

Microbe milk: We've used precision fermentation to make cheese for decades — lab-made dairy may be the next technological leap

Although plant-based analogs have never managed to fully capture the taste and texture of the real thing, a new crop of startups say they've found a better way to remove cows from the equation — by milking microbes instead of udders.

Using precision fermentation, a process commonly used to produce insulin and vitamins, food technology startups are cultivating microbes to produce milk proteins such as casein and whey. Thriving on just water and carbohydrates, the genetically engineered yeast and fungi pump out the creamy base for dairy products to deliver the same taste, texture, and performance — froth, whip, melt, and all — as their bovine-sourced counterparts. It's an innovation that could send dairy stampeding toward a more sustainable future. Already, the German startup [Formo](#) is looking to replace a tenth of Europe's conventional supply by 2030.

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Alt-dairy advocates call the label debate a distraction. "It feels like the smallest part of the argument that we should be having," says Formo's [Oscar] Zollman-Thomas. He points to chymosin, another dairy protein found in rennet, a key ingredient in cheese. Traditionally extracted from the stomachs of calves, most of the world's supply has long been produced through precision fermentation. "People have been happily eating products made through this technology for much of their lives," he adds.

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