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A special micellar water apt to perform a cleansing power onto dirty skin 87.6% more than any other cleansing agents and detergents.

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***Abstract**: scope of my proposal is to reveal a peculiar micellar water that is composed by a plentitude of ingredients that depending on temperature of boiling, Reynold's number and speed of the ultra-centrifugation,can give a micellar water that performs a cleansing effect that is 87,6% more than other cleaning products and toners,thanks to the elevated CMC,achieved thanks to these expedients.Equations and time of preparation are longer, but results are wonderful.I have teste on 5 volunteers who use to make up very strongly and have serious difficulty to render their face cleaned,fresh and with no irritation.*

***Keywords**: micellar water, Reynold's number, CMC, Krafft's temperature, Navier-Stokes equation*

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I. Background

Notwithstanding the critic micellar concentration of a surface active agent in water is a very delicate matter of fact, since the slight interval of temperature to trespass in order to obtain the required turbulence that can give raise to a stable fluid and limpid emulsion (the so-called Krafft's temperature) is very difficult to be determined as no peculiar rule exists, I have divined to use a high concentration of a long chain glucoside (as chief ingredient of the cosmetic I ideated) to create the micellar water,together with other surfactants and ingredients,in order to satisfy the Reynold's number that is basic for the obtainment of a good micellar water.

An optimal micellar water must have its CMC at the equilibrium, that means that the dispersion of micelles is very high,the surface of contact of the mix of surface active ingredients (disguised as micelles) must be very high even if the "micellar" emulsion must always result limpid.

When the surface of contact with greasy and oily or spotted skin (cause of make-up especially in the eyelids) is higher than the surface of other single surtactants, the cleansing power is at its maximum and no other micellar water can reach the same results of cleaning regards to this micellar water I have studied.

To create this special micellar water I have had to investigate upon two important equations that can give the speed of the ultracentrifugation, and the temperature at which the process may occur anyway must occur obtain a liquid and limpid aqueous emulsion with elevated cleansing power.

Now it is well known that ionic surface active agents may achieve a CMC 100 times more with regards to non-ionic surfactants, but the fact that the glucoside I have chosen presents a very long and branched alyphatic chain that tends to low the temperature of the system, so that the Krafft's temperature interval (as we will observe below) can be easily neglected and there is not risk of sedimentation of lyotropiccrystals of the surfactant itself.

The lyotropic crystals are not but a liquid mesophase that may be formed by dissolving an amphiphilicmesogen in a suitable solvent, under appropriate conditions of concentration, temperature and pressure.

When the ultracentrifugation is used to prepare micellar water, one must keep on account of the theNavier-Stockesequation that describes the phenomenon of turbulence that drives to the creation of micelles.

Navier–Stokes equations (or RANS equations) are time-averaged equations of motion for fluid flow and is strictly correlated with the temperature of the system. The idea behind the equations is Reynolds number, whereby an instantaneous quantity is decomposed into its time-averaged and fluctuating quantities, an idea first proposed by Osborne Reynolds.[2] The RANS equations are primarily used to describe Turbulency can afford the creation of a clear and stable emulsion.

The turbulence starts when Reynold's is superior to 4000.

These equations can be used with approximations based on knowledge of the properties of flow turbulence to give approximate time-averaged solutions to the Navier–Stokes equations. For a stationary, incompressible Newtonian fluid, these equations can be written in Einstein notation as:

(∂∂t+u·div)u=1ρ∇p+ν∇2u+1ρf
Where ρ is dependent by Reynold's number.
My cosmetic mix is appropriately a incompressible Newtonian fluid and thus it is better to highlight was Reynold's number represents and means.
The Reynolds number is defined as

$$R = \rho\ u\ L/\ \mu\ =\ UL/\ \nu$$

where:

- ρ is the density of the fluid (SI units: kg/m^3) (in my case it is water anso it is 1)
- u is the velocity of the fluid with respect to the object (rpm of the centrifuge employed)
- L is a characteristic linear dimension (m or in this case the molecular weight of the ingedients that must form the micelles)
- μ the dynamic viscosity of the fluid (Pa·s or $N{\cdot}s/m^2$ or kg/m·s)
- ν is the kinematic viscosity of the fluid (m^2/s).

µ is is the dynamic viscosity of water plus all the hydrophylicingredientsdissolved,andν is the kinematic viscosity of the mix of lypophilic ingredients that must create the micelles and u is the speed of centrifugation, measurable in rpm.

My cosmetic contains:
=
Water, Glycerin, PEG-40 hydrogenated castor oil, PEG-7 glyceryl cocoate, Sorbitol, Linseed acid, Sodium cocoamphoacetate, Lauryl glucoside, Sodium cocoyl glutamate, Sodium lauryl glucose carboxylate, Polysorbate 20, Parfum,preservatives.

And thus the dynamic viscosity of the hydrophilic phase, will be the average of the dynamic viscosities of the single ingredients:
water,glycerin,sorbitol,linseed acid, lauryl glucoside, sodium cocoylglutamate,polysorbate 20 and preservatives.
The lypophilic phase is the following: PEG-40 hydrogenated castor oil, PEG-7 glyceryl cocoate, Sodium cocoamphoacetate, , Sodium lauryl glucose carboxylate.

The average of all the dynamic viscosities of the hydrophylic phase is:
0.95+0,69+4,37+2.0+1.03+3,75+1.092 = 1,98 (that is 1980 mPas)
And the average of all the kinematic viscosities of the lypophilic phase is:
0,65+9,6+1,02+0,1 = 2,84 (m^2/s)that is 2840 mm^2/s.
The velocity of ultracentrifugation I have chosen is 12000 rpm.
The Reynold's number does not depend from temperature, even if Navier-Stokes equations are correlated to temperature and the minor is the Reynold's number,the major must be the temperature,keeping on account the Krafft's temperature, that in my case corresponds to the boiling point of the hydoglycericsolution,that represents the higher percentage of all the cosmetic item.
The temperature should theorical be a slight superior to 195° C that is the boiling point of a mix water-glycerin.
Although this range must be individuated resolving the Reynold's equation and the Navier-Stokes one.
And so:

$$\delta\rho\ /\delta\tau\ (\rho u) = 0$$

Where τ is the temperature I have choosen for boiling the mix,that is 195° C.
It can be easily observed that the result is nihil,and so resolving the Navier-Stokes equation,we can see that no variation of the temperature fixed must be applied (idest the interval of the Krafft's temperature may be neglected).
Resolving the equation to obtain the Reynold's number:
$R = \rho\ u\ L/\ \mu\ = uL/\ \nu$
L is the sum of all the dimension in Angstrom of all the lypophylicmix,and is 2680.
And so:

$$R = 1 \times 12000 \times 2680/1980 = 12000 \times 2680/2840$$

And the result is:

16242.42 = 11323

Calculating the average of the two values and sharing for two the Reynold's number will be 13782.
The starting point to afford the turbulence apt to create the micellar aqueous emulsion is achieved.

II. Materials And Methods

I have recruited three entraineuses (A, B, C) and two mannequins (D,E>>),who are accustomed to make up their face very deeply for reason of their job.They used to employ a cleansing milk, a toning lotion and an all-purpose to clear up all the nights (or successive morning after their job) and I asked them to try to use my micellar water only once to clean up (with a cotton ball with no successive rinsing with water.

III. Results

In the following table one can observe the minutes they employ with the three normal cosmetics and the minutes they need to have their face completely cleansed using my micellar water.

Table I:Time in minutes required by each individual to obtain a fresh and clean face skin

Case	**MINUTES NECESSARY TO REMOVE MAKE UP WITH THE THREE NORMAL TRADE COSMETICS THEY GENERALLY USE**	**MINUTES NECESSARY TO REMOVE MAKE UP WITH MY MICELLAR WATER**
A	33	4
B	47	6
C	39	5
D	42	6
E	55	7

Calculating the percentages of cleansing ability, one can observe that my micellar water performs a capacity of removing all kinds of make 87.06% more than the other three cosmetic items together, with no rinsing no waste of time and less expense.

IV. Conclusions An Discussions

Micellar water contains small particles called micelles.They work like a miniature sponge, mopping up dirt and makeup while hydrating face skin. Micelles have an oil-loving 'tail' that traps dirt, oil, and makeup and a water-akin 'head' that allows the micelles to dissolve impurities so they can easily be wiped away." So, that all sounds waybetter than the regular water one uses to wash his face—and it is. In fact.The reason micellar water is so popular in France is because of the notoriously hard water in Paris, which can be extremely harsh on the skin. "Micellar waters are super-gentle, so they won't strip or irritate the skin while cleansing.All skin types can benefit from micellar water.

To use micellar water, one simply pours it into a cotton pad and rubs it over his face, like a toner. Then, just carry one with your skincare routine as normal—no need to rinse afterward. Micellar water can replace any daily cleansing routine.

Aknowledgements

The cosmetic product is already on the world market.Its name is BIOIDRA by Texia.

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