Egg white protein produced by precision fermentation has excellent foaming properties | Photo source VTT Technical Research Centre of Finland

AN ENVIRONMENTALLY SUSTAINABLE ALTERNATIVE TO EGG WHITES

FOOD & DRINK

Researchers have developed a new sustainable method for producing the protein in egg whites

Spotted: Egg whites are an important ingredient in the food industry, where they supply protein in a huge number of products. Uses for egg whites range from clarifying wine to helping breading adhere better to fish fingers. In 2020, around 1.6 million tonnes of egg whites were used commercially, often in the form of powder. All these eggs have a significant environmental impact, for which researchers at the University of Helsinki have come up with a potential solution.

The researchers have used 'cellular agriculture' to produce ovalbumin – the protein in egg whites, without using any animals. The researchers inserted the gene carrying the blueprints for ovalbumin into the fungus *Trichoderma reesei*. The fungus then produced and secreted the protein, which was separated out, concentrated, and dried to create a final product.

When tested, the fungus-produced ovalbumin powder had many of the same useful qualities as egg white powder from chickens, such as the ability to foam up. However, the researchers also studied the sustainability of the method, as compared to raising hens for their egg whites. The fungus-derived ovalbumin would greatly reduce land use requirements and greenhouse gas emissions. However, the amount of energy saved would depend on the use of low-carbon energy.

Researcher Natasha Järviö, who participated in the project, pointed out that, "According to our research, this means that the fungus-produced ovalbumin reduced land use requirements by almost 90 per cent and greenhouse gases by 31–55 per cent compared to the production of its chicken-

based counterpart. In the future, when production is based on low carbon energy, precision fermentation has the potential to reduce the impact even by up to 72 per cent."

While the Helsinki researchers did not discuss the commercial potential for their animal-free egg whites, they are not the first to come up with this idea. Last year, California-based Every Company announced that it had developed a similar process, and also touted its sustainability. Other innovations in sustainable replacements for animal products include cell based meat and animal-free milk and cheese.

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Takeaway:

It is not always difficult for home cooks to find non-animal substitutes to everyday ingredients — vegans have been using chickpea water as an egg substitute for years (the chickpeas give off a lot of protein in the water they are cooked in). However, these substitutes are not as effective or sustainable when used in commercial quantities (the energy needed to grow and boil all those chickpeas is significant). This is why cellular agriculture is proving to be an interesting area for research. The new method developed by the University of Helsinki researchers is easy to scale up and produces very similar results to animal-based proteins at a fraction of the environmental cost.