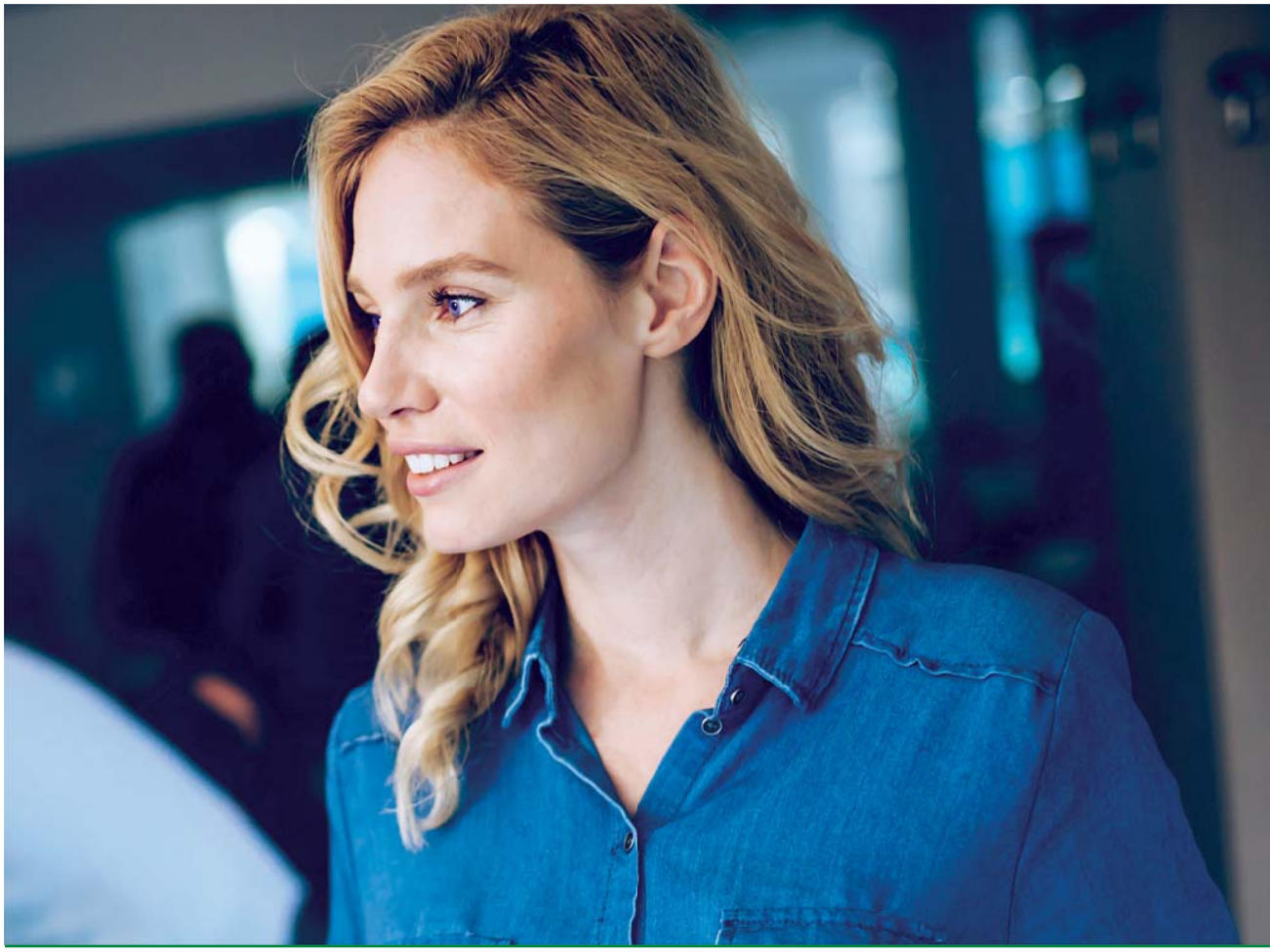
Suga®Nate 160NC

100% Biobased Surfactant

INCI NAME	Sodium Laurylglucosides Hydroxypropylsulfonate
CAS NUMBER	742087-49-6
LISTINGS	USA (TSCA); EU (REACH); Canada (NDSL); Australia (AICS); New Zealand (NZIoC)



Greener, Milder and Safer

100% Natural Carbon Biobased

100% naturally-derived, EO-free, 1,4-Dioxane free ***with no irritation***

The natural choice for sulfate-free formulations

Suga®Nate 160NC is a naturally-derived, high-performance surfactant suitable for a variety of personal care formulations. Using Suga®Nate 160NC, formulators can develop a high-foaming product with discriminating attributes without irritation to eyes and skin. Suga®Nate 160NC is very high in natural character, very low in toxicity and cost-effective when compared to other surfactants in typical sulfate-free formulations.

Benefits

- 100% naturally-derived
- EO free (1,4- Dioxane free)
- Non-irritating to skin, eyes
- Readily biodegradable under any conditions
- Equal or superior foaming characteristics to other sulfate-free surfactants
- Meets broad regulatory requirements
- Shipped without preservatives
- Cost-effective sulfate-free primary surfactant
- Compatible with nearly all surfactant classes including quaternary compounds, amides, amphoterics and nonionics

Applications

- Sulfate-free shampoos
- Low and high-pH shampoos
- Bath gels
- Body washes
- Facial cleansers
- Baby cleansing products
- Personal care wipes and make-up removers
- Pet shampoos
- Non-irritating bubble baths

Greener for Sulfate-Free Formulations

Suga®Nate 160NC is a patented anionic alkyl polyglucoside derivative that offers a superior alternative to traditional sulfate chemistries. While there are many sulfate-free options available to formulators, few represent the same degree of green feedstocks and processing represented by Suga®Nate 160NC. It is produced in a manner that uses less energy and less hazardous starting materials than traditional sulfates or sulfonates, making it greener from start to finish. The reaction is conducted in water with no solvents and no toxic by-products. All the starting materials are from bio-renewable or mineral sources, resulting in a 100% biobased product with outstanding performance characteristics.

Very High in Natural Ratings

Suga®Nate 160NC is certified 100% natural carbon* via independent testing through the USDA Biobased program, allowing for a wide variety of NGO certifications, including NPA, NSF, and EPA's Safer Choice.

Milder for End Users

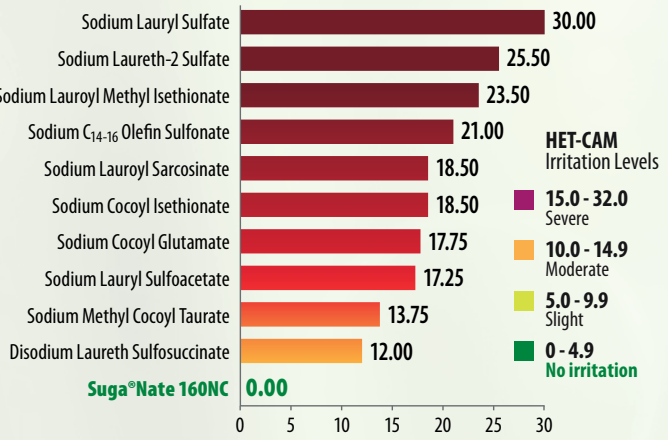
Suga®Nate 160NC test results include outstanding eye and dermal mildness, especially when compared to other surfactants used in sulfate-free formulations.

Eye Irritation

HET-CAM: *Hen's Egg Test Chorioallantoic Membrane:* No ocular irritation potential in vivo, score of **Zero**.

MatTek Epi-Ocular: *In vitroepidermal keratinocytes:* Results indicate 'non-irritating' classification, equivalent Draize score of **Zero**.

Listed below are results of HET-CAM tests (10% solids, pH 5.5 - 6.5) performed on products that are commonly used in sulfate-free formulations. For mildness, *nothing* compares to Suga®Nate 160NC.



Acute Skin Irritation

48 Hour Occlusive skin patch test: *On human volunteers - 53 Test Subjects:* no visible skin reaction, no potential for dermal irritation.

Skin Sensitization

Repeat Insult Patch testing (HRIPT): no potential for dermal irritation or allergic contact sensitization.

Safer for the Environment

Suga®Nate 160NC is truly a green surfactant and readily biodegradable, causing no harm to the environment and contributes to an environmentally safe waste stream.

Biodegradability

OECD 301 (301E) *Ready biodegradability test in an aerobic aqueous medium:* Sample shows 80 – 82% biodegradable in 28 days, exceeding 60% biodegradability requirement.

OCDE/OECD 311 *Anaerobic Biodegradability of Organic Compounds in Digested Sludge by Measurement of Gas Production:* Sample showed that anaerobic degradation occurred within the range of 75% – 85% within 60 days, indicating that the sample is anaerobically biodegradable.

Bacteria Reverse Mutation Assay

Ames test, OECD 471: No detectable genotoxic activity at the non-cytotoxic concentrations of Suga®Nate 160, neither in the absence nor in the presence of the S9 enzyme activation.

Aquatic Toxicity - Green Algae

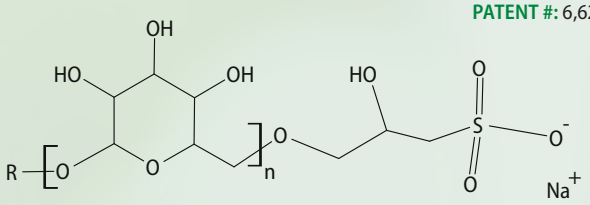
USEPA OPPTS 840.5400 and **USEPA Method 1003.0**

72 Hour Growth Inhibition Test using Freshwater Unicellular Green Algae: Results - **IC50 = 52.9 mg/L**

TYPICAL PROPERTIES / STRUCTURE

Appearance	Clear liquid	
pH (10% aqueous)	6.3	
Solids, %	40.0	
Odor	Mild, Fatty Alcohol	
Color, Gardner	< 1	
Viscosity, cps	7,500	
Ross-Miles Foam Height (1% active solution, 25° C, DI water), mm	Immediate	155
	1 minute	152
	5 minutes	150
Draves Wetting, sec.	Immediate	7.2

PATENT #: 6,627,612



Easier for the Formulator

Building Viscosity

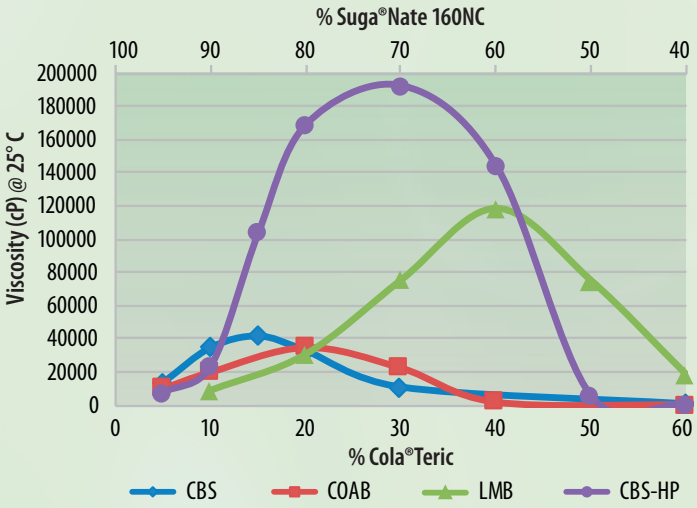
Combining Suga®Nate 160NC with a betaine or sultaine can produce high viscosity formulations. Lauramidopropyl betaine is especially well suited for producing economical products with excellent viscosity profiles.

Combinations of Suga®Nate 160NC and Cola®Teric products are shown in the graph below at various ratios. For example, a 60:40 ratio of Suga®Nate 160NC to Cola®Teric LMB (as supplied) provides optimal viscosity performance.

While commercially viable dilutions and the addition of other ingredients will greatly impact final viscosity, this shows that Suga®Nate 160NC has variable viscosity response based on the selection and concentration of secondary surfactants.

Recommended Use Levels

15–35% in shampoos, body washes and baby products.



Better Performer in Formulations

Foam Performance

Hard water foaming tests show that Suga®Nate 160NC has equal or superior immediate foam characteristics to many common surfactants. Foam height is comparable to leading sulfate surfactants and is actually maintained longer with a creamier and smaller bubble structure - ideal in personal care use.

Cleaning Performance for Detergency

Squalene Titer (SQ) Method: Suga®Nate 160NC showed a higher score (18.7) than SLS (15.8) and SLES (10.0). A higher SQ number indicates a better detergent.

Antimicrobial Performance for Detergency

Zone of Inhibition: A 16% solution was tested against a Gram-negative bacteria, Pseudomonas aeruginosa; a yeast, C. albicans; and a mold Aspergillus niger. Results showed very good microbial protection against all three microbes.

*Biobased determination of **Suga®Nate 160NC** using ASTM-D6866-12 Mean Biobased Result: **99%** (proportions biobased vs. fossil based indicated by 14C content). Since precision is +/- 3%, it is essentially 100%.

The Natural Choice for Sulfate-Free Formulations

Clarifying Shampoo (Sulfate-Free) — No. 1032

This clarifying shampoo frees hair of residue and build-up while antioxidants from Cola®Lipid BP help protect hair.

	TRADE NAME / INCI NAME	%
1	Water	qs to 100.00
2	***Cola®Teric CBS-HP*** / Cocamidopropyl Hydroxysultaine	18.00
3	***Suga®Nate 160NC*** / Sodium Laurylglucosides Hydroxypropylsulfonate	11.00
4	***Cola®Mate LA-40*** / Disodium Lauryl Sulfosuccinate	8.00
5	***Poly Suga®Phos 8600P*** / Sodium Hydroxypropylphosphate Cocoglucoside Crosspolymer	4.00
6	***Cola®Lipid BP*** / Sodium Borageamidopropyl PG-Dimonium Chloride Phosphate	2.00
7	Oud Fragrance	0.20
8	Microcare® SB / Sodium Benzoate and Potassium Sorbate	1.00

PROCEDURE:

Combine ingredients 1-3 and heat to 45-50°C. Add ingredient 4 and mix until completely dissolved. Add ingredients 5-6 while cooling to 40°C. Once below 40°C, add remaining ingredients.

TYPICAL PROPERTIES:

Appearance: Clear Viscous Liquid
pH: 5.5 – 6.5
Viscosity: 5,000 – 10,000 cP

Natural Body Wash (Betaine-Free) — No. 2018

Skin will feel clean without the dryness or irritation from harsh sulfates in a gentle, high foaming, naturally-based wash.

	TRADE NAME / INCI NAME	%
1	Water	qs to 100.00
2	***Suga®Nate 160NC*** / Sodium Laurylglucosides Hydroxypropylsulfonate	19.20
3	***Cola®Mate LA-40*** / Disodium Lauryl Sulfosuccinate	4.00
4	***Cola®Teric CBS-HP*** / Cocamidopropyl Hydroxysultaine (Fatty Acid)	9.60
5	Island Luau / Fragrance	0.20
6	Preservative	qs
7	Citric Acid	qs

PROCEDURE:

Combine ingredients 1-2. Heat to 45°C. Add remaining ingredients. Adjust pH to 5.0 - 5.5 with citric acid (viscosity is pH dependent).

TYPICAL PROPERTIES:

Appearance: Clear Liquid
pH: 5.0 – 5.5
Viscosity: 8,000 cP

Grapefruit Body Scrub (Sulfate-Free) — No. 2035

This grapefruit-scented body scrub with natural gentle Jojoba beads leaves skin feeling smooth and soft.

	TRADE NAME / INCI NAME	%
1	Water	qs to 100.00
2	Keltrol CG-SFT / Xanthan Gum	1.25
3	Glycerin	3.00
4	***Cola®Teric CBS-HP*** / Cocamidopropyl Hydroxysultaine (Fatty Acid)	10.00
5	***Cola®Mate LA-40*** / Disodium Lauryl Sulfosuccinate	13.50
6	***Cola®Lac 426*** / Isostearamidopropyl Morpholine Lactate	2.00
7	***Suga®Nate 160NC*** / Sodium Laurylglucosides Hydroxypropylsulfonate	10.00
8	Citrus Paradisi (Grapefruit) Peel Oil	0.25
9	***Poly Suga®Mulse D9*** / Sorbitan Oleate Decylglucoside Crosspolymer	0.50
10	Minasolve® Pentiol Green+ / Pentylene Glycol	1.50
11	Microcare® SB / Sodium Benzoate and Potassium Sorbate	1.00
12	OFJ™ Spheres Watermelon Patch 20/40 / Jojoba Esters	1.00

PROCEDURE:

Disperse xanthan gum in glycerin to create a smooth slurry. Add the slurry to water with moderate mixing. Mix until completely hydrated. Add ingredient 4 while heating to 45°C. Once at temperature, add ingredients 5-7. Mix until completely homogenous. Combine ingredients 8-9 separately as a premix and add to batch. Add remaining ingredients with gentle to moderate mixing. Mix until the beads are evenly dispersed.

TYPICAL PROPERTIES:

Appearance: Clear liquid with exfoliating beads
pH: 6.0
Viscosity: 6,000 cP

ADDITIONAL NGO LISTINGS

NPA Certified® Ingredient
NSF®/ANSI 305-2012
DfE (CleanGredients®)
Whole Foods Premium Body Care™
USDA Biopreferred Product
GreenStar™ Rating of **10.0**

STORAGE / HANDLING

It is recommended that Suga®Nate 160NC be stored in sealed containers at temperatures not exceeding 120°F (49°C). Shipped in 55 gallon poly drums (net weight 450 lb/204 kg). Typical shelf life is 24 months from date of manufacture. Safety Data Sheet may be found at www.colonialchem.com.

Colonial Chemical
225 Colonial Drive • South Pittsburg, TN 37380
Phone: 423-837-8800 • Fax: 423-837-3888
www.colonialchem.com
Innovative Specialty Surfactants

Natural Products Association™ MEMBER