Perfect Day Milks Millions in Animal-Free Dairy Market

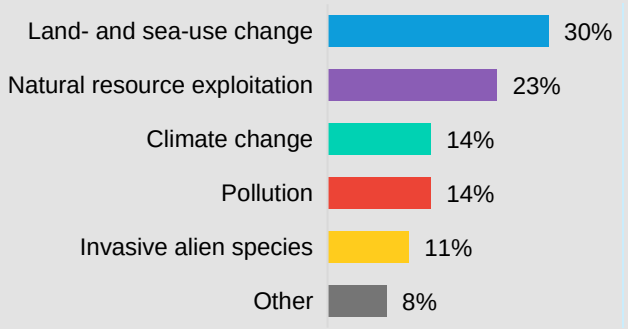
Part of the 'Opportunity Blossoms' series on real economy investments in nature

The dairy industry has a significant impact on nature. Globally, it occupies 7% of habitable land, accounts for 4% of freshwater use and is responsible for an estimated 4.7% of greenhouse gas emissions. A promising avenue to reduce this impact is the production of molecularly identical, dairy-free products and ingredients.

California-headquartered Perfect Day utilizes precision fermentation to create dairy-free whey protein that food and beverage manufacturers use as an ingredient across a diverse range of products, in place of conventional whey. The company leads in the increasingly competitive US alternative dairy market, raising $801 million in funding since 2014 and attaining a valuation in excess of $1.6 billion. Contracts with large consumer packaged goods firms suggest that alternative dairy, made well, will continue to offer investment opportunities in disrupting the global $827 billion conventional dairy industry.

Mitigating nature loss

Five drivers account for over 90% of global biodiversity and ecosystem decline. By eliminating livestock from the production of dairy protein, Perfect Day addresses land- and sea-use change, natural resource exploitation and climate change.

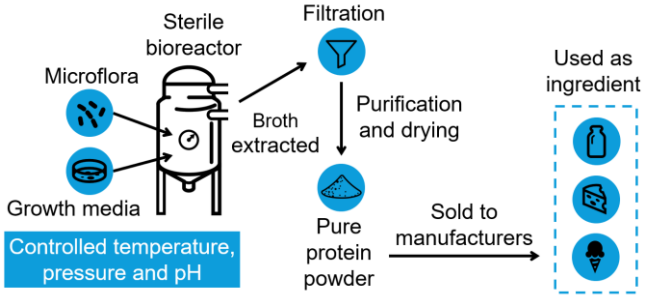


The nature-friendly product

Founded in 2014, food-tech startup Perfect Day Inc has developed animal-free protein ingredients which food companies use in place of animal dairy in products such as milk, cheese and ice cream. Perfect Day obtained intellectual property around the production of beta-lactoglobulin, a major whey protein present in cow and sheep's milk which possesses functional and nutritional characteristics that render it a versatile ingredient in food manufacturing applications.

The company creates whey protein nutritionally identical to that made by cows, using precision fermentation to engineer microorganisms and produce high-value compounds. According to a 2019 submission to the US Food and Drug Administration, a genetically modified fungus strain and sugary liquid media are placed into a sterile bioreactor under conditions that trigger the microbes to secrete the desired whey protein. The mixture is then filtered, pH-adjusted and spray dried, yielding an off-white powder comprised of around 97% whey protein. This final product is used in food production in the same manner as animal dairy, acting as an emulsifier, texturizer or high-quality protein source.

Precision fermentation process



Source: BloombergNEF, Perfect Day.

Perfect Day operates on a B2B model, having offloaded its consumer goods arm, The Urgent Company, in 2023. The company's co-founder said that this earlier B2C approach was to demonstrate the commercial viability of fermentation-derived whey protein to big food manufacturers. Perfect Day has engaged in a series of partnerships, leading to pilot trials with Nestle and Mars on animal-free milk beverages and chocolate bars.

The first full-scale product release was in February 2024 – a range of animal-free ice cream produced in collaboration with Unilever, as part of its Breyers line. BloombergNEF has identified at least nine other brands that Perfect Day is now partnering with, supplying whey proteins for products spanning milk, cheese, ice cream and nutritional supplements, for sale in thousands of retail stores across the US.

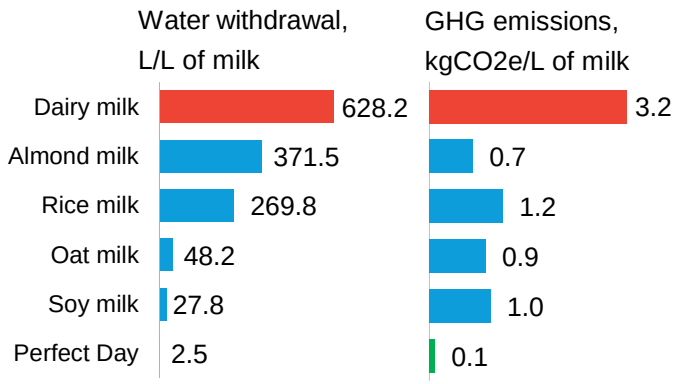
Nature benefit of animal-free whey protein

Dairy milk is among the food products with the most significant impacts on nature: its combined greenhouse gas emissions, freshwater use and land use requirements per unit of production are behind only beef, lamb and a handful of other foods. This is on account of the inefficiencies inherent in cows converting feed and forage into the protein component of milk, and amplified by the global scale of the dairy market. The cultivation and processing of cattle feed (entailing chemical fertilizer production and application), emissions from enteric fermentation, manure, and a host of other gate-to-retail emissions each contribute to the 3.15kg of CO2-equivalent released per liter of milk (11.92kg/gal), on average. Over 600 liters of freshwater is required to produce one liter of milk, while grazing and feed cultivation require more than 9 square meters of land for each liter of milk produced (440sq-ft/gal).

Perfect Day's whey protein has a substantially more modest environmental footprint. According to an LCA analysis, by eliminating the cow – and the attendant feed demands – the company produces sufficient protein for a liter of milk with 96% lower GHG emissions, 99% less freshwater withdrawals and smaller land requirement (the relative size of which depends on both the manner of raising the dairy cow and the lifespan and scale of the company's production facilities).

Even in comparison to plant-based milk alternatives, including almond, rice and soy, Perfect Day's product is still able to achieve noteworthy reductions across these key drivers of nature loss.

Environmental impacts of Perfect Day's whey protein relative to protein in other milks



Source: BloombergNEF, Poore and Nemeck (2018), Perfect Day ISO-conformant report, OurWorldInData. Note: Precision fermentation figures are emissions and water use required to produce the amount of whey protein contained in standard 3.3% protein content dairy milk.

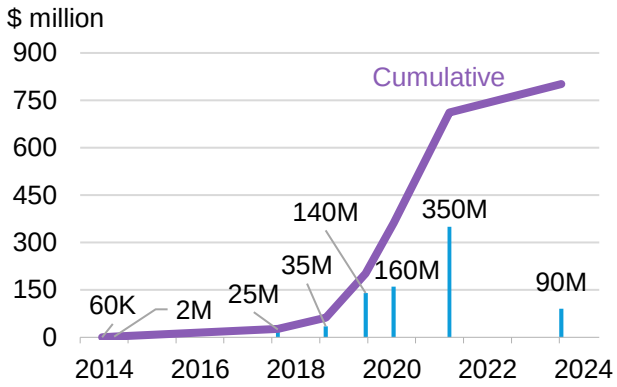
Financial performance

As of October 2024, Perfect Day has raised a total of $801 million over eight rounds from 16 different investors, valuing the company at $1.6 billion. While funding over its initial seven years was unexceptional, it began to attract significant capital from a December 2019 Series C, raising $140 million, supplemented by an additional $160 million eight months later, and a $350 million Series D in 3Q 2023. A $90 million Series E in January 2024 is its most recent infusion. Notable investors span VC (Temasek, ICONIQ), CVC (ADM Ventures), and various angels and family offices.

In an August 2023 interview with AgFunder, its co-founder stated that it was not yet clear whether the company's end game was an IPO or acquisition. In 2020, it reported being margin positive, having

achieved production cost milestones through scale, while several whey protein powders containing its product sell at cost parity to animal-based equivalents. To strengthen growth, the company now needs to finish construction of new production facilities in India and secure further CPG contracts. Key to both is the resolution of a legal dispute with a former contract manufacturing partner (both sides deny wrongdoing).

Perfect Day has raised over $800 million since 2014



Source: BloombergNEF, Crunchbase.

Broader opportunities within the sector

Manufacturers, investors and consumers have started to react to the transition underway in agri-food systems, increasingly recognizing the need for change in dairy supply chains. Many large FMCGs have committed to climate and nature targets; asset managers and financiers seek to minimize environmental risks, and the preferences of some consumers have shifted. This market atmosphere prompted an uptick in investment seeking to capitalize on technologies enabling the production of alternatives that alleviate the nature impacts of dairy products, starting in late 2019, several years after a similar movement in alternative meat.

The global dairy market was worth $827 billion in 2022 and is projected to surpass $1.3 trillion by 2030. This represents a sizeable addressable market for alternative dairy technologies to capture, including three Perfect Day competitors, below.

Notable Perfect Day competitors

Company	Description	Funding
Remilk	The Israel-headquartered alternative dairy company announced plans to construct the world's largest precision fermentation facility, having obtained regulatory go-ahead to sell in Israel and Canada. Work has since paused on the megafactory.	$131 million raised over four rounds, including a $134 million Series B in 2022.
Oatly	Oatly Group AB (Nasdaq: OTLY) produces oat-based alternatives to cow milk and other dairy products. After raising $1.4 billion in a May 2021 IPO, the company approached $800 million in revenue in 2023, though has seen its market cap fall significantly since going public.	$666 million raised over five rounds, including $425 million post-IPO.
Alpro	Belgium-based Alpro distributes soya-based dairy alternatives. Founded in 1980, it was acquired by Dean Foods for $455 million in 2009, spun-off with another part of Dean's business in 2013, before being part of a $10.4 billion purchase by Danone in 2017.	The firm was established as the subsidiary of another Belgium company.

Analyst take

Perfect Day attained a valuation of $1.6 billion, strongly backed by credible investors, intellectual property and regulatory approval in the US, and is now emboldened by a clear path to exit. It represents a prime example of a successful startup with operations predicated on a reduction in the drivers of nature loss. Unlike alternative meat companies, it offers a product identical in structure and taste to an animal-based equivalent, assuaging consumer and investor concerns. As the precision fermentation industry matures, additional financial opportunities will emerge – at the cost of animal-reliant incumbents, but to the benefit of the natural world.

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