



microbial protection newsletter

2022 Q2

who keeps cool when it comes to sunscreen preservation?

Driven by increasing consumer awareness of the damaging effects of skin exposure to UV-rays, the global sun care market is anticipated to become one of the fastest-growing segments within the personal care industry. As a result, sun protection has become more important than ever before, leading to an increased consumer expectation towards sunscreen products - not only in terms of a higher SPF value, but also added skin benefit values beyond sun protection.

This poses a complex challenge for formulators, especially when it comes to the preservation of sunscreen formulations with a higher SPF. The ratio of the phases is the driving factor in determining the degree of preservation challenge. As the ratio of polar oils to water increases, the formulation becomes harder to effectively preserve. While mineral UV-filters have minimal impact on the phase ratio, organic UV-filters contribute to a higher oil phase, and therefore, a significant increase in difficulty of preservation.

The type of preservative used can also be a determining factor in preservation efficacy. Traditional preservatives, like formaldehyde-donors and isothiazolinones, are extremely water-soluble and remain in the water phase of emulsions, where microorganisms exist. Therefore, traditional preservatives remain effective, even in high oil-phase systems. However, in line with the increased market demand towards clean beauty and gentler cosmetic products, modern antimicrobials such as phenoxyethanol, caprylyl glycol or ethylhexylglycerin, are being requested with increasing frequency. Unlike the traditional options, the modern ones have limited water solubility. For this reason, these newer systems may be less effective in the presence of high levels of polar oils.

Therefore, the partition coefficient between oil and water phase of preservatives/antimicrobial boosters plays an important role in determining their efficacy in emulsions.

conclusion

The higher the SPF, the more difficult a sunscreen is to preserve. The extent of the challenge will ultimately depend on the UV-filter choice and final formula composition. Formulas based on organic UV-filters became increasingly difficult to preserve as the SPF, and therefore the concentration of the oil phase, increases. Compounding the issue is the growing shift towards softer,

non-traditional preservation methods that have low water solubility. Challenge testing showed that there is a big influence of chelating agents like EDTA or GLDA. If used in the right amount, they can have a boosting effect on the preservation system allowing for a reduced use concentration of antimicrobials.

Please contact us for further details and recommendations for your preservative challenges.



Based on our experience and conducted challenge tests, our most suitable products are:

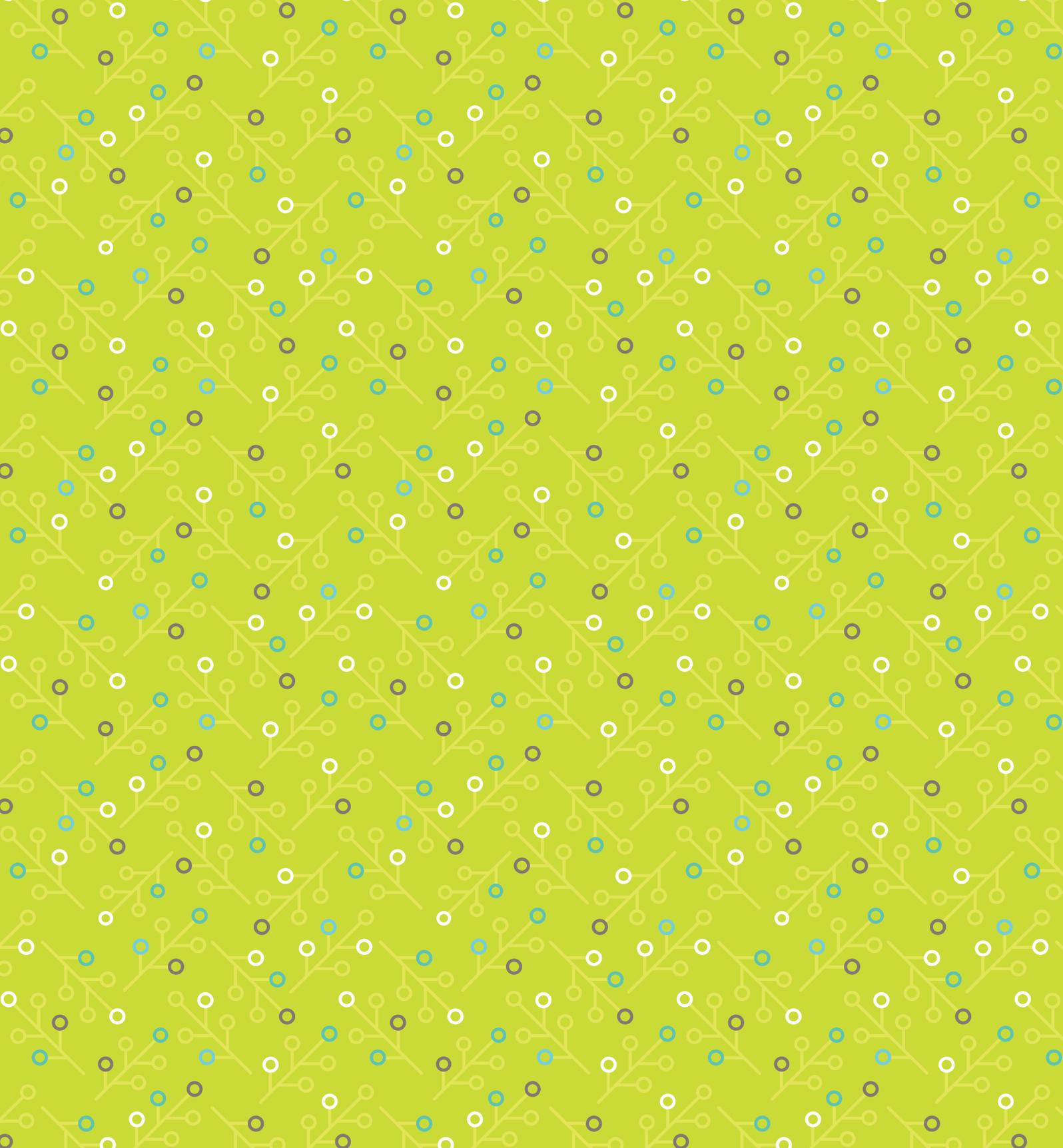
preservative

- **optiphen™ 200**
preservative
- **euxyli™ k 830**
preservative
- **optiphen™ gp**
preservative*

multifunctional

- **sensiva™ pa 40**
multifunctional
- **sensiva™ sc 80**
multifunctional*

* Not available in the US.



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