

Preservation Nation

Keeping beauty, personal care and home care products safe remains a priority even as scrutinization of select preservative chemistries continues by consumers, regulators and NGOs.

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RELEGATED TO obscurity unless something goes wrong inside the jar or hit with harsh criticism from those who believe they impact health, preservatives are both the unsung hero and, unfortunately, a whipping boy in today's personal care space.

Happi asked leading experts to weigh in on the state of the industry when it comes to preservatives used by beauty, personal and home care formulators.

HAPPI: We know that consumers are concerned about certain chemicals in the personal care/beauty and household products they use. But companies must provide safe products. In light of this, what are the biggest challenges when it comes to proper preservation? How do you work with formulators to create safe, stable products and meet consumer expectations?

"There are so many opinions, preferences, management decisions, regulatory and just plain perceptions out in the consumer world from the internet. This makes it impossible to have one or two preservatives that fit all the customer's needs and wants. Lincoln MFG specializes in focusing on the customer's needs and wants with the most diverse line of preservatives. Outside of these preservatives, we listen to customers and solve their preservative challenges by customizing to fit their formulations and wants. We have 28 years of experience in preservatives, analytical, microbiology and formulating. Customers have direct contact with the owners and research personnel. No layers."

— **Pat Lutz, president, Lincoln MFG-USA**

"The pressure generated from NGOs on traditional preservative systems and the changing regulatory restrictions all around the world limits the palette of preservative solutions, but quality and safety are still of topmost importance to personal care products, this includes microbial status. The reduced pallet of preservatives is negatively impacting the microbial quality, thus compromising consumer safety. Recently there

have been several product recalls due to the growth of undesirable microorganism in personal care products. In Ashland, we build partnership with our customers to guide them to the technologies that best meet their marketing needs and provide stable and safe end-use products. In addition, our global centers of excellence provide technical support in customized micro testing, analytical evaluations and application support."

— **Andrea Wingefeld, global marketing manager preservatives, Ashland**

"Effective preservation is incredibly important in formulation. Preservative systems exist explicitly to maintain the safety of a formulation by keeping it free of microbial contamination...we have embraced the challenge of the changing preservation landscape with safe and effective alternative preservation options that center around the Hurdle Technology approach to preservation. We use this approach to help formulators combine ingredients and formulation properties to create hurdles for microbial growth.

Common ingredient functions for creating hurdles include membrane disruptors like caprylyl glycol or glyceryl caprylate and chelating agents like caprylhydroxamic acid. Formulation aspects include pH and employment of Good Manufacturing Practice (GMP) principles"

— **Lisa Gandolfi, PhD, director of marketing, INOLEX**

"As more consumers are spending the time searching the ingredients that go into the products they use, it comes as no shock that the demand for natural, more recognizable ingredients is on the rise. The challenge today is meeting the demand for more natural preservative solutions while providing the same efficacy and broad spectrum protection of traditional preservatives such as DMDMH and MIT. With every preservative that falls under scrutiny, the palette of trusted and reliable preservative options shrinks. As such, a shrinking palette serves no benefit for the formulator or the consumer. With the increase in demand for greener products, there is no longer a one size fits all "drop-in"

preservative option. At Lonza, we understand the complex ways in which preservation solutions work across home and personal care applications. One of our core strengths is the ability to partner with formulators in order to find a solution that not only works, but fits the vision and purpose of the brand without hindering their targeted claim space.”

— **Kara Gilchrist, global marketing, preservation, Lonza Inc.**

“As consumer preferences and regulatory concerns narrow formulators’ choices for preserving their personal care products, it is more critical than ever to have preservative systems that address those constraints but are still efficacious and safe. Virtually every personal care formulation requires some type of preservative, but a one-size-fits-all approach is out of step with the marketplace. Our approach is solutions-oriented. Our strategy is to marry technology from leading ingredients manufacturers with the unique application requirements of our customers. From natural preservation to free-of solutions, chemists in Coast Southwest’s applications laboratory work with our strategic partner in preservatives, Sharon Laboratories, to formulate ideal preservative systems. We address our customers’ specific formulation challenges by applying our extensive understanding of our customers’ needs.”

— **Nicholas A. Arellano, technical marketing manager, preservatives, Coast Southwest**

“The biggest challenge is working with formulators to have them understand that a “natural/healthy/biodegradable/ethically sourced/etc. single chemical preservative for all applications” doesn’t exist. Key is to have them develop the correct preservative system for the product. It doesn’t mean that every product has a unique preservative system but it does mean that you need to review your formulation and consider what will work based upon a variety of factors including pH, water activity, product processing, etc.”

— **Todd Ahern, VP sales and marketing, Sandream Impact**

“Traditional chemistries, even with their long track records of safe use, have fallen out of favor, both by regulators as well as consumers. The internet has enabled the spread of an infinite amount of information regarding personal care ingredients, including preservatives. Some of this information has very little scientific basis and most of it has not undergone any kind of rigorous, objective review, yet it is presented to consumers as ‘fact.’ Furthermore, there has been an increasing distrust of the scientific community on these matters.

Formulators are looking for alternative methods of protection, including efficacy boosting ingredients and multifunctional materials, such as fragrances or moisturizing ingredients that provide a measure of preservation as a secondary benefit.

However, these ingredients can struggle to provide the required levels of preservation, and can be costly and difficult to formulate, as well. In fact, new ‘registered’ preservatives are very rare. Just two new preservatives have been added to Europe’s Annex V in the last 15 years, and few, if any, are expected in the near future.

There have been interesting developments in ‘alternative’ preservation, although frequently with a measure of compromise. Various ‘natural’ or ‘natural identical’ preservatives have gained in popularity over the past few years as formulators and consumers alike have been drawn to the perceived ‘green’ aspects of these products. However, many of these natural preservatives come with their own sets of challenges. Cost, higher use levels, low water solubility and limited micro efficacy are the common limitations experienced with many natural preservatives. While some consumers are willing to accept these higher costs for the sake of sustainability, it remains an open question whether the average consumer is willing to accept these tradeoffs.

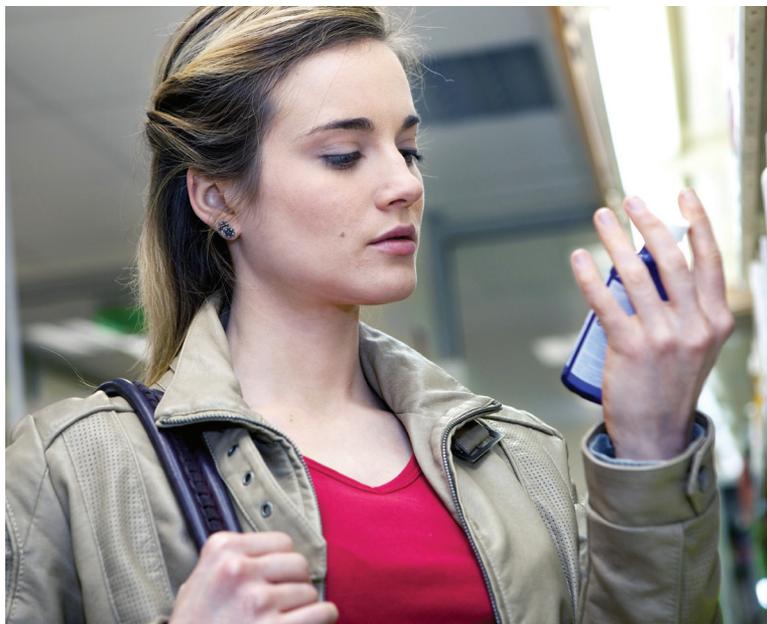
Troy has a long history of working with formulators to overcome challenges and enable them to achieve their performance, compatibility and cost objectives. We’ve gone to great lengths to understand the needs of formulators and what their customers are looking for. As a result, our R&D department has been hard at work developing some exciting solutions to market demands.”

— **David Koehl, global head, home and personal care, Troy Corporation**

“Preservatives are bioactive molecules that act effectively in destroying or inhibiting the growth of microorganisms. The ideal preservative for use in cosmetics must provide broad-spectrum activity; i.e., it should eliminate all kinds of microorganisms, including fungi, Gram-positive bacteria and Gram-negative bacteria. Another expected property is effectiveness at low concentrations, favoring the reduction of chances of irritation and other toxicity concerns. It should be also considered water solubility and insolubility in oil, when added in the aqueous phase, because microorganisms grow in the aqueous phase and water-oil interface.

Stability in any temperature and pH conditions during the process of manufacturing of cosmetics is another important characteristic of ideal preservative that must still be colorless and odorless and does not react with other ingredients to form different colors or odors.

The ideal preservative should be compatible with all ingredients and must be active during manufacturing and along the shelf life of the product. It also needs to be easy to analysis on current popular methods; and easy to control, as well as non-flammable and non-toxic. However, few options approach the ideal condition. Combinations or blends of preservatives are widely used in an attempt to achieve the features of an ideal



Consumers are reading labels to avoid products with certain chemicals.

preservative; however, most of the available alternatives have shown to cause contact sensitization.

Taking into account the challenges to replace traditional and controversial preservative, Chemyunion developed the Hebeaton range whose main structure is based on xylitol esters (Hebeaton Plus), which have broad antimicrobial activity, and may act alone or in synergy with other non-controversial preservatives, being a safe and effective alternative for the development of cosmetic formulations. Hebeaton BA, Hebeaton PS VG and Hebeaton CG were developed after exhaustive studies to determine the best synergistic combination between the xylitol esters and benzyl alcohol, potassium sorbate or caprylyl glycol, respectively.”

— *Patricia Moreira, skin care marketing manager, Chemyunion*

“Given that no product is safe without preservation, the challenge is to provide preservative systems that would provide a balance between the consumer’s demand and the formulator’s needs. For the consumer that means new materials, natural or natural-like, mild, no- irritant, and “free-from” in general. For the formulator, high efficacy of course, but also minimal to no impact on odor and color, high compatibility and stability.”

— *Naama Eylon, vice president-personal care, Sharon Laboratories Ltd.*

HAPPI: Have you noted any changes in your customers’ demands regarding preservatives and/or their preservation needs? What are you seeing and what do you think is the driving force behind it?

“We have seen the same request for all natural but without glycols, alcohols, diols and oils. We feel that the internet and blogs and opinions drive more and more negative information about ingredients.”
— *Lutz*

“Absolutely! We receive many enquiries regarding ‘natural preservation.’ We have received a great deal of interest in our new TroyCare LSB natural preservatives, since they were launched in 2018. Additionally, since Cosmos approval was announced for LSB1 two months ago, interest in that product has increased dramatically.” — *Koehl*

“Not so long ago, we were seeing just a few customers from specific countries worrying themselves about preservatives and their safety. In fact, the most well-known and used preservatives are among the top 20 most allergen ingredients. That concern was always hot in Germany, France, and other countries in Europe mainly because of the awareness of controversial cosmetic ingredients in this region caused by the final consumer who is always looking into the composition of what they are using.

European consumers are very aware of any controversy (even when there is no scientific robust data behind it) once information related to the ingredients and finished products are available on the spot and online. Exactly due to the spreadability and availability of information, that concern is a reality not only for Europe anymore but also for other regions as well.

There is an increasing concern about the kind of ingredient the cosmetic industry is using and thus formulators seek to create products with fewer, safer and more natural ingredients all around the globe. Products are then labeled not only as ‘free from’ certain ingredients but ‘worry-free’ too, as manufacturers try to assure consumers that products are safer and were produced with sustainable processes, from ingredient procurement through testing, manufacturing and packaging.

So taking into account the challenges to replace traditional and controversial preservative, efforts have been directed to the development of natural or semisynthetic compounds with antimicrobial activity, in order to reduce or even replace the traditional preservatives due to the constant security and/or restrictions that are imposed on this regulatory category of ingredients.” — *Moreira*

“When looking into trend-data like Mintel, phenoxyethanol is still the antimicrobial workhorse for personal care products. But with modern lifestyles, the growing use of social media, product selector apps, and end-user chat rooms available 24/7, all important information is ‘just one click away;’ cosmetic formulators need to develop trendy products that rate high in these online tools.

Therefore, naturality index, sustainability, proof of content and packaging are becoming more important and influencing the choice of raw materials including antimicrobial technologies.” — *Wingenfeld*

“The world is moving toward a healthier way of living. Organic and natural foods that used to be considered a trend just a few years ago can now be easily found in supermarkets. Industry leaders at Sharon say it well: When it comes to cosmetics and personal care products, customers are reading labels and asking questions. Consumers are continually influenced by social media influencers. Formulators are continually seeking innovative ingredients that answer the need for healthier products. Instead of acquiring one preservative that works in multiple formulations for multiple products, companies in personal care and cosmetics are finding that they need to match different preservatives to different formulations to meet customer preferences for natural and “free from” solutions. Consumers are eager for new products and to try new brands. New ideas for beauty and anti-aging—especially through artisanal products—have appeal. Facial masks—especially treatment masks based on clay mud, and other earth-based ingredients, such as our new line Kisameet Glacial Clay—are in demand and present special challenges for preservatives.” — *Arellano*

“Consumers are seeking more from their products without the willingness to compromise on price, and that’s no different when it comes to natural products. In order for products to claim natural or organic, the raw materials that make up

the formula must first be deemed so. Within Lonza Consumer Product Ingredients, we use the ISO 16128 standard to understand and promote the Natural and Natural Origin contents of our personal care preservatives. This standard not only allows for globally- aligned natural and organic definitions, but also creates a more transparent supply chain, which is often a non-negotiable for consumers.” — *Gilchrist*

“We are seeing a continuously increasing interest in alternative preservation options as paraben use declines and the concern about the shrinking traditional preservative pool grows. Consumer perception is a primary driving force in this shift. The personal care industry is responding at all levels – retail, product and ingredient.” — *Gandolfi*

“There’s still a healthy dose of parabens found in the market but the natural and indie brands are trying to drive the industry away from them.” — *Ahern*

“We are at the forefront of a transformational shift from traditional to alternative preservation solutions. We have seen changes in the demands and requirements from customers. The transformational shift that we are experiencing is driven by the following factors: changes in regulatory landscape (Prop 65, etc.); increase in consumer self-awareness on the side effects of the available options; global to regional market trends; and product with a purpose chassis (increase in actives consumption, extracts, exotic oils, butters, etc.).” — *Rishabh Shah, technical director, Acme-Hardesty*

EXPANDING YOUR TOOL KIT

• **Here is look at some of the newest options in preservation** and new developments from key providers of these products.

Ashlund reports that it continues to provide preservation solutions with new technologies based on alternative and innovative ingredients, including the Optiphen P platform, a preservative technology without alcoholic antimicrobials that includes cost-efficient Optiphen DP and Optiphen DLP preservatives. These preservatives are based on nature identical actives embedded in an optimized delivery system to maximize the efficacy of the actives at the oil/water interface, according to the company. “Enhancing their bioavailability allows the actives to work at lower levels, thus reducing the exposure to high level of preservatives,” said Wingenfeld. Another approach, according to Wingenfeld, is to use functional materials such as Conarom b or Conarom p-2 aromatic. These work in a wide pH range and offer a gentle fragrance that enhance consumer’s olfactory experience while delivering antimicrobial protection as a secondary effect.

“The movement towards the use of natural-sourced ingredients

in personal care products will continue to grow,” noted Arellano of Coast Southwest, who contends the mission is to fill the gap between chemical and natural. Arellano cited products such as Sharomix Amplify, SharoSense Plus and the Sharon Biomix Line. Sharomix Amplify delivers lower use levels as it enhances the efficacy of popular preservative systems to achieve the best antimicrobial results, according to the firm. SharoSense Plus, a bridge between synthetic and natural, is based on Maltol, a naturally occurring organic compound that offers several solutions while answering the demand for natural/green and effective preservative systems. Biosecure C160S is a combination of citrus extracts with certified organic vegetable glycerin from the Sharon Biomix line. This ingredient is for formulators seeking natural/organic antibacterial protection for cosmetic products, according to Coast Southwest.

Chemunion has developed the Hebeatol range, four new preservative options that can replace or reduce historical preservatives such as parabens, formaldehyde donors (**Continued on p.68**)

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(Continued from p.66) and methylisothiazolinone (MIT). Hebeato Plus is based on xylitol esters, which have broad antimicrobial activity, and may act alone or in synergy with other non-traditional preservatives, and is an ideal alternative for formulating cosmetic and personal care products. Hebeato Plus is certified by Ecocert-Cosmos and is available in a global compliance version. According to Moreira, Hebeato CG, Hebeato BA and Hebeato PS VG were developed after “exhaustive” studies to determine the best synergistic combination between the xylitol esters and caprylyl glycol, benzyl alcohol or potassium sorbate, respectively. The use of the Hebeato range in cosmetic formulations allows: development of formulations free of so-called controversial and traditional preservatives since it acts as a broad-spectrum antimicrobial; use of a 100% biodegradable molecule obtained from renewable sources; restorative effect of cutaneous barrier, reducing by 21% the transepidermal water loss; use of a synergistic and exclusive combination between a new safe, efficient, “green” and biodegradable molecule and a well-known preservative that is approved in many countries for cosmetic use; and formulations for skin and hair.

Inolex’s alternative preservation portfolio is focused on delivering a breadth of options for formulators, said Gandolfi. “The consumer concern about ingredient safety is often linked with an added desire for natural ingredients. Our new innovations in this ingredient space are focused on delivering efficacy with the added benefit of 100% natural solutions.” For example, Gandolfi cited Spectrastat G2 Natural, a certified 100% biobased system that provides broad spectrum preservation effects when employed with a GMP hurdle. A major benefit for formulators is the broad-spectrum efficacy of Spectrastat G2 Natural at neutral pH, allowing formulators to use other functional and consumer-desired ingredients that perform best in the neutral pH range.

Lincoln MFG-USA offers Linatural Ultra-MFN, a multifunctional natural that is billed as a first of its kind. All-natural, glycol-free, diol-free, alcohol-free and oil-free, it is great for all types of formulations, according to the company. Additional benefits include wide pH, water soluble, no odor in finished formulations and preservative-free claims. Lincoln MFG-USA is also offering Linatural MBS-Clear, which is a naturally derived, mild and broad spectrum alternative to preservation for formulations with pH <6.5. Linatural MBS-Clear is glycol-, diol-, alcohol- and oil- free and is water-soluble, too.

“It is great for high water content formulations like toners, serums, shampoos etc.,” said Lutz.

For formulators who want to make preservative-free claims in skin creams and lotions, Lincoln touts Linatural MBS-GC, which is based on natural/naturally derived ingredients.

In addition to new ingredients, Lincoln MFG-USA has purchased a new manufacturing and R&D center in North Kingstown, RI. The company will have four new labs at the site, reports Lutz.

“While we are always looking to innovate for an evolving world, the markets continue to tell us the importance in keeping the support of our well-trusted and reliable chemistries such as those in

our Glydant and Dantogard ranges built around DMDMH as well the IPBC chemistry found in our Glycaciil and Omacide ranges,” said Gilchrist of Lonza. Outside of the traditional preservation space, Lonza says it continues to find great interest and growth in its next-generation preservatives, primarily its Geogard range. One of Lonza’s hero preservatives, Geogard Ultra, is known for its broad-spectrum efficacy while meeting the ever-shifting and ever-demanding market needs. “This preservative blend is perfect for naturally-minded formulators looking for an effective alternative to traditional chemistries,” she said.

Also, Lonza’s Geogard Ultra preservative has Ecocert and Cosmos approval plus Halal certification and vegan and non-GMO compliancy for brands that formulate for consumers who demand those attributes. “It is these such attributes and targets which are driven by the market, that remain fundamental to our product line extension activities within the Geogard framework,” Gilchrist said.

In response to regulatory pressure and market demand, Troy has developed new TroyCare LSB organic acid preservatives. Described as a next generation option and offering formulators a more natural, customer-friendly preservative solution that combines efficacy with milder, safer attributes, TroyCare LSB offers a simple, customer-friendly INCI listing, naturally derived or natural identical components, and excellent broad-spectrum efficacy. The natural preservatives are also low odor, low color, clear liquids that are exceptionally easy to formulate, according to the company. TroyCare LSB, which offers formulators a blend of naturally derived or natural identical ingredients, consists of an expanding series of products based on levulinic, sorbic, and benzoic acids.

“Some versions of LSB contain additional components that have the important benefit of extending the maximum effective pH range. This broader pH range of TroyCare LSB significantly expands the range of cosmetic and personal care products which can now be successfully protected with organic acid based preservatives,” said Koehl.

Also Troy reports that it has received Cosmos approval for TroyCare LSB1. “Cosmos approval effectively ‘green’ lights this advanced preservative for the most eco-conscious formulators around the world,” added Koehl.

schülke is marking 130 years of innovation and protection this year. The company began back in 1889 when Rudolf Schülke and Julius Mayr produced Lysol, the first branded disinfectant, which helped control a cholera epidemic raging in Hamburg. In 1924 it created grotan, the first brand-name, industrial preservative (worldwide). As it marks this major milestone, Schülke says it has renewed its commitment to innovation and protection.

Keeping pace with changing times is critical for preservatives suppliers. Last year, for example, Acme Hardesty embarked on a strategic organizational alignment into market focused business units. According to Shah, this personal care strategic business unit has enabled the firm “to be laser focused on our approach of solution selling.”