Gene editing ‘rice revolution’: CRISPR could be used to grow one of the world’s most important crops in salt water

Traditional agriculture requires many inputs; fertilizer, specific chemicals, manual labor and water. Most of the water used in agriculture is for irrigation, and some crops require more water to grow than others. Rice is one of the most water-intensive crops, and also one of the most widely consumed worldwide.

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Manipulating the rice genome is not entirely new. The Golden Rice Project emerged in 1999 to address the rampant vitamin A deficiency, and resulting blindness in many countries where rice is a staple food. Other research into increasing photosynthetic efficiency, drought resistance, and methane reduction of rice is in the works as well, and all requires genetic modification.

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Salt-tolerant rice seedlings grow in the lab

Opposition to genetically modified organisms (GMOs) in food has halted progress on a project that the founders believe could save billions of people who eat rice every day. GMO use is a divisive topic, and many scientists and companies are choosing to stay away from them to avoid public disdain and regulatory challenges.

Agrisea is taking a different approach to food science. They want to grow rice in the ocean by using gene-editing, which would amplify the expression of genes already found in rice that control salt-tolerance. Salt-tolerant rice could be grown in salty ocean water without the use of soil, fertilizer or fresh water. Rather than inserting genes from other species, they have identified the genes that control for salt expulsion, cellular insulation and DNA protection, and are enhancing the expression of those genes.

“Together these genes act in a network, just like they do in nature,” Luke Young, CEO and co-founder of Agrisea said. “We just encourage them along the pathways that nature has formed in plants that can thrive in a salty environment.” The co-founders explained that they could use repeated selective breeding in rice to get the same result, but gene-editing just speeds up the process.

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