Advice to the Lab Lorn

"Advice to the Lab Lorn" is intended to offer advice, or maybe just solace, for confusing, challenging or downright murderous issues facing SCC members in their labs. Send us your questions at lablorn@caliscc.org and we'll track down an authority or two and get back to you in the Cosmegram. You can include your name if you wish, but we won't publish it for all to see! Your secrets are safe with us.

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2. We would like to use gums and other polymers in an effort to reduce emulsifier loads in our products. Is this a good strategy, and in doing so, how can we reduce or eliminate the risk of "pilling" or "balling" with gum or polymer-based gels and emulsions?"

A. The addition of natural gums or polymers to stabilize an emulsion is a sound strategy. Interestingly, many formulators will actually use a combination of these materials to create a stable emulsion while potentially lowering the amount or number of emulsifiers.

Such materials may include hydrocolloid gums, some of which are derived from vegetable sources such as guar, alginate and carrageenin. Others are fermentation products, which include xanthan and sclerotium gum and modified cellulosics such as hydroxyethylcellulose and hydroxypropylmethyl cellulose. Naturally based stabilizers can also include modified starches derived from corn, wheat and potato as well as mineral based materials such as aluminum silicates, montmorillonite and bentonite. The benefit of using these materials is that they can not only augment emulsion stability but also provide interesting sensory characteristics to as well. They can often be used in the presence of electrolytes or at low pH levels.

Of course, there is also an array of synthetic polymers which function well to stabilize an emulsion. These include acrylate-based thickeners such as carbomer, acrylate copolymers, polyacrylates, methacrylate and polyacrylamide. These materials are extremely efficient at relatively low levels and can provide excellent viscosity control and stabilization at elevated temperatures. They also can contribute elegance to an emulsion and exhibit a generally non-pituitous rheology. These polymers can many times be combined with other materials as described above to deliver enhanced benefits and formulating options.

Now, the tricky part...these materials are film formers. They can influence the rub-in of the emulsion and the penetration of the oils and emollient esters employed as part of the emulsion. While that can be seen as an advantage, these materials, especially the gums, can leave behind a coating on the surface of the skin. This coating can agglomerate and separate from the skin in a less than elegant fashion. This is known as "balling" or "pilling"

The simple solution to this problem is to lower the level of these materials individually or collectively. Remember that there is often a synergistic effect when combining polymers and a lower overall use level is suggested. It is advisable to err on the low side and increase levels gradually, to obtain the required sensory and stabilizing effect.

An alternate approach is to use additives that slightly plasticize the gum or polymer. These materials can range from water-based polyols such as propylene, butylene or pentylene glycol to light, emollient esters or volatile silicones. Additionally, particulate additives such as nylon-12 and boron nitride can help to alleviate tackiness and improve skin feel.

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