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Beauty Without Microplastic: Consumer Expectations For Cosmetic Products May Have To Change

by [Ryan Nelson](#)

Kelly Dobos, a consultant, adjunct professor, and former president of the Society of Cosmetic Chemists, discusses the challenges facing beauty businesses and formulators, and the changes to cosmetic products that could be coming consumers' way, under developing bans on microplastic use.

Recent headlines have declared findings of microplastic in air, water, ice and sediment samples taken in one of the remotest parts of the planet, Antarctica, and more than 200,000 microplastic particles in a typical English roast dinner.

"Eating a roast dinner – or a similar meal – every day would equate to eating two plastic bags each year," the Independent reported on 29 November.

Blue whales meanwhile may consume 10 million pieces of microplastic, or roughly 96 pounds of the material, per day, according to a recently published study in Nature Communications.

A change.org petition started by Plastic Soup Foundation, urging the EU to ban microplastic in cosmetics, has received more than 51,000 signatures at the time of writing. It's not hard to understand why the petition is attracting support. Few savor the idea of microplastic pollution, even if the health implications of ubiquitous microplastic are still not well-understood.

But the cosmetics industry has reasons for using microplastic, and it is doubtful that beauty consumers are nearly as wise to those as they are about levels of microplastic accumulating in the environment.

Already, the EU appears to be on its way to doing exactly what the petitioners ask. A draft restriction issued by the European Commission in August, currently undergoing review at the member state committee level, would prohibit use of non-biodegradable microplastic in cosmetic products within 12 years. (Also see "[Microplastic Must Be Gone From Makeup, Lip, Nail Cosmetics In 12 Years – EU Commission](#)" - HBW Insight, 8 Sep, 2022.)

Cosmetics account for a wee fraction (around 2%) of the overall microplastic emissions targeted by the restriction, which extends to a range of other industries. Detergents, paints, fertilizers, and even synthetic sports pitches stand to be affected.

However, it is estimated that the cosmetics industry could incur nearly 80% of the restriction's total cost as tens of thousands of microplastic-containing products would have to be reformulated, retested and relabeled under the regulation as currently proposed.

"You can't put [bio-glitter] into a solvent-based product like a nail polish. So those types of products, if we ban microplastics completely, would have to go away." – Kelly Dobos

Microplastic in rinse-off cosmetic products, such as cleansing scrubs, would have to go first, but that has happened already to large extent owing to the US Microbead-Free Waters Act of 2015 and voluntary industry efforts in Europe.

Microplastic in makeup, lip and nail cosmetics is a different story. The EU restriction would give industry 12 years to eliminate microplastic use in those categories, but that may be easier said than done, as currently available alternatives are said to be largely unsuitable for use.

The cosmetics industry has been advocating for microplastic in makeup, lip and nail products to be exempted from the EU restriction altogether due to lack of alternative ingredients and evidence that microplastic in such products does not release to the environment.

Meanwhile in the US, likeminded legislation has begun cropping up in California and other states to prohibit the sale of cosmetic products containing intentionally added microplastic. (Also see "[US States Take Aim At Microplastics Among 'Overwhelming' Number Of Bills With Cosmetics Relevance](#)" - HBW Insight, 4 Apr, 2022.)

Alternatives Angst

If microplastic's loss from cosmetic products is inevitable, it is less certain that stakeholders, particularly consumers, fully comprehend the impacts that bans will have.

"I think customers have gotten used to a certain aesthetic for their products and performance of their products. So customers may have to change what they expect from a cosmetic product if we remove some of these materials," said Kelly Dobos, an independent consultant, adjunct professor of cosmetic science at the University of Toledo, and advisory board member for the University of Cincinnati's James L. Winkle College of Pharmacy, in a 22 November interview with HBW Insight.

Dobos, who served formerly in R&D and management roles at Sun Chemical and Kao USA, Inc. and as president of the Society of Cosmetic Chemists, pointed to plastic glitters used in color cosmetics, nail polish and eyeshadows.

"Those performance characteristics of a glitter are hard to match with, say, a biodegradable alternative. We see things called bio-glitters that have a plant-based substrate," Dobos said. "Well, they're great and they produce a similar degree of sparkle or color effect in the product, but they're really great at being biodegradable. So you can't put them into maybe a solvent-based product like a nail polish. So those types of products, if we ban microplastics completely, would have to go away."



KELLY DOBOS, COSMETIC CHEMIST,
INDEPENDENT CONSULTANT AND ADJUNCT
PROFESSOR AT THE UNIVERSITY OF TOLEDO

Many of the polymeric materials used today can be engineered to provide desired effects in a way that natural materials cannot, according to Dobos. "You can refine it to a certain extent, you can try to purify it to a certain extent, but there are limitations on what you can do to deliver on specifications and achieve [targeted] end results."

Poly(methyl methacrylate) microspheres are used today in skin-care lotions and primers for makeup, creating interference and light to help blur fine lines and wrinkles. "You're seeing a lot of raw material suppliers and industry work to innovate in this area with natural, mineral-based materials to offer similar performance on these characteristics, like that optical blurring property," Dobos said.

She mentioned mica and calcium carbonate among materials of interest. "Unfortunately, some other materials that we use that are mineral-based can have potential downsides to them. So we think about talc having been used for a very long

time as a cosmetic filler and powder-type product. It's a mined mineral and of course there's the possibility of contamination from trace items like asbestos that we've seen in the news." (Also see "[Bankruptcy Court Stakes Authority In J&J Litigation As States Push For Talc Damages Claims](#)" - HBW Insight, 16 Oct, 2022.)

Microplastic also can be easier on skin than alternatives, meaning less potential for irritation and sensitization, Dobos said. "Microbeads are a lot softer on the skin than, say, a walnut shell, or a larger particle size of an abrasive. So that can cause damage to the skin, micro-tears, things like that. So those may not be a suitable replacement for someone who might have sensitive skin."

Cosmetic products containing microplastic for use as an abrasive, ie, to exfoliate, polish or clean ("microbeads"), would be banned immediately upon the EU restriction's adoption and publication in the Official Journal, the assumption being that such uses have all but disappeared due to voluntary efforts. Other rinse-off products must be microplastic-free within four years under the draft reg.

Dobos noted that microplastic alternatives without extensive histories of use could present new, unexpected safety issues as research and uptake increases.

"Every time we talk about cosmetic products and something comes up as a concern for consumers, like phthalates or parabens, when we go to replace it with another chemical that we may know less about, there's the potential for concerns there. ... So there is a tradeoff when we search for new replacements for material that is existing," she said.

Higher Costs, Higher Prices

Reformulated products without microplastic have to work, they have to be safe, and they have to be available at a price that consumers are willing to pay.

Consumer spending on cosmetics already is strained due to market changes in recent years. "Right now we're seeing consumer products increasing in price because of inflation. But all of our raw material inputs have increased over the course of the pandemic due to a variety of reasons," Dobos pointed out. (Also see "[Cosmetic Ingredients That Could Be Hard To Get In 2023](#)" - HBW Insight, 29 Oct, 2022.)

It isn't just a matter of finding and sourcing an alternative ingredient at scale that drives up costs.

"There's no easy drop-in replacement for anything in cosmetics," Dobos said. "The FDA basically says you have to prove your product is safe. So part of that safety is not only testing for [things like] irritation and allergy, but also performing a stability study so you know the product is not going to fall apart on the shelf or become contaminated with microbes over consumer use."

She continued, “So each change to a product formula – whether a big change in the percentage of ingredient, or putting in a completely new ingredient – we’re going to have to redo the stability studies. And generally speaking, to prove out a two-year shelf life, we tend to need at least four to four and a half months of an accelerated stability test to get a good estimate of how long the product will be stable on the shelf.”

Moreover, changes to formulations necessitate product labeling modifications, another costly process, as well as product dossier updates to remain compliant with the EU’s Cosmetic Products Regulation.

It remains to be seen the extent to which all those additional costs get passed down to consumers. Consumers may balk at paying more, especially if they perceive products as less functional or appealing after microplastic has been removed.

Dobos drew a parallel to consumer expectations for shampoo and dish soaps that foam – “a sign that they’re cleaning.” As manufacturers have moved away from traditional foaming agents such as sodium lauryl sulfate due to NGO pressures and public demand, product performance has taken a hit.

“These newer surfactants don’t perform as well in foaming, nor do they create the viscosity or the thickness sometimes that people expect from our products.”

Consumers notice, Dobos said, “and may not repurchase.”

Innovators, Come Forward!

According to Francine Lamoriello, executive VP of global strategies at the Personal Care Products Council, the cosmetics industry has an historic task ahead of it as microplastic bans take shape. (Also see “[‘The Search Is On’: PCPC’s Lamoriello On Replacing Microplastic In Cosmetics, Reasonable Deadlines](#)” - HBW Insight, 30 Nov, 2022.)

Dobos agrees that challenges abound. However, “it’s also an inspiration for innovation,” she said.

She called for open dialogue and information sharing to surface potential solutions. “Come talk to us cosmetic chemists if you’re developing a new ingredient or if you have an idea for one. I think there’s a lot of ingenuity out there that maybe hasn’t quite found its way into the cosmetics industry.”

Dobos concluded, “I think these problems are solvable. It just takes getting the right people in the room.”