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Emulsifiers: the hidden active ingredients for innovative textures

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ABSTRACT

Beauty and behaviour have a new meaning and a new definition. Traditional textures have left the place to innovative products which focus on engaging cosmetic experiences in which the consumer is directly involved in the beauty routine. Consumers become "actors" with increasingly complex roles and aid in developing innovative textures. Formulators examine new ingredients and techniques from which design modern cosmetics and textures. The choice of natural ingredients, especially emulsifiers, becomes not only a technical and functional tool, but an ally for creating emotional textures. Sensory, liquid crystals, transforming and vanishing textures are some concepts in which emulsifiers play as marketing drivers to build an effective and modern communication. Sensory emulsifiers become hidden active ingredients

The current approach to beauty has evolved tremendously over the last decade in particular with regard to customer consciousness, advent of new technologies and the social implications linked to each consumer's personal choice (1).

Consumers have moved from the traditional idea of simply buying a product and being a consumer to wanting to take part and truly understand what is behind the creation of each speciality he or she purchases. The contemporary consumers are increasingly interested in the choices they make; along with the sensory experience, they want to know where the product comes from, what materials it was made from and to do so also use information from the different social-media. How much energy has been used to produce and transport the cosmetic I am using? Can I easily and completely recycle the packaging? Is the formulation eco-compatible? Does it contain ingredients that may be harmful to my health? What does the label of the product I am buying tell me? Can I contribute to someone else's well-being with my purchase? The cosmetic industry is therefore moving from a product-based model to an experience-based model in which consumers seek a fully interactive experience and create strong bonds with the beauty brand they choose, making it part of their lifestyle.

This scenario has produced cosmetic fervor: the panorama of cosmetic textures has quickly expanded and evolved from the traditional white, glossy emulsions to unique innovative textures. These in turn offer new experiences which call for the need to share beauty through social networks. The customers, though are more aware to environmental matters all of their lifestyle behaviors. In our field, *Being*

Commercial Name	Supplier	INCI Name (US)	%	Activity
19PS29 HUILE D'OR <i>no longer just an oil</i>				
A vanishing oil with multipurpose texture. Deep nourishing for dry skin transforming formulation; on wet skin becomes a light body lotion.				
Phase A				
EMULPHARMA® ECOTECH	RES PHARMA INNOVATIVE INGREDIENTS	Polyglyceryl-3 Cocoate	11.00	COSMOS Sensory Emulsifier
EMULPHARMA® PG20	RES PHARMA INNOVATIVE INGREDIENTS	Polyglyceryl-2 Disostearate	1.25	COSMOS Sensory Emulsifier
		Dicaprylyl Ether	75.00	Emollient
		Cucurbita Pepo Seed Oil	2.50	Emollient
		Octyl Palmitate	7.00	Emollient
		Tocopheryl Acetate	0.50	Antioxidant
PANTROFINA® OLV	RES PHARMA INNOVATIVE INGREDIENTS	Oleo Europaeo Oil Unsaponifiables	1.50	COSMOS Active
Phase B				
		Aqua (Water)	0.75	Solvent
PANTROFINA® SKIN 360	RES PHARMA INNOVATIVE INGREDIENTS	Diglycerin, Pinus Pinaster Extract	0.50	Botanical COSMOS Universal Active

Figure 1. huile d'or.

Green also passes through the choice of natural, non-ethoxylated, cold-processable emulsifiers, which allow energy saving in their processing and machinability; a *green emulsifier*, though, has to be able to offer a sensory texture.

This gives tremendous opportunity to use structural and technical properties of products as true marketing messages, giving the new consumer information he or she may need or want.

THE EMULSIFIER JUNGLE

Consumers want to become knowledgeable on the origin of ingredients, have details on the technology used and information on the choices which lie behind the formulation that they have chosen as their own. This means that formulation specialists are required to have transverse skills ranging from cosmetology, to chemistry and technical marketing and are the true bridge between marketing and the final client.

Cosmetic emulsions have advanced from their traditional function of plain carriers of active ingredients to substances that can convey pleasure to the skin. An emulsion must have the ability to enhance the performance of cosmetics and offer an added value with appealing technical characteristics and features. These are the tools we can use to "convince" our clients.

Current examples of innovative emulsifiers are, but not limited to: Liquid crystals, α -gel, nano-emulsions, micro-emulsions,

natural emulsifiers. Among these, liquid crystal emulsions are an example of a specific cosmetic architecture which may appeal to the contemporary final consumer. They are composed of a biological system of lamellae between the solid and liquid phase which create enhanced structure and mechanism of action known as supramolecular models (2).

Let's describe how we can convey a technical work of art to a consumer who searches for well-being. The stratum corneum and the molecular liquid crystal organization have intrinsic similarities which can be used to activate the active ingredients (3) contained in an emulsion. In this way, the structure can enhance some of the product's most important properties such as affinity and the natural moisturizing effect. With Em1, Em2 and Em3 we can obtain a crystal liquid emulsion, in which the emulsifier works as the "hidden active ingredient" avoiding having to add more.

The limited number of ingredients in a formulation follows two important drivers: Minimalism and the Back2basics (4), novel transversal trends which focus on simple formulations and packaging with a low environmental impact.

TRANSFORMING TEXTURE

Nowadays, everything seems to take on a *liquid structure*; all objects can be transformed into something else and take life in another form. In the cosmetic industry, this concept takes form through transforming texture.

But what exactly does "transforming" mean? A formulation in a metastable balance can change into something else when an external factor occurs.

Huile d'or (Figure 1) is an example of stable microemulsion. Em6 and Em7 are two secondary naturally-derived emulsifiers obtained from polyglycerols which can be used

19PS44 OCEANBLUE CREAM		Feel a waterfall on your skin; as gel breaks-up during application, water is released.		
		<i>feel a surfash</i>		
Commercial Name	Supplier	INCI Name (US)	%	Activity
Phase A				
EMULPHARMA® PG20	RES PHARMA INNOVATIVE INGREDIENTS	Polyglyceryl-2 Disostearate	1.25	COSMOS sensory emulsifier
		Isamyl Laurate	3.00	Emollient
		Parfum	0.10	Fragrance
Phase B				
RESASSOL® DN	RES PHARMA INNOVATIVE INGREDIENTS	Diglycerin	3.00	COSMOS Moisturizer
EMULPHARMA® ECOTECH	RES PHARMA INNOVATIVE INGREDIENTS	Polyglyceryl-3 Cocoate	1.00	COSMOS sensory emulsifier (Blue Shade)
PANTROFINA® SKIN DNA	RES PHARMA INNOVATIVE INGREDIENTS	Lecithin, Rutin	0.50	Botanical DNA protector
PANTROFINA® SKIN 360	RES PHARMA INNOVATIVE INGREDIENTS	Diglycerin, Pinus Pinaster Bark Extract	0.50	COSMOS Botanical Universal active
		Carageenan	0.10	Rheological Additive
		Xanthan Gum	0.10	Rheological Additive
Phase C				
		Aqua (Water)	43.90	Solvent
		Aqua, Potassium Sorbate, Sodium Benzoate	1.50	Preservative
Phase D				
		Aqua (Water)	43.05	Solvent

Figure 2. Ocean blue cream.



Figure 2B. Regular and fine texture. The homogeneity and uniformity help to extend the shelf life of the dispersed system. (Leica DM 1000- 20x).

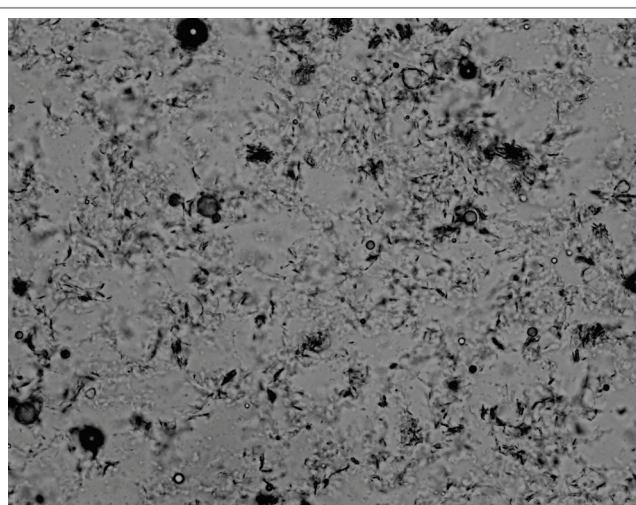


Figure 3B. Multidimensional texture. Natural Scrub Particles are perfectly suspended in a dispersed system (Leica DM 1000- 10x).

to create microemulsions. Used together they create a perfectly transparent texture able which can contain up to 2% of water without affecting transparency. The formula is perceived by the consumer as a traditional oily mixture but by only adding water, a visible transformation occurs making the transparent oil become an oily emulsion which in turn creates a new experience. Communication for marketing purposes has an array of ways to convey this message; oil that turns into a light foam for a body cleansing oil that can be used in the shower or its use as a make-up remover.

Em7 is the perfect ally to create w/o formulation with a high internal phase emulsion. Unlike many other w/o emulsifiers, it can withstand 80% of water in formula and creates a fresh texture which is unusual for oil-based emulsions.

Ocean Blue cream (Figure 2), contains more than 80% of watery phase. With a limited amount of energy, such as that used during application, bonds break releasing water. it is a transformation of structure that translates into a sensory dynamism: a milk to water transformation.

A balm to oil transformation (Figure 3). The use of Em5 as primary emulsifier, gives a formulation with a double transforming effect: a rheologic change from balm to oil, due to the heat of the massage; with water a second transformation from oil to cream occurs in the structure.

CONCLUSION

Back to basics: Coming back to essentials. An essential and powerful tool for a simpler life style with the potential to become an important trend in the *millennials*.

Living the change; a transversal trend which highlights the need of an experience in which a substance transforms into something else.

	INCI Name	%	Activity	Supplier
Phase A				
RESPLANTA® OLIVE	Olive Oil Glycereth-8 Esters	30.00	Water soluble vegetable oil	RES PHARMA Innovative Ingredients
	Macadamia Ternifolia Seed Oil	30.00	Vegetable oil	
	Butyrospermum Parkii Butter	7.00	Vegetable butter	
EMULPHARMA® ECO10	Polyglyceryl-10 Laurate	5.00	COSMOS PGF Emulsifier	RES PHARMA Innovative Ingredients
	Cetearyl Alcohol	14.00	Lipophilic consistence factor	
EMULPHARMA® CORE	Ceteth-2, Isotridecyl Cocoate, Ceteareth-25, Glyceryl Stearate, Cetearyl Alcohol, Ethylhexyl Palmitate	10.00	Liquid crystal promoter emulsifier	RES PHARMA Innovative Ingredients
Phase B				
TABASHIREX	Bambusa Arundinacea Stem Extract	3.00	Natural scrub	GREENTECH
Phase C				
	Tocopheryl Acetate	0.50	Lipophilic antioxidant	
Phase D				
	Parfum	0.50	Fragrance	

Figure 3. Splash crash.

New natural raw materials and emulsifiers with an excellent sensory effect that offer the ability to make an innovative formulation are the primary focus of today's formulator.

The new trends of beauty routines are becoming closer to those of Asian rituals and create potential for layering the skin with a number of cosmetic steps. Formulators must evaluate their formulation using traditional sensory analysis in order to give a realistic feedback, but must also mimic the final layering that the final consumer will apply on his or her skin.

The cosmetic formulation is therefore the result of a balance between the complexity of the molecular organization and sensorial aspects.

Innovation in fields that go beyond those purely cosmetic.

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Emulsifiers	INCI	Technical properties	Marketing advantages
Em1	C12-20 Acid PEG-8 Ester	Self emulsifiers Liquid crystal High stability Wide range pH stability primary	High performance product Active ingredients booster Minimalism Dry skin
Em 2	Ceteth-2, Isotridecyl Cocoate, Ceteareth-25, Glyceryl Stearate, Cetearyl Alcohol Ethylhexyl Palmitate.	Selfemulsifier Liquid crystal High stability Salt resistance high viscosity primary emulsifier	High performance product Active ingredients booster skin affinity Buttery texture – dry skin
Em 3	Cetearyl Alcohol, Glyceryl Stearate, Sorbitan Stearate, Cetearyl Glucoside)	COSMOS oleosome Good stability high viscosity primary emulsifier	Active ingredients booster Skin affinity Sustainable beauty Rich texture
Em 4	(Glyceryl Stearate, Cetearyl Alcohol, Stearic Acid, Sodium Lauryl Glutamate)	Liquid crystal good stability high viscosity COSMOS-RSPO vanishing cream	Bioavailability of active ingredients Skin affinity Sustainable beauty Transforming texture
Em 5	Polyglyceryl-10 Laurate, Aqua (Water)	Natural Secondary emulsifier Very high HLB Low viscosity Foaming stabilizer	Layering Transforming texture Sustainable beauty Micellar products Sensory cleanser
Em6	Polyglyceryl-3 Cocoate, Aqua (Water)	Natural High stability Non ionic	Sustainable beauty Transforming texture
Em7	Polyglyceryl-2 Diisostearate	Natural, W/O High amount of internal phase	Sustainable beauty Transforming texture Water break effect Freshness

Table 1. Most frequently used emulsifiers: Technical properties and advantages.

ABOUT THE AUTHOR

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Strong academic knowledge in cosmetic formulation and cosmetic technical Marketing.

15 years of experience in project management from fragrances to

skincare products. Specialist skincare formulator and strong experience in Japanese cosmetics.

Experience in creative technical marketing to design innovation and concepts around cosmetic textures.



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Experienced R&D Specialist in cosmetics industry. Strong knowledge in raw

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about 10 years as Formulator, specializing in skin care and make up emulsions. Since January 2019 she is a Technical Marketing Specialist at Res Pharma Innovative Ingredients.

