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Simbiose registers Flow N, Brazil's first gene-edited technology for nitrogen fixation

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The Brazil-registered innovation modifies bacterial metabolism to increase nitrogen availability to plants, marking a new frontier in microbiology-led crop nutrition



Simbiose has announced the registration of Flow N, the first plant nutrition product developed using gene editing of microorganisms in Brazil. The technology introduces a new approach to biological nitrogen fixation (BNF), using genetic engineering to modify bacterial metabolism and increase the availability of nitrogen to plants.

Flow N was developed through a scientific collaboration between Orygen Research, Latin America's largest private agricultural microbiology research center, and the Federal University of Paraná (UFPR). The project combines academic research, technological infrastructure and applied development to modify genetic mechanisms involved in regulating biological nitrogen fixation.

The main innovation lies in directing bacterial metabolism to promote the release of nitrogen in the form of ammonium (NHâ??â•º), a compound that plants can absorb. In conventional microorganisms, a significant proportion of the nitrogen fixed is consumed by the bacteria themselves to support their metabolic activity, limiting the amount made available in the growing environment.

Gene editing has enabled the modification of regulatory mechanisms that contribute to this metabolic limitation, increasing ammonium excretion and extending its release over time. The objective is to strengthen the contribution of biological processes to crop nitrogen nutrition by making greater use of atmospheric nitrogen in agricultural production systems.

According to Artur Soares, Simbiose's research director, Flow N represents a significant change in how microbiological technologies are developed and used in agriculture.

“More than the registration of a new product, this innovation demonstrates how genetic engineering can expand the potential of microorganisms and transform natural biological processes into more efficient technologies for agriculture. We are exploring new metabolic possibilities so that microorganisms can contribute more effectively to plant nutrition,” he said.

Soares highlighted that the technology targets biological mechanisms governing nutrient availability. “In conventional bacteria, much of the fixed nitrogen meets the microorganism's own metabolic needs. With gene editing, we have been able to modify this dynamic, favoring the release of higher concentrations of ammonium and maintaining this activity for longer,” he explained.

The technology behind Flow N is in the final stages of the patenting process, further underscoring the innovative nature of the development. Further details about the technology, its differentiating features and agronomic results will be presented at the product's official launch.

Green Nutrition: a new technology platform

The launch will also mark the beginning of a broader Simbiose strategy for developing biotechnological solutions. Flow N is part of the company's Green Nutrition concept, a platform expected to bring together a new generation of microbiological products targeting different stages of plant nutrition.

The initiative encompasses technologies for biological nitrogen fixation, solubilization of nutrients present in the soil, increased availability of essential elements and stimulation of plant nutrient uptake mechanisms. The goal is to develop complementary solutions that improve crop nutritional efficiency and make better use of resources already available in agricultural systems.

According to Felipe Fiorese, Simbiose's head of marketing and communications, Green Nutrition represents an evolution in plant nutrition through the use of microbiology to improve production efficiency.

“Green Nutrition represents a new strategic vision for the future of plant nutrition. We want to go beyond conventional nutrient supply by exploring the potential of microbiology to increase the efficiency of production systems. Flow N is one of the first concrete demonstrations of this platform, which is expected to incorporate new technologies in the coming years,” Fiorese said.

Orygen Research's participation is considered strategic to this process. As Latin America's largest private agricultural microbiology research center, the company provides the infrastructure and development capabilities needed to turn scientific advances into commercial solutions. The partnership with UFPR, in turn, strengthens the integration between universities and the private sector in the development of more sophisticated domestic technologies.

For Simbiose, Flow N represents more than an expansion of its product portfolio. The product signals the entry of genetic engineering into a new phase of biological input development, in which the editing of specific metabolic mechanisms could create microorganisms with enhanced agronomic functions.

“The future of agriculture will be built through the integration of science, biotechnology and agronomic efficiency. Flow N embodies this vision: turning scientific knowledge into innovation and creating new possibilities for farmers,” Fiorese concluded.