



Patent Granted Suga[®]Citrate L1C MB

100% Biobased APG Citrate | **Mass Balance RSPO**

Cleanse • Thicken • Reduce Irritation



Clean and Simple

100% Naturally-Derived,
Sulfate-Free*, Non-Irritating *at*
typical use rates



Suga®Citrate Clean and Simple



Suga®Citrate is the newest generation natural surfactant, meeting all the demands of today's consumer. It is an extremely low irritation anionic surfactant derived entirely from renewable plant sources. SugaCitrate functionalized alkyl polyglucosides deliver many highly desirable product features. Luxurious cleansers with excellent foam, rich viscosity, and low irritation are easily achievable.

BENEFITS

- 100% naturally-derived
- Made without PEGs or ethoxylation
- Non-irritating at typical use rates
- Readily biodegradable
- Retains clarity at low temperature
- High clarity, low color, low odor
- Shipped without preservatives
- Does not use GMO ingredients
- Cost-effective sulfate-free* primary surfactant
- Suitable for use with nearly all surfactant classes including quaternary compounds, amides, amphoterics and nonionics
- Compatible with a wide variety of formulation additives, including popular extracts, humectants, and preservatives.
- Especially well-suited for
 - Clean beauty products
 - Highly sustainable cleansers
 - Baby care
 - Facial care
 - Sensitive skin needs



SugaCitrate L1C MB is "Derived Natural" with a **Natural Origin Index of 1.00** in accordance with ISO 16128 guideline.

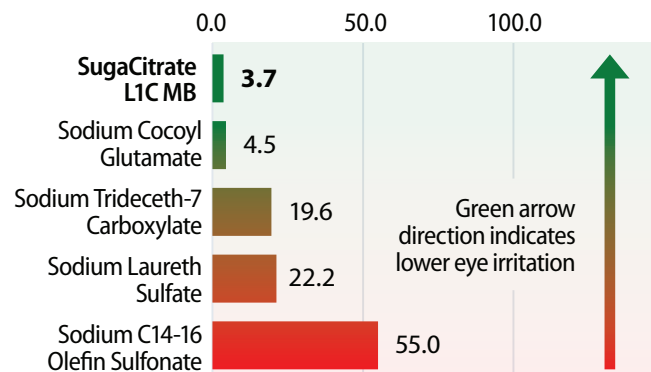
APPLICATIONS

- Sulfate-free* cleansers
 - Mild cleansing
 - Foaming
 - Viscosity building
 - Irritation reduction
- Wipes
 - Mild cleansing
 - Wetting
- Syndet Bars
 - Mild cleansing
 - Foaming
 - Irritation reduction



EYE IRRITATION TESTING

The following data correlates to the OECD TG 405 Acute Eye Irritation/Corrosion (Draize) results of products that represent a variety of irritants. Tests are globally approved, completely cruelty-free and mathematically correlated to the Draize equivalent score. All tests conducted at 10% Solids, pH 6.0.



Draize Equivalent

0.0 – 0.5 / Non-irritating	25.1 – 50.0 / Moderately irritating
0.6 – 2.5 / Practically non-irritating	50.1 – 80.0 / Severely irritating
2.6 – 15.0 / Minimally irritating	80.1 – 100.0 / Extremely irritating
15.1 – 25.0 / Mildly irritating	100.1 – 110 / Maximally irritating



PERFORMANCE

Irritation Potential in Sulfate-Based Cleanser (Chart 1)

SugaCitate L1C MB is extremely effective at reducing irritation potential in cleansing formulations, without negatively impacting other important attributes.

The Zein test is an in-vitro test that measures irritation potential by measuring the denaturation of a proxy protein (zein). As the zein denatures, water solubility increases.

This study demonstrates that the milder but undesirable Sodium Laureth-2 Sulfate can be replaced with a combination of Sodium Lauryl Sulfate and SugaCitate L1C MB. This combination exhibits lower irritation with even better viscosity building performance.

Viscosity Build in Sulfate-Based Cleanser (Chart 2)

Incorporating SugaCitate L1C MB into gel cleanser formulations results in faster, higher viscosity building. Formulations with no added salt are achievable, meeting the demand for those claims.

Viscosity Build in Sulfate-Free Cleanser (Chart 3)

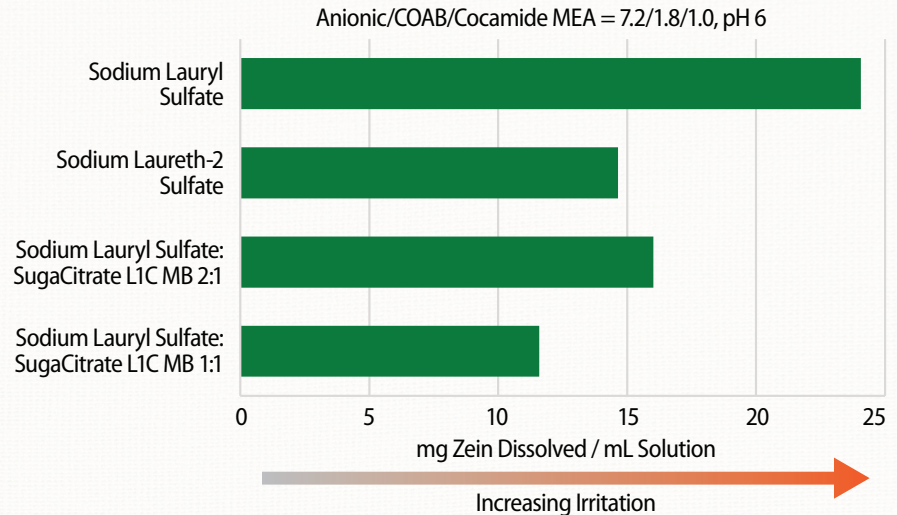
This chart demonstrates multiple variables which can be altered in this sulfate-free* system to modify viscosity response, including:

- pH
- Salt
- Addition of a mid-HLB surfactant (Sodium Stearoyl Lactylate, or SSL)

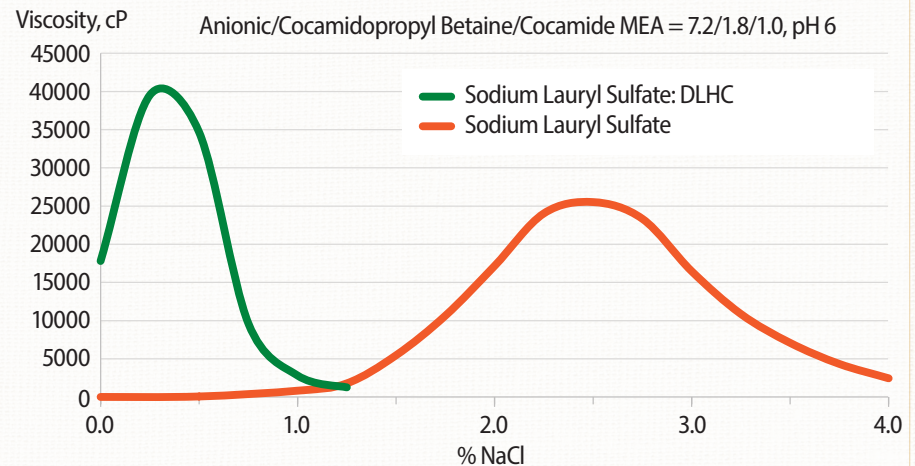
Sulfate-Free* Cleanser Formulation

Ingredient	0.75% SSL	1.0% SSL
Water	72.75	72.50
Suga®Citate L1C MB	16.00	16.00
Poly Suga®Glycinate C	2.50	2.50
Cola®Teric CBS-HP	5.00	5.00
Sodium Methyl Cocoyl Taurate	3.00	3.00
Sodium Stearoyl Lactylate	0.75	1.00
Citric Acid 50%	qs to pH	qs to pH

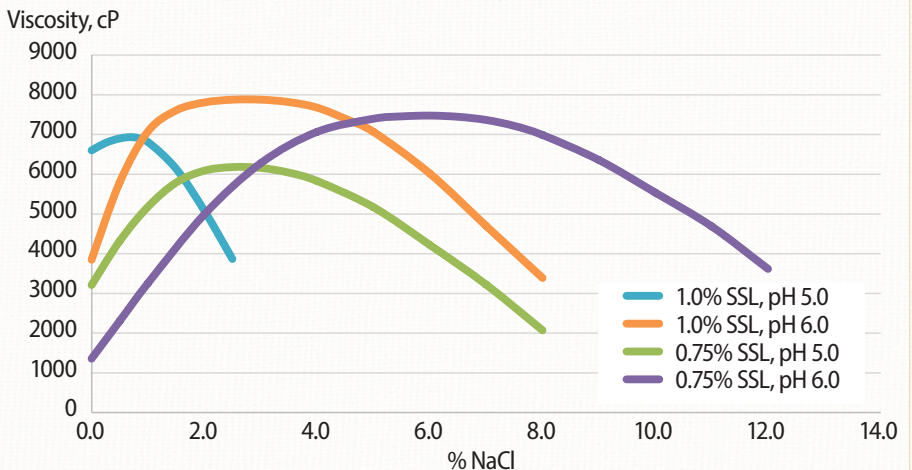
1. Irritation Potential of Sulfate-Based Cleanser



2. Viscosity Build in Sulfate-Based Cleanser



3. Viscosity Build in Sulfate-Free* Cleanser



Clean & Simple Shampoo

No. 1055

Designed with safe, mild ingredients to create a gentle, sulfate-free*, silicone-free shampoo that effectively washes away dirt and oils. Hair is left healthy and light without any build-up with daily use or when hair needs a "cleanse."

	TRADE NAME / INCI NAME	%
1	Water	qs to 100.00
2	UCARE™ Polymer JR-30M / Polyquaternium-10	0.20
3	Cola®Teric CBS / Cocamidopropyl Hydroxysultaine	7.00
4	Suga®Citrate L1C MB / Disodium Laurylglucosides Hydroxypropyl Citrate	13.00
5	Cola®Mate LA-40 / Disodium Lauryl Sulfosuccinate	12.00
6	Poly Suga®Quat S-1210P / Polyquaternium-81	2.00
7	Fragrance	0.30
8	Euxyl®K 900 / Benzyl Alcohol and Ethylhexylglycerin and Tocopherol	0.70

PROCEDURE:

Combine ingredients 1–2 and mix until completely hydrated. Add ingredients 3–4 in order and begin heating to 45–50°C. Once at temperature, add ingredient 5 and mix until completely dissolved. Add ingredients 6–8 while beginning to cool and continue mixing until clear. If necessary, adjust to pH 5.0–5.5 with citric acid (viscosity is pH dependent, increasing at lower pH).

TYPICAL PROPERTIES:

Appearance:	Clear, viscous liquid
pH:	5.0 – 5.5
Viscosity:	5,000 – 10,000 cP
Surfactant Solids:	13.6 – 14.5%
Stability:	Passes 6 weeks @45°C and 3 Freeze/Thaw cycles

INCI Disodium Laurylglucosides
Hydroxypropyl Citrate

CAS 2481100-10-9

TYPICAL PROPERTIES

Appearance @ 25°C	Clear Liquid
Appearance @ 5°C	Clear Liquid
pH (10% Aqueous)	7.0
% NaCl	3.0
% Solids, 2G 1H@110°C	40
Color, Gardner '98	1
Draves Wetting, secs (1% active)	5.5
Ross-Miles Foam Height (1% active solution, 25° C, DI water), mm	Immediate 150 1 minute 130 5 minutes 130

Clean & Simple Face Wash

No. 2070

Sulfate-free* daily face wash designed with safe, mild ingredients to create a gentle lather that effectively lifts away dirt and oils. Skin-conditioning and moisture-locking ingredients leaves skin feeling healthy, not tight or dry.

	TRADE NAME / INCI NAME	%
1	Water	qs to 100.00
2	Suga®Citrate L1C MB / Disodium Laurylglucosides Hydroxypropyl Citrate	15.00
3	Cola®Mate LA-40 / Disodium Lauryl Sulfosuccinate	7.00
4	Cola®Teric BBS / Babassuamidopropyl Hydroxysultaine	7.00
5	Cola®Teric CBS / Cocamidopropyl Hydroxysultaine	5.00
6	Cola®Lipid C / Cocamidopropyl PG-Dimonium Chloride Phosphate	0.50
7	Cola®Moist 200 / Hydroxypropyl Bis-Hydroxyethylmonium Chloride	3.00
8	Fragrance	0.15
9	Euxyl®K 900 / Benzyl Alcohol and Ethylhexylglycerin and Tocopherol	0.70

PROCEDURE:

Combine ingredients 1–2 and heat to 45–50°C. Add ingredient 3 and mix until completely dissolved. Add ingredients 4–7 while beginning to cool. Once uniform, add ingredients 8–9 and continue mixing until clear. Adjust pH as necessary with citric acid (viscosity is pH dependent, increasing at lower pH).

TYPICAL PROPERTIES:

Appearance:	Clear, viscous liquid
pH:	5.0 – 5.5
Viscosity:	2,000 – 4,000 cP
Surfactant Solids:	16.4 – 17.6%
Stability:	Passes 6 weeks @45°C and 3 Freeze/Thaw cycles

MASS BALANCE RSPO

In keeping with Colonial Chemical's commitment to sustainable raw material sourcing, this product is derived from palm oil that contributes to the production of certified sustainable palm oil. More information on www.RSPO.org.

STORAGE AND HANDLING

Suga®Citrate L1C MB should be stored in closed containers. Shelf life is 12 months from date of manufacture. Suga®Citrate L1C MB is shipped in 55-gallon drums, net weight (net weight 460 lb/208.6 kg). Complete Safety Data Sheet may be downloaded at www.colonialchem.com.



Colonial Chemical
Innovative Specialty Surfactants
www.colonialchem.com

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*Does not contain alkyl or alkyl ether sulfate surfactants