

# ROKAtend GL

Sodium Lauroyl Glycinate



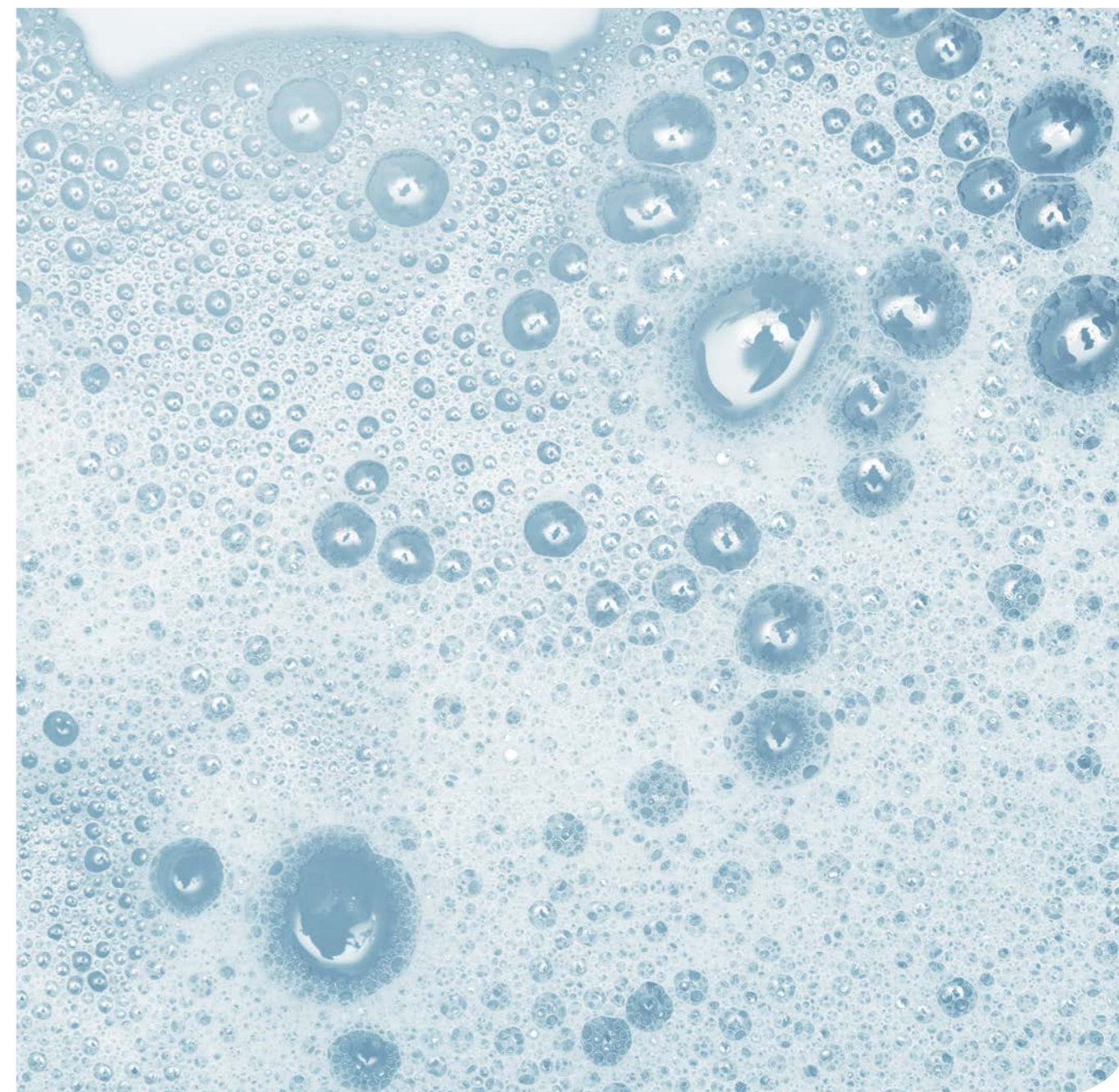
## ROKAtend GL

### Sodium Lauroyl Glycinate

**ROKAtend GL** (Sodium Lauroyl Glycinate) is an anionic surface active compound, mainly used in cosmetic applications. It belongs to a group of amino acid surfactants and it is manufactured based on biomimetics (compounds which imitate naturally occurring substances) and vegetable oils derivatives. **ROKAtend GL** occurs in the form of light yellow water solution with approximately 20% content of active substance.

Amino acid surfactants are the mildest surface active compounds available on the market. They are mild to the skin as primary and secondary surfactants.

Due to the strong adsorption on protein surfaces, they contribute to the feeling of long-term comfort and softness of the skin. They also significantly reduce the irritating effect of other surfactants and prevent drying of the skin.



Apart from very good application properties, amino acid surfactants are also environmentally friendly and easily biodegradable. The bacterial degradation of amino acid surfactants (test OECD 30, OECD 301F) proceeds faster in comparison to most other anionic surfactants available on the market. Stable and dense foam is created even in the presence of sebaceous substances and hard water. Foam height and its stability is comparable to the best foaming surfactants such as SLES (Sodium Lauryl Ether Sulfate) and betaines. Amino acid surfactants are characterized by good alkali-tolerance. Furthermore, this group of products can be used as foam boosters even at the high pH, while other surfactants lose effectiveness in such conditions.

Favourable dermatological properties as well as very good foaming and thickening abilities make **ROKAtend GL** a perfect choice where mildness and effectiveness in a final cosmetic formulation is required.

Table 1. Quality parameters of ROKAtend GL

Appearance at (20±25)°C	clear or slightly turbid liquid
Hazen colour at 40 °C	max. 150
Active substance, % (m/m)	19 ÷ 21
Free fatty acids, % (m/m)	max. 2.5
Dry matter, % (m/m)	24 ÷ 29
pH of 10% solution	10 ÷ 11
Sodium chloride, % (m/m)	4.0 ÷ 5.5
Glycerol, % (m/m)	0.5 ÷ 1.0

### Product advantages:

- an anionic surfactant with a very mild effect on the skin
- very good foaming properties
- reduction of irritant effect of other surfactant on the skin
- excellent cleaning properties
- provides a feeling of long-term comfort and softness to the skin
- due to the strong adsorption on hair surface as well as reduction and binding of electrostatic charges, ROKAtend GL contributes to the feeling of hair softness and silkiness
- easily biodegradable
- based on renewable vegetable raw materials
- preservative free

### Intended use:

- shampoos, especially very mild baby shampoos
- body wash lotions
- shower gels
- bath lotions
- gentle liquid soaps
- facial cleansers and care products

\* Comedogenicity – tendency to clog pores, thereby creating blackheads.

\*\* Adsorption – the process of binding molecules, atoms or ions at the surface or boundary of physical phases, causing local changes in concentration. Adsorption should not be confused with absorption, which is the process of penetrating into the interior of the phase.



## Foaming properties

Amino acid surfactants are characterized by very good foaming properties. They can be successfully used as foam stabilizers even at high pH, at which other surfactants very often lose effectiveness. Stable and dense foam is also created in the presence of sebum and hard water. Foam height and its stability are comparable with the best foaming surfactants such as SULFOROKAnols (SLES-Sodium Lauryl Ether Sulfate) and ROSULfans (SLS-Sodium Lauryl Sulfate) (Fig. 1). Foaming ability was determined in accordance with the **PN-ISO 696:1994** Standard (modified Ross-Miles method) for solutions prepared in distilled water at 25°C.

For **ROKAtend GL** high and stable foam comparable to the foaming results obtained for the other anionic surfactants is achieved at the concentration of 2.5 g/L of active substance (SA).

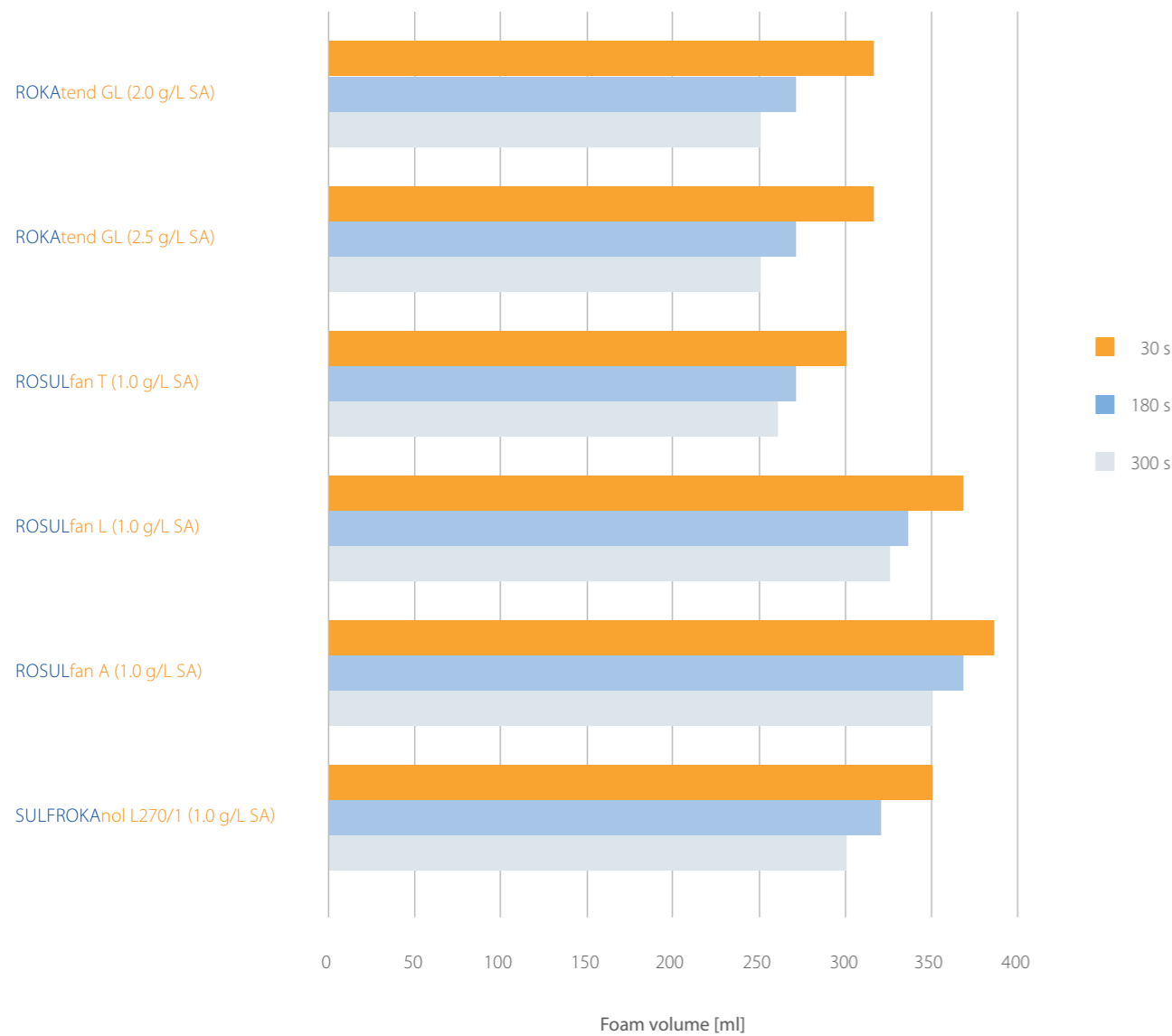


Fig. 1 Foaming properties of ROKAtend GL compared to the other anionic surfactants (ROSULfan T – TEA Lauryl Sulfate; ROSULfan L – Sodium Lauryl Sulfate; ROSULfan A – Ammonium Lauryl Sulfate; SULFOROKAnol L270/1 – Sodium Laureth Sulfate).

## Wettability

The desirable feature of surfactants in many applications, especially in shampoos is good wetting properties. The shorter the wetting time, the better wetting and cleaning properties of the product. Pure water has a relatively high surface tension at room temperature (~72 mN/m), which corresponds to the poor washing properties. In the cleaning process, the surface tension must be lowered so that water can cover and moisten the entire surface. The addition of surfactant reduces the interfacial tension, improves wetting and solubilization of impurities low-soluble - or non-soluble in water, as well as dispersing of dirt particles in an aqueous solution. Consequently, it increases the ability to dissolve and remove residues.

The wetting capacity of the cotton disc has been marked in accordance with EN 1772:2001. The wetting time (given in seconds for the cotton material) was measured for the following active substance concentrations of 1.0 g/L; 1.5 g/L, 2.0 g/L and 2.5 g/L, prepared in deionized water at 20°C.

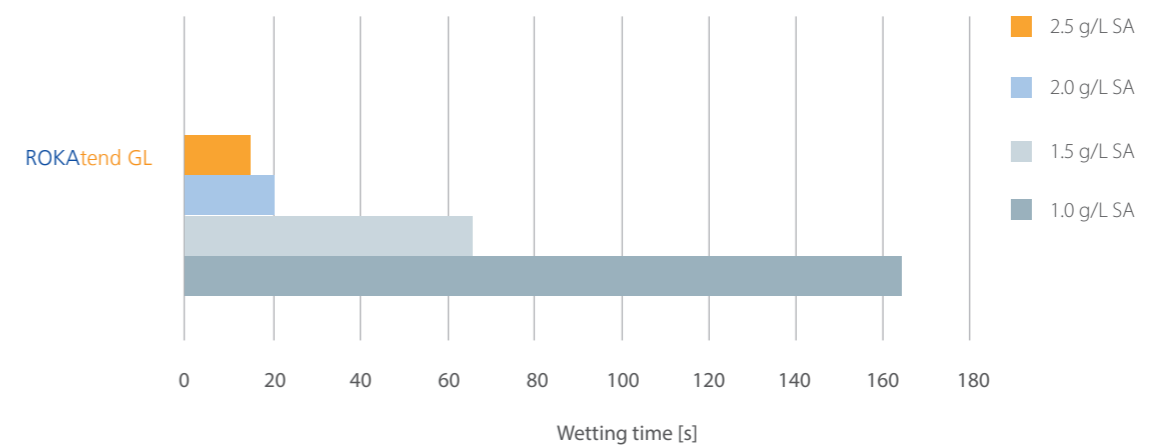


Fig. 2. The influence of ROKAtend GL concentration on wetting time.



## Thickening

Sodium chloride is one of the most often used ingredient in cosmetic and household formulations. Anionic surfactants in the presence of sodium chloride act as an excellent rheology modifiers. It is tremendously important because in case of different cosmetic preparations a different consistency is required. Dependence between viscosity and NaCl concentration for ROKAtend GL is shown in Fig. 3.

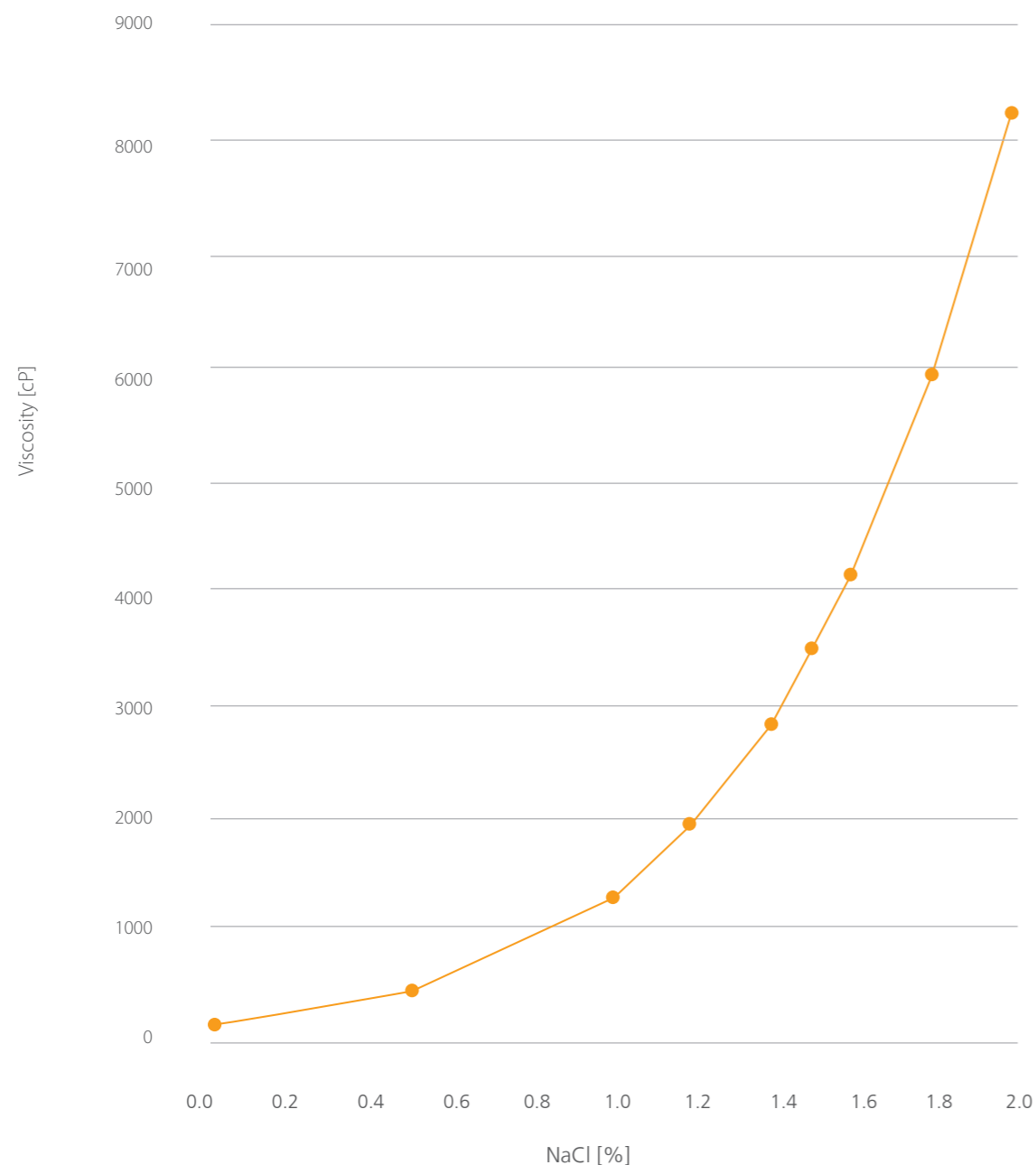


Fig. 3. Dependence of ROKAtend GL between viscosity and sodium chloride concentration.

## Effects on skin cells

Shampoos, shower gels, liquid soaps, make-up removers, body lotions and other cosmetic products have direct contact with human skin. Sodium Lauryl Sulphate (SLS) is currently widely substituted for Sodium Lauryl Ether Sulphate (SLES) because of less irritating effect to the skin. However, its properties are still far away from mild features. In order to reduce the irritation effect of final formulation, the cosmetic products containing SLES are enriched with additional surfactants what is also reflected in obtaining good foaming and wetting properties. Nevertheless, surfactants, especially anionic ones, which exhibit excellent application properties and at the same time, mild skin effects, are constantly seek for.

Surfactants contained in cosmetics can penetrate the stratum corneum and act on fibroblasts, which are generally more sensitive than keratinocytes. For this reason, the creation of a product that is gentle to the cells of specific layer - fibroblasts is more difficult, but better describes the effect of the tested substance on the skin.

The effect of aqueous solutions ROKAtend GL and SULFOROKAnol L227/1 on skin cells was investigated. In the MTT test, analyzes were carried out on skin cells - human fibroblasts, i.e., on normal lines located in the dermis (HFF-1 cell line from ATCC® SCRC-1041™).

The method involves the measurement of the mitochondrial activity of cells treated with an analyte solution with respect to untreated control cells.



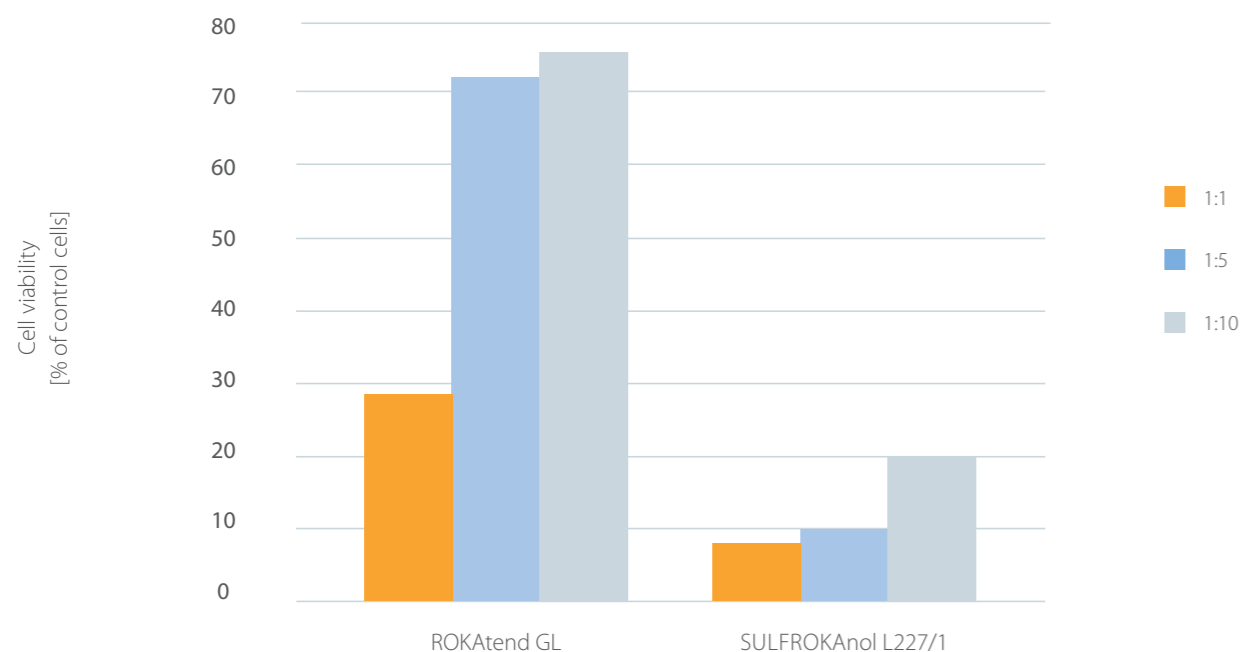


Fig. 4. Viability of skin cells after contact with a solution of surfactant diluted 1:1, 1:5, 1:10 with a DMEM cell fluid (Dulbecco's Modified Eagle Medium), respectively.

**ROKAtend GL** exhibits much milder effect to the skin when compared to other anionic surfactants commonly used in cosmetic preparations. Cell viability for **ROKAtend GL** is much higher considering the same dilutions for both commercial products (Fig. 4). In addition, a significant increase in cell viability with increase of dilution with cell fluid can be observed for **ROKAtend GL**. Such phenomenon is not as clearly visible for SLES.



## Dermatological tests

The irritant and allergic properties of the **ROKAtend GL** were assessed by examining 20 healthy adult volunteers with no hypersensitivity to cosmetic preparations and those who do not have a lesioned skin disease. The research methodology consisted in applying the tested product once to the cleansed forearm skin. After 15 minutes, 30 minutes, 1 hour and after 24 hours of application, the dermatologist assessed the irritating and allergic effects of the tested product based on the skin reaction.

The dermatological tests were carried out in an accredited cosmetics laboratory has confirmed that **ROKAtend GL** is well tolerated by the skin.

The examined group of people unambiguously stated the lack of allergic reaction, no irritation or allergic reactions were observed. The classification of skin reactions in each case was defined as 0. It confirms that the product meets the requirements of the SCT (eng. *Skin Compatibility Test*) and can be classified as **NON-IRRITATING**.



# Example formulations

PCC EXOL SA recommends to use the ROKAtend GL in concentration between the range of 5 - 25% (m/m).

## Deeply cleansing gel for skin face

Phase	INCI name	Brand name	Concentration [%]	Function
<b>A</b>	Aqua		49.00	solvent
	Acrylates/C10-30 Alkyl Acrylate Crosspolymer		1.00	viscosity modifier
<b>B</b>	Aqua		14.00	solvent
	<b>Sodium Lauroyl Glycinate</b>	<b>ROKAtend GL</b>	<b>10.00</b>	<b>surfactant</b>
	<b>Sodium Lauroyl Sarcosinate</b>	<b>ROKAtend LS</b>	<b>20.00</b>	<b>surfactant</b>
	<b>Cocamidopropyl Betaine</b>	<b>ROKamina K30</b>	<b>3.40</b>	<b>surfactant</b>
<b>C</b>	Parfum		0.40	fragrance
	Propylene Glycol		1.00	solvent
	Benzyl Alcohol, Ethylhexylglycerin, Tocopherol		1.00	preservative
<b>D</b>	Sodium Hydroxide (30% solution)		0.20	pH modifier

<b>APPEARANCE</b>	visual method	clear, viscous gel with suspended air bubbles
<b>pH</b>		5.5 - 6.5
<b>VISCOSITY [cP]</b>	Brookfield LV, spindle 34, speed 2.5 RPM, T:25°C	15000 - 20000
<b>STABILITY</b>	1 month in 5°C, 20°C, 40°C	confirmed



### Procedure

1. Pour the warm deionized water (40-50°C) in to the main vessel and add the Acrylates/C10-30 Alkyl Acrylate Crosspolymer. Start mixing when the polymer is completely wetted. Mix until the homogenous solution is obtained.
2. Combine ingredients from phase B in a separate vessel. Heat up to 60°C with gentle agitation. Mix until homogenous solution is obtained.
3. Add phase B to phase A. Mix until homogenous solution is obtained. Cool the batch down to 30°C.
4. When the batch temperature is 30°C, add preservative, propylene glycol and fragrance. Mix for 20 minutes with slow agitation.
5. Readjust the final pH to 5.5 - 6.5 with additional Sodium Hydroxide (30%) if necessary.

## Liquid black soap for men

Phase	INCI name	Brand name	Concentration [%]	Function
<b>A</b>	Aqua		48.23	solvent
	Acrylates/C10-30 Alkyl Acrylate Crosspolymer		1.00	viscosity modifier
<b>B</b>	Aqua		16.00	solvent
	<b>Sodium Lauroyl Glycinate</b>	<b>ROKAtend GL</b>	<b>5.00</b>	<b>primary surfactant</b>
	<b>Sodium Lauroyl Sarcosinate</b>	<b>ROKAtend LS</b>	<b>20.00</b>	<b>primary surfactant</b>
	<b>Cocamidopropylbetaine</b>	<b>ROKamina K30</b>	<b>7.00</b>	<b>secondary surfactant</b>
<b>C</b>	Parfum		0.50	fragrance composition
	Activated Charcoal		0.02	black color additive
	Ethylhexyl Glycerine, Phenoxyethanol		1.00	preservative
<b>D</b>	Sodium Hydroxide (30% solution)		0.25	pH modifier

<b>APPEARANCE</b>	visual method	black, viscous gel
<b>pH</b>		5.5 - 6.5
<b>VISCOSITY [cP]</b>	Brookfield LV, spindle 34, speed 2.5 RPM, T: 25°C	15000 - 25000
<b>STABILITY</b>	1 month in 5°C, 20°C, 40°C	confirmed



### Procedure

1. Pour the warm deionized water (40-50°C) in to the main vessel and add the Acrylates/C10-30 Alkyl Acrylate Crosspolymer. Start mixing when the polymer is completely wetted. Mix until the homogenous solution is obtained.
2. Combine ingredients from phase B in a separate vessel. Heat up to 60°C with gentle agitation. Mix until homogenous solution is obtained.
3. Add phase B to phase A. Mix until homogenous solution is obtained. Cool the batch down to 30°C. When the batch temperature is 30°C, add preservative, activated charcoal and fragrance. Mix for 20 - 30 minutes with slow agitation. If necessary, homogenise for 1-2 minutes.
4. Readjust the final pH to 5.5 - 6.5 with additional Sodium Hydroxide (30%) if necessary.

## Example formulations

PCC EXOL SA recommends to use the ROKAtend GL in concentration between the range of 5 - 25% (m/m).

### White shower gel

Phase	INCI name	Brand name	Concentration [%]	Function
<b>A</b>	Aqua		33.37	solvent
	Acrylates/C10-30 Alkyl Acrylate Crosspolymer		0.40	viscosity modifier
	Sodium Hydroxide (30% solution)		0.25	pH modifier
<b>B</b>	Aqua		20.00	solvent
	Xanthan gum		0.45	viscosity modifier
	Glycerin		2.00	moisturising agent
	Polyquaternium-10		0.01	conditioning agent
<b>C</b>	Aqua		10.00	solvent
	Talc		2.00	skin condition improver
	Mica, Titanium dioxide		0.02	pearling agent
	<b>Sodium Lauroyl Glycinate</b>	<b>ROKAtend GL</b>	<b>10.00</b>	<b>primary surfactant</b>
	<b>Sodium Lauroyl Sarcosinate</b>	<b>ROKAtend LS</b>	<b>20.00</b>	<b>primary surfactant</b>
<b>D</b>	Parfum		0.50	fragrance composition
	Ethylhexyl glycerine, Phenoxyethanol		1.00	preservative

<b>APPEARANCE</b>	visual method	white viscosus gel
<b>pH</b>		6.0 - 7.5
<b>VISCOSITY [cP]</b>	Brookfield LV, spindle 34, speed 4 RPM, T:25C	6000 - 9000
<b>STABILITY</b>	1 month in 5°C, 20°C, 40°C	confirmed



### Procedure

1. Pour the warm deionized water (40-50°C) in to the main vessel and add the Acrylates/C10-30 Alkyl Acrylate Crosspolymer. Start mixing when the polymer is completely wetted. Mix until the homogenous solution is obtained.
2. Add Sodium Hydroxide. Mix until homogenous solution is obtained.
3. Combine ingredients from phase B in a separate vessel. Add xanthan gum to the glycerin - mix until homogenous solution is obtained. Add warm water (40-50°C) and Polyquaternium-10. Mix until homogenous solution is obtained. If necessary, homogenise for 2-3 minutes.
4. Add phase B to the main vessel. Mix until homogenous solution is obtained. If necessary, homogenise for 2-3 minutes.
5. Combine ingredients from phase C in a separate vessel. Heat up to 40°C with gentle agitation. Mix until homogenous solution is obtained.
6. Add phase C to the main vessel. Mix until homogenous solution is obtained. Cool the batch down to 30°C.
7. Add fragrance and preservative. Mix gently until homogenous solution is obtained.

### Mild yellow hand soap

Phase	INCI name	Brand name	Concentration [%]	Function
<b>A</b>	Aqua		46.55	solvent
	Potassium Oleate		8.00	primary surfactant
	<b>Sodium Lauroyl Glycinate</b>	<b>ROKAtend GL</b>	<b>25.00</b>	<b>primary surfactant</b>
	Decyl Glucoside		7.00	primary surfactant
<b>B</b>	Citric Acid		0.20	pH modifier
<b>C</b>	Parfum		0.50	fragrance composition
	Euxyl K900		1.00	preservative
	<b>Cocamidopropylbetaine</b>	<b>ROKAmina K30</b>	<b>10.00</b>	<b>secondary surfactant</b>
	Sodium chloride		1.75	viscosity modifier

<b>APPEARANCE</b>	visual method	yellow liquid
<b>pH</b>		8.5 - 9.0
<b>VISCOSITY [cP]</b>	Brookfield LV, spindle 34, speed 2.5 RPM T:25°C	3000 - 5000
<b>STABILITY</b>	1 month in 5°C, 20°C, 40°C	confirmed



### Procedure

1. In to the large vessel (big enough to provide adequate mixing while preparing batch) pour deionized water.
2. Add ingredients from phase A to the vessel while mixing. Heat up to 70 - 75°C. Mix until homogenous solution is obtained.
3. Cool the batch down to at least 35°C.
4. Adjust pH to 8.5 - 9.0 by using citric acid. Mix well after adjustment.
5. Add fragrance, preservative and cocamidopropylbetaine. Mix until homogenous solution is obtained.
6. If necessary, add sodium chloride to adjust the viscosity. (NOTE: it is very important to equilibrate a sample at 25°C for at least one hour to get an accurate viscosity measurement)



## PCC EXOL SA

### Sustainable technologies for new generations



PCC Exol SA is a combination of the latest technology with experience in production and distribution of surfactants.

PCC Exol SA is a combination of the latest technology with experience in production and distribution of surfactants. The company has its headquarters in Brzeg Dolny, Poland, where the manufacturing units of anionic, nonionic and amphoteric surfactants are located. Flexibility of production enables us to offer a wide range of surfactants adjusted to the current customer needs. As one of the leading chemical products manufacturers, we continue to undertake investment activities based on the principle of sustainable development. Our products have numerous industrial applications. Our surfactants are used as raw materials for various markets including:

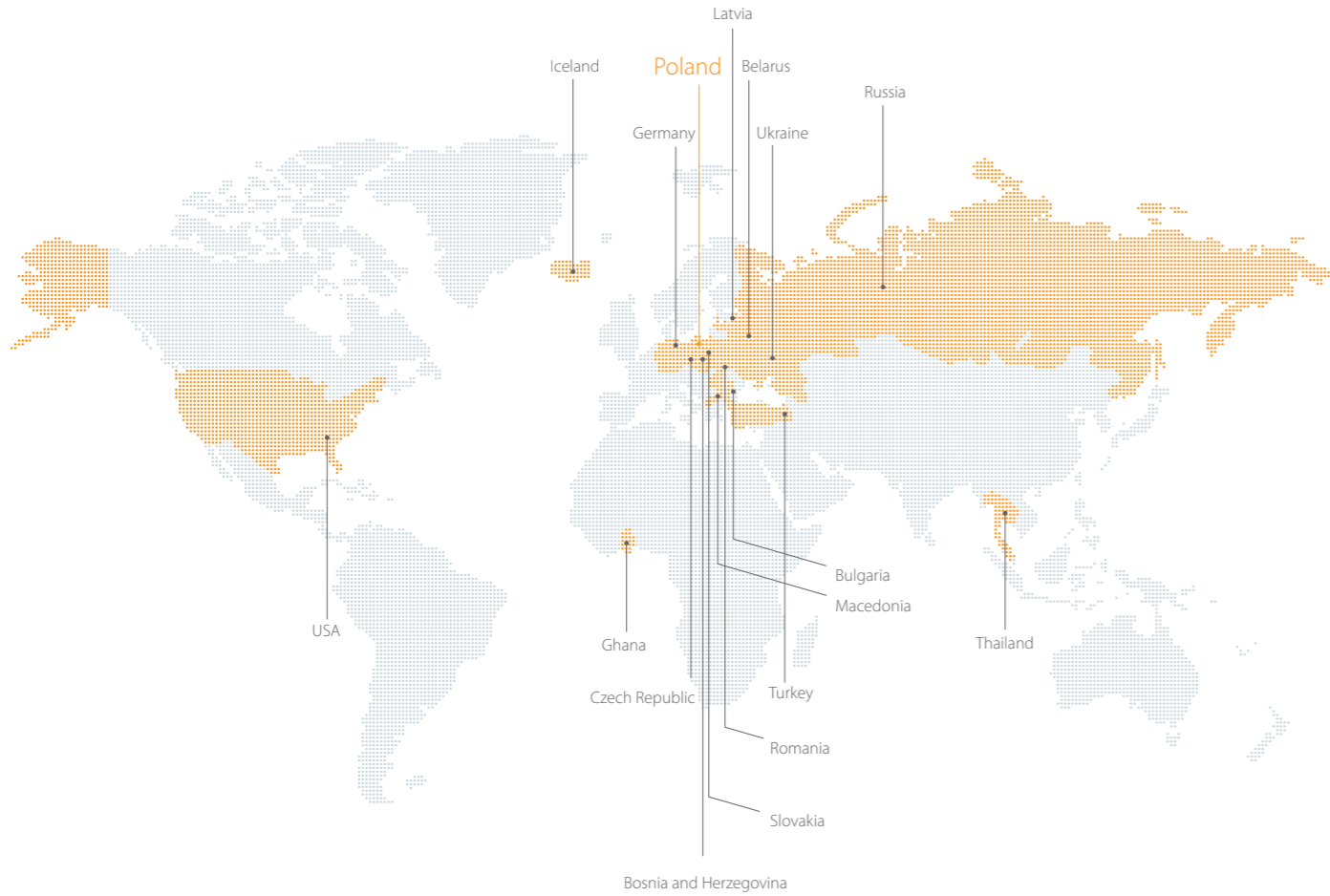
household chemicals, textile, agrochemicals, metalworking, oilfield industries, construction industry, paints & coatings, pulp and paper, and many others. Over the years, PCC Exol SA has developed core expertise in manufacturing specialty surfactants. We meet our customers' needs with a unique and versatile product portfolio, a broad expertise in surfactants chemistry and a high degree of flexibility. Through close customer relationships and by maximizing the synergy of customers' application experience combined with our knowledge of chemistry, we continuously strive to offer tailor-made products and system solutions that contribute to your success.

We are continuously expanding our product range with new surfactants, focusing on safe chemistry and being friendly to people and environment. Our operations are conducted in full compliance with legal and other requirements, including environmental requirements. The design, production and sale of large volumes of specialist, often unique, chemical products for further processing requires the coordinated cooperation of many services at the Company's disposal. A certified quality management system and environmental management system has proven to be very useful. Those two integrated systems help our employees to be aware of their

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Our specialists know that in the end, by carrying out their tasks in accordance with procedures applicable to their positions and other internal regulations, we provide our clients with exactly what they expect from us, acting within conditions of reasonable and legal usage with regard to the environment. Our strategic investor is the German company PCC SE, which operates internationally as three divisions: Chemical, Energy and Logistics.

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