

NEW BLENDS FOR PERSONAL CARE

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Abstract

Personal care growth is nowadays primarily driven by different trends. The most important request products environmentally friendly, from vegetable or renewable sources, obtained with limited and well defined chemical processes.

The article will describe two interesting patented blends with their properties and applications.

Introduction

No regulations exist in cosmetics regarding the word “natural”. Nevertheless consumers and some associations are requesting cosmetics raw materials with specific characteristics: from vegetable origin, obtained with limited and well defined chemical processes, completely biodegradable, no animal tested, with proper packaging and without preservative and/or chemical additives.

For years, typical rinse-off products have been containing alkyl and/or alkylether sulfates as main anionic surfactants (1,2). These molecules exhibit excellent foaming properties, good detergent power, viscosity building capacity and acceptable irritation potential that can be decreased with mild non ionic or amphoteric co-surfactants.

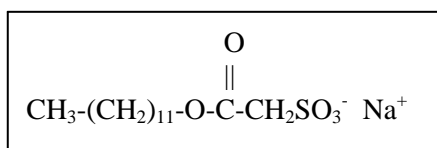
As viscosity is often evaluated as product richness, thickeners are also added to rinse-off products. Ethanolamides are able to boost viscosity and/or stabilize foam. Their use is limited by the possible nitrosamines formation. So is it possible to develop products without alkyl/alkylether sulfates, ethanolamides and ethoxylated molecules maintaining the same performances as traditional products?

Zschimmer & Schwarz has developed two high concentrated blends able to answer to these requests.

Surfactants choice

The first challenge was the choice of surfactants. Many blends on the market are based only on amphoteric and/or non ionic surfactants but they don't clean properly skin/hair and are too substantive. An anionic surfactant with good cleansing, foam and viscosity power and acceptable toxicological profile was a not easy formulation task. Sodium Lauryl Sulfoacetate (fig. 1) was selected.

Figure 1 - Sodium Lauryl Sulfoacetate chemical structure



Nevertheless, Sodium Lauryl Sulfoacetate alone has poor solubility and it is difficult to handle. So we chose to blend it with other surfactants.

The use of amphoteric surfactants as Cocamidopropyl Betaine (fig. 2) or Sodium Cocoamphoacetate (fig. 3) allowed us to obtain mildness, antistatic, conditioning and substantive properties as well as viscosity building effect.

Figure 2 - Cocamidopropyl Betaine chemical structure

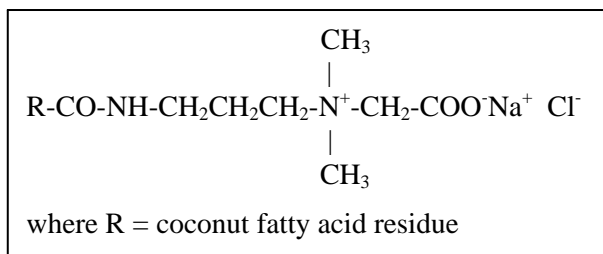
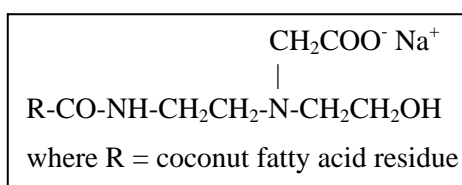
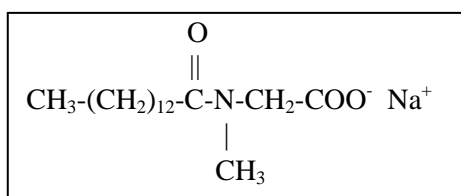


Figure 3 - Sodium Cocoamphoacetate chemical structure



At the end also Sodium Myristoyl Sarcosinate (fig. 4) was introduced in order to improve texturising and substantive properties of the blends and to help viscosity building of the dilution.

Figure 4 - Sodium Myristoyl Sarcosinate chemical structure



Formulation trials

Different formulation trials have been made in order to obtain high concentrated bases flowable at room temperature (25°C) and able to thicken by simple water dilution. All formulations prepared were submitted to accelerated stability trials by centrifuge at 7000 g for 30' at 37°C and long term stability test at room temperature, 40°C and 4°C.

Among the different formulations we chose the following:

Blend A:

- 10% - 25% (active matter) of Sodium Cocoamphoacetate
- 10% - 25% (active matter) of Sodium Myristoyl Sarcosinate
- 5% - 10% (active matter) of Sodium Lauryl Sulfoacetate
- 1% - 5% (active matter) of Glycerin
- 1% - 5% (active matter) of Urea
- to 100% of water

Blend B:

10% - 25% (active matter) of Sodium Myristoyl Sarcosinate

10% - 25% (active matter) of Cocamidopropyl Betaine

5% - 10% (active matter) of Sodium Lauryl Sulfoacetate

to 100% of water

Table 1 describes chemical-physical properties of the blends (3).

Table 1 - Blends characteristics

	BLEND A	BLEND B
Appearance at 20°C	from clear to turbid viscous liquid	from clear to turbid viscous liquid
Colour	from lightly yellow to yellow	from colourless to lightly yellow
pH as it is at 20°C	5.0 - 6.5	5.0 - 6.0
Dry matter	41% - 45%	34% - 38%
Sodium chloride	7.0% - 9.0%	5.5% - 7.5%
Viscosity at 20°C	8000 cps maximum	8000 cps maximum
Preservative	absent	absent

Other combinations based on same concept were evaluated and all patented (4)

Thickening performance

All the realized formulations have a viscosity lower than 8000 cps at 20°C and are therefore flowable. Viscosity can be changed modifying pH.

We analyzed different products of the market and we decided to take as a standard the value of 18% of dry matter for foam baths/shower gels and 11% of dry matter for shampoos.

Then we diluted with water our blends in order to obtain these dry matter values and we measured the obtained viscosities. In both cases and for both blends at 20°C we obtained gels (viscosity values higher than 20000 cps). Maximum yields in viscosity were obtained at pH 5.5-6.5 for formulation A and at pH lower than 5.5 for formulation B (3).

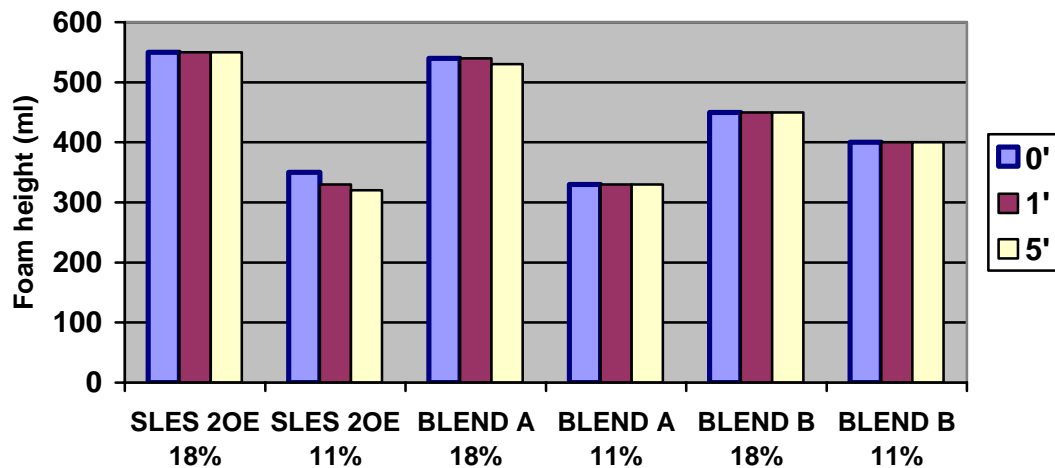
Foam power

Foam height and stability of the blends were measured (3).

Figure 5 shows the foam ability of the blends at 18% and 11% of dry matter compared with Sodium Laureth Sulfate with 2 moles of ethylene oxide brought at the same dry matter and pH.

Stroke method was used (hard water 15 French Degrees, 1g/l solution, perforated disk method, 30 strokes in 30 seconds, 200 ml of solution used). Foam was evaluated immediately, after 1 minute and 5 minutes.

Figure 5 - Blends Foam Power



The two blends showed also a good foam index, which is a combination of the volume and water uptake of foam. The latter is an indication of the creaminess of the foam. When the foam can take up more water, it does not slip down wet skin too fast while the user is showering. The higher the foam index of foam, the higher the quantity and the better the aspect of the foam.

Foam obtained with SLES is coarse and with bubbles of large dimensions; foam obtained with the two blends is more compact, tiny and with little bubbles.

Foam stability was more or less comparable for all trials. Formulation B gave excellent results at low dilution.

Conclusions

The described formulations want to be a valid proposal with good foaming properties and viscosity build-up capacity for the recurrent “green” trend.

* Many thanks to Claudia Savino for her help in this work

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