Mild cleansing by surfactants based on naturally-occurring amino acids

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Amino acid based Surfactants

Lubricants
- corrosion inhibition under hydrophobic cond.
- corrosion inhibition under hydrophilic conditions

Metal Working Fluids
- interaction with metal ions (chromium)

Industrial

Leather
- interaction with metal ions (chromium)

Personal Care
- enzyme inhibition, neutral taste
  - BDIH, ECOCERT

Oral Care

Skin Care /Hair Care
- foam boosting, fine foam texture, mildness, conditioning, BDIH, ECOCERT

Household/Home Care
- ECOCert (anaerobic degradation), wetting, foaming, withstands alkaline conditions

Carpet Shampoos
- non-tacky residues after drying

Aerosol applications
- corrosion inhibition, wetting

Hard Surface Cleaners
- ECO-Label (anaerobic degradation), wetting, foaming, withstands alkaline conditions

Glass Cleaners
- non-smear, wetting

Bleaching Aids
- withstands high pH, not oxidized by hypochlorides
  - thickening effects

Pet Care
- mildness, foaming wash off

Amino acid based Surfactants

Schill Seilacher
Amino Acid Based Surfactants

PERLASTAN Glutamate Surfactants

Sodium/Disodium Cocoyl Glutamate | PERLASTAN SCG 50 HC
Sodium/Disodium Lauroyl Glutamate | PERLASTAN SLG 38

PERLASTAN Sarcosinate Surfactants

Sodium Lauroyl Sarcosinate | Perlastan L-30
Sodium Cocoyl Sarcosinate | Perlastan C-30
Sodium Myristoyl Sarcosinate | Perlastan M-30
Oleoyl Sarcosine | Perlastan OCV
Origin and Availability of N-Acyl Glutamate Surfactants

Sodium N-Acyl Glutamate

R = lauroyl, cocoyl, myristoyl, oleoyl or stearoyl
Non-proteinogenic amino acids - sarcosine

- Identified: By Justus Liebig (in 1847)

- Natural occurance: Body tissues like muscles
  As intermediate in metabolism of choline to glycine

- Production: Chemical process

- Demand: Raw material for creatine production (approx. 1500 tons/year)
  Surfactant production (approx. 6000 tons/year)
**Proteinogenic amino acids - L-glutamic acid**

- **Identified:** By Karl Heinrich Leopold Ritthausen (in 1866)
- **Natural occurrence:** Proteins (cheese, milk, meat, peas and mushrooms)
- **Production:** Fermentation process via corynebacterium glutamicum (1956)
  - Raw materials (sugar beets, sugar cane and it's molasses; 1kg Glucose leads to 500g Glutamic Acid)
- **Demand:** Flavour enhancer E 620 (approx. 1.7 mio. tons/year)
  - Surfactant production (approx. 3000 tons/year)
Mildness
Cytotoxicity of N-acylamido acids and other anionic surfactants

Benefits of N-Acyl Sarcosinate and Glutamate Surfactants

Sodium N-Acyl Glutamate
Sodium N-Acyl Sarcosinate
Sodium Salt of Fatty Acid
Sodium Lauryl Ether Sulfate
Sodium Alkyl Sulfate


Cytotoxicity of N-acylamido acids and other anionic surfactants
Benefits of N-Acyl Sarcosinate and Glutamate Surfactants

Reduction of moisture loss of skin

SLG: Sodium Lauroyl Glutamate like PERLASTAN® SLG 38
SLS: Sodium Lauryl Sulfate

TEWL (g/m²/h)

C.H. Lee, Y. Kawasaki, H. I. Maibach, Contact Dermatitis, 1994, 30, 205-209
Benefits of N-Acyl Sarcosinate and Glutamate Surfactants

Reduction of SLES-adsorption to skin by addition of SCG

N =10, 10% SLES

55% Reduction

SCG-concentration in the formulation

0% 0.63% 1.25% 1.75% 2.5%

SLES-Adsorption [µg/cm²]

0 2 4 6 8 10 12 14

Benefits of N-Acyl Sarcosinate and Glutamate Surfactants

Keeps pH of Skin
Buffer Capacity at pH = 5.5 of Skin

- Sodium Lauryl Sulfate
- Sodium Laureth-3 Sulfate
- Cocoamidopropyl Betaine
- Sodium Cocoyl Sarcosinate (Perlastan C-30)
- Sodium Lauroyl Sarcosinate (Perlastan L-30)
- Sodium Cocooyl Glutamate (Perlastan SC)
- Sodium Lauroyl Glutamate (Perlastan SL)
Foam Behavior
Benefits of N-Acyl Sarcosinate and Glutamate Surfactants

Foam behaviour (Ross-Miles test, 0.5% solution at 25°C)

- Sodium Cocoyl Glutamate (PERLASTAN SCG 50 HC) ++
- Sodium Lauroyl Sarcosinate (PERLASTAN L 30) ++
- Cocamidopropyl Betaine +
- Sodium Lauryl Sulfate +
- Sodium Laureth-3 Sulfate -
- Sodium Oleate --
Benefits of N-Acyl Sarcosinate and Glutamate Surfactants

Drainage Liquid Amount of Foam (0.3% active, 50g in cylinder)
Benefits of N-Acyl Sarcosinate and Glutamate Surfactants

Drainage Liquid Amount of Foam (0.3% active, 50g in cylinder)

- Cocamidopropyl betaine
- Sodium Laureth-3 Sulfate
- Sodium Lauryl Sulfate
- Sodium Lauroyl Sarcosinate
- Sodium Cocoyle Glutamate
- PERLASTAN L-30
- PERLASTAN SCG 50 HC
Benefits of N-Acyl Sarcosinate and Glutamate Surfactants

Drainage Amount of Foam (0.3% active, 50g/500ml in Separating Funnel)

- Perlastan SCG 50 HC, 100%
- 25 : 75 (PERLASTAN : Coco Glucoside)
- Coco Glucoside, 100%
- 50 : 50 (PERLASTAN : Coco Glucoside)
- (50:50) + Xanthan Gum 0.75%
- 75 : 25 (PERLASTAN : Coco Glucoside)
Cleaning/Cleansing Properties
Cleansing Power

Critical Micelle Concentration

- Perlastan SC 25 NKW

Surface Tension [mN/m] vs. Concentration [g/1000ml]

AIR

WATER
Cleansing Power

Critical Micelle Concentration

- Perlastan SC 25 NKW
- Perlastan L-30
- Coco Glucoside
- Sodium Laureth-3 Sulfate
- Cocamidopropyl betaine
- Sodium Lauryl Sulfate

Surface Tension [mN/m] vs. Concentration [g/1000ml]
Cleansing Power

Critical Micelle Concentration

CMC [g/1000ml]

Perlastan SCG 25 NKW
Perlastan L-30
Coco Glucoside
Cocamidopropyl betaine
Sodium Laureth-3 Sulfate
Sodium Lauryl Sulfate
Cleansing Power

Critical Micelle Concentration

ratio between:
PERLASTAN SC 25 NKW and Coco Glucoside
Certification

Ecological, Natural, Organic, Palm-Free
Natural and Organic Certification

Based on naturally occurring renewable sources
Natural and Organic Certification

PERLASTAN SC 25 NKW
Sodium/Disodium Cocoyle Glutamate
Ecological Certification

Environmentally friendly – Ecological

European – Flower

German – Blue angel

Nordic - Swan
### Detergents Ingredients Database, version 2014.1

<table>
<thead>
<tr>
<th>DID-no</th>
<th>Ingredient name</th>
<th>Acute toxicity</th>
<th>Chronic toxicity</th>
<th>Degradation</th>
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<td>TF (Acute)</td>
<td>TF (Chronic)</td>
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<td>Lauroyl sarcosinate</td>
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<td>2027</td>
<td>C9-11, 2-&lt;10 EO Carboxymethylated, sodium salt or acid</td>
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<td>2031</td>
<td>Sodium cocooyl glutamate</td>
<td>230 230</td>
<td>0.238</td>
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2026 Lauroyl sarcosinate
2031 Sodium cocooyl glutamate
Palm-Free (not impacted by RSPO)

PERLASTAN SCG 50 PPF
INCI: Disodium Cocoyl Glutamate, Propylene Glycol

PERLASTAN SCG 50 IPF
INCI: Disodium Cocoyl Glutamate, Isopropanol

PERLASTAN SC 25 NKPF
INCI: Disodium Cocoyl Glutamate, Sodium Cocoyl Glutamate
Consumer Acceptance
A **Total of 124 volunteer** healthy male and female were involved in this study

A collective of 50 male and female test subjects were involved in a **compatibility test** using for 48h test plasters.

2 groups of 25 male and female test subjects were involed in **daily application test** using once a day shampoo or body shower for 4 weeks.

12 voluntary healthy female test subjects were involed in **skin hydration and transepidermal water loss studies**

- **In vivo dermatological and sensoric trials underline that Sodium Cocoyl Glutamate as well as Sodium Lauroyl Sarcosinate are mild and eudermic surfactants**

### Natural Based Basic Shampoo

<table>
<thead>
<tr>
<th>INCI</th>
<th>%</th>
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<tbody>
<tr>
<td>Aqua</td>
<td>51.25</td>
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<tr>
<td>Xanthan Gum</td>
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<tr>
<td>Sodium Cocoyl Glutamate</td>
<td>40.00</td>
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<tr>
<td>Capryl/Capryl Glucoside</td>
<td>5.00</td>
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<tr>
<td>Preservative</td>
<td>0.60</td>
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<tr>
<td>Perfum</td>
<td>0.40</td>
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<tr>
<td>Lactic Acid</td>
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### Summer Bubble Body Shower

<table>
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<th>INCI</th>
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<td>Aqua</td>
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<tr>
<td>Xanthan Gum</td>
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<td>Sodium Cocoyl Glutamate</td>
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<td>Sodium Lauroyl Sarkosinate</td>
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<td>Coco-Glucoside &amp; Glyceril Oleate</td>
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<td>Menthyl Lactate &amp; Menthol</td>
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<td>Lipobead Blue AE</td>
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Results of Daily Application Test

Consumer Acceptance

Scoring:
1 = very good
2 = good
3 = fair
4 = satisfactory
5 = unsatisfactory
6 = insufficient

2 groups of 25 male and female test subjects were involved using once a day shampoo or body shower for 4 weeks.
Consumer Acceptance

Results of TEWL measurements

Tewameter measurements (TEWL) before and after irritation, - Day 5

- product A
- product B
- 2% aqueous SLS
- water
- untreated skin field

A = Natural Based Basic Shampoo
B = Summer Body Bubble Shower
Lubricants
- corrosion inhibition under hydrophobic cond.
- Metal Working Fluids
- corrosion inhibition under hydrophilic conditions

Industrial
- interaction with metal ions (chromium)

Leather
- Leather
- interaction with metal ions (chromium)

Personal Care
- Oral Care
- enzyme inhibition, neutral taste
- BDIH, ECOCERT

Skin Care /Hair Care
- foam boosting, fine foam texture, mildness, conditioning, BDIH, ECO CERT

Pet Care
- mildness, foaming, wash off

Household/Home Care
- Hard Surface Cleaners
  - ECO-Label (anaerobic degradation), wetting, foaming, withstands alkaline conditions
  - Carpet Shampoos
    - non-tacky residues after drying
- Aerosol applications
  - corrosion inhibition, wetting
- Bleaching Aids
  - withstands high pH, not oxidized by hypochlorides
  - thickening effects

Glass Cleaners
- non-smear, wetting

Amino acid based Surfactants
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Please visit us at booth 6G30

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