REINOLDERM OLV4

In the formulation of rinsing products such as shampoos, bath and shower foams and intimate cleansers, it is now possible to create new formulations with a lower value of active washing substance: this gives a better compliance, more safety and tolerance to the products in which the functionality is not compromised.

These results can be easily obtained by using new milder surfactants with multifunctional properties. The multifunctionality actually represents an extension of the old idea of primary surfactant.

REINOL has synthesized a molecule similar to soap, but which has some important differences: it has been modified in order to eliminate the low solubility and the low foaming capacity in hard water, and to lower the alkaline pH, which are peculiar disadvantages of fatty acids derived detergents.

REINOLDERM OLV4 is a surfactant in a high concentration (40%.) which derives from olive oil and which has excellent dermatological compliance and with a very low eye irritating power. It can be easily worked at room temperature, it is colourless and odourless. This surfactant makes a creamy and pleasant foam and reveals a perfect complinance towards skin and hair. Ii is stable in a wide pH range and permorfs a good cleansing power while irritation index is very low.

The new important characteristics are:

- In opposition to anionic surfactants, **REINOLDERM OLV4** reveals a perfect compliance towards skin and hair, and it has all the good properties of the carboxylate group without the troubles of soap due to alkaline hydrolysis.
- When used in shampoos, bath and shower foams, it makes a rich, creamy, shining and small bubbled foam, while cleansing in a new, milder and softer way.
- It has a good solubilizing capacity.
- It is stable in alkalies and acids, and it can be used in a range of pH from 3 to 12 with no particular cautions.
- It reveals an excellent stability in hard waters.
- It fits well with all systems: anionic, non ionic and anpholitic ones; it can also be added, in small amounts, to cationic surfactants.
- Its wetting power is one of the most elevated, and it remains stable at all pH values.
- It can be used from 5 to 25% in shampoos and other toiletries, both as primary surfactant and in assaciation with others.
- Potential impurities as 1-4 dioxane and free ethylene oxyde are absent

Surface activity

REINOLDERM OLV4 behaves as a non ionic compound in aqueous solution. The micelles are neutral clusters; their formation takes place at a critic concentration which is higher than the one of non ionic compounds, and comparable to the critical concentration of anionic compounds. As for all surfactants, in fact, surface activity depends on their concentration.

Cleansing power

In laboratory trials, **REINOLDERM OLV4** has revealed a very high cleansing power, comparable to the one of alkylethers sulphate, sulphosuccinates and betains (Tergometer, 2g/l solution in active substance, 30 minutes at 40°C. The resuling values are expressed in percentage, referring to MgO=100%).

Dodecylbenzene sodium salt	36
Cocoilamidopropyl betaine	31
REINOLDERM OLV4	30
Laureth Sulphosuccinate sodium salt	29
SLES	29

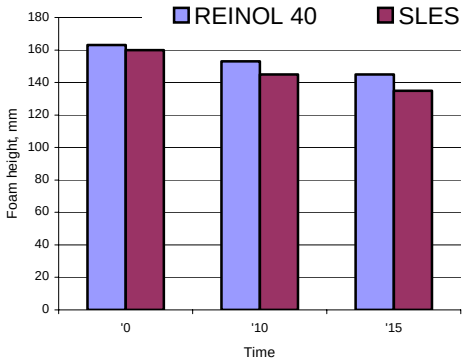
Foam height

The foam height has been determined with the ROSS & MILES method at a temperature of 37°C, using an aqueous solution at a concentration of 1g/l in active substance, pH=7.

The results are here reported in comparison to the foam obtained from an equivalent solution of SLES, being the test leaded in the same conditions.

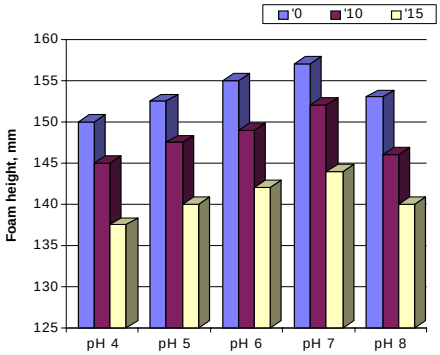
It is very interesting to observe that the foam produced by reveals a higher stability than the foam produced by SLES. Furthermore, keeps its foaming capacity unvaried in a large range of pH, even at extremes pH values.

The following graphic shows that though the foam produced by **REINOLDERM OLV4** reaches its highest values at pH 6-7, it has an acceptable height even at acid values, such as pH =4.

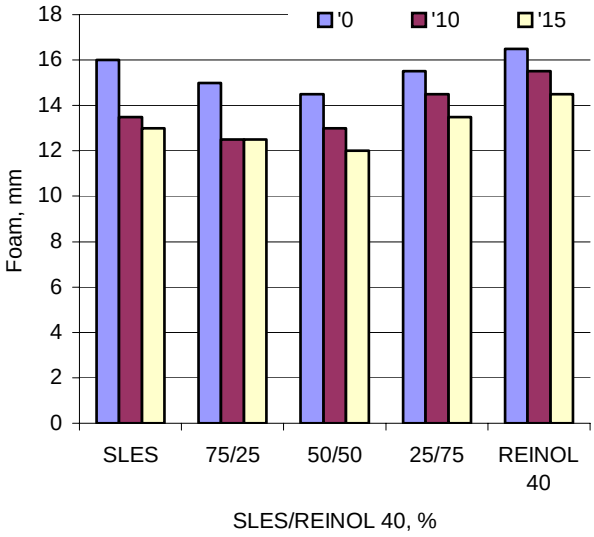


The foam reveals both a high stability, and the same important characteristics of usual anionic surfactants. The stability has remained unchanged for the whole range of the considered pH values.

The foaming capacity of binary mixtures made of SLES (decreasing) and **REINOLDERM OLV4** (increasing) has been evaluated, using the same conditions as in the previous tests: aqueous solution with 1 g/l in active substance, temperature of 37°C, pH 7. The results are described in the following graphic.

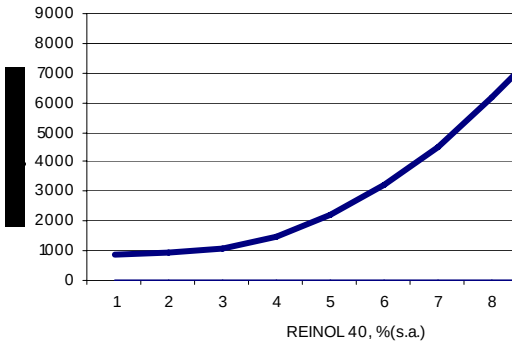


Even if in these mixtures the foam height shows a light fall, mostly when SLES is less or equal to **REINOLDERM OLV4**. Its increasing percentage produces an effective increase in foam stability.



Viscosity

REINOLDERM OLV4 shows a strong thickener action towards SLES. In the following graphic there is reported the increasing viscosity of an aqueous solution (10% in active substance) of SLES while increasing the amount of **REINOLDERM OLV4**



If used as a primary surfactant, **REINOLDERM OLV4** reveals an interesting viscosizing capacity even without using mineral salts.

The employment of **REINOLDERM OLV4** (PEG-7 OLIVE OIL), a particular glyceryl derivative from olive oil, to obtain an emollient, surfatting and solubilizing action, doesn't decrease the viscosity of the formulation; in many cases it determines a thickening effect. In formulations where the surfactant system is composed mostly or completely by **REINOLDERM OLV4**, viscosity can be increased

not with salt, but with agents like PEG 6000 or PEG 120 Methyl Glucose Dioleate.

Biodegradability

The determination of biodegradability has been made according to the CEE Regulation N. 82/242. The results are satisfying: **REINOLDERM OLV4** is biodegradable over 95% (OECD method).

Toxicity

Skin irritation has been tested both on human volunteers (Schwartz's PATCH TEST), and *in vitro* (Dermal and ocular). **REINOLDERM OLV4**, such as all REINOL products, has not been tested on animals, accoring to the new trend of cosmetic products. Considering the chemical similarity of **REINOLDERM OLV4** with some compounds that have been largely tested in the past, the existing data for chemical analogues allow to define this product as much less toxic and irritant than all the commonly used surfactants.

The primary irritation test has been made also on some of the most commonly used surfactants, in comparison to **REINOLDERM OLV4**. The test requires the application of an occlusive patch on the skin of the right arm of 20 adult volunteers, and it is renewed every day for three days. At the end of the third day this treatment is repeated in the same way.

	Conc.	Irritation Index
REINOLDERM OLV4	10 %	0.9
SLES	10 %	2.3
Sodium Lauryl Sulphate	10 %	3.0
TEA Lauryl Sulphate	10 %	3.0

Evaluation scale

0	no irritation
0 – 2	low irritation
2 – 5	moderate irritation

The trials have been made using a solution 15% s.a. The value of cutaneous irritation has been tested after 72 hours. **REINOL® 40** results therefore NOT IRRITANT. The same test has been made using various mixtures with SLES.

		Irritation Index
SLES		2.3
SLES/ **REINOLDERM OLV4**	3/1	2.0
SLES/ **REINOLDERM OLV4**	1/1	1.5
SLES/ **REINOLDERM OLV4**	1/3	1.2
REINOLDERM OLV4		0.9

The following formulations are here indicated in order to give general directions for the employment of **REINOLDERM OLV4**. Although they have been realised according to the best information we owe, this does not exonerate the user from verifying their validity.
REINOL's technical service is at the user's disposal in order contribute to the development of new formulations, and to give the needful information for a correct use of our products.

Conditioning Shampoo

REINOLDERM OLV4		35.00
SLES		10.00
REINOLDERM OLV3		3.00
Water	up to 100	
POLYQUATERNIUM 7		1.00
Yucca Glauca Extract		2.00
pH modifier, as needed to pH=4,5		
NaCl	q.s.	
Perfume and preservatives	q.s.	

Shampoo frequent use

REINOLDERM OLV4		40.00
SLES (27%)		20.00
Sodium Lauroyl Sarcosinate (30 %)		5.00
REINOLDERM OLV3		2.50
Water	up to 100	
D-Panthenol		2.00
pH modifier, as needed to pH=5,5		
NaCl	q.s.	
Perfume and preservatives	q.s.	

Foam bath

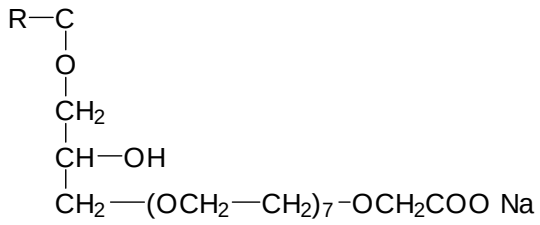
REINOLDERM OLV4		27.00
SLES (27 %)		20.00
Disodium Laureth Sulfosuccinate		5.00
REINOLDERM OLV3		2.00
Water	up to 100	
Arnica Extract		1.00
pH modifier, as needed to pH=5,5		
NaCl	q.s.	
Perfume and preservatives	q.s.	

Liqiud soap

REINOLDERM OLV4		30.00
Glycol Distearate		5.00
Disodium Cocamido MEA-Sulfosuccinate		3.00
REINOLDERM OLV3		1.00
Water	up to 100	

Horse-chestnut Extract	2.00
pH modifier, as needed to pH=5,5	
NaCl	q.s.
Perfume and preservatives	q.s.

Alkyl ether carboxylates are ether-soaps that are generally obtained through the reaction of an ethoxylated fatty alcohol with mono chloro-acetic acid. A carboxylic group is present in the terminal stages, but it can be neutralised in order to obtain a stable, clear product that is free of free soap residuals with an alkaline pH that are incompatible with hard water. In our product, in the place of a ethoxylated fatty alcohol we used a special derivative of olive oil. This is the structural formula:



Where RCO= olive fatty acids

REINOLDERM OLV4 is used in all preparations that are designed for delicate use in personal hygiene products, shampoo, shower gel, liquid soap, bath foams, etc. It produces a rich, creamy, slightly shiny foam with small bubbles. It washes delicately without excessively delipidifying the skin or the hair. **REINOL® 40** can be used with every type of surfactant (non ionic, anionic, amphoteric) and in a wide pH range.
The functional and applicative advantages of this modified product are listed in the following table.

- High compatibility with skin and hair
- Forms a creamy foam, with small bubbles, suitable for delicate detergents, not excessively delipidifying.
- Good rheological characteristics: practically colourless and odourless.
- Good solubilising power and excellent wetting ability, neither of which are effected by different pH conditions.
- Stable in alkaline and acid environments, can be used in a pH range of 3 to 12, without problem.
- Compatible with anionic, non ionic and amphoteric systems; in small quantities it is also compatiblewith cationic substances.
- Free of impurities like 1-4-dioxane and practically free of ethylene oxide.

In application, the product proved to have excellent detergent power which is directly comparable with that of alkyl ether sulphate and betains.

Another point to note about **REINOLDERM OLV4** is that it has shows ionic and anionic characteristics at the same time, which make it compatible with cationic substances which are able to supply good foaming properties and disperse (in small doses) calcareous soaps. Furthermore, it is understood that it is well tolerated by the skin (by the scalp in particular) and by the mucous.

Gentle body exfoliant

REINOLDERM OLV4	30.00
REINOLDERM OLV3	3.00
Cocamidopropyl Betaine	3.00
SLES	10.00
Water	up to 100
Jojoba beads	5.00
Perfume and preservatives	q.s.

Shower gel

REINOLDERM OLV4	18.00
REINOLDERM OLV3	3.00
SLES	15.00
Water	up to 100
Panthenol	1.00
Perfume and preservatives	q.s.
NaCl	q.s.

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