



CRODASINIC™ Series DS-71R-6 August 11, 2009

CRODASINIC™ Series

INCI Names:

CRODASINIC L	Lauroyl Sarcosine
CRODASINIC C	Cocoyl Sarcosine
CRODASINIC M	Myristoyl Sarcosine
CRODASINIC O	Oleoyl Sarcosine
CRODASINIC SM	Myristoyl/Stearoyl Sarcosine
CRODASINIC LS-30/LS-95	Sodium Lauroyl Sarcosinate
CRODASINIC CS-30	Sodium Cocoyl Sarcosinate
CRODASINIC MS-30	Sodium Myristoyl Sarcosinate

The **CRODASINIC** surfactants are mild anionic surfactants that can be used in a wide range of personal care applications. They are available in the acid form, such as **CRODASINIC L** (Lauroyl Sarcosine), or as the sodium salt, such as **CRODASINIC LS-30** (Sodium Lauroyl Sarcosinate, 30% solution). The neutralized **CRODASINIC** salts are convenient, easy to use, and highly water-soluble materials and do not salt out of solution in high electrolyte environments. The **CRODASINIC** acids are used in more specialized applications where they can be neutralized *in situ* and are soluble in most organic solvents, glycols, glycerin, silicones and hydrocarbons.

Applications	Functional benefits of the CRODASINIC salts
Shampoos	Foaming
Mild facial cleansers	Mild detergency
Body washes and foam baths	Wetting
Baby products	Synergy with other detergents
Liquid soaps	Compatible with various cationics
Antibacterial hand washes	Substantive to skin and hair
Shaving preparations	Salt tolerant
Liquid Makeup	Biodegradable

As sodium lauroyl analogs, **CRODASINIC LS-30** and **CRODASINIC LS-95** are the most commonly used of the sarcosinates. These mild anionic surfactants have unique surface activity, compatibility and substantivity and act as wetting, foaming and conditioning agents, all in one. They are less alkaline than the fatty acid soaps and provide optimum performance under slightly acidic conditions. As such, **CRODASINIC LS-30** is helpful in formulating facial washes, skin cleansers, conditioning shampoos and other mildly cationic surfactant systems. **CRODASINIC LS-95** is a higher active version and is recommended for soap bars and anhydrous products.

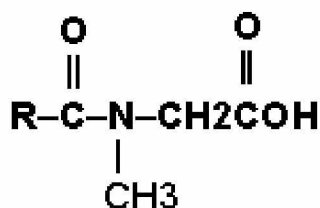
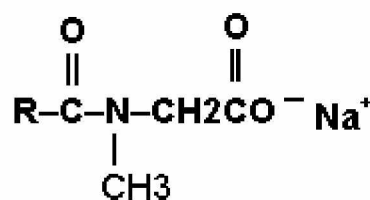
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CRODASINIC™ Series

Sarcosinates are one of the few classes of anionic surfactants that are compatible with quaternary compounds. Because they can adsorb onto proteinaceous and cellulosic surfaces, they are also highly substantive. As conditioning surfactants, sarcosinates offer a desirable mix of functionality: compatibility with cationics, high substantivity, excellent foaming properties, and good wetting ability. Taken collectively, these characteristics form a composite of functional benefits that give sarcosinates their unique identity as anionic conditioning surfactants.

The **CRODASINIC** surfactants conform to the structures shown below. **CRODASINIC** acids (sarcosines) are N-acyl fatty acid derivatives of the amino acid sarcosine (N-methyl glycine). The **CRODASINIC** salts (sarcosinates) are sodium salts of N-acyl sarcosine.

**CRODASINIC Acid****CRODASINIC Salt**

R represents the alkyl radical derived from the fatty acid.

Foaming

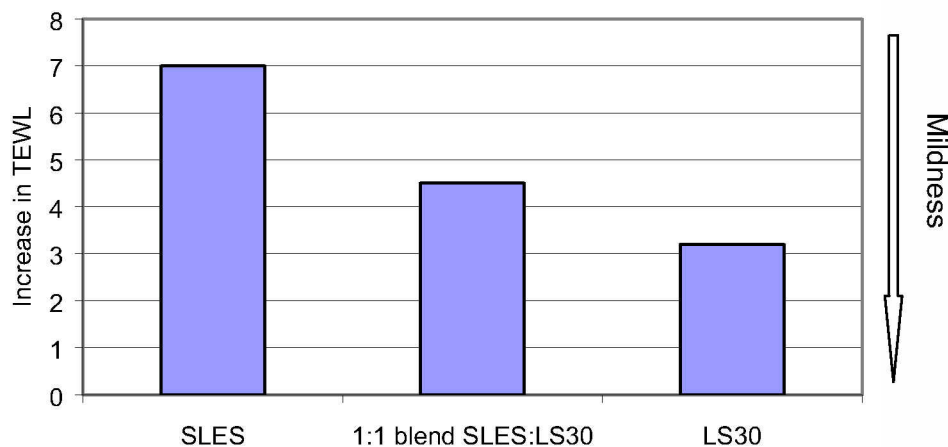
As anionics, the **CRODASINIC** salts provide high foaming and exhibit good foam stability, behaving synergistically with other surfactants like dodecyl benzene sulfonate or sodium lauryl sulfate. It is recommended that they be used in systems having a pH between 5.0 and 6.0, as foam stability may become somewhat compromised above pH 7.0. Should this occur, the addition of a lime soap dispersant, such as an alkanolamide or a polyglycol ether/ester, can improve the foam. Sarcosinates are known for their ability to create a substantial reduction in surface tension, behavior that is conducive to high surface wetting.

Substantivity

The substantivity of the **CRODASINIC** surfactants makes them useful surfactants in a wide variety of detergent cleansing systems. Studies have shown that acyl sarcosinates are able to adsorb onto human hair and other proteinaceous materials. Increased adsorption has been observed at lower pH levels, higher concentrations and on damaged hair. The adsorbed layer of sarcosinate may be responsible for the perceptible skin conditioning effect imparted when they are included in rinse-off detergent formulations. At mildly acidic to neutral pH, **CRODASINIC** salts may contain small amounts of free acyl sarcosine, which is clearly solubilized in the detergent system. The free sarcosine is substantive and is adsorbed onto the hair to form a thin film which lubricates the cuticle, enhancing wet and dry combability. The presence of an amide group in the sarcosine structure promotes static reduction.

CRODASINIC™ Series**Mildness**

The **CRODASINIC** surfactants are substantially milder than sodium laureth sulfate (SLES) and sodium lauryl sulfate (SLS), even acting as a counter-irritant to SLES. Transepidermal water loss (TEWL) studies were conducted to determine the effect of **CRODASINIC LS-30** on skin barrier function, as compared to SLES and a 50:50 blend of the two. The results show that **CRODASINIC LS-30** is substantially milder than SLES and contributes an irritation mitigation effect when included with SLES as a 50:50 blend.



*Mildness and irritation mitigation effects of **CRODASINIC LS-30***

FUNCTIONS/APPLICATIONS IN PERSONAL CARE**Shampoos**

The benefits of **CRODASINIC** salts in shampoos are numerous, as they provide mildness, detergency, foaming and light conditioning when used at neutral or acid pH (*use at pH 5.5 for color shampoos*). Adding our patented high-performance thickener CROTHIX™ (*PEG-150 Pentaerythryl Tetrastearate*) or CROTHIX LIQUID to the surfactant solution works particularly well to increase viscosity in these systems.

Substantivity/Conditioning: Because of their substantivity and affinity for the hair surface, the **CRODASINIC** surfactants are also effective in reducing the static charge, to better control flyaway and give hair more manageability. Once adsorbed onto hair, **CRODASINIC** salts provide lubricity, an effect that gives hair a softer and silkier feel.

Cleansing Agents: For blends of **CRODASINIC LS-30**/Dodecyl benzene sulfonate, the recommended ratio for maximum foaming in distilled water is 90:10, sarcosinate:sulfonate; in hard water, the ratio is 50:50. When using **CRODASINIC LS-30** with SLS, the recommended ratio is between 25:75 and 75:25, sarcosinate:SLS. (*Ratios for **CRODASINIC LS-95** can be obtained by calculating according to weight of the active.*)

CRODASINIC™ Series**Facial Washes, Skin Cleansers and Toilet Soaps**

CRODASINIC salts are useful in the formulation of facial washes, skin cleansers and synthetic soap bars. Given their mildness, substantivity to skin and cationic compatibility, **CRODASINIC** salts are able to enhance the effectiveness of these preparations, as well as increase their conditioning properties. The compatibility of **CRODASINIC LS-30** and **LS-95** with cationic germicides precludes any loss in their biocidal activity, allowing them to be used in the formulation of antiseptic soap formulations.

Liquid Make-up

Emulsifiers/Emulsion Stabilizers: **CRODASINIC LS-30** and **LS-95** are excellent choices for liquid make-up formulations in that anionic surfactants are considered the emulsifier of choice to help stabilize the emulsion in these systems. However, because these products are applied to the facial area, it is essential that mild ingredients be used. Given its mildness, sodium lauroyl sarcosinate would be preferred over conventional anionic surfactants. It should, however, be used at low levels to prevent the occurrence of any foaming.

Shaving Preparations

CRODASINIC salts are highly recommended for aerosol products, where they act as both conditioners and corrosion inhibitors. The addition of **CRODASINIC LS-95** at 3% is sufficient to inhibit corrosion of a 10% solution of sodium lauryl sulfate.

Corrosion Inhibitors: The unusual ability of sarcosines and their salts to inhibit corrosion is due to their tendency to adsorb strongly onto metallic surfaces, particularly ferrous (Fe⁺) metals. Their inhibitory activity is retained, even if other surfactants or wetting agents are present in high concentration or if these materials are corrosive themselves. The inhibitory effects of **CRODASINIC LS-30** and **LS-95** can help prevent both the container and the razor from becoming corroded.

OTHER APPLICATIONS

Sarcosinates possess a set of unique properties that give them many uses in pharmaceuticals and the institutional/industrial/household industries, as well as in personal care. (*Please refer to the data sheet HI 151 R1, CRODASINIC Sarcosines and Sarcosinates for Household, Institutional and Industrial Applications.*) Interestingly, sarcosinates have the ability to inhibit the growth of certain enzymes and bacteria, as well as that of corrosion. Coupled with their inherent nature as conditioning surfactants, this allows them to perform valuable ancillary functions in other areas.

Dental Care:

Sarcosinates possess characteristics considered important in the manufacture of dental care preparations, the effects of which enable them to perform other functions besides their use as foaming agents. Their efficacy as enzyme inhibitors, bacteriostats and foaming agents has led to the existence of several patents on the

CRODASINIC™ Series

use of sodium lauroyl sarcosinate in toothpaste. Using the surfactant at 1-3% has proven to be an effective level.

Foaming Agents: Sodium lauroyl sarcosinate produces good foaming in toothpaste. Due to its foaming ability, cleansing action and mild taste, it has been used as the sole surfactant in dentifrice products.

Enzyme Inhibitors: Sodium lauroyl sarcosinate has been used in toothpaste and mouthwashes for years due to its anti-enzyme effect.¹ References in the literature have established that sodium lauroyl sarcosinate is capable of inhibiting the growth of certain enzymes, particularly hexokinase, an enzyme involved with the breakdown of sugars to acids. (*Salivary or pancreatic amylase and pancreatic lipase are others.*)

The ability of sarcosinates to adsorb onto dental plaque² (*a proteinaceous surface*) is another factor contributing to their use in toothpaste. Sodium lauroyl sarcosinate has been known to produce synergism when used with dodecyl sulfate, the effects of which have been successful in the prevention of plaque formation.³

Bacteriostats: Sodium lauroyl sarcosinate has shown it can inhibit the bacterial flora of human saliva, even at a concentration as low as 0.25%⁴, behavior that allows it to function as a bacteriostat when used under acidic conditions. In addition, it has been established that sodium lauroyl sarcosinate is compatible with many cationic germicides⁵, enabling it to be used with these compounds without compromising their efficacy.

Pharmaceuticals:

CRODASINIC LS-30 and **LS-95** can be used as wetting agents or as penetrating aids in nasal/throat sprays, mouthwashes, douches and suppositories. Since they are compatible with cationics, **CRODASINIC LS-30** and **LS-95** will not interfere with the biocidal activity of the cationic germicides added to many of these preparations.

Solubility Characteristics/Biodegradability

CRODASINIC LS-30 and **LS-95** are stable to alkaline hydrolysis and are stable under moderately acidic conditions at normal temperatures. At pH 5.0-6.0, they produce solutions that are completely clear. Below this pH, solutions may appear cloudy. These ingredients should not, however, be used in strongly acidic media. Because **CRODASINIC LS-30** and **LS-95** are derived from natural fatty acids, they are biodegradable and quickly degrade upon normal disposal.

References:

- 1 *Wilkinson, J.B. & Moore, R.J. (ed), Harry's Cosmeticology, 7th Edition, Longman Scientific & Technical, 1982.*
- 2 *Nelson, N.F. & Stewart, D., "The Adsorption of N-Acyl Sarcosines on Various Protein Materials", Journal of the Society of Cosmetic Chemists, 7, 1956 pp. 122-131.*
- 3 *CA 1126160, Warner-Lambert Canada Inc., Pure Alkali Metal Salts of Lauryl (Dodecyl) Sulfate in Oral Composition.*
- 4 *Rieger, M.M. (ed), "Surfactants in Cosmetics", Surfactant Science Series, Vol. 16, Marcel Dekker Inc.*
- 5 *Karsa, D.R., Industrial Applications of Surfactants III, RSC, 1992.*

CRODASINIC™ Series**Milky Baby Bath****BP-45-1**

This bubble bath is a mild, pearly formula that uses **CRODASINIC™ LS-30** to enhance foaming. **HYDROLACTIN™ 2500** acts as a conditioning agent and gives the formulation a natural appeal.

Ingredients

	<u>%</u>
Deionized Water	49.00
Sodium Laureth Sulfate	30.00
INCROMINE™ OXIDE C (Cocamidopropyl Amine Oxide)	7.00
CRODASINIC LS-30 (Sodium Lauroyl Sarcosinate)	6.00
GLYCEROX™ HE (PEG-7 Glyceryl Cocoate)	4.00
Glycol Stearate	1.50
Sodium Chloride	1.00
INCROMIDE™ CDEA (Cocamide DEA)	0.50
CROTHIX™ (PEG-150 Pentaerythrityl Tetrastearate)	0.50
HYDROLACTIN 2500 (Hydrolyzed Milk Protein)	0.50

PROCEDURE

Combine ingredients with mixing and heat to 75-80°C. Cool to desired fill temperature.

5/16/94

CRODASINIC™ Series

Low Cost Clear Cleansing Bar**SC-252-1**

This cleansing bar offers the appeal of economy, yet has the foam quality and mildness of a more luxurious skin care bar. **CRODASINIC™ LS-30** is a mild sarcosinate and has excellent foaming properties. GLYCEROX™ PK-70 is used as a wetting agent and also contributes to the mildness of the formula. INCROMECTANT™ AMEA 70 provides humectancy.

Ingredients**%****PART A**

Deionized Water	12.00
Propylene Glycol	10.00
INCROMECTANT AMEA 70 (Acetamide MEA)	9.00
Triethanolamine Lauryl Sulfate ¹	8.50
INCROMIDE™ CDEAS (Cocamide DEA Cocoyl Sarcosine)	6.50
Glycerin	6.50
CRODASINIC LS-30 (Sodium Lauroyl Sarcosinate)	6.00
GLYCEROX™ PK-70 (PEG-45 Palm Kernel Glycerides)	2.50
Sodium Cumene Sulfonate (45%)	2.00
Triethanolamine (99%)	2.00

PART B

Sucrose	8.00
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PART C

Tallow Soap #7325 ²	27.00
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PROCEDURE

Combine ingredients of Part A with mixing and heat to 80-90°C. Add Part B, mixing until uniform. Add Part C with mixing, keeping temperature at 95-100°C until tallow is dissolved (20-30 minutes). Cover mixing vessel to prevent water loss. Skim off surface foam and pour into molds. Allow molded soap to cool completely.

1) Standapol T (Henkel)

2) Armour-Dial

October 20, 1994

CRODASINIC™ Series

Cationic Dye Shampoo**SC-111**

This cationic dye shampoo can be used to get a quick color change or add highlights to your own hair. Either way, it's a fast, easy way to get a new look and leaves no damage behind. The formula gently cleanses the hair using a mix of mild Croda surfactants: **CRODASINIC™ LS-30**, **INCRONAM™ 30**, and **INCROMINE™ OXIDE C**. **CROSILKQUAT™** is a quaternized amino acid and imparts moisturization. **CROMOLLIENT™ SCE** adds to the hair's afterfeel. Thickening is provided by **CROTHIX™ LIQUID**.

Ingredients	Burgundy	Red	Gold
	%		
PART A			
Deionized Water	23.900	23.900	23.900
Disodium EDTA	0.200	0.200	0.200
CRODASINIC LS-30 (Sodium Lauroyl Sarcosinate)	25.000	25.000	25.000
INCRONAM 30 (Cocamidopropyl Betaine)	14.000	14.000	14.000
INCROMINE OXIDE C (Cocamidopropylamine Oxide)	5.000	5.000	5.000
CROSILKQUAT (Cocodimonium Hydroxypropyl Silk Amino Acids)	2.000	2.000	2.000
CROMOLLIENT SCE (Di-PPG-2 Myreth-10 Adipate)	0.500	0.500	0.500
CROTHIX LIQUID (PEG-150 Pentaerythrityl Tetrastearate (and) PEG-6 Caprylic/Capric Glycerides)	3.000	3.000	3.000
Citric Acid (30%)	1.200	1.200	1.200
Propylene Glycol (and) Diazolidinyl Urea (and) Propylparaben (and) Methylparaben ¹	1.000	1.000	1.000
PART B			
Deionized Water	23.750	23.713	23.750
GLYCEROX™ PK-70 (PEG-45 Palm Kernel Glycerides)	1.000	1.000	1.000
Basic Red 76 (Jarocol Madder Red) ²	0.200	0.200	—
Basic Blue 99 (Jarocol Steel Blue) ²	0.003	—	—
Basic Brown 16 (Jarocol Mahogany) ²	0.050	0.012	0.050
Bordeaux ³	0.075	—	—
Basic Yellow 57 (Jarocol Straw Yellow) ²	—	—	0.200
Viscosity, cps (RVT Spindle #3 @ 10 rpm @ RT)	1,300	1,440	1,510
pH:	5.80	5.83	5.86

PROCEDURE

Combine first two ingredients of Part A and heat to 65°C. Mix until EDTA has dissolved; then add remaining ingredients, mixing until solids have dissolved. Pre-mix Part B ingredients according to shade desired and heat to 65°C. Add Part B to Part A with mixing. Continue mixing until batch has reached room temperature.

- 1) Germaben II (ISP)
- 2) Keystone
- 3) Tri-K

CRODASINIC™ Series

Suncare Shampoo**SH-112**

This shampoo formula uses a diverse mix of Croda ingredients—mild surfactants that provide gentle cleansing, functional extracts that leave hair feeling naturally healthy, and conditioning agents that give hair body and shine. CROVOL™ MARACUJÁ is an ethoxylated derivative of an oil native to the Brazilian rain forest and acts as a solubilizer. As a quaternized UV absorber, CRODASORB™ UV-HPP protects hair from the sun.

Ingredients**%****PART A**

Deionized Water	63.10
CRODASINIC™ LS-30 (Sodium Lauroyl Sarcosinate)	10.00
Sodium Laureth Sulfate	10.00
INCROMINE™ OXIDE C (Cocamidopropylamine Oxide)	5.00
GLYCEROX™ HE (PEG-7 Glyceryl Cocoate)	3.00
CROTHIX™ (PEG-150 Pentaerythrityl Tetrastearate)	3.00
INCROMATE™ SDL (Stearamidopropyl Dimethylamine Lactate)	1.00
CRODASORB UV-HPP (Polyquaternium-59 (and) Butylene Glycol)	1.00
CRODASONE™ W (Hydrolyzed Wheat Protein PG-Propyl Silanetriol)	1.00

PART B

CROVOL MARACUJÁ (PEG-60 Maracuja Glycerides)	1.00
CROMOLLIENT™ SCE (Di-PPG-2 Myreth-10 Adipate)	0.50

PART C

PHYTESSENCE™ OLIVE (Butylene Glycol (and) Water (and) Olea Europaea Fruit Extract)	0.50
CRODAROM® CHARDONNAY (Propylene Glycol (and) Water (and) Vitis Vinifera Seed Extract)	0.50
Phenoxyethanol (and) Methylparaben (and) Ethylparaben (and) Butylparaben (and) Propylparaben (and) Isobutylparaben)	0.40

PROCEDURE

Combine Part A ingredients with mixing and heat to 75-80°C. Remove heat. Combine Part B ingredients and add to Part A once mixture has cooled to 60°C. At 40°C add Part C ingredients with mixing. Continue mixing until cool.

November 6, 2003

CRODA

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WATERBURY CT 06720
USA

Selling Specification

Date: 12/02/2009
Page: 1 of 2
Your Fax: 203-759-1942

Material Name: CRODASINIC O
Material Code: SN01019/0190/P04
Chemical Name: Oleoyl Sarcosine
Specification: REVIEWED 22-AUG-2008

Analy. Test Method No.	Characteristic	Specification Limits		Units
		Lower	Upper	
G00400	ACTIVITY OF SARCOSINES	93.0	110.0	%
G00604	FFA IN N-OLEOYL SARCOSINE	0.0	7.0	%
G01113	ACID VALUE (IN IPS/WATER)	154.00	163.00	mg KOH/g
G01700	COLOUR (GARDNER)	0.00	7.00	Gardner
G01701	COLOUR (DR LANGE)	0.10	15.00	
G02102	IODINE VALUE SCALE WATER CONTENT (COULOMETRIC)	0.000	1.000	%
G02400	SULPHATED ASH	0.000	0.500	%
G07800	INFRARED SPECTRUM	TO MATCH	STANDARD	
G30001	APPEARANCE (CLARITY)	CLEAR		
G30001	APPEARANCE (FORM)	LIQUID		
G30001	APPEARANCE (COLOUR)	YELLOW		

Period of validity of Certificate of Analysis for material stored in unopened containers and stored in cool dry conditions: 1,080 days.

If you agree to accept this specification please complete the following section and return to us at the address above.