

# Beauty Lab

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Could a new breed of plant-based ingredients, grown on science-lab counters instead of out in the wild, be the next shake-up in the skincare industry?

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While not the most obvious of bedfellows, skincare and space have more in common than you might think. Nasa might have pioneered the LED technology that stimulates wound healing and collagen production, but beauty labs channelled it into stormtrooper-esque masks. Elsewhere, the antioxidant formula in III Skin's Y Theorem Repair Serum NAC Y<sup>2</sup> was engineered to heal the wounds of astronauts in space, despite it being one of the harshest and most extreme environments for your skin.

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Skincare:  
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So, what's the latest scientific breakthrough in beauty? Lab-grown ingredients. Following the trail of lab-grown diamonds and Silicon Valley's start-ups to create meat alternatives, skincare and fragrance researchers are grasping for a slice of the pie – and making exciting developments in growing plant-based ingredients that produce more sustainable and potent formulas. Here, we put the concept under the microscope...

## NEEDS MUST

Tinkering with the biological make-up of ingredients in the name of beauty is nothing new. Chances are you have products in your bathroom that are the result of biotech, the broad term for describing the use of biology to drive innovation, often as a consequence of consumer demands for more ethical processes and transparent ingredient provenance.

Jasmina Aganovic, a chemical engineer and founder of biotech start-up Arcaea, which focuses

products and ingredients. To give you an idea, the natural cosmetics industry is now worth a whopping \$48.4bn (about £38bn) globally.

By default, some natural ingredients need huge amounts of land to grow – bad news for the environment. 'Agriculture is the biggest driver for biodiversity loss, and practices that require more land have higher CO<sub>2</sub> emissions, thanks to deforestation,' says Jen Novakovich, a cosmetic scientist and founder of The Eco Well, a science communication platform dedicated to making accurate information more accessible. Take palm oil, for example – it's used in more than 70% of beauty products, contributing to an estimated 5% of deforestation in tropical areas.

'The size and scale of the industry now, having grown at such a fast rate due to increased demand and a growing population, has created clear pressure points in the supply chain,' agrees Aganovic. It's led to some ingredients, such as shea, argan and candelilla, becoming endangered; others like Australian sandalwood oil, a popular fragrance extracted from trees growing in the outback, even face extinction.

Plus, as the impact of climate change takes hold, most notably the change of seasons and increase in extreme weather, sourcing natural ingredients becomes evermore difficult. 'Growers are not able to guarantee consistent quality or quantity, which has led to a lot of fluctuation in prices and availability,' Aganovic says.

## A limitless supply of one ingredient can be made from a single molecule

on cutting-edge research into what she calls 'biology-first beauty', points to hyaluronic acid as an example. 'It was originally sourced from roosters, but the animal rights movement was key in pushing suppliers and brands towards alternative sources using biotech,' she says. Beauty giants Shiseido were the first to make a breakthrough in the 1980s when they found a way to emulate the molecule via fermentation of plant sources such as wheat, corn and soya, a formula still used by the brand and one that has inspired a host of hydrating products.

The impetus behind a newer wave of lab-grown ingredients is sustainability, driven by the spike in popularity of so-called natural

## TAKING ROOT

This is where the lab comes in; it's a place where soil composition and weather patterns don't matter. Molecules can be taken from a wild plant and grown in a controlled setting, using a process similar to the fermentation of kimchi, where you add sugar, yeast or salt and let the natural bacteria ferment. In theory, a limitless supply of one ingredient can be made from a single plant molecule.

British natural skincare company Haeckels is leading the charge and witnessing the benefits. 'Through precision fermentation, not only can we minimise the unwanted

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compounds present in plant extracts for purer ingredients with greater efficacy, but we can also control the process, so the final ingredient has specific desirable properties,' explains Em Rose, the brand's head of formulation. Take Spiraglow, an ingredient created in-house from spirulina, a type of algae. It's been designed in a way to increase its bioavailability, which means boosting its active ingredients – in this case, peptides. The result? Far more power to calm, hydrate and moisturise your skin.

Haeckels has also collaborated with sustainable clothing brand Pangaia and biotechnology firm C16 Biosciences to create the Palmless

## 'Sometimes, you can design things to be even better than in nature'

formula that's used in the Pangaia Lab Rewild Body Block, a cleansing soap. Created from sugar cane in an innovative fermentation process, Palmless replicates the properties of palm oil without the need for the habitat-destroying crop.

Lab-grown ingredients could also prove useful in formulating products that help balance and boost the skin microbiome, key to a healthy skin barrier. Botanical skincare brand Skin Diligent created its morinda citrifolia leaf extract by obtaining a molecule from noni (a tropical fruit tree). Its purpose is to control the skin's bacterial population by acting as a 'quorum sensor'. Put simply: this is a biological process where cells communicate with each other. And it's an especially useful function in the brand's Regulating Cream, which is designed to balance the skin and prevent breakouts for acne-prone complexions.

The majority of lab-grown innovation is in the skincare space, which Aganovic attributes to higher product prices that help to absorb the hefty production costs.



Business is blooming in lab-grown skincare

However, she predicts haircare will follow suit as the tech develops and becomes more affordable. At Arcaea, its first launch is in the fragrance arena, with the debut of Future Society's Scent Surrection Collection – six perfumes derived from the DNA of extinct flowers.

### GROWTH OPPORTUNITY

With financial backing from the likes of Chanel and fragrance giant Givaudan, more innovation is on the horizon at Arcaea. And across the industry, investment from big

companies such as Unilever and Estée Lauder suggests ingredients grown in the lab are of real interest. For Aganovic, the excitement in this ever-evolving field of biotech is the creativity and new opportunity it offers. 'Sometimes, you can design things to be even better than in nature,' she says.

But while these ingredients can push the boundaries of beauty and help to reduce the impact on the environment, experts advise considering them as one piece of a larger puzzle. Novakovich suggests taking a case-by-case

approach; sometimes, she points out, producing materials in the conventional way is the better option, especially if they're able to be efficiently produced with little natural resource.

There's also the barrier of cost. 'Getting biotech fermentation systems in place requires a huge amount of investment, so it's not feasible for all companies to utilise this technology,' adds Novakovich. And as Em Rose from Haeckels warns, 'Humans have a funny way of wanting to master nature rather than exist with it,

and so we would never want to lose touch with nature in that way.'

Skin Diligent co-founder Tule Park believes that engineered and natural materials both have their place. 'I think we'll see lab-grown ingredients taking up more space, but I doubt they'll become the new norm across the board, as natural botanical ingredients offer a plethora of benefits and we're still discovering new polyphenols (micronutrients) in plants that can offer beauty benefits,' she says. Either way, the future of beauty is bright – and backed by biology. **WEB**

## The best lab-grown beauty buys to bag now



### 01/ Haeckels Spiraglow Cleansing Milk

Enriched with Haeckels' trademark Spiraglow formula, this daily milky cleanser balances your skin and reduce breakouts. And it leaves your face feeling soothed and soft. **£48, haeckels.co.uk**



### 02/ Skin Diligent Regulating Cream: Corrects & Prevents

This moisturiser for oily, combination and acne-prone skin contains the bacteria-busting biotech molecule from the noni plant, but it's also formulated with a rare form of vitamin C to brighten skin and extracts of wild African grape to tackle the visible signs of stress. **£27, skindiligent.com**



### 03/ Grown Alchemist Skin Renewal Serum

Formulated with biotech-engineered ashwagandha, a plant known for its abilities to help the body deal with stress, this lightweight, gel-based serum strengthens your skin's moisture barrier and repairs the damage caused by environmental aggressors (stress or otherwise). **£58, grownalchemist.com**

