

ProteinDistillery GmbH

Using microorganisms to create a source of sustainable protein

Yeast has been part of the human diet for thousands of years. ProteinDistillery GmbH now wants to revolutionise the environmentally friendly protein suppliers market by introducing brewer's yeast and secure the protein supply of the future.

How can society be kept supplied with protein in a sustainable and vegan way? This was the question Christoph Pitter asked himself after completing his master's degree. He knew that in 2020 in Germany, greenhouse gases from livestock farming accounted for approximately 5 percent of the country's total emissions and around 61.6 percent of the emissions from agriculture.¹⁾ As the global population continues to grow, new ideas and innovations are needed to guarantee a sustainable and affordable supply of proteins based on alternatives to animal products like milk, egg or meat. "Currently, all alternative food producers use plant proteins to replace animal proteins," explains Pitter, CEO of ProteinDistillery. But plant proteins do not have the properties that make them truly suitable as animal protein replacements. They lack the texturising properties of animal protein that therefore have to be compensated for with additives, which in turn requires finding a way to mask the unpleasant aftertaste. "We believe people will only change their diets to more plant-based ones if vegan alternatives resemble meat products in texture and taste without the need for additives. ProteinDistillery can produce the right proteins for this purpose and is currently upscaling its technology for mass production."

Saccha becomes ProteinDistillery GmbH



ProteinDistillery team (from left to right): Dr.-Ing. Tomas Kurz, Christoph Pitter, Michael Baunach.
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Christoph Pitter and his fellow student Michael Baunach founded a company called Saccha in order to change the way plant protein is produced. The name comes from *Saccharomyces*, a genus of fungi that includes many species of yeast. Since late 2021, the biotech company has been operating under a new name: ProteinDistillery GmbH. The start-up offers a new process for developing brewer's yeast into a tasty protein source.

Brewer's yeast accumulates as a side stream in many breweries and, according to Pitter, is generally used as feed in livestock farming. "We have developed a process to extract the many natural proteins from brewer's yeast. The proteins remain in their natural state and so have all the properties we associate with a high-quality animal protein, such as egg protein. Egg protein hardens when you cook it, and you get a nice foam when you whip it. These are exactly the properties customers are looking for," says Pitter, who, after completing his bachelor's degree in biotechnology at the Esslingen University of Applied Sciences, went on to earn a master's degree in industrial engineering.

In the context of a changing climate, microorganisms offer a very efficient way to produce proteins. Another important aspect is that they can be produced anywhere, no matter the weather and location. Furthermore, according to Pitter, the inhibition threshold for using microorganisms in food production is not very high, as microorganisms are already used in food, for example in fermented products such as yoghurt or sauerkraut.

Functional properties are retained



The development of white protein powder (right) from brown brewer's yeast powder (left) was a long journey with various developmental stages. Prototypes 1 and 2 are shown between the starting material and the product.
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ProteinDistillery has four different applications for its proteins:

- meat alternatives,
- functional food,
- egg replacement,
- replacement for whey and casein in milk products.

"The difficulty associated with protein purification is that you break the proteins during the process. And this results in the proteins losing their properties," Pitter explains. Pitter and Baunach, both biotechnologists, purify different proteins and combine them in a way that results in the desired properties. They worked with the University of Hohenheim to provide proof that the yeast proteins were easy to digest and could be converted into muscle proteins. This gives them an advantage over protein sources from plants such as lentils or peas, which are less easily converted into muscle mass.

Of course, the company's ambition to produce protein with properties that are typical of animal protein does not end there. Pitter comments: "In the future, we want to use complete cells. The idea is to break down brewer's yeast cells into their individual parts and sell the different protein fractions with their different texture and taste properties to the many different sectors in the food industry." The combination of the different protein fractions results in customised proteins that have, for example, umami, meaning a rich or savoury taste. This would reduce the quantity and/or number of food additives, because the new protein would give the food both texture and flavour.

Biotech start-up funding

Of course, setting up a company also brings challenges. For example, when they started out, the team didn't know how they would finance their idea. This was because there wasn't any laboratory proof as to whether their idea would work. Fortunately, Esslingen University of Applied Sciences provided the ProteinDistillery founders with rooms where they could carry out initial experiments. "At first, the proteins we produced were not exactly what you'd call delicious," reports Pitter. "In fact, they tasted

awful because brewer's yeast is very bitter. But when we eventually came up with proteins that tasted good, our vision took shape. At the outset, we were just looking to develop a protein shake for athletes. But we have now come quite a bit further." Over time, the ProteinDistillery founders became bolder and applied for a 'Young Innovators' grant. The application was approved and Pitter and Baunach were then able to work full time on turning their vision into reality. ProteinDistillery is currently receiving start-up money through the EXIST funding programme. The two company founders are also working on their first seed financing application, and a pilot plant for producing yeast proteins looks within reach. "If everything goes well, we will have a medium-sized pilot plant up and running in the second quarter of 2023. This would help our customers to actually launch products on the market," says Pitter. The target market is countries in Scandinavia and in the so-called DACH region, i.e. Germany (D), Austria (A) and Switzerland (CH).

As their vision grew, Pitter and Baunach also expanded their company. The first to join the two company founders was Prof. Dr.-Ing. Tomas Kurz, who now brings his expertise in food technology to ProteinDistillery. Marco Ries joined the company to look after the finances. With a new name and an expanded team, the winners of the 2021 'Bioeconomy - Innovation for Rural Areas' ideas competition are now planning to transform the production of sustainable food.

Reference:

1) <https://www.umweltbundesamt.de/daten/land-forstwirtschaft/beitrag-der-landwirtschaft-zu-den-treibhausgas#klimagase-aus-der-viehhaltung>

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