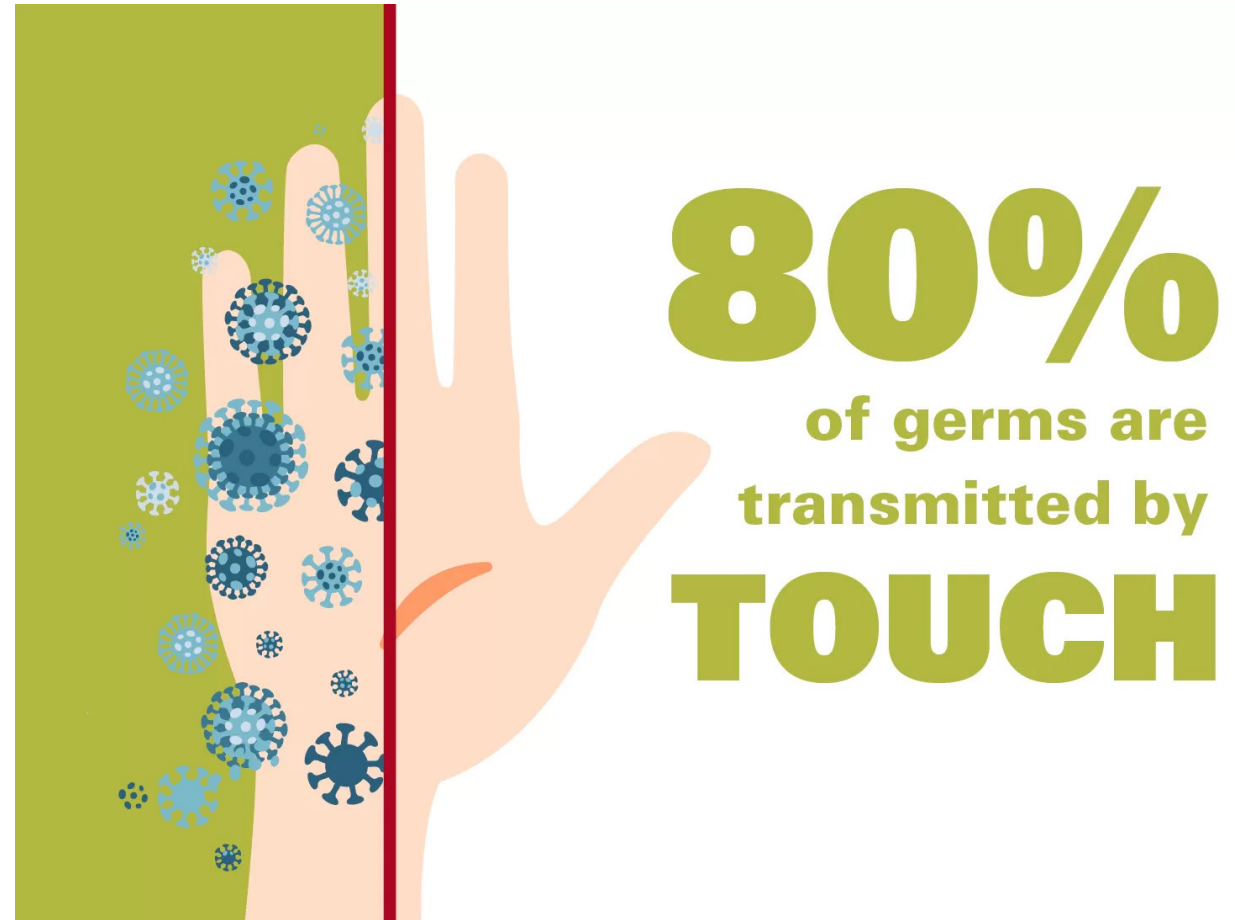
New Surfactant Solutions, September 2023

Dennis Abbeduto, Personal Care Business Manager



Hand Hygiene Moment

- Have you ever wondered if it's better to towel-dry or use an air dryer?
- So have a lot of people!
- To date, the data does not appear to support a difference between towel-drying and air-drying



<https://ami-journals.onlinelibrary.wiley.com/doi/10.1111/jam.14796>

Today's Pressing Market Needs

- What are formulators asking us for?
 - Globally compliant ingredients
 - More environmental impact data
 - Better performing sulfate-free options
 - Higher foam
 - Easier to build viscosity
 - Robust, workhorse products with customizable benefits
 - Larger variety of certifications
 - “Friendly sounding” INCI names
 - High quality offsets to existing materials

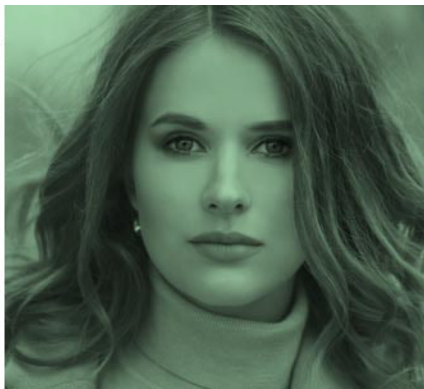


New Products Discussed Today

- **Cola[®]Lac SLB** – Biodegradable Conditioner Concentrate
- **Cola[®]Teric 12HS MB** – Globally Registered Lauryl Hydroxysultaine
- **Suga[®]Det LSLG MB** – Multifunctional Surfactant Combination
- **Suga[®]Mate LGC MB** – Sodium Lauryl Glucose Carboxylate

Cola[®]Lac SLB

Biodegradable Conditioner Concentrate



A Good Time to Rethink Conditioning

- Hair conditioning mainly dominated by two nearly identical conditioning agents
- Many other existing technologies have been proven effective, but some may have poor environmental profile
- The broad variety of hair types and washing behaviors demand a broader array of go-to conditioning actives, not just modestly different formats
- Amidoamine salts can be effective conditioners, offering uniquely customizable performance characteristics

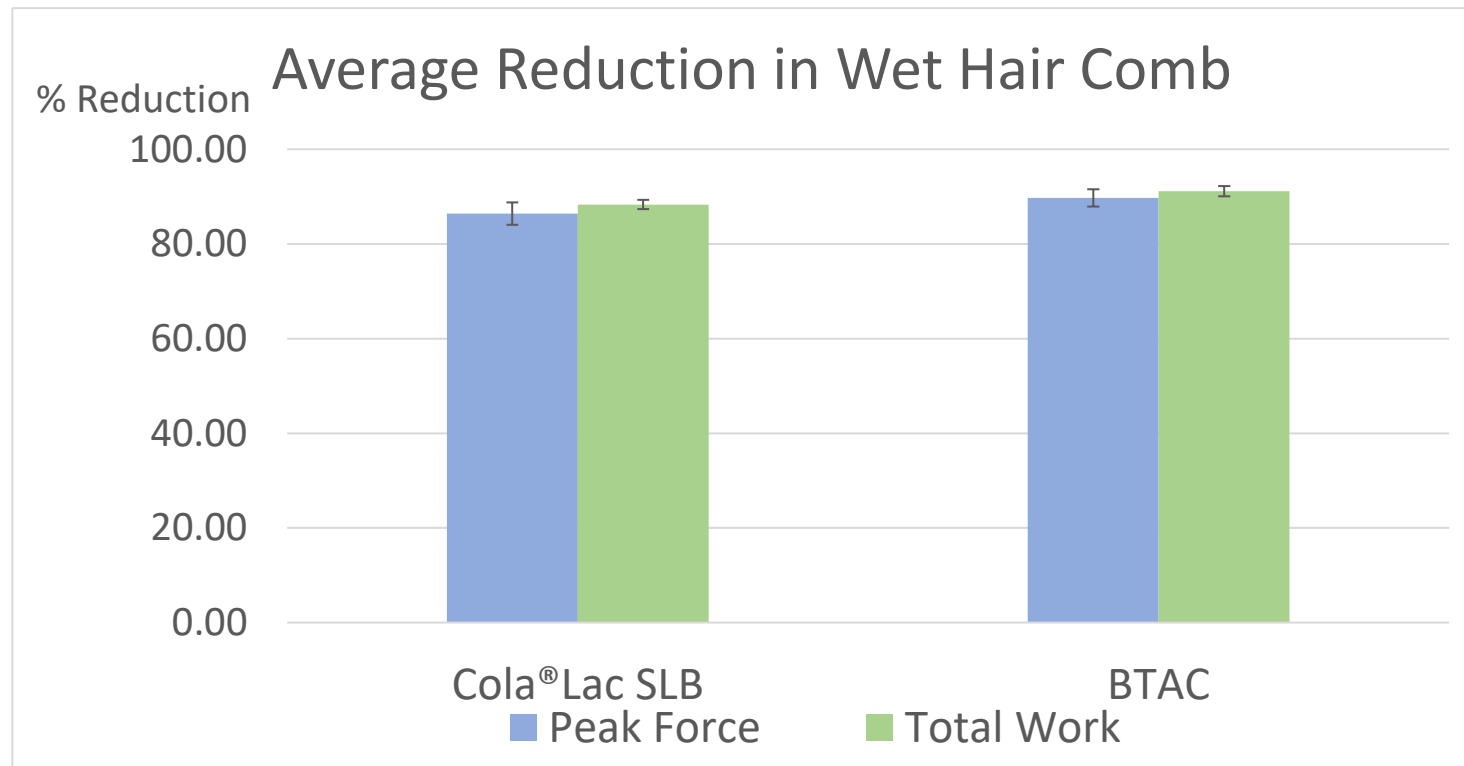


Cola[®]Lac SLB

Conditioner Concentrate	
INCI Name	Cetearyl Alcohol, Stearamidopropyl Dimethylamine Lactate
Global Clearances	Globally approved, REACH possible
Physical Form	White waxy flake or pastille
Key Features	Naturally derived quaternary conditioning active Easy to use, 5% in water provides cream conditioner base for additives Good compatibility with wide range of additives • Fragrances • Extracts Excellent combing reduction properties Reduced build-up compared to BTAC/BTMS
Suggested Applications	Cream conditioners Conditioning masques Conditioning bars
Certifications	ISO 16128 0.97, USDA BioPreferred Certified 97% Biobased

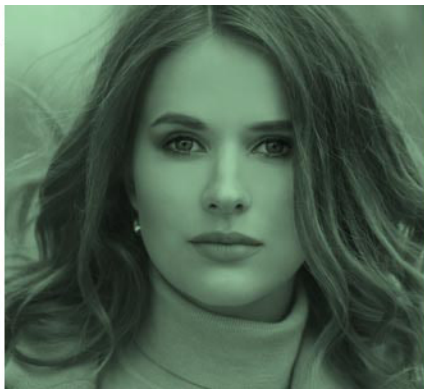
ColaLac SLB Performance

- Test formula: 1.5% conditioning active, cetearyl alcohol, pH 5
- ColaLac SLB provides 86% reduction in peak combing force, 88% reduction in total work
- BTAC at identical active use rate provides 90% and 91% reductions, respectively



Cola[®]Teric 12HS MB

Globally Registered Lauryl Hydroxysultaine



An Increasingly Difficult to Navigate Regulatory Landscape

- As brands become increasingly global, so does their need to use globally compliant ingredients
 - US TSCA
 - Canada DSL
 - EU REACH
 - China IECIC/IECSC/CSAR
 - Australia AICIS/AIIC
 - Local translations: Korea, Japan
- Differences in products that were previously considered minor and insubstantial now represent tipping factors for compliance and non-compliance



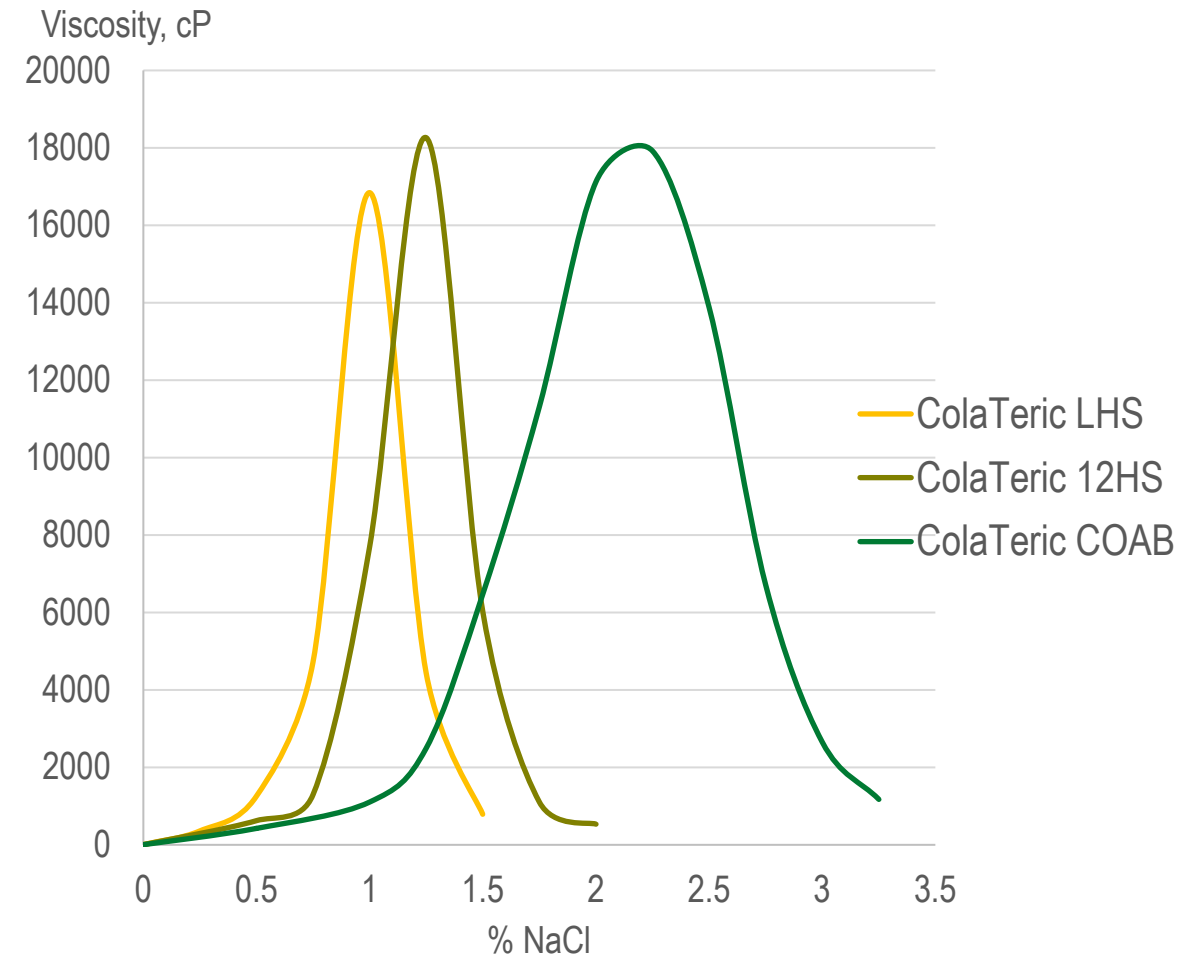
ColaTeric 12HS MB

Globally Approved Lauryl Hydroxysultaine	
INCI Name	Lauryl Hydroxysultaine
Global Clearances	Globally approved, REACH registered
Physical Form	Liquid, 50%
Key Features	Mild amphoteric surfactant Fast wetting Tolerant to pH extremes High biobased content, coconut derived Improves cold temperature stability of surfactant systems Biodegradable
Suggested Applications	Shampoos Body washes Facial cleansing AHA/BHA cleansers High pH hair treatments (dyes, relaxers, perms)
Certifications	ISO 16128 0.90, USDA BioPreferred Certified 90% Biobased, RSPO Mass Balanced

Viscosity Development

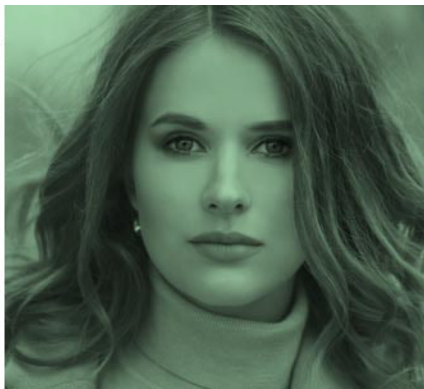
- In a traditional SLS/SLES based system, ColaTeric 12HS provides similar overall viscosity build compared to Cocamidopropyl Betaine, but with faster and narrower response.

Ingredient	% As Supplied
Water	qs to 100.00
SLS, 30%	10.00
SLES-2, 30%	10.00
Sultaine/Betaine	3.6/5.0
ColaLiquid DC	1.5
Citric Acid 50%	qs to pH 6



Suga®Det LSLG MB

Multifunctional Surfactant Combination



Doing More With Less

- As declining consumer acceptance of certain ingredients drives formulators away from them, we are left with fewer tools, especially those that are easy to use
- The trend toward minimalist formulating further creates challenges in ingredient selection
- Formulators continue to try to balance ease of use with performance and natural content of sulfate replacements
- Higher raw material costs necessitate re-evaluating types and use rates
- Cost effective, easy to use ingredients that can deliver multiple benefits are desperately needed



Suga®Det LSLG MB

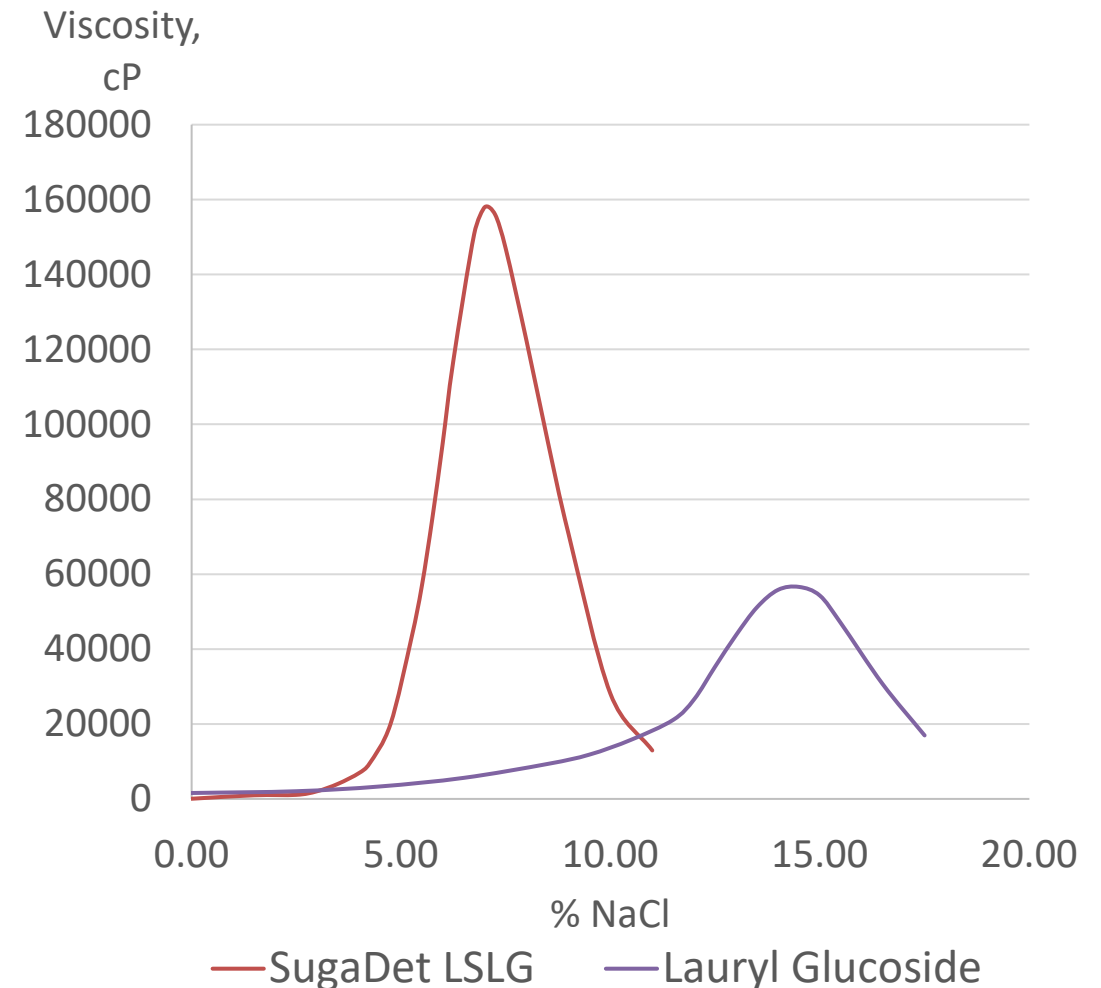
Powerful Foam Booster for Sulfate-free Formulations

INCI Name	Lauryl Glucoside, Disodium Lauryl Sulfosuccinate
Global Clearances	Globally approved, REACH registered
Physical Form	Clear liquid, 30% solids
Key Features	High foam volume with excellent detergency Easy to use liquid format for Disodium Lauryl Sulfosuccinate Low irritation profile Can be combined with a wide variety of additional surfactants Can be used to create clear, gentle formulations
Suggested Applications	Shampoos Body Washes Facial Cleansers
Certifications	RSPO Mass Balanced ISO 16128 (0.87) USDA Biopreferred (87% Biobased)

Viscosity Development

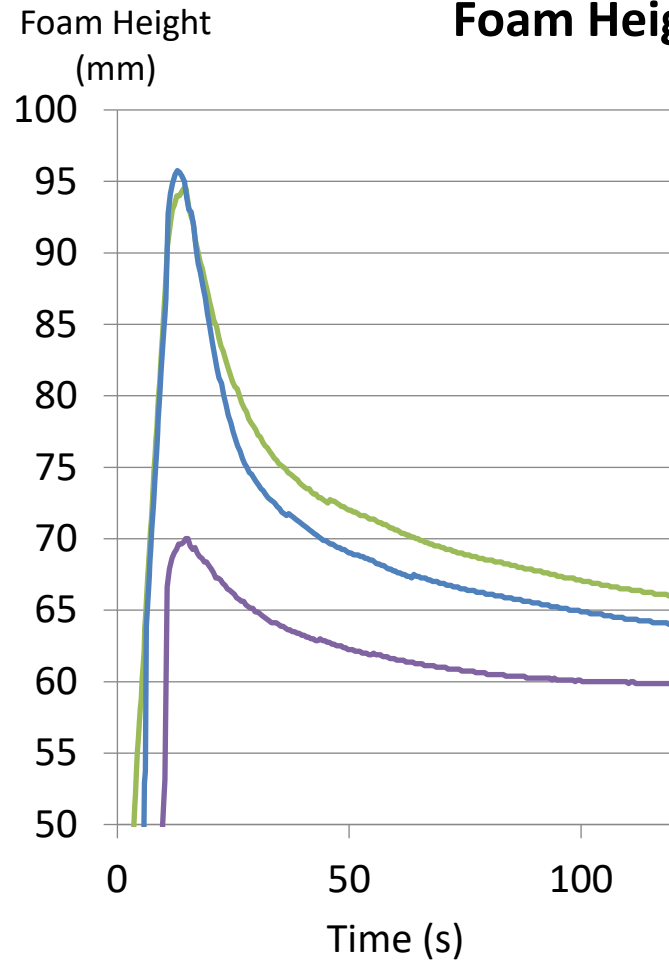
- When combined with an amphoteric surfactant, SugaDet LSLG provides much higher viscosity than Lauryl Glucoside alone
 - Reduced irritation with less overall surfactant
 - Better support of additives (like preservatives)
 - Lower cost formulations

Ingredient	% Solids
Water	qs to 100.00
SugaDet LSLG or Lauryl APG	10.00
ColaTeric CBS-HP	5.00
Thickener	qs
Citric Acid 50%	qs to pH 6



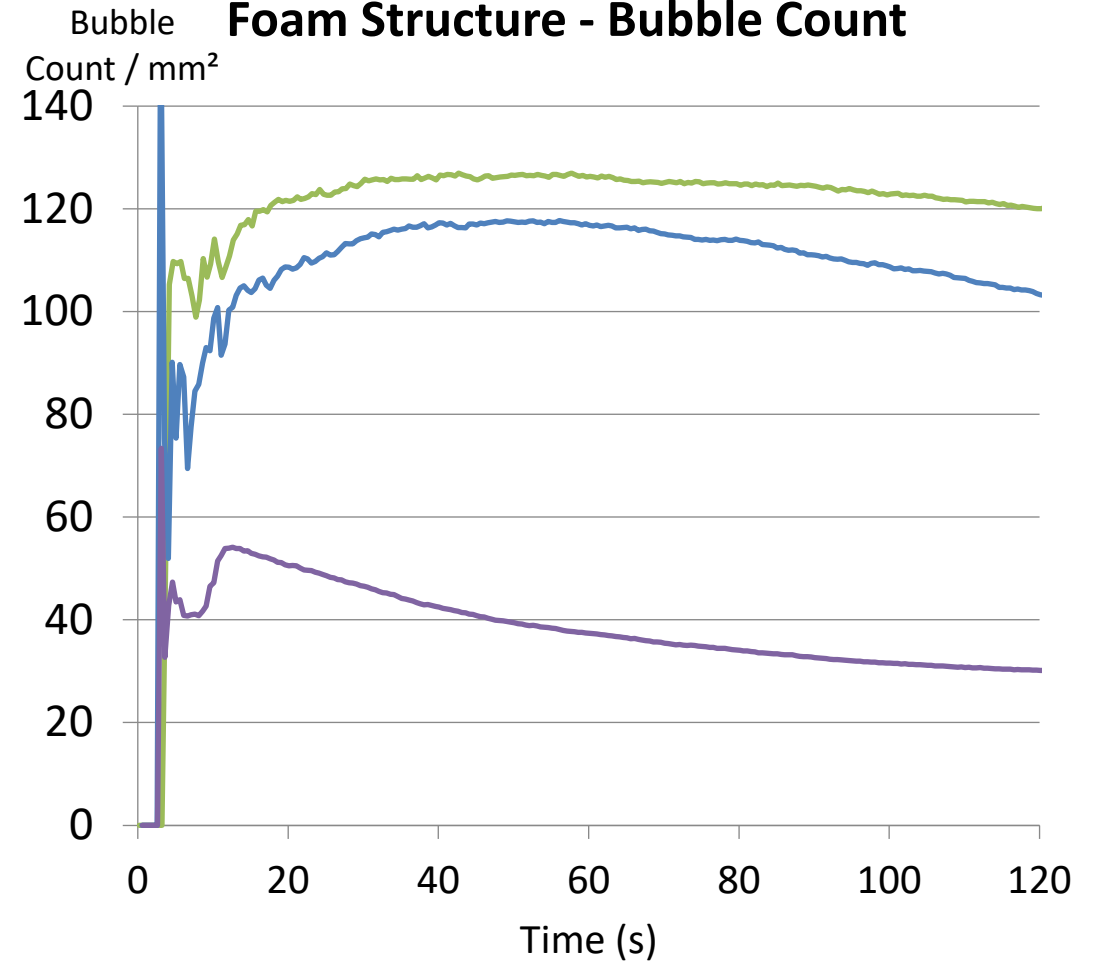
Foam Performance

Foam Height



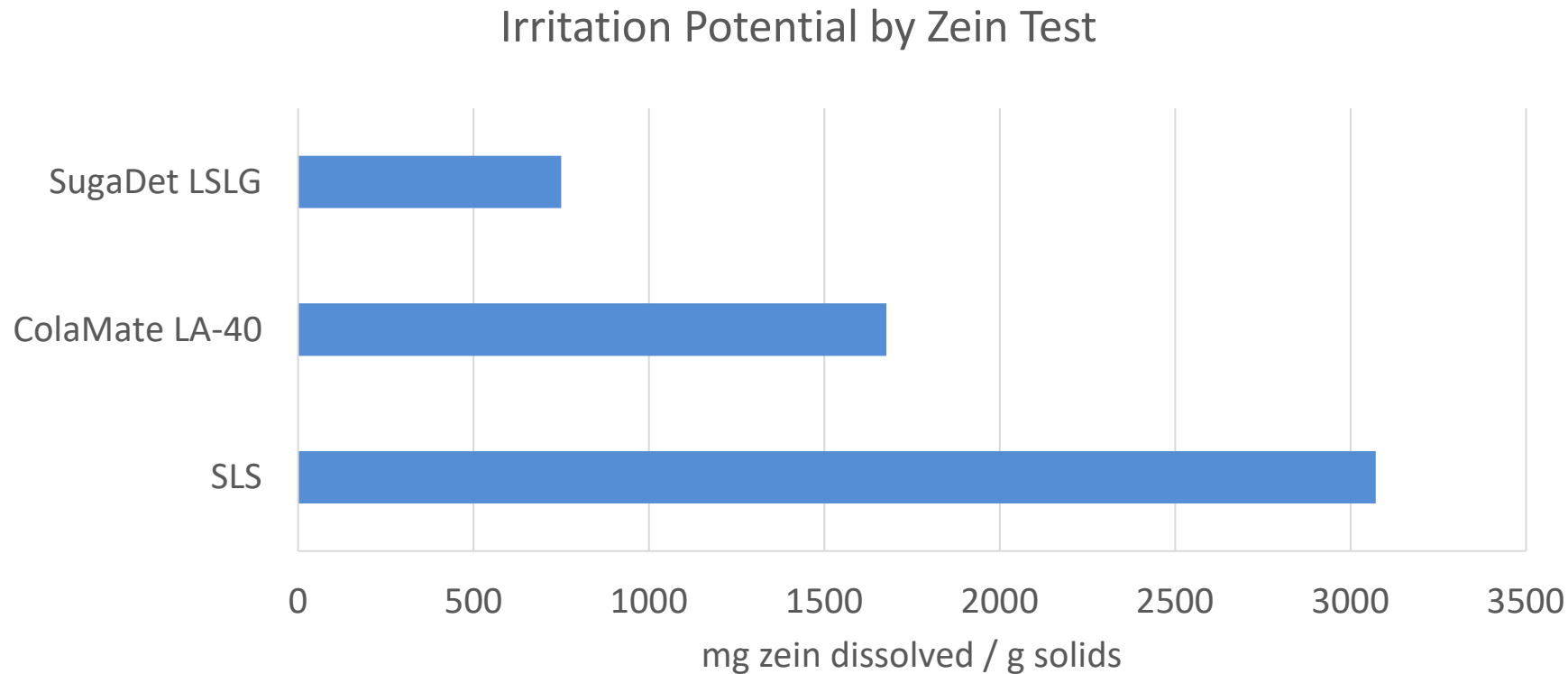
— ColaMate LA-40
 — SugaDet LSLG
 — Lauryl Glucoside

Foam Structure - Bubble Count



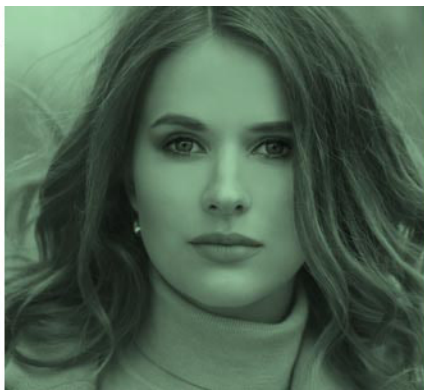
Irritation Potential

- SugaDet LSLG demonstrates extremely low irritation potential in vitro via the Zein Test, even substantially lower than the mild sulfosuccinate.



Suga[®]Mate LGC MB

Sodium Lauryl Glucose Carboxylate



Expanding the Toolkit

- Formulators are in need of anionic surfactants that meet a large array of demands
 - High foam
 - High viscosity building
 - Robust stability
 - High biobased
 - Readily biodegradable
 - Sulfate-free
 - Low irritation
 - COSMOS approved
- Very few products meet all these competing needs!



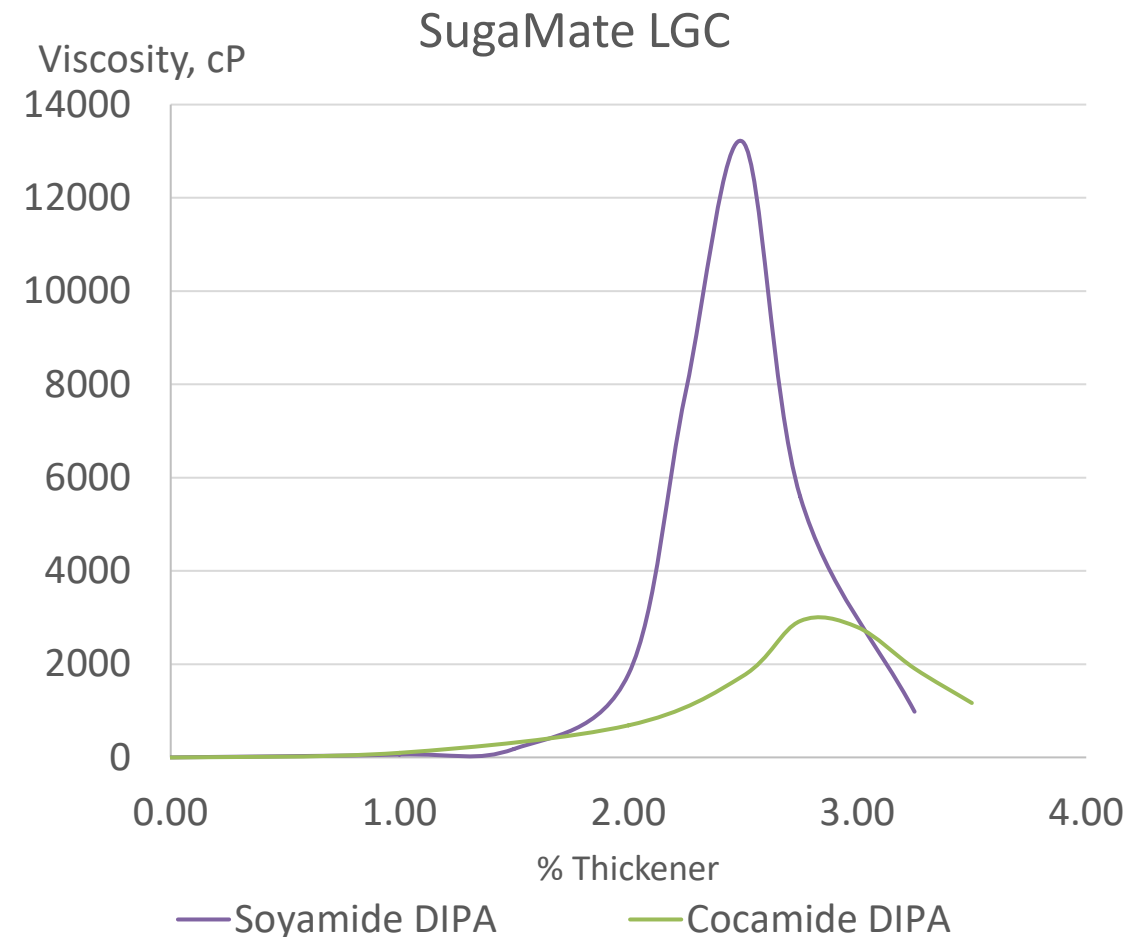
Suga®Mate LGC MB

APG-Carboxylate	
INCI Name	Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside
Global Clearances	Globally Approved, REACH Registered
Physical Form	Liquid, 40%
Key Features	Low irritation sulfate-free anionic/nonionic surfactant combination Improved foam performance vs Lauryl Glucoside alone Readily biodegradable Offsets Plantapon LGC SORB
Suggested Applications	Shampoos Body wash Mild facial cleansers Baby care AHA/BHA cleansers
Certifications	ISO 16128 0.91, USDA Biopreferred Certified 91% Biobased

Viscosity Development

- Combinations of SugaMate LGC and traditional secondary surfactants tend to exhibit muted salt responsiveness
- High viscosity formulations are possible with the addition of long-chain amphoteric or nonionic surfactants

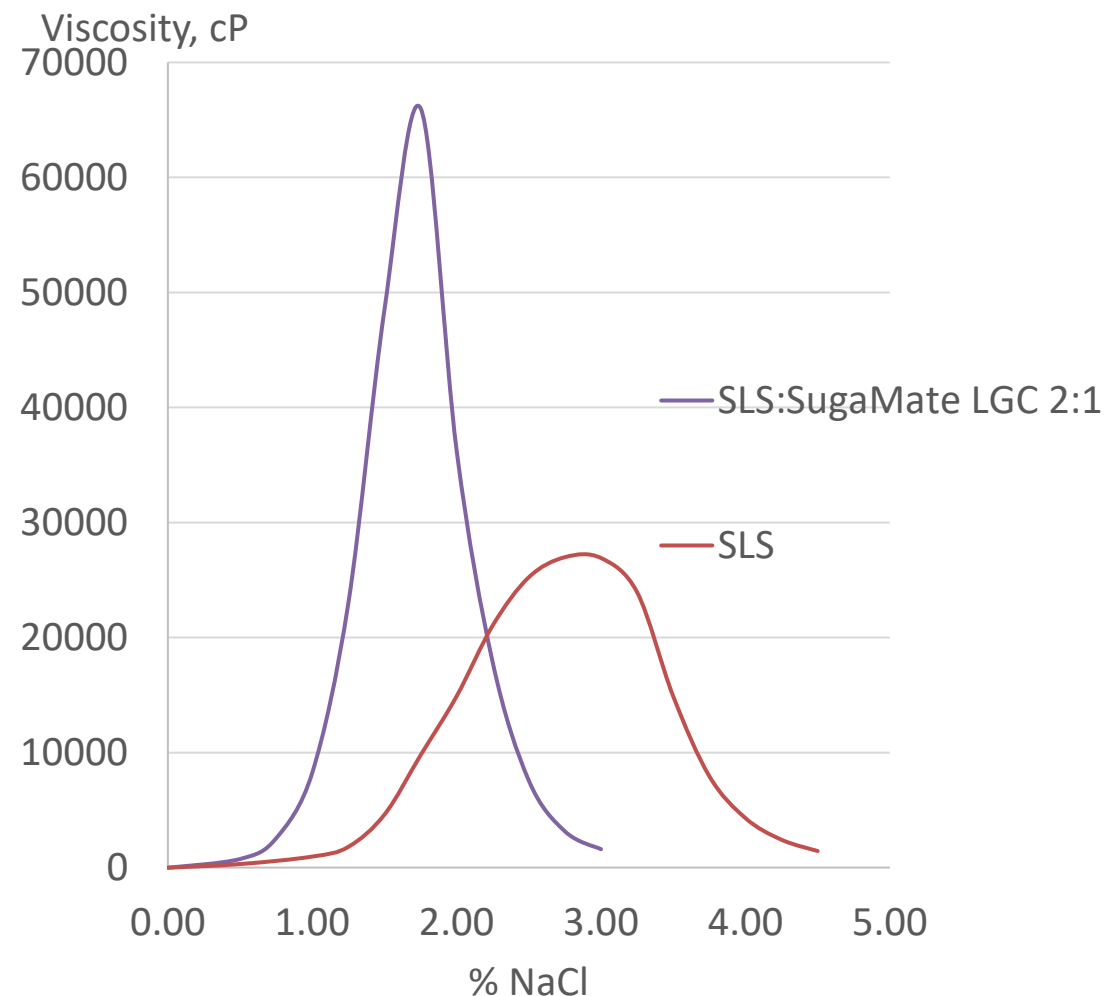
Ingredient	% Solids
Water	qs to 100.00
SugaMate LGC	10.00
ColaTeric CBS-HP	5.00
Thickener	qs
Citric Acid 50%	qs to pH 6



Viscosity Development

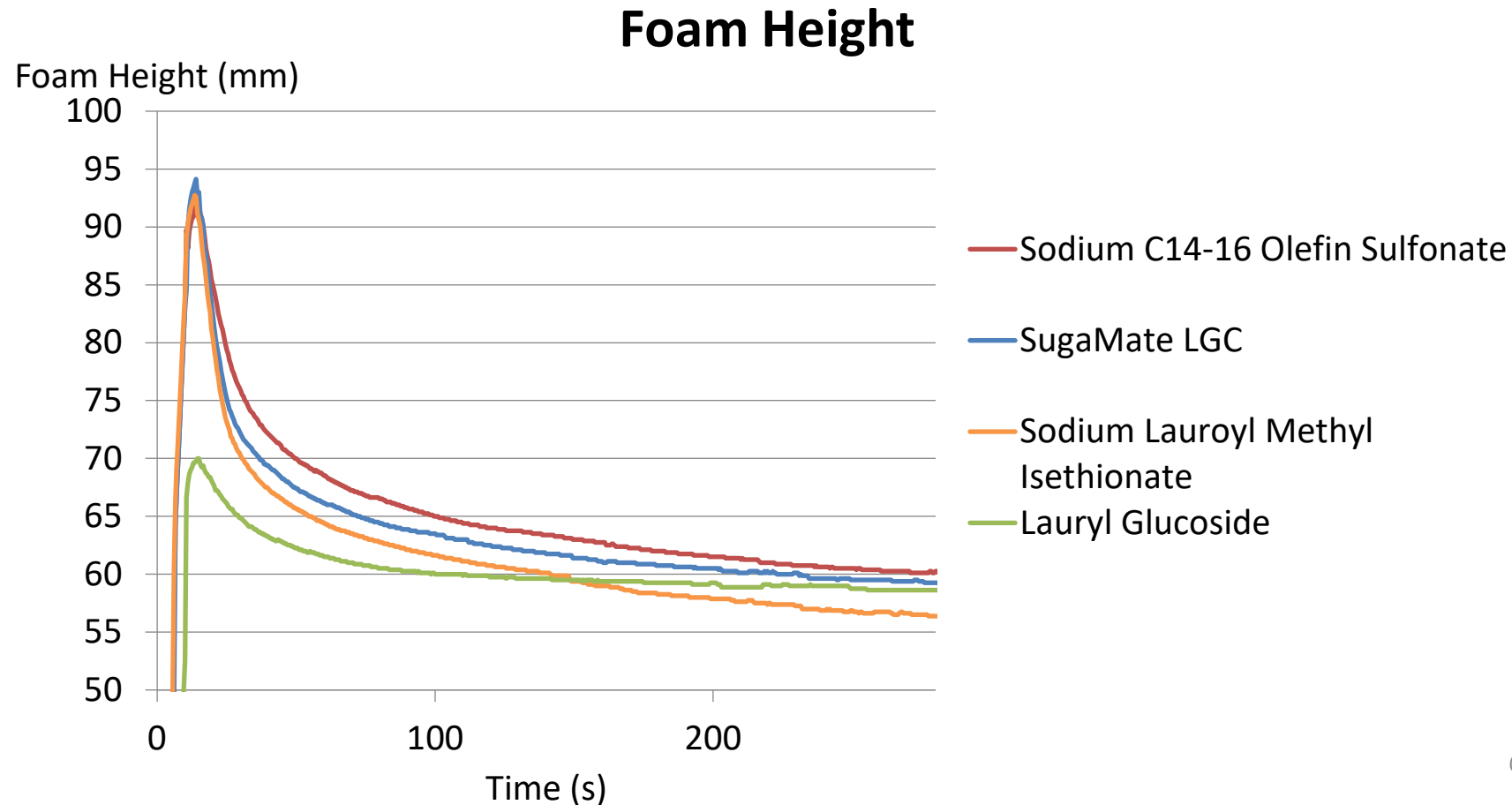
- Adding SugaMate LGC to SLS or other more traditional primary surfactant systems can enhance viscosity build while simultaneously lowering irritation potential

Ingredient	% Solids
Water	qs to 100.00
Anionic	7.20
ColaTeric COAB	1.80
ColaMid CMA	1.00
Citric Acid 50%	qs to pH 6



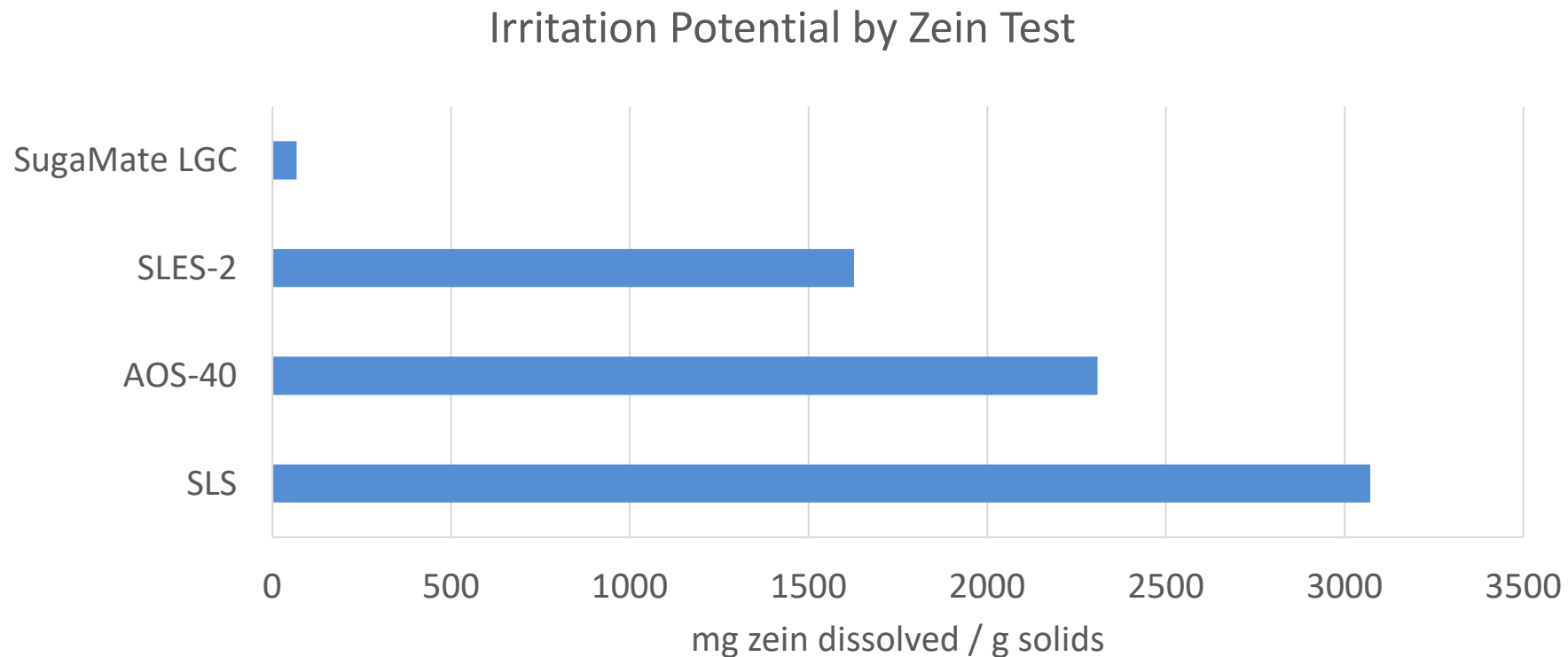
Foam Performance

- SugaMate LGC generates foam volume similar to leading sulfate-free surfactants and exhibits an appealing bubble structure. Foam volume is much improved over unmodified Lauryl Glucoside.

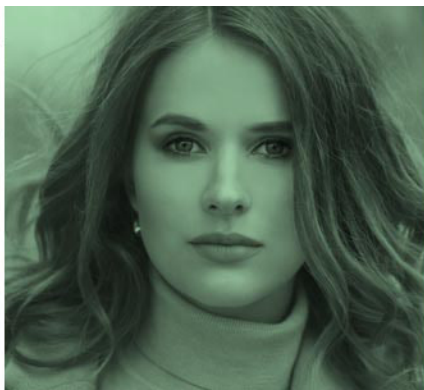


Irritation Potential

- Like our other Anionic APGs, SugaMate LGC demonstrates much lower skin irritation potential in vitro than traditional sulfates and sulfate replacements.



Formulations



Natural Daily Shampoo (Sulfate-Free)

Formulation No. 1071

DESCRIPTION

- Plant-based, sulfate-free, mild shampoo
- Estimated 85% biobased
- Cold-process formulation
- Builds a rich lather that rinses easily
- pH balanced for skin and hair
- Silicone-free
- Contains plant-based conditioning aids that do not weigh down hair or build up over time

FEATURED INGREDIENTS

- **Suga®Mate LGC MB: Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside**
 - a highly biobased, readily biodegradable, sulfate-free anionic surfactant with good foam and extremely low irritation
- **Suga®Det LSLG MB: Lauryl Glucoside, Disodium Lauryl Sulfosuccinate**
 - a plant-based, sulfate-free liquid blend that offers high foam and allows for an easy manufacturing process
- **Poly Suga®Quat TM-8610P: Polyquaternium 77**
 - a plant-based, mild conditioning aid with no greasy buildup
- **Suga®Det EcoPearl: Glycol Distearate, Sodium Hydroxypropylphosphate Decylglucoside Crosspolymer, Cocamidopropyl Hydroxysultaine, Sodium Stearoyl Lactylate**
 - a plant-based, mild, liquid blend that offers a luxurious pearled appearance and allows for an easy manufacturing process
- **Cola®Teric CBS-HP MB: Cocamidopropyl Hydroxysultaine**
 - a plant-based, high-performance amphoteric that provides improved viscosity build and foam stabilization
- **Cola®Liquid DC-5 MB: Cocamide DIPA**
 - a liquid DEA-free amide that provides enhanced viscosity build

Natural Daily Shampoo (Sulfate-Free)

Formulation No. 1071

FORMULATION

INCI NAME	TRADE NAME	WT. %	FUNCTION
Water	Water	qs to 100.00	Carrier
Hydroxypropyl Guar, Hydroxypropyl Guar Hydroxypropyltrimonium Chloride	Jaguar C-162 ¹	0.30	Conditioning
Citric Acid	Citric Acid, 50%	0.80	pH adjuster
Cocamidopropyl Hydroxysultaine	Cola®Teric CBS-HP MB	10.00	Viscosity building
Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside	Suga®Mate LGC MB	20.00	Ultra-mild primary anionic
Disodium Lauryl Sulfosuccinate, Lauryl Glucoside	Suga®Det LSLG MB	15.00	Foam boosting, viscosity building
Polyquaternium 77	Poly Suga®Quat TM-8610P	3.00	Conditioning, increases deposition of cationic guar
Cocamide DIPA	Cola®Liquid DC-5 MB	0.75	Viscosity boosting
Glycol Distearate, Sodium Hydroxypropylphosphate Decylglucoside	Suga®Det Eco Pearl	3.00	Pearling
Crosspolymer, Cocamidopropyl Hydroxysultaine, Sodium Stearoyl Lactylate			
Sodium Benzoate, Potassium Sorbate	Euxyl® K712 ²	1.00	Preservative
Fragrance	Blackcurrant Nectar Fragrance ORC2200474 ³	0.50	Fragrance

¹Solvay, ²Schülke and Mayr, ³Orchidia Fragrances

TYPICAL PROPERTIES	SPECIFICATION
Appearance	Pearled, Viscous Liquid
pH	5.0 – 5.5
Viscosity (LV3, 12 rpm)	5,000 – 10,000 cP
Surfactant Solids	19.5 – 21.5%

PHA/AHA Exfoliating Cleanser (Sulfate-Free)

Formulation No. 2087

DESCRIPTION

- Plant-based, sulfate-free cleanser for gentle exfoliation to give a smoother, clearer complexion
- Estimated 90% biobased
- Contains 4% Gluconolactone (PHA) and 1% Glycolic Acid (AHA)
- pH 3.5 – 4.5
- Cold-process formulation
- Contains a plant-based moisturizer and skin conditioner to promote healthy skin

FEATURED INGREDIENTS

- **Suga[®]Mate LGC MB: Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside**
 - a highly biobased, readily biodegradable, sulfate-free anionic surfactant with good foam and extremely low irritation
- **Cola[®]Teric HBS: Cannabisamidopropyl Hydroxysultaine, Water, Propanediol**
 - a hemp-derived amphoteric that provides enhanced viscosity build
- **Colonial BetaNat: Betaine**
 - a 100% plant-based, readily biodegradable betaine that offers excellent moisture regulation
- **Cola[®]Lipid C: Cocamidopropyl PG-Dimonium Chloride Phosphate**
 - a coconut-derived biomimetic phospholipid that multi-functions as a gentle cleanser, skin conditioner, and antimicrobial
- **Cola[®]Teric CBS-HP MB: Cocamidopropyl Hydroxysultaine**
 - a plant-based, high-performance amphoteric that provides improved viscosity build and foam stabilization

PHA/AHA Exfoliating Cleanser (Sulfate-Free)

Formulation No. 2087

FORMULATION

INCI NAME	TRADE NAME	WT. %	FUNCTION
Water	Water	qs to 100.00	Carrier
Betaine	Colonial BetaNat	1.00	Moisturizing
Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside	Suga®Mate LGC MB	20.00	Ultra-mild primary anionic
Cocamidopropyl Hydroxysultaine	Cola®Teric CBS-HP MB	5.00	Viscosity building
Cannabisamidopropyl Hydroxysultaine, Water, Propanediol	Cola®Teric HBS	3.00	Viscosity boosting
Cocamidopropyl PG-Dimonium Chloride Phosphate	Cola®Lipid C	1.00	Skin conditioning
Gluconolactone	Glucono-delta-Lactone ¹	4.00	PHA exfoliant
Glycolic Acid	Glycolic Acid 70%	1.43	AHA exfoliant
Sodium Benzoate, Potassium Sorbate	Euxyl® K712 ²	1.00	Preservative
Fragrance	Minty Herbal Spa Fragrance ORC1207895 ³	0.20	Fragrance

¹Jungbunzlauer, ²Schülke and Mayr, ³Orchidia Fragrances

TYPICAL PROPERTIES	SPECIFICATION
Appearance	Clear, Viscous Liquid
pH	3.5 – 4.5
Viscosity (LV3, 12 rpm)	1,500 – 2,500 cP
Surfactant Solids	12.5 – 14.0%

Sensitive Skin Wash (Sulfate-Free)

Formulation No. 2084

DESCRIPTION

- Plant-based, sulfate-free, mild face and body cleanser
- Estimated 84% biobased
- Cold-process formulation
- Builds a rich lather that rinses easily
- pH balanced for skin
- Contains a plant-based skin conditioner to promote healthy skin

FEATURED INGREDIENTS

- **Suga®Nate 160NC MB: Sodium Laurylglucosides Hydroxypropylsulfonate**
 - a 100% biobased, readily biodegradable, sulfate-free anionic surfactant with excellent detergency and zero irritation
- **Suga®Det LSLG MB: Lauryl Glucoside, Disodium Lauryl Sulfosuccinate**
 - a plant-based, sulfate-free liquid blend that offers high foam and viscosity build and allows for an easy manufacturing process
- **Suga®Det LSDG MB: Decyl Glucoside, Disodium Lauryl Sulfosuccinate**
 - a plant-based, sulfate-free liquid blend that offers high foam and allows for an easy manufacturing process
- **Cola®Lipid C: Cocamidopropyl PG-Dimonium Chloride Phosphate**
 - a coconut-derived biomimetic phospholipid that multi-functions as a gentle cleanser, skin conditioner, and antimicrobial
- **Cola®Teric CBS-HP MB: Cocamidopropyl Hydroxysultaine**
 - a plant-based, high-performance amphoteric that provides improved viscosity build and foam stabilization

Sensitive Skin Wash (Sulfate-Free)

Formulation No. 2084

FORMULATION

INCI NAME	TRADE NAME	WT. %	FUNCTION
Water	Water	qs to 100.00	Carrier
Polyquaternium-7	Merquat™ 550PR Polymer ¹	2.00	Enhanced feel
Cocamidopropyl Hydroxysultaine	Cola®Teric CBS-HP MB	8.00	Viscosity building
Sodium Laurylglucosides Hydroxypropylsulfonate	Suga®Nate 160NC MB	15.00	Ultra-mild primary anionic
Disodium Lauryl Sulfosuccinate, Lauryl Glucoside	Suga®Det LSLG MB	7.50	Foam boosting, viscosity building
Disodium Lauryl Sulfosuccinate and Decyl Glucoside	Suga®Det LSDG MB	7.50	Foam boosting
Cocamidopropyl PG-Dimonium Chloride Phosphate	Cola®Lipid C	1.50	Skin conditioning
Sodium Benzoate and Potassium Sorbate	Euxyl® K712 ²	1.00	Preservative
Fragrance	Sea Air & Lavender Fragrance ORC2001553 ³	0.20	Fragrance
Citric Acid	Citric Acid 50%	qs to pH 5.0 – 5.5	pH adjuster

¹Lubrizol, ²Schülke & Mayr, ³Orchidia Fragrance

TYPICAL PROPERTIES	SPECIFICATION
Appearance	Clear, Viscous Liquid
pH	5.0 – 5.5
Viscosity (LV3, 12 rpm)	4,000 – 8,000 cP
Surfactant Solids	14.5 – 16.0%

Creamy Shower Gel (Sulfate-Free)

Formulation No. 2085

DESCRIPTION

- Plant-based, sulfate-free, mild face and body cleanser
- Contains 5% nourishing grapeseed oil
- Estimated 92% biobased
- Cold-process formulation
- Creamy lather that rinses clean
- pH balanced for skin
- Contains a plant-based skin conditioner and antioxidant to promote healthy skin

FEATURED INGREDIENTS

- **Suga[®]Mate LGC MB: Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside**
 - a highly biobased, readily biodegradable, sulfate-free anionic surfactant with good foam and extremely low irritation
- **Suga[®]Det LSDG MB: Decyl Glucoside, Disodium Lauryl Sulfosuccinate**
 - a plant-based, sulfate-free liquid blend that offers high foam and allows for an easy manufacturing process
- **Cola[®]Lipid GS: Sodium Grapeseedamidopropyl PG-Dimonium Chloride Phosphate**
 - a sustainable biomimetic phospholipid derived from grapeseed oil that multi-functions as a gentle cleanser, skin conditioner, and antioxidant
- **Cola[®]Teric CBS MB: Cocamidopropyl Hydroxysultaine**
 - a plant-based amphoteric that provides enhanced viscosity build and foam stabilization

Creamy Shower Gel (Sulfate-Free)

Formulation No. 2085

FORMULATION

INCI NAME	TRADE NAME	WT. %	FUNCTION
Water	Water	qs to 100.00	Carrier
Xanthan Gum	Keltrol® CG-SFT ¹	1.25	Thickening, suspending
Glycerin	Glycerin	3.00	Moisturizing
Cocamidopropyl Hydroxysultaine	Cola®Teric CBS MB	5.00	Viscosity building
Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside	Suga®Mate LGC MB	15.00	Ultra-mild primary anionic
Disodium Lauryl Sulfosuccinate, Decyl Glucoside	Suga®Det LSDG MB	10.00	Foam boosting
Sodium Grapeseedamidopropyl PG-Dimonium Chloride Phosphate	Cola®Lipid GS	3.00	Skin conditioning
Vitis Vinifera (Grape) Seed Oil	Grapeseed Oil ²	5.00	Emollient
Sodium Benzoate, Potassium Sorbate	Euxyl® K712 ³	1.00	Preservative
Fragrance	Fragrance	0.20	Fragrance
Citric Acid	Citric Acid 50%	qs to pH 5.0 – 5.5	pH adjuster

¹CP Kelco, ²Jedwards International, ³Schülke & Mayr

TYPICAL PROPERTIES	SPECIFICATION
Appearance	Opaque, Viscous Liquid
pH	5.0 – 5.5
Viscosity (LV3, 12 rpm)	4,000 – 6,000 cP
Surfactant Solids	12.0 – 13.0%

Gentle Body Cleanser (Sulfate-Free)

Formulation No. 2086

DESCRIPTION

- Plant-based, sulfate-free, mild cleanser
- Estimated 76% biobased
- Cold-process formulation
- pH balanced for skin
- Contains a cationic humectant for long-lasting skin hydration

FEATURED INGREDIENTS

- **Suga®Mate LGC MB: Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside**
 - a highly biobased, readily biodegradable, sulfate-free anionic surfactant with good foam and extremely low irritation
- **Suga®Det LSLG MB: Lauryl Glucoside, Disodium Lauryl Sulfosuccinate**
 - a plant-based, sulfate-free, liquid blend that offers high foam and allows for an easy manufacturing process
- **Cola®Moist BE 200 MB: Hydroxypropyl Bis-Hydroxyethyldimonium Chloride**
 - a mild, cationic humectant with a high charge density and outstanding water binding properties for enhanced moisturization
- **Cola®Teric CBS-HP MB: Cocamidopropyl Hydroxysultaine**
 - a plant-based, high-performance amphoteric that provides improved viscosity build and foam stabilization
- **Cola®Liquid DC-5 MB: Cocamide DIPA**
 - a liquid DEA-free amide that provides enhanced viscosity build

Gentle Body Cleanser (Sulfate-Free)

Formulation No. 2086

FORMULATION

INCI NAME	TRADE NAME	WT. %	FUNCTION
Water	Water	qs to 100.00	Carrier
Sodium Lauryl Glucose Carboxylate, Lauryl Glucoside	Suga®Mate LGC MB	15.00	Ultra-mild primary anionic
Disodium Lauryl Sulfosuccinate, Lauryl Glucoside	Suga®Det LSLG MB	10.00	Foam boosting, viscosity building
Cocamidopropyl Hydroxysultaine	Cola®Teric CBS-HP MB	7.00	Viscosity building
Cocamide DIPA	Cola®Liquid DC-5 MB	1.00	Viscosity boosting
Hydroxypropyl Bis-Hydroxyethylmonium Chloride	Cola®Moist BE 200 MB	3.00	Moisturizing
Sodium Benzoate and Potassium Sorbate	Euxyl® K712 ¹	1.00	Preservative
Fragrance	Uplifting Grapefruit Fragrance ORC2001557 ²	0.20	Fragrance
Citric Acid	Citric Acid, 50%	qs to pH 5.0 – 5.5	pH adjuster
Sodium Chloride	NaCl	2.50	Thickening

¹Schülke and Mayr, ²Orchidia Fragrances

TYPICAL PROPERTIES	SPECIFICATION
Appearance	Clear, Viscous Liquid
pH	5.0 – 5.5
Viscosity (LV3, 12 rpm)	4,000 – 6,000 cP
Surfactant Solids	14.5 – 16.0%

Recap

- **Cola®Lac SLB**
 - Convenience blend with excellent performance
 - Can replace commonly used quaternary conditioner actives
- **Cola®Teric 12HS MB**
 - High biobased amphoteric with global registrations
 - Fast wetting surfactant with excellent viscosity building
- **Suga®Det LSLG MB**
 - Easy to use, liquid form of Disodium Lauryl Sulfosuccinate
 - Outstanding foam and viscosity building
- **Suga®Mate LGC**
 - Completely sulfate-free APG Carboxylate
 - Globally compliant



Thank you!

Dennis Abbeduto: dennis@colonialchem.com

Product TDS/SDS/Formulations: <https://www.colonialchem.com>

Formula Girls Podcast: <https://apple.co/3dUq5fh>

