AKYPO®

PERSONAL CARE

MILD SURFACTANTS

HAIR COLOR PROTECTION

RSPO CERTIFIED PRODUCTS

YOUR PARTNER
FOR SULFATE-FREE
FORMULATIONS

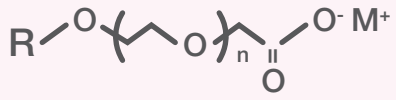
THE TECHNOLOGY OF KAO'S SURFACTANTS APPLIED TO PERSONAL CARE

kao

AKYPO® for Personal Care

The AKYPO® products are Ether Carboxylic Acids (EC) or their salts. The products included in the AKYPO® range differ from each other in the degree of ethoxylation and in the alkyl chain length. They can be categorised according to the counter-ion (M^+) into either acid form or neutralized sodium salt.

AKYPO®



R= C_{12} - C_{14}
n= 4 - 10
M^+= H^+, Na^+

For cosmetic applications, vegetable-origin fatty alcohols are used, mainly C12/14 alkyl chain length, because of the high foaming properties required for cleansing products.

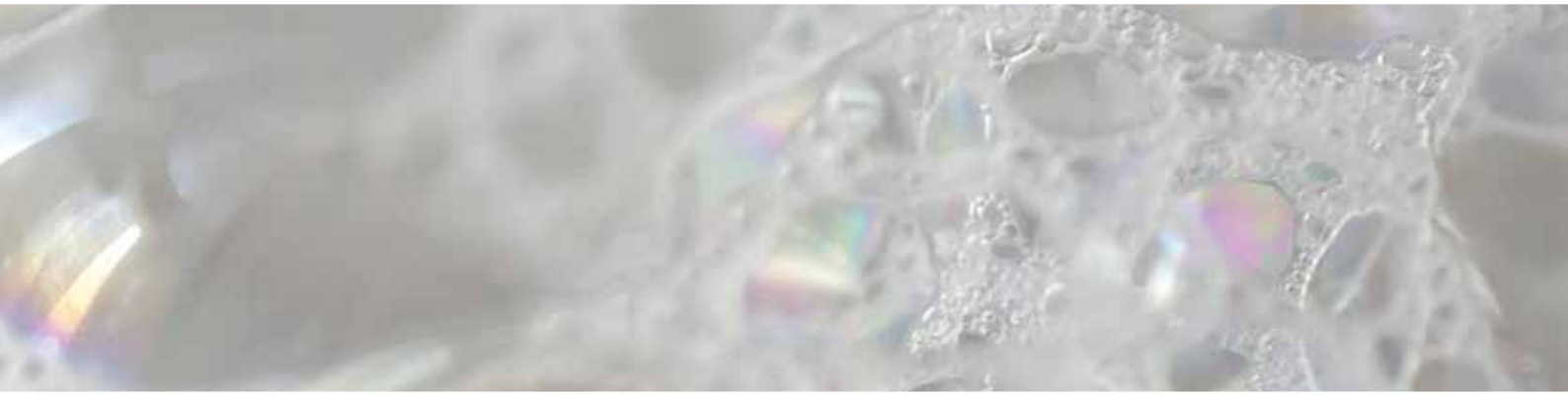
Surfactants from the AKYPO® range have been used in Personal Care products for many years because of their mildness to skin and eyes, good ecotoxicity properties, and excellent compatibility with all kinds of surfactants – including cationic-type surfactants and specific additives such as cationic polymers in shampoos and bath gels.

The ability of AKYPO® to enhance coacervate formation offers fine-control deposition of cationic polymers, hydrophobic materials and other active ingredients, improving some important properties such as soft feel, manageability, and conditioning, without forgoing other attributes. The capacity of AKYPO® to promote coacervate formation allows optimum polymer performance with the best cost/effectiveness ratio.

AKYPO®, especially AKYPO® FOAM RL40, are a good choice in the preparation of sulfate-free products, because they offer an excellent balance between foam and mildness properties. In shampoos, AKYPO® protects the color of dyed hair, reducing color fading that occurs during the washing process.

AKYPO®

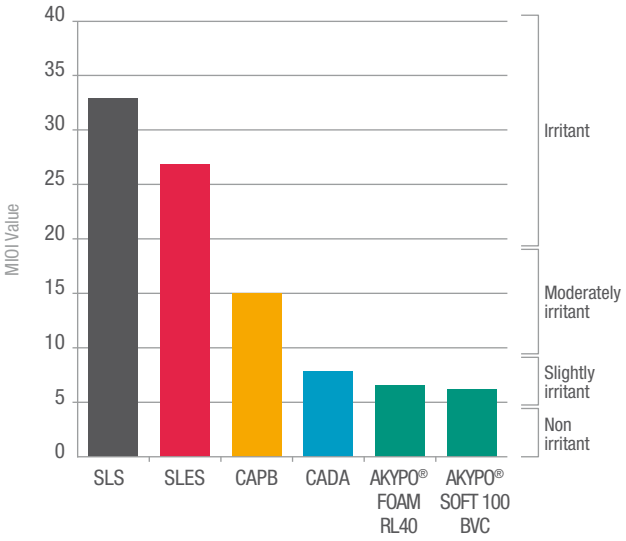
RANGE	INCI Name	EO	Alkyl Chain	Appearance (20°C)	Active Matter (%)
AKYPO® FOAM RL 40	Sodium Laureth-5 Carboxylate	4	C_{12}	Paste	60
AKYPO® RLM 45 CA	Laureth-6 Carboxylic Acid	4.5	C_{12}/C_{14}	Liquid	92
AKYPO® RLM 45 N	Sodium Laureth-6 Carboxylate	4.5	C_{12}/C_{14}	Paste	82
AKYPO® SOFT 45 HP	Sodium Laureth-6 Carboxylate	4.5	C_{12}/C_{14}	Liquid	22
AKYPO® RLM 100	Laureth-11 Carboxylic Acid	10	C_{12}/C_{14}	Liquid	90
AKYPO® SOFT 100 BVC	Sodium Laureth-11 Carboxylate	10	C_{12}/C_{14}	Liquid	70



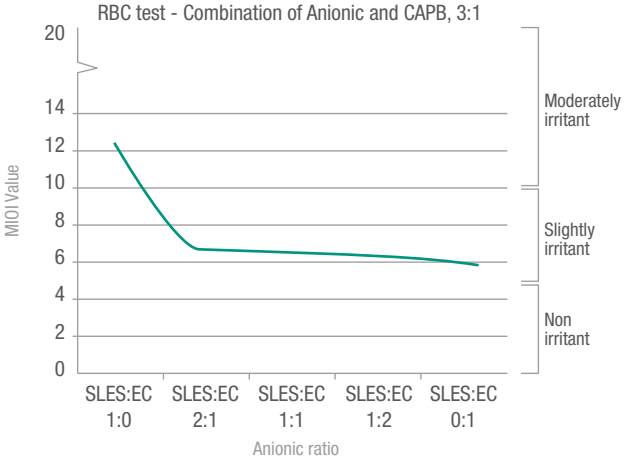
MILDNESS

AKYPO®, despite of being anionic surfactants, are very mild products and permit to improve the mildness of Personal Care cleansers. They are able to reduce the irritation level of more aggressive surfactants, such as Sodium Laureth Sulfate (SLES).

EYE IRRITATION POTENTIAL
RBC test - Surfactant itself

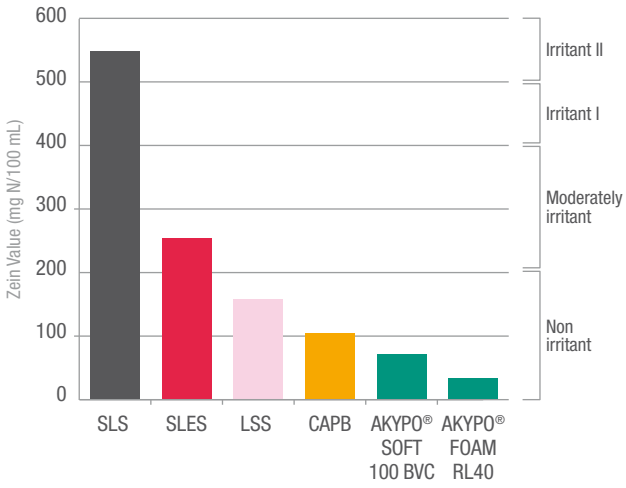


EYE IRRITATION POTENTIAL
RBC test - Combination of Anionic and CAPB, 3:1

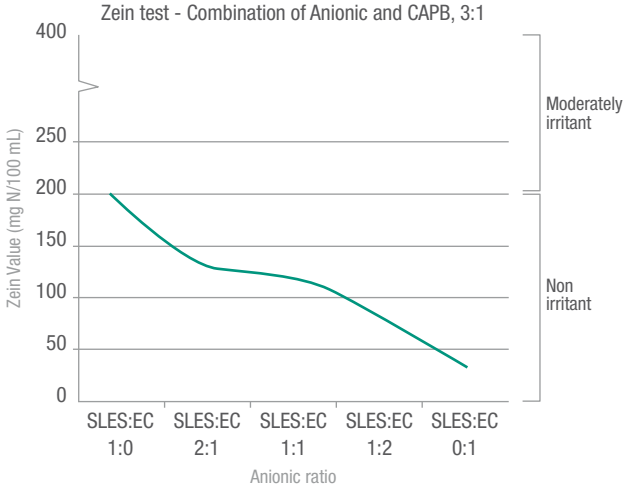


SLS: Sodium Lauryl Sulfate. SLES: Sodium Laureth Sulfate. LSS: Sodium Laureth Sulfosuccinate. CAPB: Cocamidopropyl Betaine. CADA: Disodium Cocoamphodiacetate. EC: AKYPO® FOAM RL 40

SKIN IRRITATION POTENTIAL
Zein test - Surfactant itself



SKIN IRRITATION POTENTIAL
Zein test - Combination of Anionic and CAPB, 3:1



Among the range, AKYPO® SOFT 100 BVC is the mildest AKYPO®. It is recommended for a wide range of mild products such as baby shampoos, liquid soaps for dry and sensitive skin, shampoo for professional uses or intimate hygiene products.

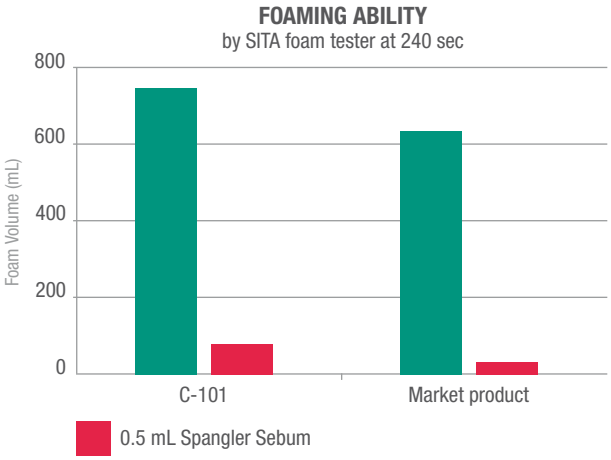
SULFATE-FREE

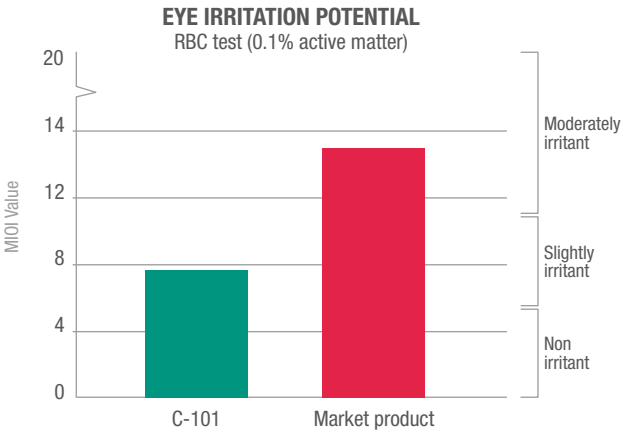
Nowadays, the Personal Care market demands sulfate-free formulations to afford truly mild products addressed to sensitive skin. AKYPO® can be used as the main surfactant combined with amphoteric and non-ionic surfactants to replace Sodium Laureth Sulfate (SLES) without forgoing other important properties such as foam. AKYPO® FOAM RL 40 is the best option due to its properties and good cost/performance ratio.

MILD SHAMPOO	% C-101
BETADET® HR Cocamidopropyl Betaine	17.0
AKYPO® FOAM RL 40 Sodium Laureth-5 Carboxylate	8.0
AMIDET® N PEG-4 Rapeseedamide	3.8
QUARTAMIN® BTC-131 Behenoyl PG-Trimonium Chloride	0.3
Additives*	q.s.
pH adjuster	q.s.
Deionised Water	Up to 100%
Appearance (20ºC)	Clear Viscous Liquid
Viscosity Brookfield (20ºC, cP)	7.500 approx.

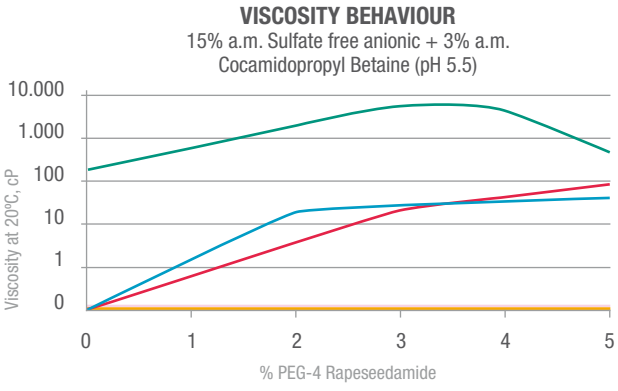
* Additives: Fragrance, dyes, preservatives, etc.

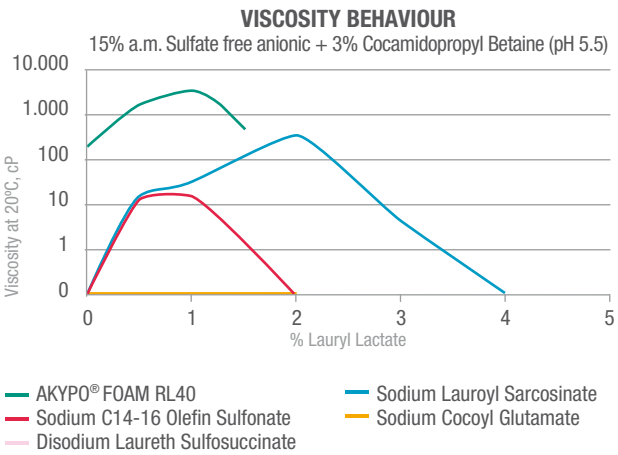
Very mild compositions, with high foamability can be prepared, by combining AKYPO® FOAM RL 40, with other amphoteric or non-ionic surfactants. Foam and mildness are comparable or better than benchmark.

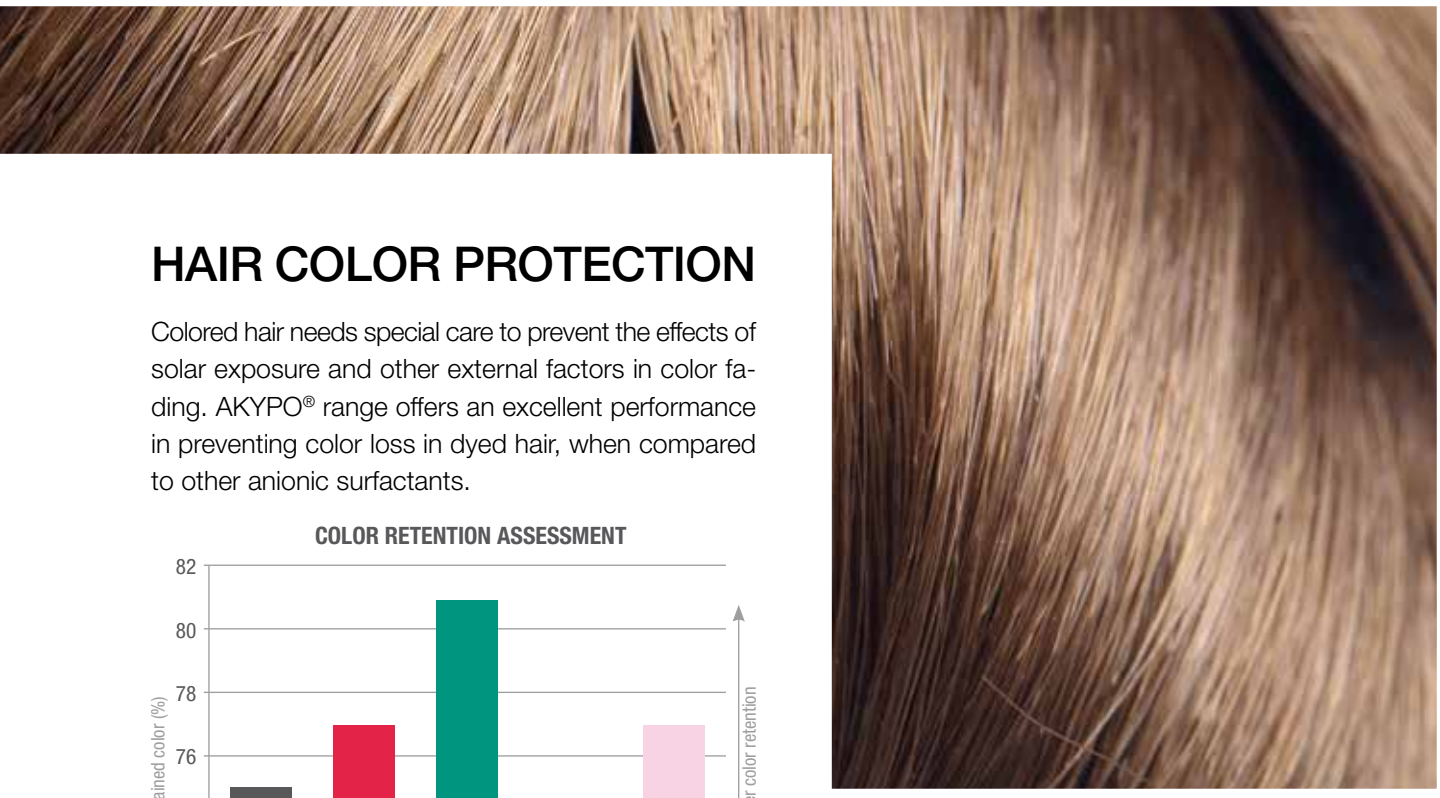




A key issue when developing sulfate-free rinse-off systems is how to build up viscosity. To overcome this difficulty when AKYPO® FOAM RL 40 is used as a main anionic surfactant, Kao Chemicals Europe, proposes a couple of alternatives: EXCEPARL® LM-LC (Lauryl Lactate) a natural liquid thickener derived from renewable sources or/and AMIDET® N (PEG-4 Rapeseedamide) both providing good viscosity results even without NaCl addition.







HAIR COLOR PROTECTION

Colored hair needs special care to prevent the effects of solar exposure and other external factors in color fading. AKYPO® range offers an excellent performance in preventing color loss in dyed hair, when compared to other anionic surfactants.

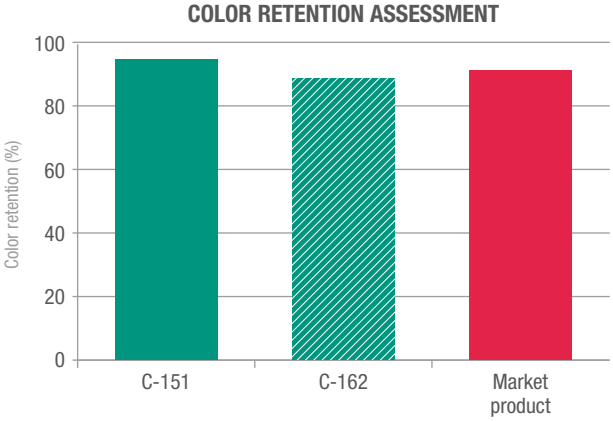
SHAMPOO FOR COLORED HAIR	% C-151	% C-162
AKYPO® FOAM RL 40 Sodium Laureth-5 Carboxylate	-	15.0
BETADET® S-20 Lauryl Hydroxysultaine	-	9.0
EMAL® 270D Sodium Laureth Sulfate	8.6	-
BETADET® THC-2 Disodium Cocoamphodiacetate	7.5	-
DANOX® PL-10 Pearlizing agent	4.0	4.0
AKYPO® RLM 100 Laureth-11 Carboxylic Acid	3.3	-
AMIDET® APA-22 Behenamidopropyl Dimethylamine	2.0	1.5
Cationic Amino Quaternized Silicone Terpolymer	1.0	1.0
PEG-150 Distearate	-	0.4
Additives*	q.s.	q.s.
pH adjuster	q.s.	q.s.
Deionised Water	Up to 100%	

* Additives: Fragrance, dyes, preservatives, etc.

SLS: Sodium Lauryl Sulfate. SLES: Sodium Laureth Sulfate. AOS: Sodium C14-16 Olefin Sulfonate. LSS: Sodium Laureth Sulfosuccinate. EC-11: AKYPO® RLM 100

References C-151 and C-162 are compositions optimized as shampoos for colored hair. Both formulations are very mild for skin and scalp, and clean while reducing color fading and improving color shine.

The first formulation contains Sodium Laureth Sulfate as primary anionic surfactant, while the second one is a SLES-free formulation based on AKYPO® FOAM RL 40. After washing process, both references show a color retention comparable to a benchmark product, which claims color protection in its label.



HAIR & SKIN conditioning

Cleansing formulations for skin and hair are currently quite complex as they are also expected to provide additional benefits such as conditioning, ease of combing, soft feel and pleasant appearance. Coacervation plays an important role in providing many of these features. Coacervation is a physicochemical mechanism that occurs when a composition containing cationic polymers and surfactants is diluted in water. During the washing step and especially during rinse-off, the surfactant concentration falls below the critical level required for solubilization (CMC), and an insoluble complex of polymer/surfactant is formed. This complex is known as coacervate.

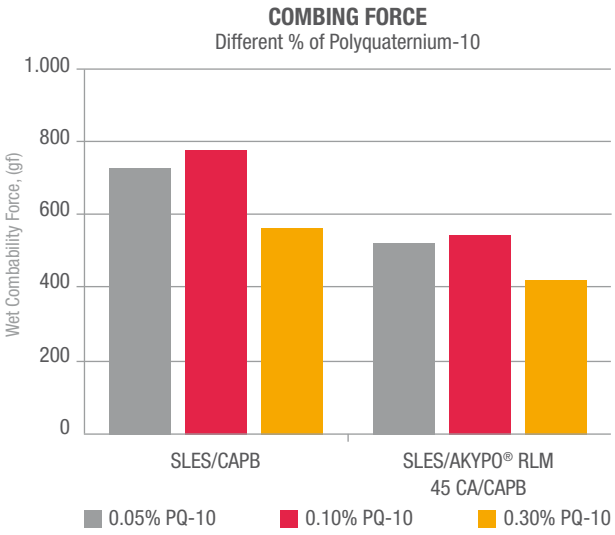
A coacervate contains a high level of cationic charge, what enhances deposition of polymers or other insoluble additives such as silicones, onto the hair or skin. Due to their chemical structure, AKYPO® products enhance coacervates formation, thus allowing higher deposition of polymers and other hydrophobic components such as silicones or oils.

HAIR

Formulations with AKYPO® offer truly noticeable benefits for consumers. In a basic shampoo formula (SLES/CAPB), the addition of AKYPO® has a boosting effect on the performance of the polymers, included as conditioning agents.

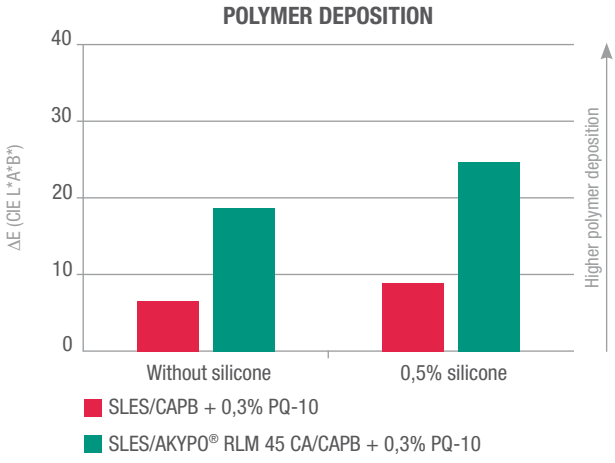
· COMBABILITY

When using AKYPO®, the polymer percentage can be reduced, while maintaining the performance and smoothing effect. Thus, additionally allows an optimization of the final cost of the formulation.



· POLYMER DEPOSITION

Formulations with AKYPO®, deposit significantly more polymer onto the hair surface, than if only SLES is used as anionic surfactant. This effect is more relevant when silicone is included. However, despite higher polymer deposition, no build-up occurs after several applications and there is no negative effect on hair volume.



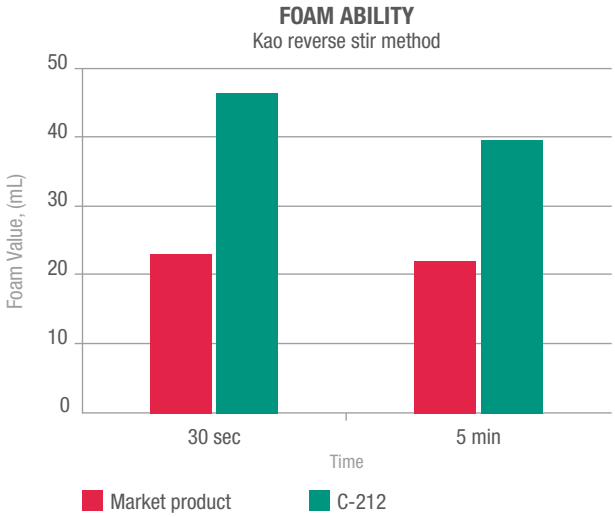
BODY

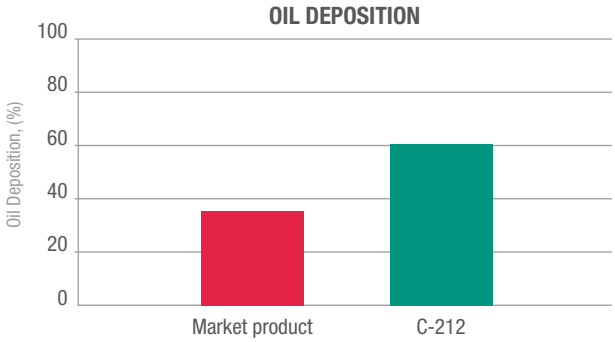
AKYPO® products show a very good compatibility with oils. In body cleansers with high oil content, the AKYPO® range provides creamy foam and a soft skin feel. They also improve rinse out.

In this type of formulations, combinations of AKYPO® RLM 45 CA and EMANON® EV-E (Glycereth-7 Caprylate/Caprate) are recommended in order to achieve a good balance between cleansing effect, mildness, foaming ability (volume and stability), and oils' deposition. Obtained results are comparable or better than benchmark products.

SHOWER OIL SLES-FREE	% C-212	C-271
EMANON® EV-E Glycereth-7 Caprylate/ Caprate	23	23
AKYPO® RLM 45 CA Laureth-6 Carboxylic Acid	19	19
AMIDET® N PEG-4 Rapeseedamide	12	12
Castor Oil	30	17
Soybean Oil	9	-
Prunus Amigdalus Dulcis Oil	-	23
Propylene Glycol	2	2
Additives*	q.s.	q.s.
pH adjuster	q.s.	q.s.
Deionised Water	Up to 100%	

* Additives: Fragrance, dyes, preservatives, etc.





KAO CHEMICALS EUROPE

www.kaochemicals-eu.com

Enriching lives,
in harmony with nature.

Kao Corporation, S.A.
Puig dels Tudons, 10
E-08210 Barberà del Vallès
(Barcelona) Spain
Tel.: +34 93 7399-300
Fax: +34 93 7399-377
e-mail: sales@kao.es

Kao Chemicals GmbH
Kupferstrasse 1
D-46446 Emmerich, Germany
Tel.: +49 (0) 2822 711-0
Fax: +49 (0) 2822 711-201
e-mail: sales@kaochemicals.de

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