Piggy Sooy? USDA Approves Plan to Genetically Modify Soybeans to Produce 'Plant-Grown' Pig Protein

childrenshealthdefense.org/defender/piggy-sooy-genetically-modify-soybeans-pig-protein-usda-approval/

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The U.S. Department of Agriculture (USDA) this month approved a biotech firm's plan to genetically engineer soybeans to produce a "plant-grown" meat protein the company calls Piggy Sooy.

Luxembourg-based Moolec Science is genetically modifying soybeans to produce porcine myoglobin, a pig protein. The end product is a "blended meat," which is part plant, part animal.

The company, a subsidiary of the Argentine biotech group Bioceres, is also developing a yellow pea plant that produces beef protein.

Moolec's patented technology — which the company calls molecular farming — splices pig genes into a conventional soybean. The resulting soybeans are a pink fleshy color inside and the company claims they contain 26.6% animal protein.

Martin Salinas, Moolec's co-founder and chief of technology, said in a press release that the approval sets the stage for another food biotech "revolution" that is "paving the way for expedited adoption of Molecular Farming technology by other industry players."

But Brian Hooker, Ph.D., chief scientific officer for Children's Health Defense (CHD), called the technology "a nightmare in the making."

“To reduce the complexities of porcine meat into a single protein (myosin) which is the only pork protein produced by the Franken-beans is completely myopic. This is not a pork replacement, it is a recombinant myosin production factory.

“Consumers would therefore be eating a novel substance requiring extensive testing and would require something far beyond what FDA [U.S. Food and Drug Administration] does routinely for GM [genetically modified] food.”

John Fagan, Ph.D., co-founder, CEO and chief scientistof Health Research Institute, told The Defender there is always a very real and serious concern that there will be unanticipated and unpredictable side effects associated with GM foods.

This product is particularly concerning, he said because, “Until now most GM foods fed to humans have been a minor ingredient within a product, whereas here the GM ingredient will be the primary ingredient. So people who eat it will eat much larger amounts of GM foods than they’ve eaten in the past.”

“That means they pose a whole lot more risk,” he added.

‘What could go wrong?’

The USDA’s Animal Plant Health Inspection Service (APHIS), which regulates genetically modified organisms (GMOs), determined that Piggy Sooy and its progeny won’t likely pose a greater plant pest risk than regular soybeans and therefore doesn’t need to be regulated by that agency.

Moolec said the company plans to “accelerate its go-to-market strategy” now that it has approval from APHIS. However, the company may still need approval by the FDA and is going through that consultation process.

GMO experts who spoke with The Defender said their biggest concern with “blended meats” products is that there hasn’t been any human health testing on any of them.

Crop scientist and regenerative farmer Howard Vlieger said the potential danger from GMOs comes not only from the genes spliced into the plant but also from the insertion process itself, which can introduce foreign proteins that stress the human immune system.

“It wreaks havoc,” on human health, he said.

Mark Kastel, executive director of food industry watchdog OrganicEye, said he was also concerned with the lack of environmental testing.

“Once we release these GMOs into the environment, there’s no calling them back,” he said. He cited past examples with untested products, for example, DDT. Once regulators realized it was toxic, they could stop its production and application, but because it is a persistent chemical, they couldn’t get it out of the environment.

“Once GMOs are in the environment, depending on the cultivar, it can cross with other species. It can contaminate crops, non-targeted crops,” he said.

Vlieger said such products also have been shown to pose serious problems for people who may have a food allergy to the contaminants.

In this case, Vlieger and Kastel said, people may have religious or other beliefs that prohibit them from consuming the pork that could accidentally contaminate their food.

Piggy Sooy “is not soy and it’s not pork,” Kastel said. “It’s a novel food that has never been part of the human food chain. That’s a lot of experiments in one economic venture.”

“What could go wrong?” Kastel asked. “We’re opening up this can of worms. We don’t know where it will lead, maybe no problem, but we’re just kind of rolling the dice and experimenting.”

Creating a patented life form for profit, with USDA support

Kastel said the primary motivation was not to address any environmental issues, as the alternative protein industry claims. “It’s profit,” he said.

“What problem are they even really claiming to address?” he asked. We don’t have a shortage of pork, and we don’t have a shortage of soybeans.” And existing production processes, “as inhumane as they are,” he said, “are efficient.”

“So the problem they are actually chasing is, ‘How do we create a patented life form that can be licensed to be grown and realize a return for investors?”

Vlieger said these companies can get their products through the regulatory process easily because regulations are lax.

Regulatory agencies don't regulate GMOs differently from regular food crops based on the principle that they are "substantially equivalent" to the non-modified product and therefore don't need tailored regulations.

"But," he said, "If there's no difference between this and a different organism, why should you be able to patent it?"

The approval process is "so ludicrous that it is hard to fathom," he added.

Farmers, food sovereignty advocates and others have long protested patents on plants and other living organisms, because they restrict farmers' access to seeds, and their ability to experiment and research and have led to consolidation of the food industry.

Patents for genetic modification processes also often claim intellectual property rights over any seeds or plants that include the same genetic information as the products created in that process.

"It's almost laughable," Fagan said. "Human beings have been producing soy for at least a few centuries, if not more. And they've influenced probably almost every gene in the plant. And now a corporation comes in and adds one thing, and on the basis of that, they can own the whole soybean."

Food sovereignty advocates have extensively documented how patenting food has hurt small farmers and traditional practices.

The food critic for the Financial Times, Tim Hayward, wrote in September 2021 that intellectual property rights — which can lead to windfall profits — are behind the push for lab-grown meats.

Owning intellectual property rights over meat, Hayward wrote, would give private companies the power to replace the meat that is currently consumed with a proprietary product.

Both Vlieger and Kastel said the heart of the problem in the approval process is that the industry has captured the regulators.

Tom Vilsack, Biden's USDA secretary who also served eight years under Obama, was the former governor of Iowa. According to the Center for Food Safety, which opposed his nomination as secretary in 2021, Vilsack has long been recognized for his "aggressive promotion of genetic engineering."

He was named "Governor of the Year" twice by the Biotechnology Innovation Organization.

He also used his authority to push through approval of genetically engineered (GE) crops with little to no scientific oversight and weakened regulations for genetically engineered crops and sided with biotech companies, "in every single public interest case attempting to halt GE crop harms or have them better regulated," Center for Food Safety said.

Fagan said that there is also “huge lack of transparency” today concerning genetically engineered crops. Even the information shared with regulatory agencies is often inaccessible to the public because it is considered proprietary.

As a result, he said, “Consumers are rightfully highly skeptical of them [GE foods] because they have not been given any information about their nutritional value, about their safety, their molecular composition, all of those things.”

A savior for the faltering ‘alternative meats’ market?

Most lab-grown meat is made by taking stem cells from animals and placing them in large steel tanks called cultivators or bioreactors. The cells are “fed” a mixture of sugars, amino and fatty acids, salts, and vitamins to proliferate quickly. The patented processes used by the different companies vary. Some produce muscle and connective tissue in large sheets and others in big masses.

Moolec’s technology is different, but the company makes similar promises — that its technology will “overcome climate change and global food security concerns” while “creating value for shareholders and the planet,” it said.

CEO Gaston Paladini, board member and heir to the Paladini SA Argentinian meat dynasty, founded the company in 2020. He introduced his pork soybeans to the world in June 2023.

The company went public in January 2023 after merging with LightJump Acquisition Corp. At the time it was valued at $504 million and was the first molecular framing food-tech company to be publicly traded.

In October 2023 it announced it had raised $30 million to expand its molecular farming operation. It has an industrial facility in Argentina with the capacity to crush 10,000 tons of soybeans per year.

At the time, Moolec projected a $65 billion market for its products, according to an investor presentation.

In a press release this week, Paladini commented enthusiastically on the USDA approval of its Piggy Sooy product.

“Moolec embraced Nasdaq’s slogan ‘Rewrite Tomorrow’ and took it literally! We achieved an unprecedented milestone in biotechnology with the first-ever USDA-APHIS approval of this kind,” he said.

Moolec’s stock shot up by 121% on the news, but overall it was down significantly. In long-term trends, company shares traded at a record high of $20. Last week it peaked at $2.17 per share. As of Monday morning, it was back down to $1.45 per share.

Paladini ascribed this to “a mismatch between market understanding and the real opportunity,” and said the company needs more visibility to change that, Green Queen reported.

Investors have poured billions of dollars into making “alternative meats,” either in a lab or, more recently, in plants. Investments came from venture capitals and sovereign wealth funds like SoftBank and Temasek, and major meatpackers like Tyson, Cargill and JBS, The New York Times reported.

Company CEOs boldly touted “a new era” in agriculture, and billionaire investors like Bill Gates and Richard Branson rushed to invest heavily and publicly promote several cultivated, or “lab-grown” meat companies and lab-produced meat substitutes like the Impossible Burger.

Lab-grown meat start-ups Eat Just and Upside Foods reportedly had valuations at over $1 billion each. And the USDA greenlit the sale of the first lab-grown meat in the U.S. market last year.

The enthusiasm that drew billions to the industry, however, has waned in the last several months.

Initial investor capital dried up, production has proven to be very expensive, touted environmental benefits were shown to be either mistaken or fraudulent, scientists have questioned its safety and companies have been unable to convince consumers to buy their products.

Industry leaders like Upside Foods reported earlier this year that it would pause its major factory expansion plans.

Even the Times pronounced the lab-grown meat “revolution” to be “dead,” and venture capital funding for food technology took a major dive in 2023.

Plant-based meat companies like Impossible Foods and Beyond Meat also faltered, with many restaurants pulling the fake meat from their menus and profits plummeting after consumer scrutiny of the ultra-processed products and disappointment with the products’ taste and affordability.

Kastel said people confuse the term “plant-based” to mean healthy, but most so-called plant-based foods are highly processed, separated from the natural microbiome of the earth and none of them are organic.

Instead, he said, the companies use conventional industrial organic materials and synthetic ingredients to create “food-like substances.”

A new report from the Good Food Institute shows that sales of vegan meat, dairy and seafood fell 26% between 2021 and 2023.

Paladini said his company's products will be different, because they will sell the blended soy and pea products with the meat embedded in them, rather than extracting the meat, which will save on costs.

In doing so, Moolec joins a niche "blended meat" market, with several other companies, including 50/50 Foods, SciFi Foods and Mush foods, who say they are bringing together plant-based foods with cultivated meats.

These companies say cultivated meat "is not ready for prime time," and that their products can help people eat less meat and get more people eating vegetable proteins.

Moolec, a self-described "food hacker," has an international patent portfolio of over 25 patents that are either granted or pending.

Paladini said his products will make better-tasting "alternative proteins" by enhancing plant-based proteins with molecular material from animals. They do this by "embracing science."

In 2025, Moolec is set to launch a nutritional oil containing gamma-linoleic acid (an omega-6 fatty acid) produced using another patented technology applied to a strain of safflower.

The FDA and USDA approved the oil, so Moolec can grow, import and move its plants across state lines without a permit.

It is also developing a bovine chymosin protein used in cheese, also greenlighted by the USDA.