WEBINAR

Award-Winning Green Surfactants

For Personal Care, Household, and Industrial Applications

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President, Colonial Chemical, Inc.

Dennis Abbeduto
Business Manager, Personal Care

Dr. Andy Sun
Business Manager, HI&I Products

Colonial Chemical

Colonial Chemical

Safe and Sustainable Surfactant Innovations

David Anderson Jr., President
Dr. Andy Sun, Global Business Development Director & HI&I Business Manager
Dennis Abbeduto, Personal Care Business Manager

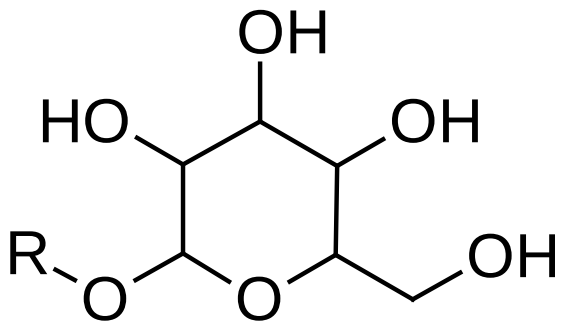





Overview & Agenda

- Colonial launched the first products in the *Suga® and Poly Suga®* product line over 15 years ago…
- Explore Colonial's continued expansion of this award-winning product line
- Demonstrate unique performance characteristics and safety profiles vs. traditional synthetic ingredients
- Relevant information for every personal care, household and institutional formulator
- Share continued expansion of this product line with new molecules, applications data and performance blends
- *Suga® Boost 030 and 050* were awarded the *2021 EPA Green Chemistry Challenge For Designing Greener Chemicals*
- Additional chemistries have been recognized with the P2 (Pollution Prevention) Award previously

Functionalized APG Chemistry (patented)



Alkyl Poly Glucoside

Suga®

Suga®Nate • APG Sulfonates
Suga®Fax • APG Phosphate Esters
Suga®Citrate • APG Citrate

Poly Suga®

Poly Suga®Glycinate • Poly APG Amphoterics
Poly Suga®Mulse • EO-Free Poly APG Emulsifiers
Poly Suga®Nate • Poly APG Sulfonates
Poly Suga®Phos • Poly APG Phosphates
Poly Suga®Quat • Poly APG Quats

Suga®Boost

High Performance Boosting Blends

Suga® and Poly Suga®

- 100% or close to 100% naturally-derived
- Very mild to eyes and skin contact, over harsh sulfates, alkoxylates, coco DEA
- No GHS warning labels for some products
- Free of Prop 65 components (1,4-Dioxane, DEA, DCA, etc.)
- Stable in wide range of pH
- Stable in hard water and electrolyte solution without hydrotropes
- Great environmental profiles (readily biodegradable, low aqua toxicity, direct release)
- Broad regulation approval (EPA Safer Choice, USDA Biobased, EU Detergent Directive)
- Compatible with majority of surfactants
- Variety of chemistries that meet different formulation and performance demands
- *Superior Performance Over Traditional Surfactants*

(Poly) Suga®Nate

100% Biobased APG Sulfonates

2008 P2 (Pollution Prevention) Recognition Project Awardee






Suga®Nate 160NC

100% Biobased Anionic APG Sulfonate	
INCI Name	Sodium Laurylglucosides Hydroxypropylsulfonate
Global Clearances	Global (except China)
Physical Form	Clear Liquid, 40% solid matter
Key Features	**Zero Irritation surfactant** for a wide variety of applications Biodegradable **Reduces irritation** of other primary surfactants **Improves viscosity** response of other primary surfactants **Peroxide stable** No added preservatives
Suggested Applications	Gentle cleansing for face, babies, sensitive skin Oral care Improved aesthetics in sulfate-free formulations
Certifications	ISO 16128 (1.0); USDA Certified 100% Biobased; EPA Cleangredients: Safe for Direct Release; NSF ANSI 305:2012; 2008 P2 (Pollution Prevention) Recognition Project Awardee

Suga®Nate 160NC Human Safety

Eye Irritation

- HET-CAM: Hen's Egg Test Chorioallantoic Membrane
  - Practically no ocular irritation potential in vivo, **score of zero**
- MatTek Epi-Ocular: In vitro epidermal keratinocytes
  - Draize equivalent **score of zero**

Acute Skin Irritation

- 48 Hour Occlusive skin patch test on human volunteers
  53 Test Subjects - 53/53 showed no visible skin reaction
  - **No potential for dermal irritation**

Skin Sensitization

- Repeat Insult Patch testing (HRIPT)
  - SugaNate 160NC **does not indicate** a potential for dermal irritation or allergic contact sensitization

Suga®Nate 160NC Human Safety

Oral Irritation

- MatTek EpiGingival
  - 4% as supplied (1.6% solids):
    - ET50 could not be determined (>18 hours/1080 min)
  - 100% as supplied (40% solids)
    - ET50 could not be determined (>18 hours/1080 min)
  - Bechmark SLS (0.6% solids)
    - ET50 418.2min

- MatTek EpiOral
  - 4% as supplied (1.6% solids)
    - ET50 could not be determined (>120 min)
  - 100% as supplied (40% solids)
    - ET50 could not be determined (>120 min)

Suga®Nate 160NC in Formulation

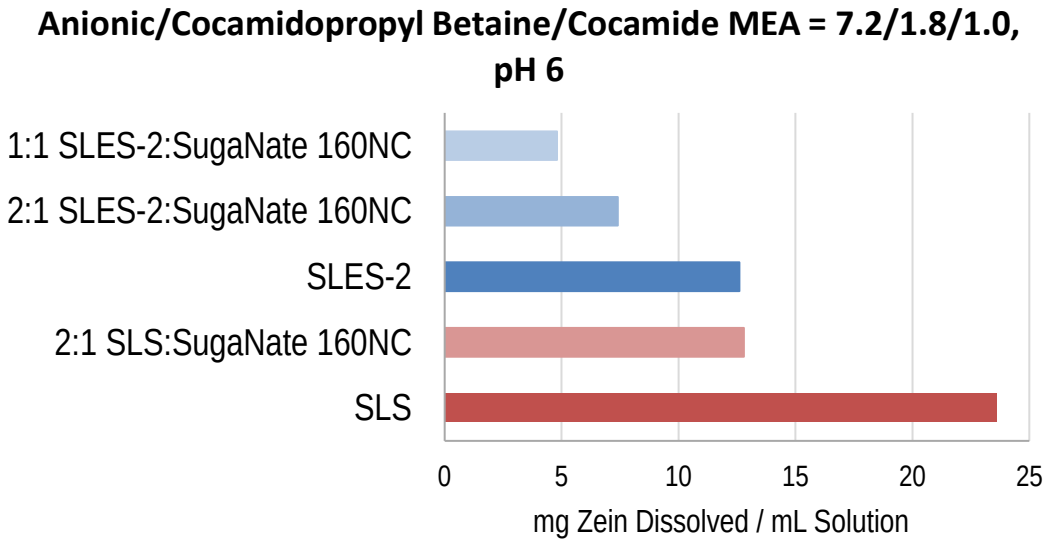
Toothpaste

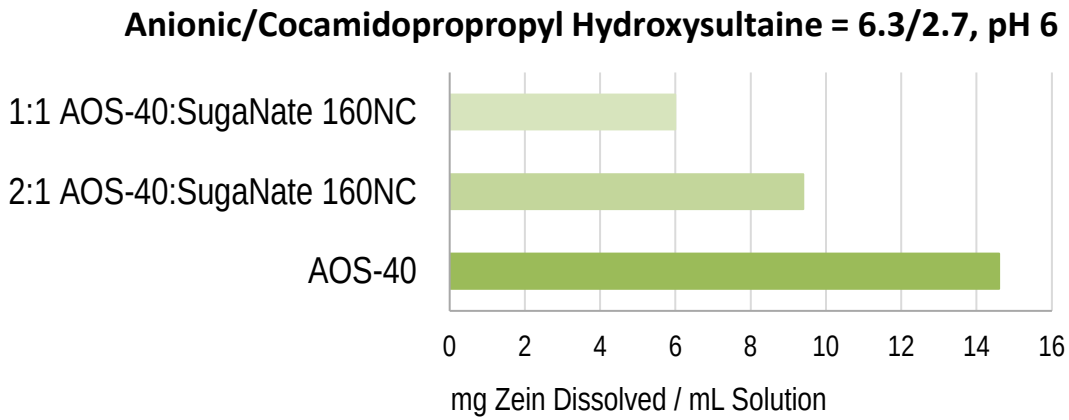
INCI Name	*Trade Name*	*%*	*Function*
Calcium Carbonate	Calcium Carbonate USP31 Powder [3]	44.00	Abrasive
Sorbitol	Sorbitol 70%	25.00	Humectant
Water	Water	14.20	Diluent
Glycerin	Glycerin	10.00	Humectant
Sodium Laurylglucosides Hydroxypropylsulfonate	Suga®Nate 160NC	4.00	Surfactant
Magnesium Aluminum Silicate	VEEGUM® D [1]	1.00	Thickener
Flavor	Nat. Mint Extract [4]	1.00	Flavor
Sodium Carboxymethylcellulose	Aqualon™ CMC-7MF [2]	0.40	Thickener
Sodium Saccharine	Sodium Saccharine [5]	0.20	Sweetener
Sodium Benzoate	Sodium Benzoate	0.20	Preservative

[1]Vanderbilt Minerals, [2]Ashland, [3]Vivion, [4]Flavorchem, [5]Jan Dekker

Irritation Reduction in Sulfate and Sulfate-Free Systems

- Adding Suga®Nate to sulfate and sulfate-free surfactants demonstrates the potential for a strong mollifying effect on irritation
- The in-vitro zein protein data suggest that SugaNate can be a very useful tool for reducing irritation in more traditional cleansing systems
- SugaNate can be a useful tool in reducing reliance on ethoxylated surfactants to reduce irritation or improve viscosity performance





Suga®Nate 160NC Environmental Safety

Biodegradability

- OECD 301 Ready Biodegradability Test (301E)
  - 80-82% biodegradable in 28 days
  - Exceeds 70% biodegradability requirement
- OECD 311 Anaerobic Biodegradability Test
  - 76% biodegradable in 60 days

Bacteria Reverse Mutation Assay

- Ames test, OECD 471
  - No detectable genotoxic activity at the non-cytotoxic concentrations of Suga®Nate160NC, neither in the absence nor in the presence of the S9 enzyme activation

Suga®Nate 100NC

100% Biobased Anionic APG Sulfonate	
INCI Name	Sodium Decylglucosides Hydroxypropylsulfonate
Global Clearances	Global (except China)
Physical Form	Clear Liquid, 40% solid matter
Key Features	**Low Irritation surfactant** for a wide variety of applications Biodegradable **Reduces irritation** of other primary surfactants **High foaming** sulfate-free surfactant No added preservatives
Suggested Applications	High foam cleansing Shampoos Bar products Exterior and transportation washes
Certifications	ISO 16128 (1.0); USDA Certified 97% Biobased 2008 P2 (Pollution Prevention) Recognition Project Awardee EPA Cleangredients: Safe for Direct Release

AOS-40 vs. Suga®Nate 100NC

	C14-16 Olefin Sulfonate	Suga®Nate 100NC
Appearance @ 25°C	Clear Liquid	Clear Liquid
pH (10% aqueous)	5.0 – 6.5	6.5 – 8.5
% solids	38.0 – 40.0	39.0 – 41.0
% Unsulfonated Matter	1.25 max	N/A
Foam, Ross Miles - Immediate - 1 minutes - 5 minutes	180 160 150	180 165 160
Draves Wetting, 1% (seconds)	9.0	Immediate
CMC, mg/L	301	500
Preservative	Kathon	None
HET-CAM score	21.0	18.5
Biobased Carbon %	0	100
Cleangredients	Yes	Yes
Approved for Direct Release	No	Yes

Poly Suga®Nate 160P NC

100% Biobased Anionic Poly-APG Sulfonate	
INCI Name	Sodium Hydroxypropylsulfonate Laurylglucoside Crosspolymer
Global Clearances	Global (**including** China)
Physical Form	Clear Liquid, 40% solid matter
Key Features	**Low Irritation surfactant** for a wide variety of applications Biodegradable **Reduces irritation** of other primary surfactants **Improves viscosity** response of other primary surfactants No added preservatives
Suggested Applications	Gentle cleansing Enhanced performance in sulfate-free formulations Micellar waters
Certifications	ISO 16128 (1.0)

Suga®Citrate

100% Biorenewable APG-Citrates

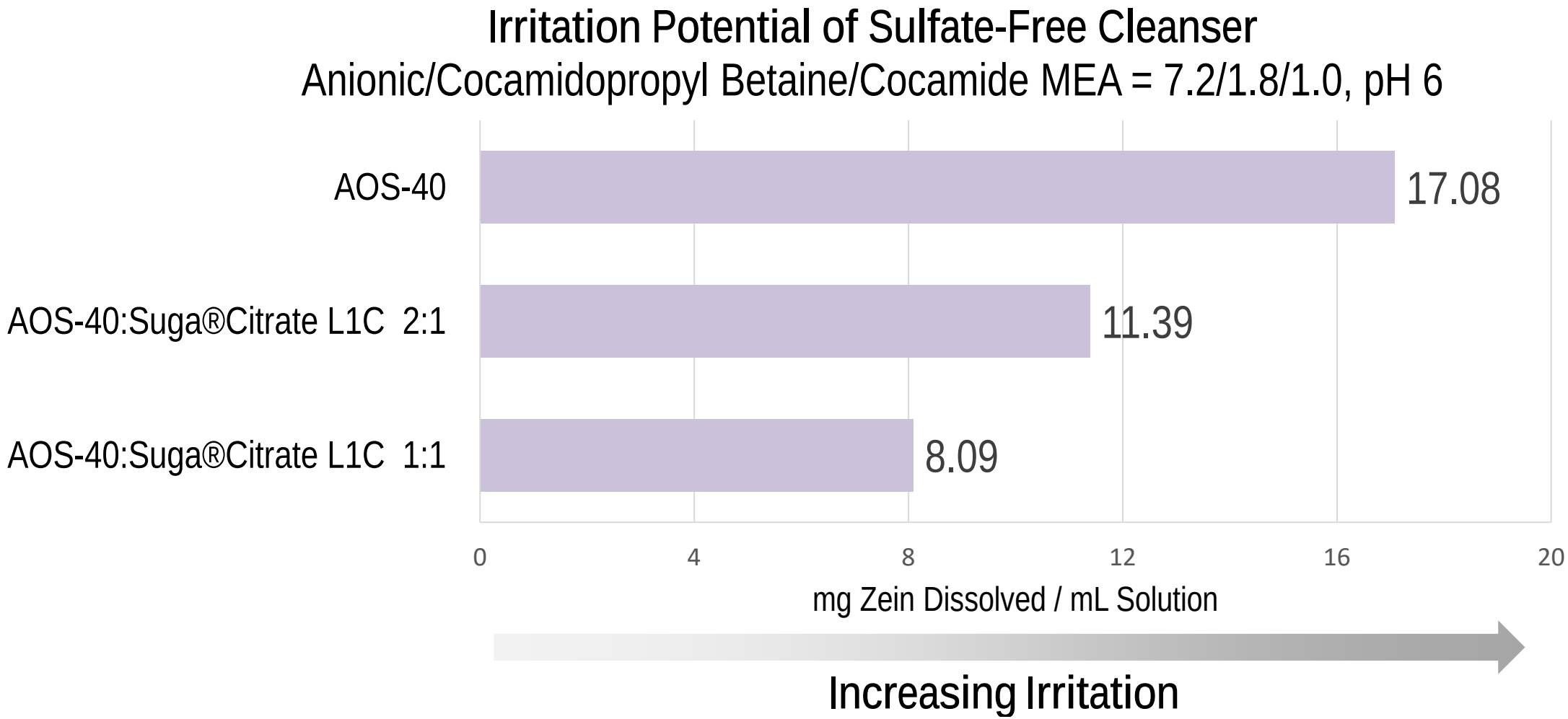





Suga®Citrate L1C

100% Biobased Anionic Surfactant for “Clean Beauty”	
INCI Name	Disodium Laurylglucosides Hydroxypropyl Citrate
Global Clearances	US TSCA Exempt, similar global exemptions
Physical Form	Clear Liquid, 40% solid matter
Key Features	**Completely bio-renewable** Biodegradable **Reduces irritation** of other primary surfactants **Improves viscosity** response of other primary surfactants No added preservatives Acceptable for all “clean beauty” guidelines
Suggested Applications	Facial cleansers Hand and body washes Shampoos Bar products
Certifications	ISO 16128 (1.0), USDA Certified 100% Biobased

Using Suga®Citrate to Reduce Product Irritation



Poly Suga®Quats

Quaternized Polymeric Alkylpolyglucosides






Poly Suga®Quats

High Biobased Multifunctional Polyquats	
INCI Name	Polyquaternium 77, 78, 80, 81
Global Clearances	Vary by product
Physical Form	Clear Liquid, 30% solid matter
Key Features	Made from **naturally derived**, renewable resources **PEG-free**, toxic monomer-free **Excellent conditioning** for hair, controls fly-away hair Excellent compatibility with anionics **Does not contain preservatives** when shipped **Lower irritation** when compared to many traditional quaternaries Excellent replacement for Cetrimonium Chloride and Stearalkonium Chloride
Suggested Applications	Cream conditioners and masks 2 in 1 shampoos Antiseptic hand washes
Certifications	ISO 16128 >0.95 (Vary by product)

Poly Suga®Quat S1210P Combability Testing

- We tested Poly SugaQuat S1210P in the following formulation:

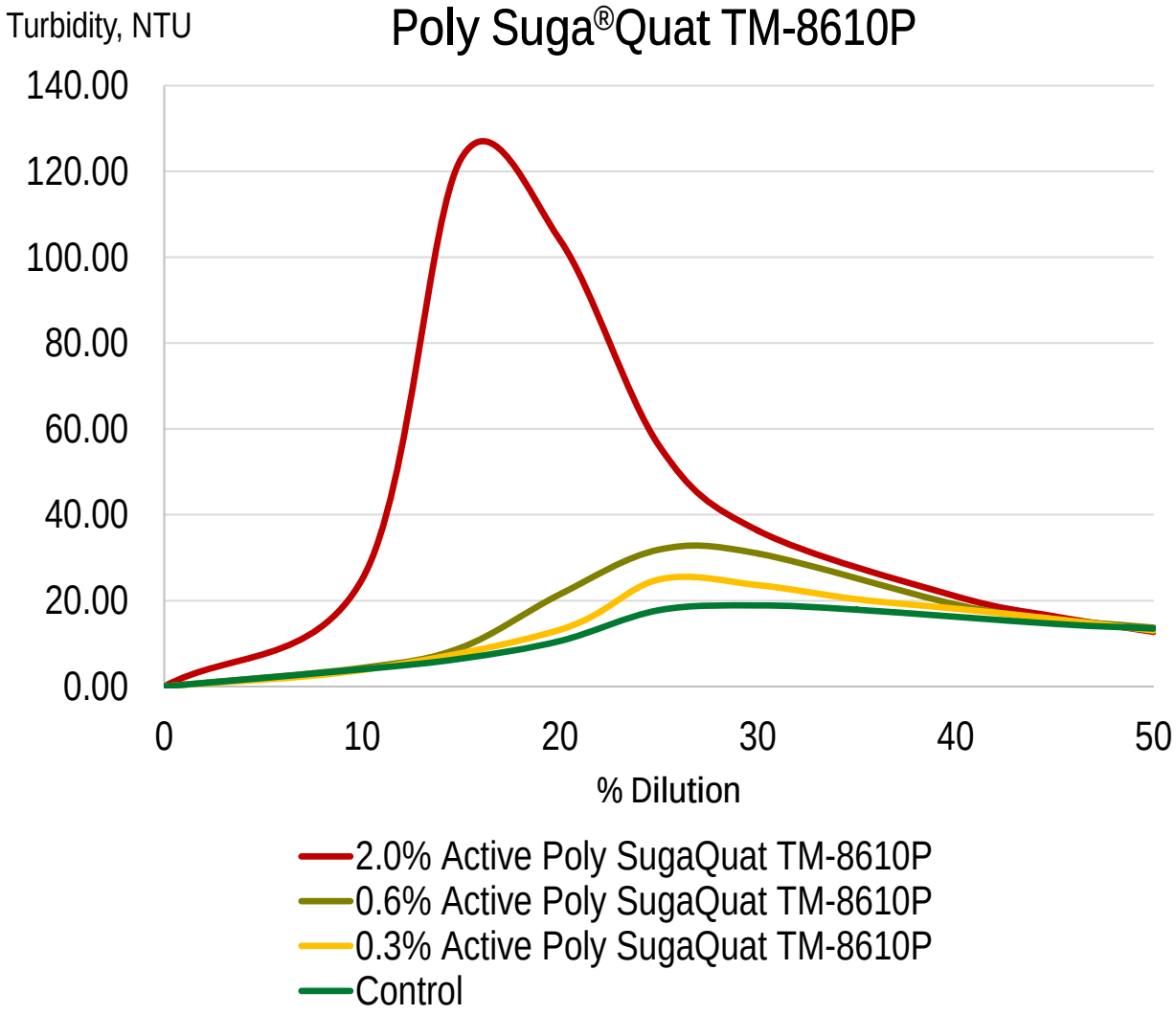
Ingredient	Amount
Poly SugaQuat S1210P	6.00
GMS SE/AS	2.50
Cetearyl Alcohol	5.00
Water, preservative	qs

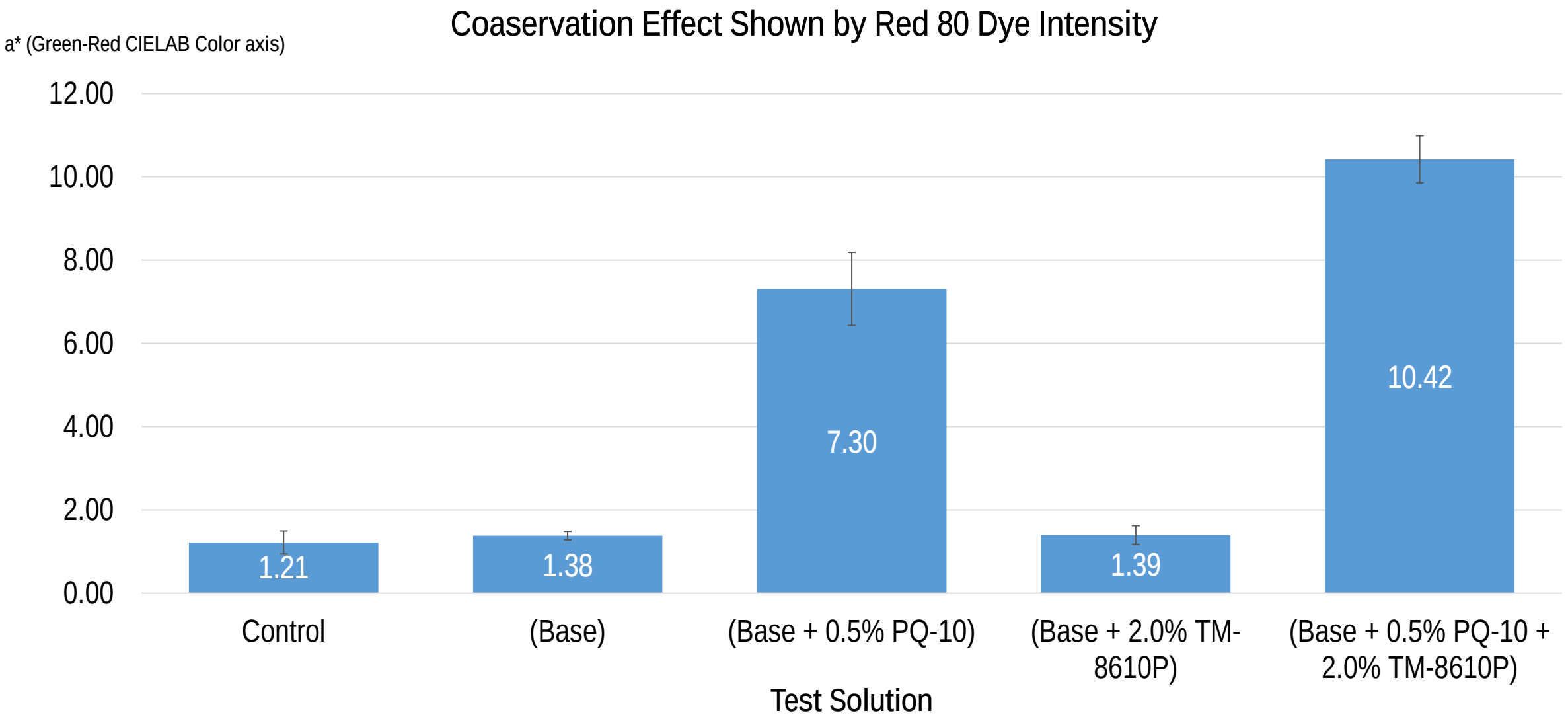
Formula MCM-1019-113A

- This formulation demonstrated excellent conditioning of lightly bleached brown hair, with a **96% reduction** in both peak and average wet combing forces with results comparable to Stearalkonium Chloride and Behenyl Quats.

Increased Coacervation

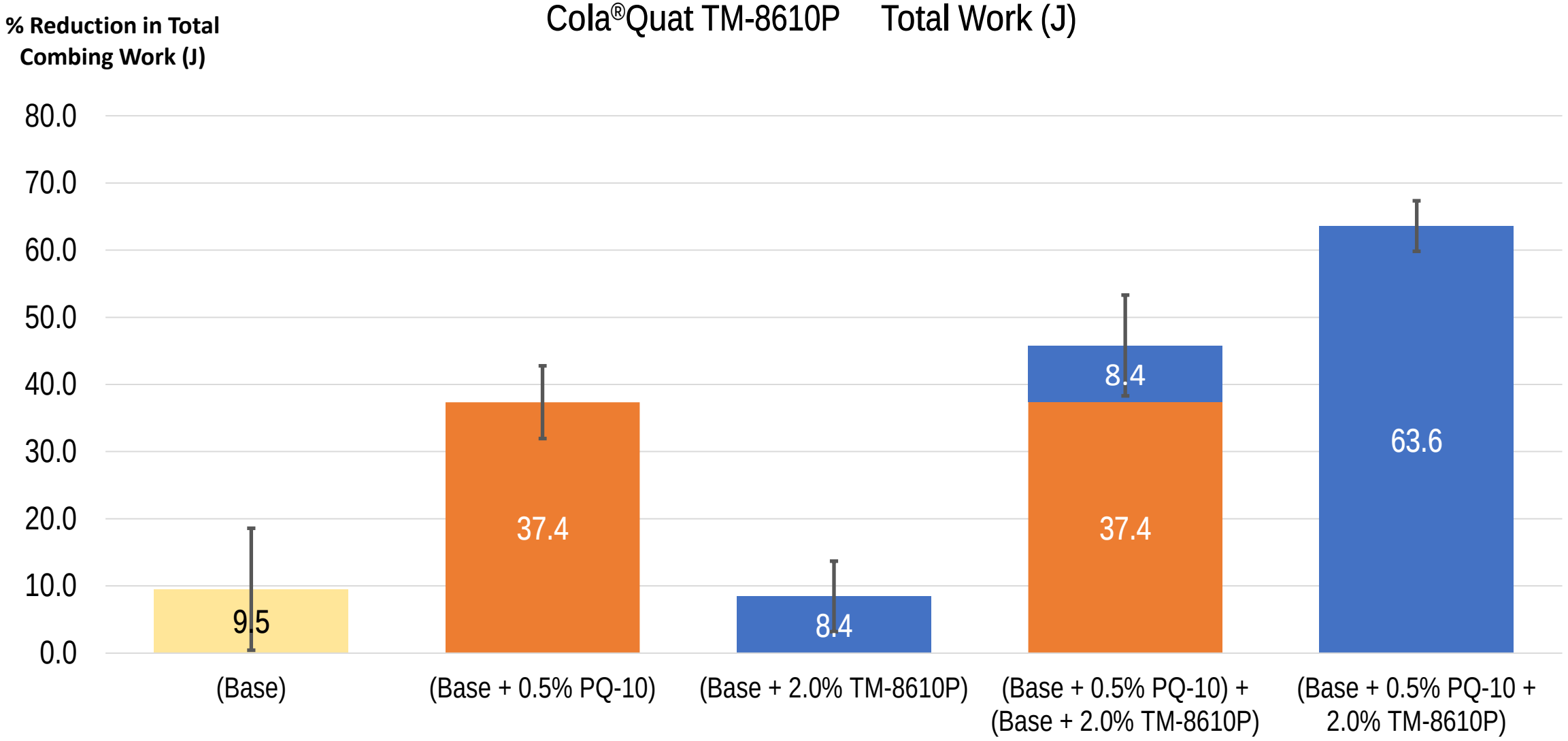
- Study Design
  - TM8610P was evaluated in an anionic-based surfactant system containing 0.5% polyquaternium-10, 15.5% sodium laureth-2 sulfate, 3.4% disodium cocoamphodiacetate.
  - Turbidity measurements were taken over a range of dilutions at ambient temperature.
- Results
  - The addition of TM8610P to systems with PQ-10 increases coacervation and broadens the range over which the complex forms, giving the potential for improved conditioning performance.




Coaservation Effect Shown by Red 80 Dye Intensity
a* (Green-Red CIELAB Color axis)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1.21
1.38
7.30
1.39
10.42
Control
(Base)
(Base + 0.5% PQ-10)
(Base + 2.0% TM-8610P)
(Base + 0.5% PQ-10 + 2.0% TM-8610P)
Test Solution

Coacervation Effect Seen by Dia-Stron Combing Force Reduction

Cola®Quat TM-8610P Total Work (J)



Poly SugaQuat Human Safety

Eye Irritation – HET-CAM scores

Product	Score	Summary
Poly SugaQuat TM8610P	14.5	Moderate ocular irritation potential
Poly SugaQuat L1010P	13.25	Moderate ocular irritation potential
Poly SugaQuat S1210P	12.50	Moderate ocular irritation potential

Skin Irritation – 48-Hour Patch Test, 50+ subjects

Product	Subjects Completing	Summary
Poly SugaQuat TM8610P	53	No potential for dermal irritation
Poly SugaQuat L1010P	53	No potential for dermal irritation
Poly SugaQuat S1210P	53	No potential for dermal irritation

Poly Suga®Mulse D9

100% Biobased PEG-Free Fragrance Solubilizer	
INCI Name	Sorbitan Oleate Decylglucoside Crosspolymer
Global Clearances	Global except China
Physical Form	Amber liquid, 70% solid matter
Key Features	Freely **water soluble** (HLB 12-14) **Low irritation** potential Used for oil-in-water (O/W) co-emulsification, **fragrance dispersion, solubilization** of essential oils **Compatible** with nonionic, cationic, and anionic surfactants **Effective** in systems with high loading of electrolyte, acid, and base Demonstrated to be an effective solubilizer of a variety of **essential oils** **Minimal impact** on foam and viscosity in formulation
Suggested Applications	All fragranced clear cleaning applications O/W water emulsions
Certifications	ISO 16128 (1.0), USDA Certified Biobased 100%, NSF ANSI 305:2012, EPA Cleangredients – Safe for Direct Release

Poly Suga®Mulse D6

100% Biobased PEG-Free Bulk Emulsifier	
INCI Name	Sorbitan Oleate Decylglucoside Crosspolymer
Global Clearances	Global except China
Physical Form	Amber liquid, 70% solid matter
Key Features	**Dispersible in water** (HLB 8-10) **Extremely low irritation** potential Bulk emulsifier used for oil-in-water (O/W) **co-emulsification** **Compatible** with nonionic, cationic, and anionic surfactants Assists in formulation of **innovative textures** **Readily Biodegradeable**
Suggested Applications	O/W emulsions Sunscreens
Certifications	ISO 16128 (1.0), USDA Certified Biobased 100%

Poly Suga®Mulse Human Safety

Eye irritation

- HET-CAM testing
  - 5% solids D6 solution – Score 2.25 (Non-irritating)
- MatTek EpiOcular
  - 5% solids D9 solution – Draize equivalent score 0 (Non-irritating)

Skin irritation

- 48 hour patch test
  - 3% solid D6 solution – No irritation detected
- HRIPT
  - 5% as supplied D9 solution – No sensitization detected

Suga®Det and Cola®Det Blends

High-biobased, clean beauty concentrates






Suga®Det Mild

Extraordinarily Mild Concentrate	
INCI Name	Sodium Laurylglucosides Hydroxypropylsulfonate (and) Sodium Methyl Cocoyl Taurate (and) Cocamidopropyl Hydroxysultaine (and) Sodium Bis-Hydroxyethylglycinate Coco-Glucosides Crosspolymer (and) Sodium Stearoyl Lactylate
Global Clearances	North America, can get coverage for EU REACH
Physical Form	Liquid, 35% solid matter
Key Features	**Easy to use** cold-process concentrate for extremely gentle cleansing Can provide **good viscosity** at 30-40% use level **High biobased** content Sulfate-free, PEG-free, Betaine-free **Non-irritant** at typical use
Suggested Applications	Baby shampoos Sensitive skin formulations Intimate care
Certifications	ISO 16128 (0.89)

Suga®Det EcoPearl

Clean Beauty Pearl Concentrate	
INCI Name	Glycol Distearate, Sodium Hydroxypropylphosphate Decylglucoside Crosspolymer, Cocamidopropyl Hydroxysultaine, Sodium Stearoyl Lactylate
Global Clearances	North America, can get coverage for EU REACH
Physical Form	White pearlescent liquid, 50% solid matter
Key Features	**Easy to use** cold-process pearl concentrate Can provide **brilliant pearls** at 3-5% use level **Good tolerance** to processing conditions **High biobased** content Sulfate-free, PEG-free, Betaine-free **Non-irritant** at typical use
Suggested Applications	All pearlescent cleansers
Certifications	ISO 16128 (0.92)

Cola®Det EQ-20

Clean Beauty AHA/BHA Compatible Concentrate	
INCI Name	Sodium Laurylglucosides Hydroxypropylsulfonate (and) Sodium Cocoamphoacetate (and) Cocamidopropyl Hydroxysultaine
Global Clearances	Global (except China)
Physical Form	Clear liquid, 40% solid matter
Key Features	**Easy to use** surfactant concentrate **Good tolerance** to low pH conditions **High biobased** content Sulfate-free, PEG-free, Betaine-free **Low irritation potential** at typical use Thickens with low pH and/or additional sultaine. Supports polymeric thickeners.
Suggested Applications	AHA, BHA cleansers Neutralizing shampoos Mild, high biobased pump foaming cleansers
Certifications	None

Suga®Boost

EO-Free Surfactants for Home Care and Industrial Degreasing

2021 EPA Green Chemistry Challenge Award Winner

GREEN CHEMISTRY CHALLENGE

EPA United States Environmental Protection Agency

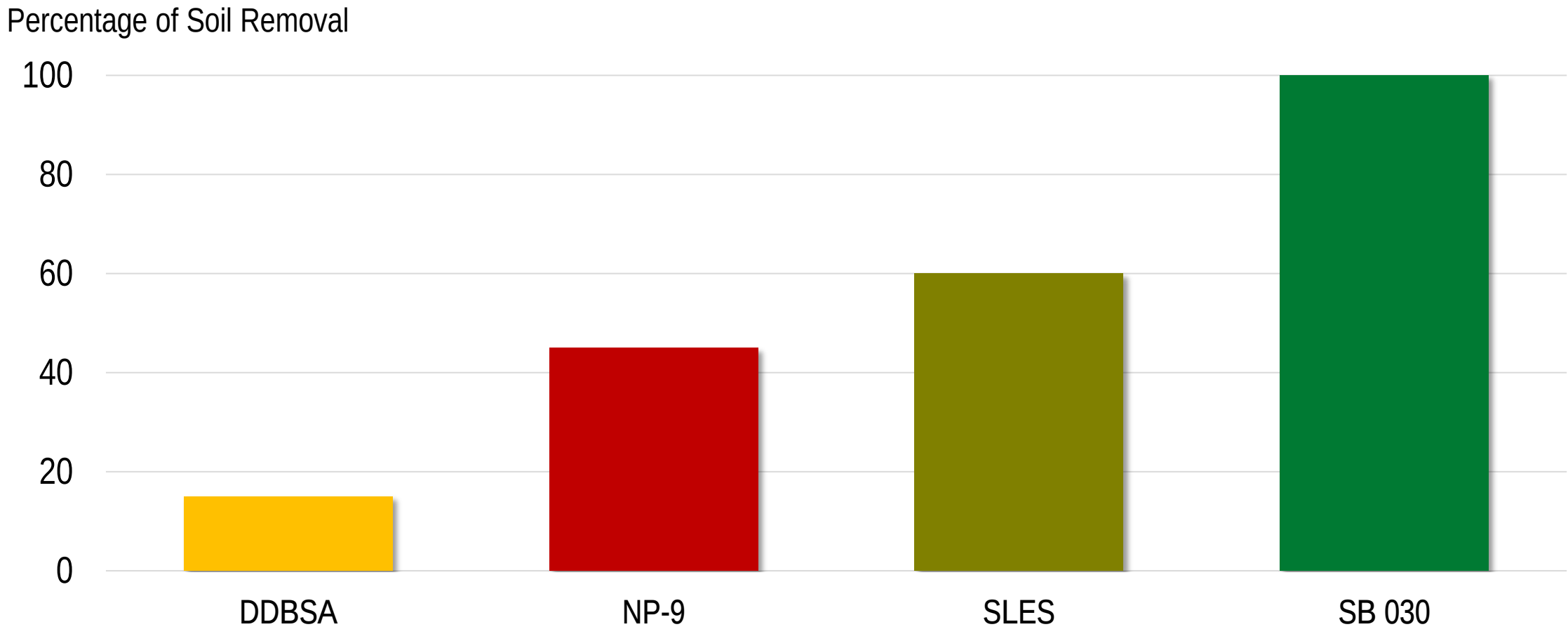





Suga®Boost 030

Description	
Common Name	Functionalized Alkyl Polyglucoside
Global Clearances	US (TSCA), Canada (NDSL), REACH (EU)
Physical Form	Clear liquid
Key Features	Hard surface cleaning and degreasing Outstanding soil lifting Aids in preventing re-deposition of soils Outperforms petrochemical, ethoxylated, and skin/eye irritant chemistries
Suggested Applications	Heavy duty food and industrial degreasing Food processing (dairy, bakery, meat packaging, etc.) Pot and pans, dish washing, smokehouse and grill cleaning Spot treatment for textiles, carpets, upholstery Bathroom and toilet bowl cleaning Vehicle and machinery degreasing
Certifications	USDA Certified 95% Biobased 2021 EPA Green Chemistry Challenge Winner

Suga®Boost 030 in Food Soil Cleaning



Test Method: Immersion Cleaning
Soil: Lard, egg powder, corn oil, red dye
Detergent: Water, 0.07% EDTA, 0.006% phosphoric acid, 0.03% IPA, 0.0625% surfactant

Demonstration of Suga®Boost 030 in Food Soil Cleaning

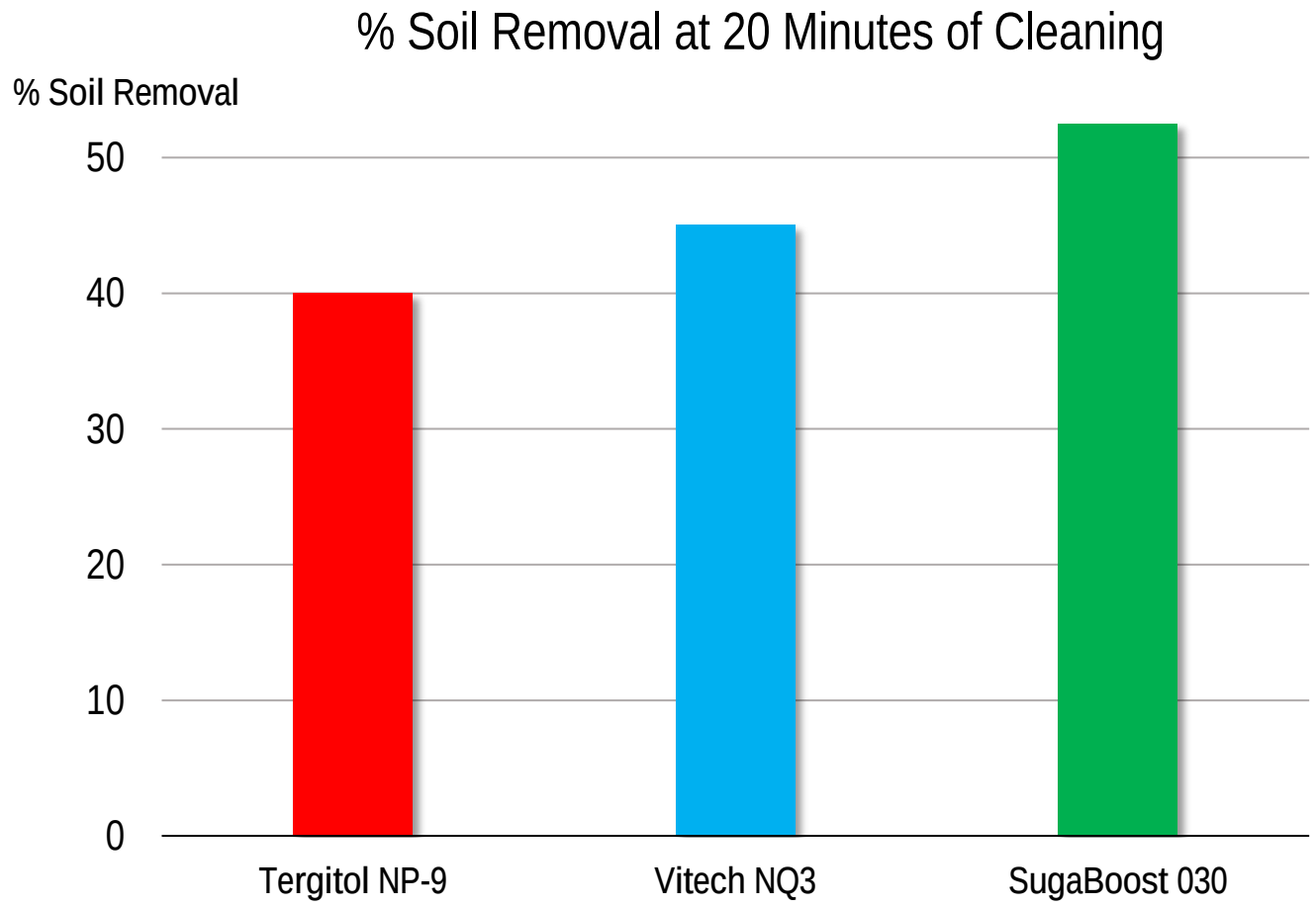
Test Method:	Immersion Cleaning
Soil:	Lard, egg powder, corn oil, red dye
Detergent:	Water, Surfactant, 0.07% EDTA, 0.006% phosphoric acid, 0.03% IPA
Surfactants:	*Suga®Boost 030* NP-9 APG

Suga®Boost 030 Industrial Degreasing

Test Conditions

- **Greasy Soil**: Engine oil / Lithium Grease
- **Testing method**: Immersion cleaning
- **Test temperature**: Room temperature
- **Cleaning Formula**

Detergent Formula	% WT
Water	q.s.
Sodium Metasilicate	3
Sodium Gluconate	2
EDTA, 40%	1
KOH, 45%	1
Active surfactant	5



Carpet Spot Treatment Test Formulation with *Suga®Boost 030*

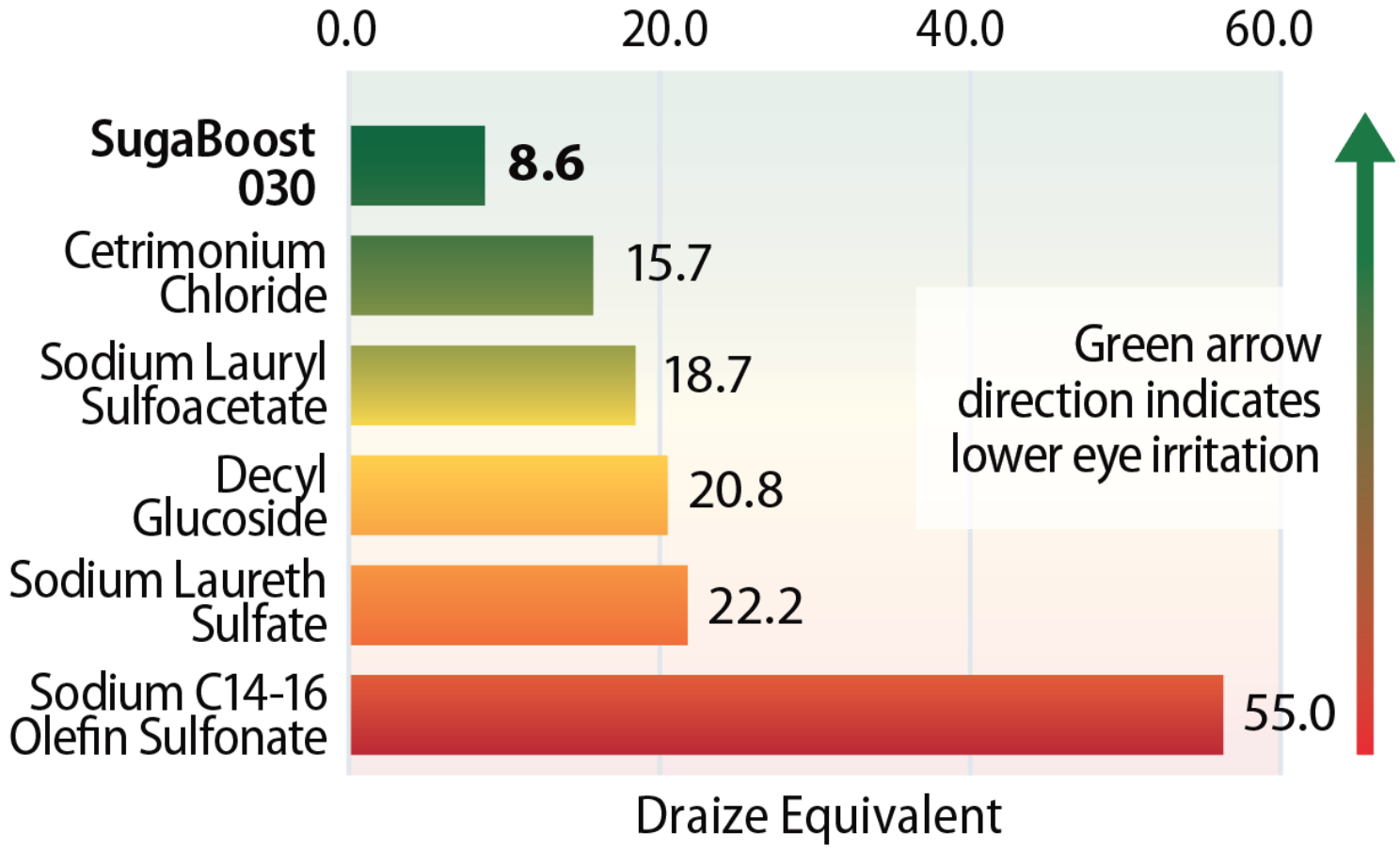
Carpet Spot Treatment

Compound	*%*
Water	92.8
Suga®Boost 030	4.0
Cola®Lux LO	0.2
Hydrogen Peroxide, 30%	3.0

Suga®Boost 030 Toxicological Properties

- OECD TG 405 Acute Eye Irritation/Corrosion (Draize)

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



Suga®Boost 030 Toxicological Properties

Acute Skin Irritation

- 48 Hour Occlusive skin patch test on human volunteers – 53 Test Subjects
  - 53/53 showed no visible skin reaction
  - No potential for dermal irritation

Skin Sensitization

- Repeat Insult Patch testing (HRIPT)
  - Suga®Boost 030 does not indicate a potential for dermal irritation or allergic contact sensitization

Biodegradation

- OECD 301: 89.3% biodegradable in 28 days, exceeding 60% biodegradability requirement.

Suga®Boost 030 in 1,4-Dioxane Free Formulations

*Heavy Duty Industrial Degreaser**

Compound	*Weight %*
Water	qs to 100.00
Sodium Gluconate	2.0
Sodium Metasilicate	3.0
Na_4EDTA, 40%	1.0
KOH, 45%	1.0
Suga®Boost 030	12.2

* Ready to use or dilute 1-3:1

Grill and Smokehouse Cleaner (#5029)*

Compound	*Weight %*
Water	qs to 100.00
Sodium Hydroxide	2.0
Sodium Gluconate	0.5
Cola®Teric AP	3.5
Suga®Boost 030	2.0

* Ready to use

Suga®Boost 030 in 1,4-Dioxane Free Toilet Bowl Cleaner Formulation

Order	*Chemical Name*	*Trade Name*	*%*
1	Water		qs to 100.00
2	Cetyl Hydroxyethylcelluse		1.0
3	Sodium Hydroxide, 50%		q.s.
4	Functionalized Alkyl Poly Glucosides	*Suga®Boost 030*	2.00
5	Citric Acid, 50%		3.00
6	Glycolic Acid		1.00

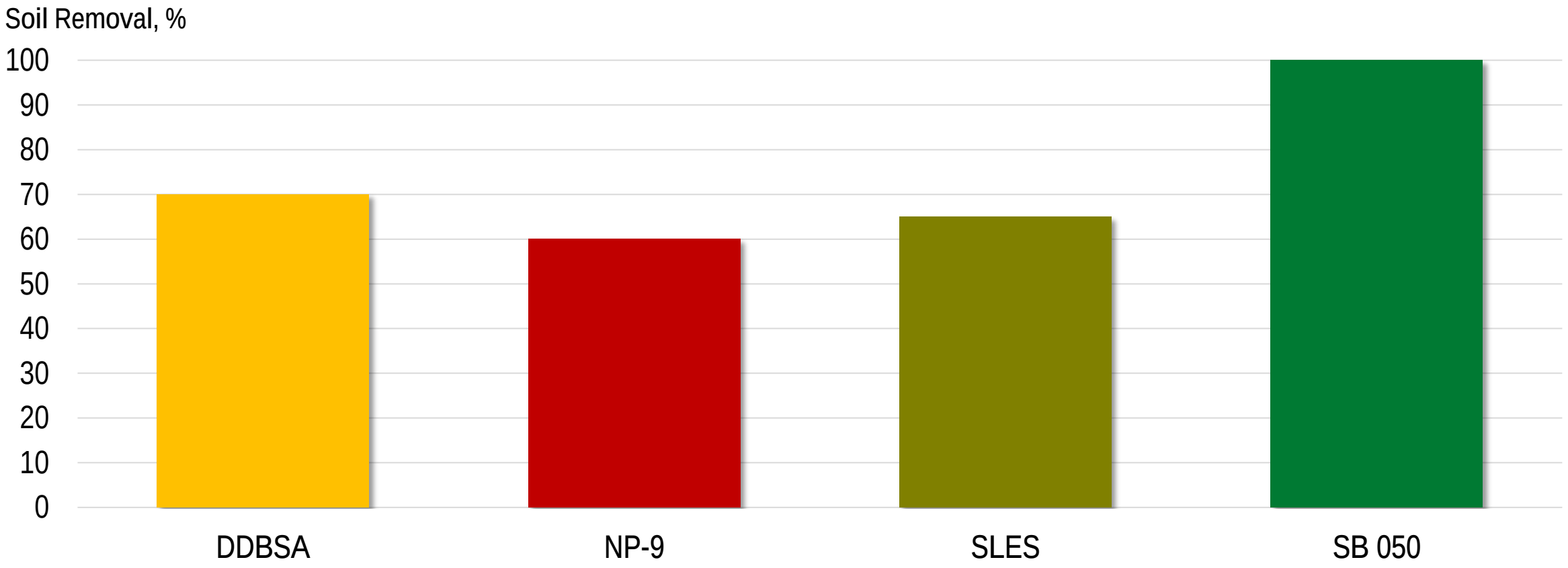
PROCEDURE

1. Add ingredients 1 and 2 and mix, add enough sodium hydroxide 50% to raise pH above 8.5
2. Mix 45 minutes to 1 hour to allow cetyl hydroxyethyl cellulose to hydrate.
3. Add remaining ingredients and mix until homogenous.

Suga®Boost 050 *EPA Direct Release*

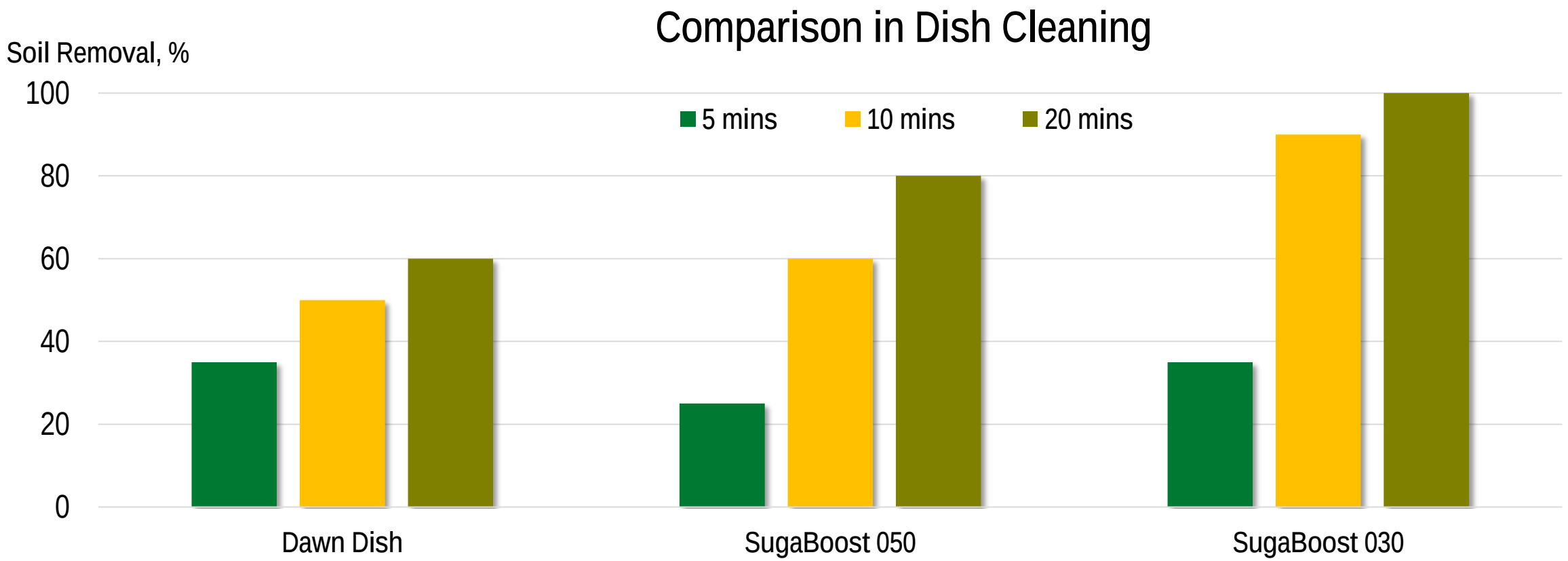
Description	
Common Name	Functionalized Alky Polyglucoside
Global Clearances	US (TSCA); EU (REACH); Canada (NDSL); Australia (AICS)
Physical Form	Clear liquid
Key Features	Extremely gentle with powerful cleansing performance Environmentally safe Outperforms petrochemical, ethoxylated, and skin/eye irritant chemistries
Suggested Applications	Exterior roof, siding, deck washes (home and commercial) Laundry, fine fabric care Transportation cleaning of boats, trucks, trains, etc Winery cleaning and sanitization Agriculture and horticulture, ornamentals Fire fighting
Certifications	USDA Biopreferred Certified 100% Biobased EPA Cleangredients Safe for Direct Release 2021 EPA Green Chemistry Challenge Winner

Suga®Boost 050 Hard Surface Cleaning on Food Soil



Test Method: Immersion Cleaning
Soil: Lard, egg powder, corn oil, red dye
Detergent: Water, 0.07% EDTA, 0.006% phosphoric acid, 0.03% IPA, 0.0625% surfactant

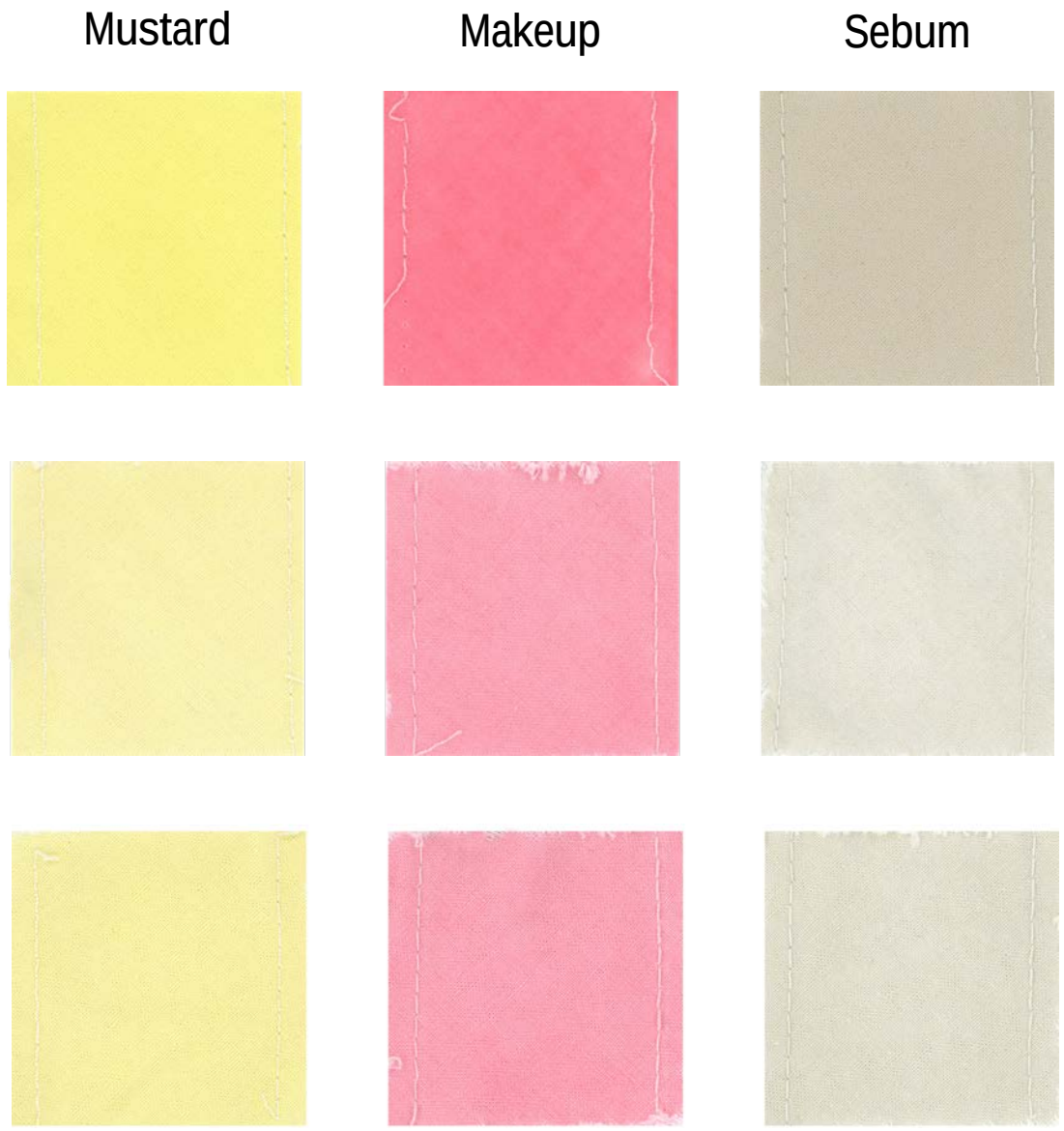
Suga®Boost vs. Dawn Dish Soap in Food Soil Cleaning



Test soil: lard, egg powder, vegetable oil, dye
Formula: 0.0375% isopropanol, 0.0075% phosphoric acid, 0.09% EDTA, 0.27% active SugaBoost
Reference: Dawn Dish at 1.5% by solid
Test method: Immersion Cleaning

Suga®Boost 050 Laundry Tests

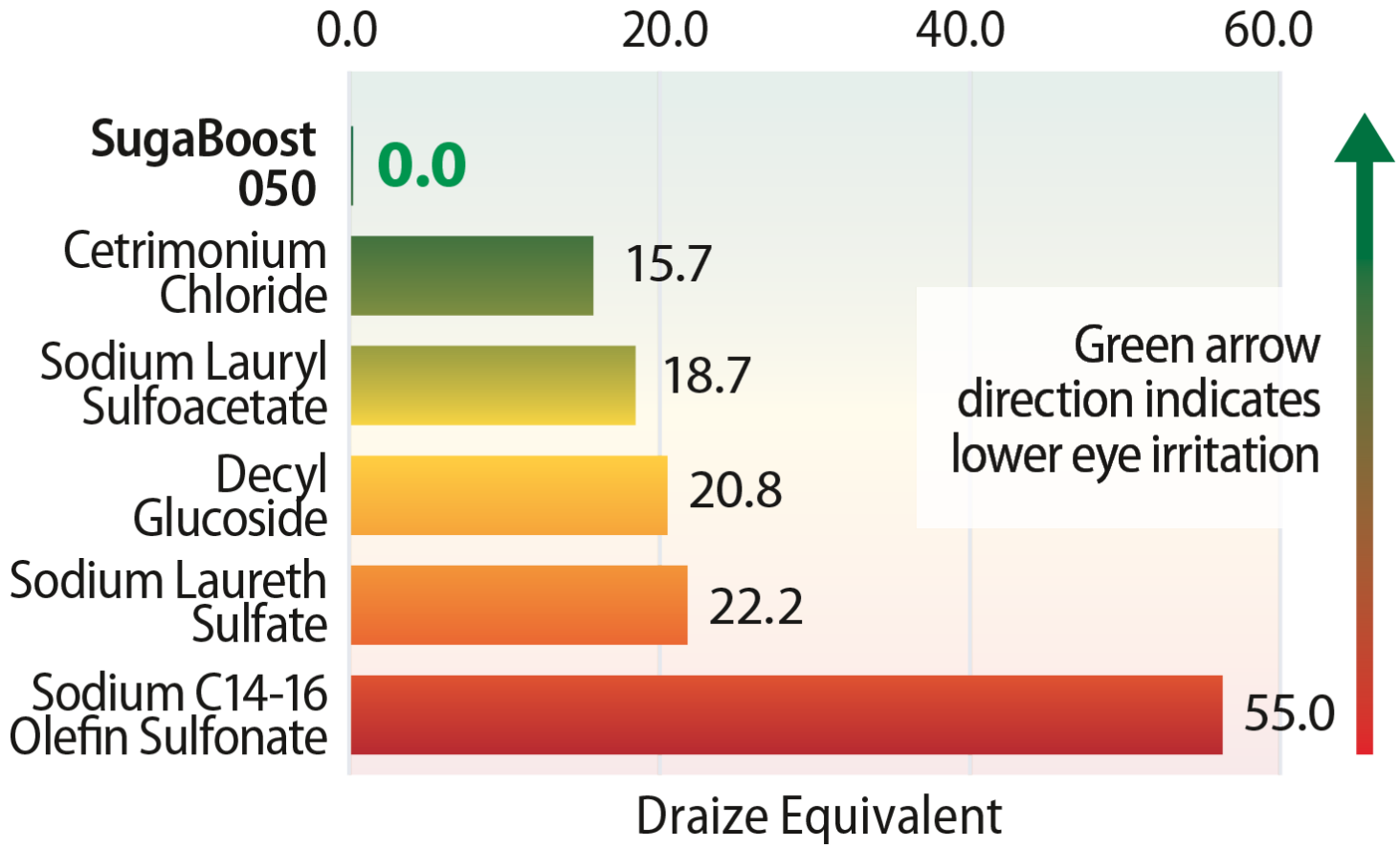
- Laundry tests using Suga®Boost 050 demonstrated comparable results in comparison to nonylphenol ethoylate.
- Pre-soiled fabrics used in test
- Test solution: 0.25% active surfactant in water



Suga®Boost 050 Toxicological Properties

- OECD TG 405 Acute Eye Irritation/Corrosion (Draize)

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



Suga®Boost 050 Toxicological Properties

Acute Skin Irritation

- 48 Hour Occlusive skin patch test on human volunteers
  - 53 Test Subjects
  - 53/53 showed no visible skin reaction
  - No potential for dermal irritation

Skin Sensitization

- Repeat Insult Patch testing (HRIPT)
  - Suga®Boost 050 does not indicate a potential for dermal irritation or allergic contact sensitization

Biodegradability

- Readily biodegradable per OECD 301.
- This product meets the criteria for a surfactant under the EU Detergents Regulation (EC) 648/2004.

Suga®Boost 050 in Eco-Friendly Hand & Dishwashing Liquid

Order	*Chemical Name*	*Trade Name*	*%*
1	Water	Water	qs to 100.00
2	Cetyl Hydroxyethyl Cellulose	Cetyl Hydroxyethyl Cellulose	1.5
3	NaOH, 50%	NaOH, 50%	qs
4	Functionalized Alkyl Polyglucoside	*Suga®Boost 050*	15.0
5	Citric Acid, 50%	Citric Acid, 50%	qs

PROCEDURE

Disperse cetyl hydroxyethyl cellulose in water
Add NaOH 50% to raise pH above 8.5 and mix until product fully hydrated
Add SugaBoost 050 and mix until homogenous
Add citric acid 50% to final pH range

TYPICAL PROPERTIES

Appearance	Slightly hazy liquid
pH	6.0 – 7.0
Viscosity	400 – 500 cP

Suga®Boost 050 in 1,4-Dioxane Free Formulations

Ultra Mild Laundry Detergent (4X Ultra Concentrate)

Compound	*Weight %*
Soft Water	20 – 40
Suga®Boost 050	60 – 80
Citric Acid	q.s.

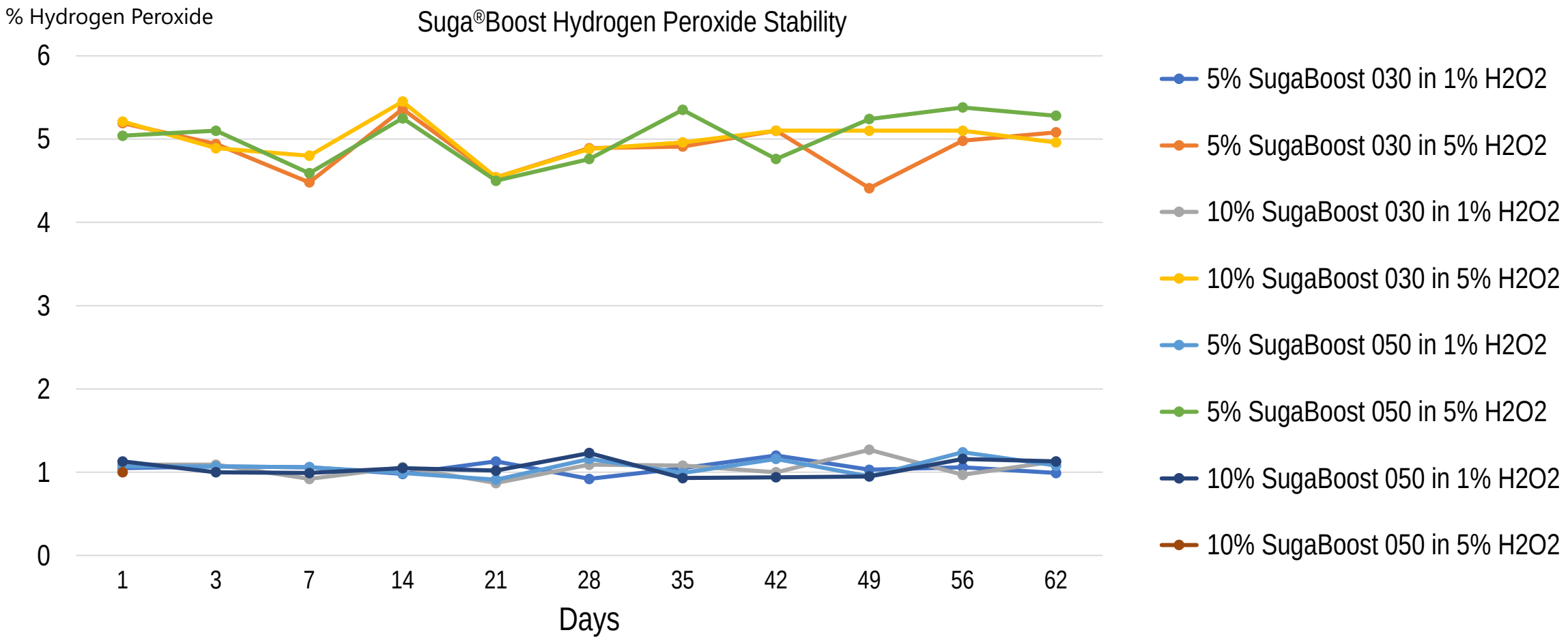
Usage Small to Medium Load ¾ oz, Large Load or Heavy Soiled 1oz

Green Transportation Cleaner (For boats, cars, trucks, etc.)

Compound	*Weight %*
Water	qs to 100.00
Sodium Citrate	5 - 10
Trilon M	3 - 5
Suga®Boost 050	30 - 40
Cola®Dry DAB	2 - 3
Preservative	q.s.

Dilution: 30-100:1 at use

Suga®Boost is Stable in Hydrogen Peroxide

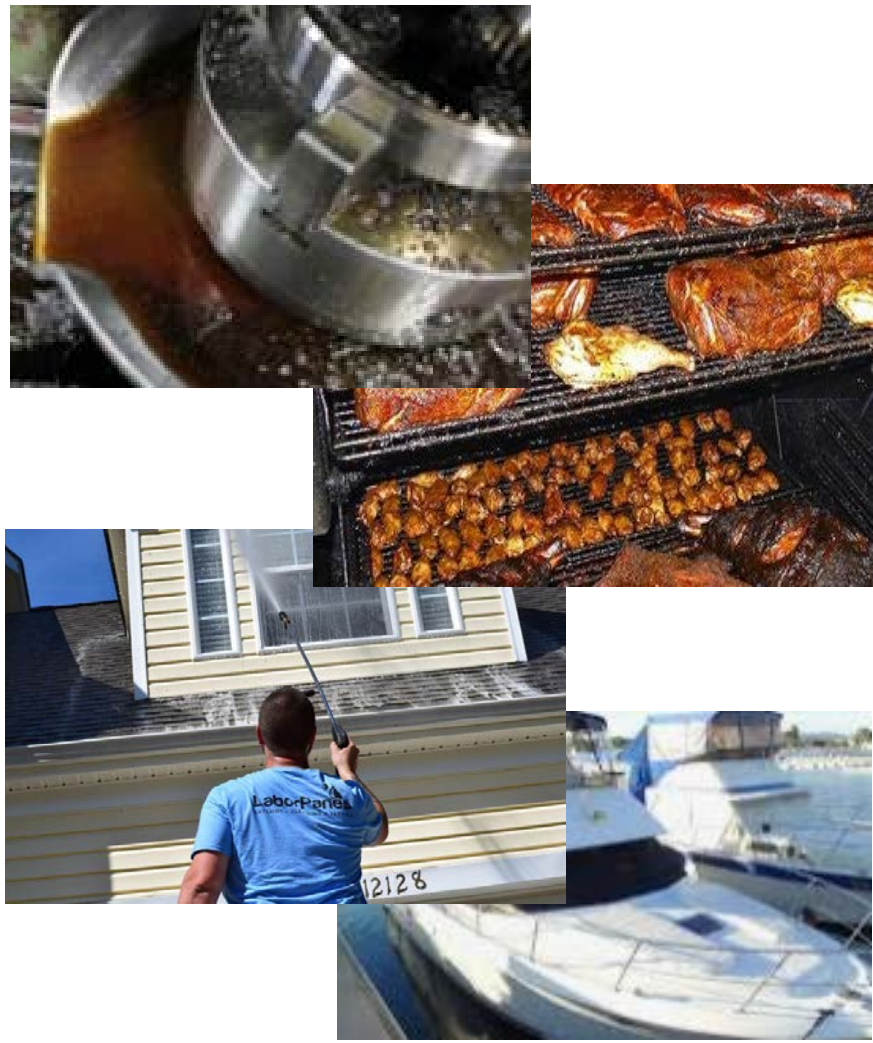


Award Winning Suga®Boost for Household & Industrial Cleaning

- Suga®Boost 050
  Great naturally-derived surfactant qualified for EPA Direct Release. Great for EO-free and sulfate-free laundry, hand soap, hand dish, exterior cleaning such as boat, train, airplane, roofs, decks, and exterior wall cleaning

- Suga®Boost 030
  |Great naturally-derived surfactant for EO-free and sulfate-free heavy-duty industrial degreasing, food processing, toilet bowl, grills and smokehouse, carpet stain removal, transportation cleaning, metal and parts, machinery and equipment

- More to come…



Thank you!

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Product TDS/SDS/Formulations: https://www.colonialchem.com
Formula Girls Podcast: https://apple.co/3dUq5fh