

'Beauty Biotech' Packs the Punch of Natural Ingredients With Less Environmental Impact

By Zoe Weiner

In the near-decade since the natural beauty boom took hold of the industry with its plant-powered products, consumers have wisened up to the fact that “botanically based” doesn’t necessarily mean “better.” For starters, cosmetic ingredients don’t require approval by the Food and Drug Administration (FDA) before they hit the market, which means any kitchen chemist can whip up a floral serum and slap a \$300 price tag on it with very little oversight. (Unsafe products or misleading labels would be in violation of the law, however.) What’s more, the resources that go into these formulas (think: plants, minerals, and animal byproducts) are in limited supply; in the face of a growing climate crisis, consumers and brands alike are questioning whether pulling them from the earth for the sake of clearer/firmer/brighter skin is *really* worth it. But thanks to the increased use of biotechnology in the beauty industry, come 2023, we won’t have to choose between products that are safe and efficacious or environmentally friendly.

“Biotechnology” is an umbrella term for tech that uses biological (aka naturally occurring) processes and microorganisms to fuel the creation of different products. “Biotechnology is the melding of nature and the lab in a way that’s really sustainable,” says [Rose Fernandez](#), CEO of [Algenist](#), a skin-care brand that’s been using lab-developed algae in its formulas since its launch in 2011. “You look to different microorganisms to take aspects of them in order to create new ingredients or technologies.” In recent decades, biotechnology has been used in food ([lab-grown meat](#)), medicine (the [mRNA COVID-19 vaccine](#)), and fragrance (allergen-free synthetic scents).

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“Different parts of plants have different actives, and those actives can be completely different between the stem and the leaf or the petal,” says [Barbara Paldus, PhD](#), founder of [CODEX Labs](#), a plant-powered biotech skin-care company. For example, CODEX uses comfrey in some of its products, which has powerful moisturizing, anti-aging, and wound-healing properties— but also contains some [compounds that can be toxic to humans](#). By using a lab-developed, “nature equivalent” version of the ingredient instead of the whole plant, CODEX is able to optimize the benefits while doing away with the risk.

This type of tech isn't brand-new to skin care: [Shiseido](#) has been using it since the launch of its bio-hyaluronic acid serum in the '80s, and [Biossance](#) brought it into the spotlight in 2016 with its line of products made from lab-developed vegan squalane (which uses sugar cane instead of the traditional shark liver oil). But thanks to rising environmental concerns, we can expect biotech in beauty to flourish in 2023 and beyond. According to a [market analysis report from Grand View Research](#), the global biotech ingredients market size was valued at \$1.61 billion in 2019 and is expected to grow at a compound annual growth rate (CAGR) of 9.3 percent and reach \$3.01 billion by 2027.

“Today, biotech-derived cosmetic raw materials are gaining popularity thanks to their effectiveness and safety, and because they are a sustainable option,” says Anne-Catherine Auvray, the executive editor at [BEAUTYSTREAMS](#), a beauty trends insights platform. “With consumers becoming more knowledgeable about ingredients and viewing sustainability as a key factor in their buying decisions, biotech solutions will continue to rise in the near future.”

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Because biotech ingredients are made from single cells, skin-care formulators don't have to rely on huge batches of natural resources to work with them—a considerable win for the [66 percent of shoppers](#) who *Consumer Goods Technology* magazine reports are seeking out eco-friendly brands. Traditional methods of formulating plant-based beauty require bottling up finite natural resources, which isn't as sustainable as these brands' marketing materials may lead you to believe. Popular "natural" skin-care ingredients like [vanilla](#), [argan oil](#), and [apricot](#) have all faced declining supplies in recent years due to over-farming and climate change; the rise of bakuchiol as a natural retinol alternative has [raised alarm bells](#) about the possibility that the endangered plant it's derived from could go extinct; and palm oil, another common beauty ingredient, is a [major driver of deforestation](#).

Biotechnology gives brands a way to bypass some of these environmental concerns. "It allows us to obtain highly efficient new ingredients that traditional chemistry cannot always provide, while remaining natural and reducing our impact on nature," says Ulrich Katusevanako, the head of new product development and scientific communication at [Orveda](#), a skin-care line that uses bio-fermented kombucha black tea to support skin microbiome health. "It's an advanced way to manufacture new natural molecules while also minimizing our environmental footprint." One notable example? In June, [Unilever](#) partnered with Geno, a San Diego-based biotechnology firm, to jointly invest \$120 million into a biotech alternative for palm oil and fossil fuels found in personal-care products.

Next year, we'll see some exciting new players enter the beauty biotech space. After raising [\\$120 million in June 2022](#), Chanel-backed biotech brand [Evolved by Nature](#) launched its first skin-care product in October: a [Barrier Redux Emulsion](#) that heroes a polypeptide derived from upcycled silk cocoons. The compound is meant to replace common fossil-fuel-derived ingredients, like petrolatum and silicones. [Arcaea](#), which raised [\\$78 million in 2021](#) with investments from beauty behemoths including Chanel (again) and Givaudan, is expected to launch early next year with a line of products that use biotechnology to harness the natural UV-protective properties of marine plants and animals. And [Seaspire](#), a skin-care company that uses lab-developed marine ingredients, [raised \\$3 million in 2022](#) ahead of its launch in the first half of 2023, which will include a cleanser, serum, and moisturizer.

Existing brands are also working to incorporate new biotech ingredients into their formulas in 2023. Next spring, CODEX Labs will relaunch its Bia skin-care collection with biotech-derived calendula and comfrey; the upgraded formulation is poised to offer new wound-healing, skin-shedding, and barrier-rebuilding benefits. The brand is also working with a Swiss biotech company to create a new protective ingredient meant to be used on sensitive skin that's expected to launch next year. Algenist, which is known for its formulas made from bio-engineered algae, has partnered with a biotech lab to reformulate one of its hero products for better sustainability and efficacy, and plans to launch a sensitive-skin-friendly, highly active treatment some time next year.

"Biotech [ingredients] can allow products to have a higher concentration of actives, producing visible results while being fully biocompatible, respecting the skin, and minimizing our impact on natural resources," says Katusevanako. "This science is still developing, but in the future, more biotech skin-care formulas will definitely be available." We can't wait. 🌱