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Formula protection and development: how to surf the microbiota-ingredients wave

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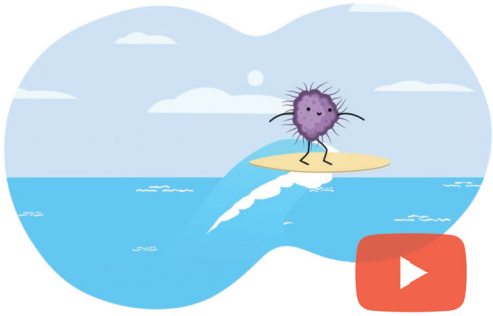
***ABSTRACT:** Have you ever wondered if introducing probiotic-derived ingredients could interfere with the sensoriality of your formula? And what if it unbalances the preservative system? ROELMI HPC is here to share our formulation tips for well-studied cosmetic ingredients combinations that will take care of your Skin Microbiota.*

What is formulators' favourite sport? To surf the *-insert here market trend of the moment-* wave! It is exactly like real physical activity: challenging, hard, but satisfying! They often feel inspired and stimulated by the direction the market is going. With their creativity, scientific background and ingredients experience, they are able to create new amazing products. It is nevertheless a concrete challenge for them, an unexplored land where they need to find the perfect balance between old and new, what the formulation needs and what the market wants, avoiding solubility and stability issues. They also cannot forget about the safety for the end user. So … not exactly like surfing! The concept is still to find the perfect balance, but while when surfing you are responsible for yourself only… the choices of a formulator will effect many other people!

I'm sure we all know what the main trend in the cosmetics field in this first half of 21st century is … yes! You got it! *Skin microbiota*! It is essential to take care of our skin inhabitants, and we can do that by using the right cosmetic ingredients, as we mentioned in our last intervention on the Microbiome column (*1*).
Unfortunately, there is not a single recipe that will work for everyone on this Earth: our microbiota is different not only from individual to individual, it also changes constantly according to both internal and external factors and with time.
This is a good news because diversity is what makes us special, but it also means hard work for cosmetic companies! As there are so many different skin microbiota compositions and needs, the number of variables is so high and there are infinite possible formulas to be created.
Luckily, one product will probably fit different end users, as happened since day one of cosmetics, it is a matter of attempts. Skin care is highly subjective and each consumer needs to try different formulas and evaluate which one is better for their own skin health.

Consequently, different ingredients can contribute to create the variety of finished products that the market requests. As mentioned in our previous article, the main substances used to do so are all the micro-world related ones: probiotics, postbiotics, prebiotics. If they all mean the same to you, check out our article focused on definitions to clarify this cloudy situation (2).
These microbiota-friends are very well-known in the nutraceutical field and their application as food supplements, but quite new for the cosmetic world; the first thing to check is: how can they be introduced in a formulation?
Well, it depends on the type of substance: prebiotics like glucose or other sugars are present in cosmetic products since forever, they are usually solubilized in water and every formulator knows how to play with them. Easy. With microorganisms, however, things turn… sticky. Since we are now not talking about chemicals but living (or previously-living) things, with proteins, membranes and enzymes, it is a completely different approach. These substances are usually sticky and hard to work with, probably due to the presence of the previous mentioned high molecular

Watch the video



weight polymers. Plus, where to solubilize them? Water phase, lipid phase, silicon phase? As mentioned, an unexplored land and new challenges that formulators need to face.

The direct consequence of this cloudy situation is the need of support from experts in developing innovative ingredients, so that when considering the trend, also the formulation point of view is kept in mind.

As ROELMI HPC, our approach to this new micro-world is represented by a postbiotic coming from *Lactobacillus rhamnosus LRH020*.

Thanks to the deep knowledge of our nutraceutical department, we were able to translate the postbiotics technology to the cosmetic application, making microbiota-care easy and effective.

The ingredient is in fact a sensorial powder: thanks to a specific technology it is possible to gently inactivate the microorganisms, but also turn them into a sensorial powder. The matrix used is maltodextrin: well known in the cosmetic field for being not so pleasant when touched. In this case, the combination of our inactivated strain and maltodextrin, applying our specific process, avoided this problem.

This is a key factor because a formulator can allow himself to put this ingredient up to 6-7% in the formula before starting to feel a certain stickiness. The percentage needed to see benefits on the skin and to count on the ingredient mechanism of action is 1%. (4)

What about its solubility? Older products like lysates were usually tricky for a formulator: since they are only water soluble, they couldn't be included in anhydrous systems. This ingredient, on the other hand, takes the best of both worlds: it can be easily solubilized in water and is also dispersible in the lipid phase. It behaves more or less like pearls, it needs a rich lattice to hold it up, it is perfect for a product like a lip balm or a lipstick. Skin care of course is its main field of action, but especially considering launches of the last couple of years, active makeup is a growing trend that also fits perfectly with its purpose.

Last but not least, it is logic to wonder whether a substance that is microbiota-friendly could interfere with the preservative system of a product. Because the former are supposed to benefit and support microbial growth while the latter is included in the formula in order to avoid it, could these two ingredients categories contrast each other?

Although these questions are really delicate and difficult to answer to, in one of our previous articles (3) we approached this topic by trying to give a reasonable answer through experimental data. We compared the results of Challenge tests for three formulas that had different ingredients inside (base cream, base cram + a prebiotic, base cream + a postbiotic). Considering this preliminary study, the microbiota-friends we introduced in the formulas did not affect considerably the preservation system, which is in contrast with the reasonable expectation that they would affect the preservatives efficacy. We could suppose that the vice versa is true as well, meaning that also preservatives do not affect that much the skin microbiota eubiosis, but at the same time we can't be sure about it. Of course there are infinite variables to consider, the preservative itself, other components in the formula, type of ingredient, just to mention few; further studies will be necessary to explore this topic, this was a first but indicative step.

To conclude, the *Microbiota revolution* is here and we have to take care of it by choosing the most suitable products. Sometimes the substances meant to protect, optimize and/or restore skin microbial balance might be tricky to formulate with, but ingredient experts' support and the constant innovation can be keys for formulators to create concrete and skin health targeted cosmetic formulas, without losing the sensoriality and the comfort that all consumers require from their favourite self-care allies.

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