

SUGA[®]PHOS

Natural Gemini Surfactant For Personal Care

Patented

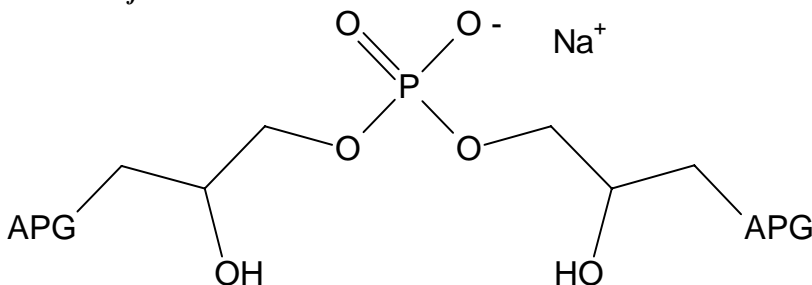
Colonial Chemical has pioneered a new series of products based upon alkyl polyglucoside. The Colonial Suga[®]Phos series of products represent the first new technology in the manufacture of Gemini surfactants in years. These new Suga[®]Phos based Gemini products offer formulating advantages over traditional mono-alkyl phosphate products.

The Suga[®]Phos materials are derived from alkyl polyglucosides which are renewable resources. These starting materials form biodegradable, mild surfactants that function in extreme conditions for personal care applications.

The Suga[®]Phos developmental product line has products that demonstrate a variety of the following properties.

- Choice between high foam or low foam
- Compatibility with other anionics
- Useful over a broad pH range
- Mild anionic materials

Gemini surfactant structure:



The structure of Suga[®]Phos is such that they are Gemini surfactants that are extremely mild and have a variety of cosmetic properties.

Suga[®]Phos is covered under patent #6,627,612

IRRITATION INFORMATION

The evaluation of Suga®Phos as an eye irritant was performed using the chorioallantoic membrane technique. The test was performed with Suga®Phos diluted to 2 % activity. This test utilizes the inner membrane of a hen's egg to gauge the irritation potential of a compound by visual observation of injurious changes in the membrane. Suga®Phos was rated to be as mild as a leading brand of baby shampoo. The product was rated as having a slight ocular irritation potential.

To evaluate the potential irritation to skin, a study was performed adhering to ICH Guideline E6 and 21 CFR parts 50 and 56. Fifty-Seven (57) volunteers, males and females, ranging in age from 16 to 76 were subjected to a "patch test". The "patch test" was performed with the Suga®Phos 8600 diluted to 0.4 % activity. A 1" X 1" absorbent pad was moistened with 0.2 ml of liquid and applied to the backs of the subjects between the scapulae. The patch sites were inspected at 48 hours for gross changes. It was observed that there was a complete absence of skin change. The test sites were evaluated again at 72 hours. Once again the observation was negative skin changes. Under the conditions of this test, Colonial Suga®Phos did not indicate a potential for dermal irritation.

CTFA/INCI NAMES**CAS NUMBERS**

Colonial Suga®Phos 4000	
Sodium Dibutylglucosides Hydroxypropyl Phosphate.....	630106-08-0
Colonial Suga®Phos 1000	
Sodium Didecylglucosides Hydroxypropyl Phosphate.....	630106-05-7
Colonial Suga®Phos 1200	
Sodium Dilaurylglucosides Hydroxypropyl Phosphate.....	630106-06-8
Colonial Suga®Phos 8600	
Sodium Dicocoglucosides Hydroxypropyl Phosphate.....	630106-07-9

PERSONAL APPLICATIONS

Hair relaxer
 Depilatories
 Strong, AHA products
 Oil in water emulsifiers
 Sunscreens
 Low pH Shampoos

FOAMING PROPERTIES

Like many anionics, the Suga®Phos products have foaming properties that contribute to the base formulation in shampoos, body washes and all types of foaming skin care products. Unlike typical anionics, Suga®Phos products are extremely mild to skin and eyes.

The graphs on the following page indicate the key foaming attributes of the Suga®Phos when compared to traditional workhorse surfactants like sodium lauryl and sodium lauryl ether sulfate.

Graph One: “ Initial Foam Height” is a test comparing the foam of four of the Suga®Phos products versus sodium lauryl sulfate and various sodium lauryl ether sulfates. This high-speed blender test shows the initial foam with 0.5% active surfactant in water. We also compared Suga®Phos to the standard APG product.

Conclusion: Suga®Phos 1000 proved to be a good foamer and nearly as good as SLES-3. While good foam was achieved, the Suga®Phos is much milder than lauryl sulfates.

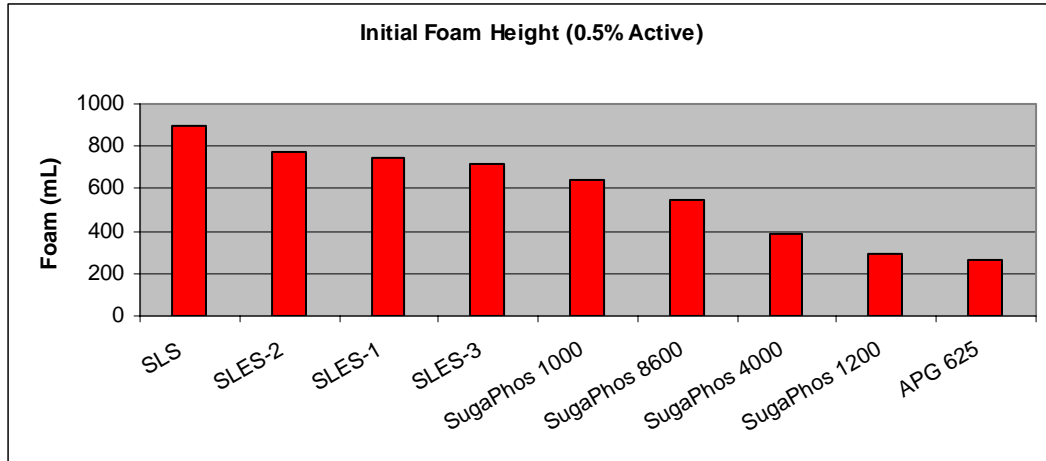
Graph Two:“ Foam Drainage Test” measures the rate at which the water drains from the foam indicating the strength of the foam and its ability to retain moisture over a 2-minute period.

Conclusion: Suga®Phos proved to be nearly equal to the sodium lauryl ether sulfates in water retention.

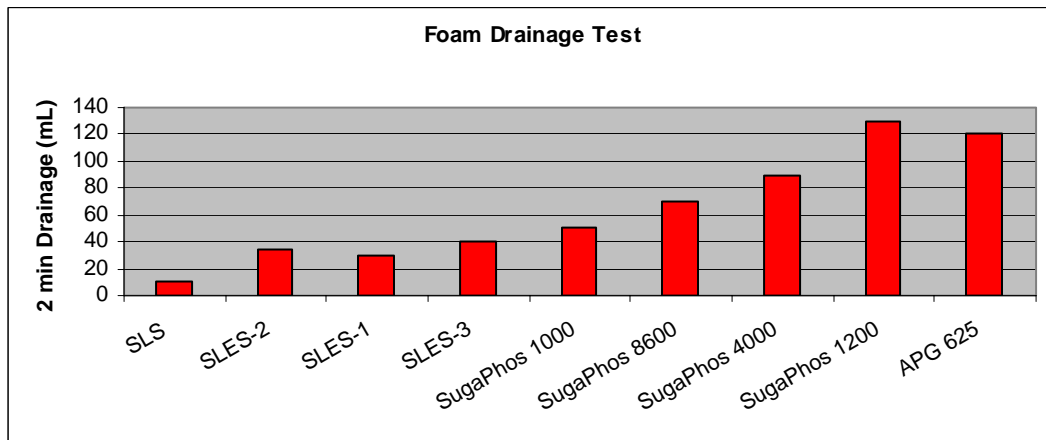
Graph Three: “ Foam Density Test measures the physical strength of the foam by recording the length of time it takes for a stopper to fall through the foam in a graduated cylinder.

Conclusion: Suga®Phos 1000 showed superior performance over the traditional SLES-3 and made a thick, dense foam.

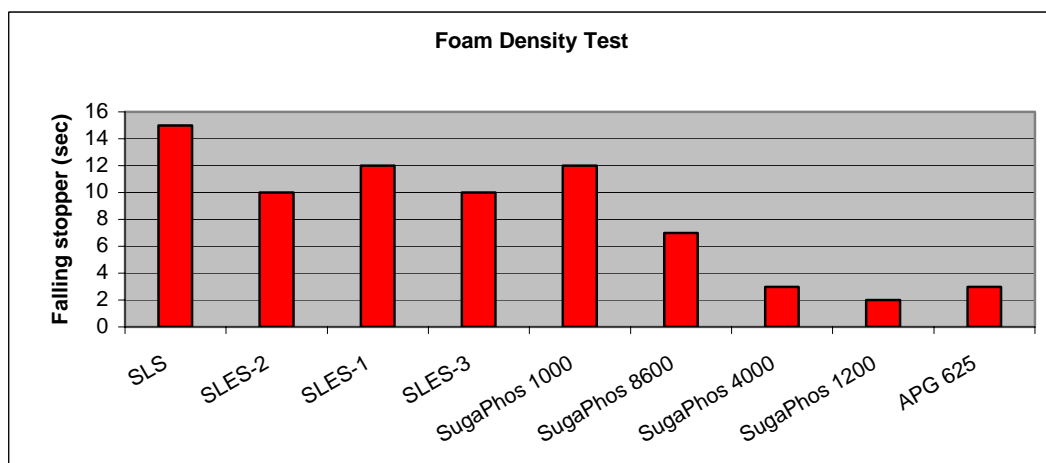
Suga®Phos products are viable for personal care cleansing formulations because of the contribution of foam, mildness, cleansing and low odor.



Higher number score is desirable.

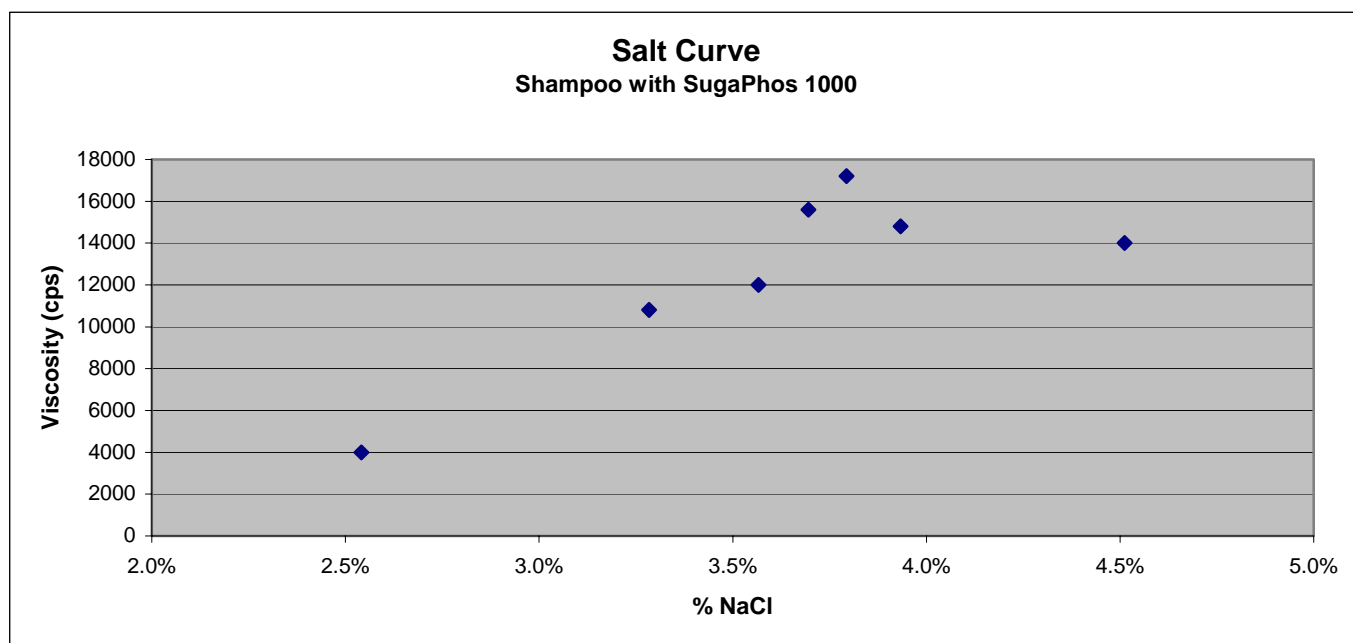


Low number is desirable.



Higher number is desirable.

Property	4000	1000	1200	8600
Lot #	RJC-01-097	RJC-01-099	RJC-01-101	RJC-01-111
Color, Gardner	4	< 1	1 +	1
Activity, %	40.2	40.2	40.1	40.7
Viscosity (as is) 25°C	11	19.5	905	20
Odor	mild, sweet	mild, fatty alcohol	mild, fatty alcohol	mild, fatty alcohol
pH (10% aq)	6.93	7.77	7.87	6.62
appearance, 10% aq.	Clear	Clear	Cloudy	Clear
Foam Height (1% active)				
Immed.	58	250 +	66	250 +
30 sec.	50	250 +	66	250 +
60 sec.	50	250 +	66	250 +
120 sec.	50	250 +	64	250 +
Draves Wetting (1 % active)	> 200 sec	Immed.	13.9 sec	2.6 sec
Solubility (10% active)				
50% NaOH	Soluble	Soluble	Soluble (gel)	Soluble
25% NaOH			Soluble (gel)	
25% H2SO4	Soluble	Soluble	Cloudy	Soluble



Extra Mild Shampoo With SUGA[®] PHOS 1000

<u>No.</u>	<u>Phase</u>	<u>Ingredient</u>	<u>% By Weight</u>
1	A	Deionized Water	45.59
2	A	NA2EDTA	0.10
3	B	Cola [®] Teric COAB	2.50
4	C	Colonial SLES-2	41.33
5	D	Suga [®] Phos 1000	5.00
6	E	Cola [®] Mid CMA	2.00
7	F	Cola [®] Mulse FE	0.75
8	F	Belle Aire Plumeria #18957	0.15
9	G	Kathon CG	0.05
10	H	NACL	<u>2.53</u>
		TOTAL	100.00

MANUFACTURING INSTRUCTIONS:

Heat Phase A to 75C. Add Phases B, C, D and E. Cool to 35C and add remaining Phases.

LAB CONTROL:

Run salt curve and determine cloud point and foam at peak.

PH: 7.32

Viscosity: 17,200 CPS (at peak)

TB@ 5 RPM

Suga[®]Phos/Cola[®] Moist Lotion

COL L 102004A

<u>COMPOUND</u>	<u>Wt. %</u>
Water	50.15
Natrosol 250 HHR Hydroxyethylcellulose	0.50
Suga [®] Phos 8600	20.00
Isopropyl Palmitate	15.00
Canola Oil	10.00
Cola [®] Moist	3.00
Fragrance 1412712 AFF Intl	0.25
Germaben II	1.00
Na ₂ EDTA	<u>0.10</u>
	100.00

pH 5.5
viscosity 3,500

Last Modified 07/18/2006

WARRANTY

Colonial Chemical guarantees that its products meet published specifications. No other warranties or guarantees are expressed or implied because the use of this material is beyond the control of Colonial Chemical.