Beef rice is born, the healthy and cheap alternative to meat

AGI - A new sustainable recipe developed: beef rice grown by growing muscle cells and animal fat inside rice grains. The method, devised by researchers at Yonsei University, South Korea, described in the journal Matter, results in a **hybrid, nutritious and flavorful food** that, once marketed, could offer a more affordable protein alternative, obtained with a lower carbon footprint. From laboratory-rainged chicken to proteins derived from crickets, these innovative alternatives offer hope to a planet that is struggling with the environmental and ethical impact of industrial farming.

“Imagine getting all the nutrients we need from **protein rice grown in cells**,” said Sohyeon Park's first author, who conducted the study under the guidance of corresponding author Jinkee Hong, at Yonsei University, South Korea. “Rice already has a high level of nutrients, but the addition of cells from livestock can further increase it,” Park continued.

In animals, biological scaffolding helps guide and support the three-dimensional growth of cells to form tissues and organs. To grow meat in cell culture, the research team imitated this cellular environment, using rice. Rice grains are porous and have organized structures, ensuring solid bases to house cells of animal origin in the corners and crevices.

Some molecules present in rice can also nourish and promote the growth of these cells, making rice an ideal platform. The group of scientists first coated rice with fish gelatin, a safe and edible ingredient that helps cells adhere better to rice. **The muscle and cow fat stem cells** were then sown in the rice and left in culture in the Petri dish for about 9 -11 days.

The final product harvested is a cell-grown beef rice with main ingredients

that meet food safety requirements and have a low risk of triggering food allergies. To characterize beef hybrid rice, researchers steamed it and performed several food industry analyses, including nutritional value, smell, and texture.

The results revealed that hybrid rice has 8% more protein and 7% more fat than regular rice. Compared to the typical sticky and soft texture, hybrid rice was more solid and brittle. Hybrid rice with a higher muscle content had beef- and almond-smelling compounds, while those with a higher fat content had compounds corresponding to cream, butter and coconut oil. “We usually get the protein we need from livestock, but beef production consumes a lot of resources, including water, and releases a lot of greenhouse gases,” Park explained.

The product developed by the team of Korean scientists has a carbon footprint significantly less than a fraction of the price. For every 100 g of protein produced, hybrid rice is estimated to release less than 6.27 kg of CO2, while beef releases 49.89 kg of CO2. If marketed, hybrid rice could cost about $2.23 per kilogram, while beef costs $14.88.

Given that hybrid rice for meat **presents low risks to food safety** and a relatively simple production process, the research group was optimistic about the marketing of the product. But, before rice arrives on the market, the team intends to create better conditions in the rice grain for the growth of muscle and fat cells, so as to further increase the nutritional value.

“I didn't expect the cells to grow so well in rice,” Park said. “Now I see a world of possibilities for this hybrid cereal-based food,” Park added. “One day it could serve as rescue food for famines, military rations, or even space food,” Park concluded.