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Switch Bioworks advances novel microbial fertilizer into first-in-class field trials

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Switch Bioworks, a biotechnology company focused on sustainable fertilizer innovation, has announced the launch of field trials for its novel microbial fertilizer following authorization from the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA).

Microbial fertilizers utilize living microbes to capture nitrogen from the atmosphere and deliver it directly to crops, offering farmers an alternative to conventional nitrogen fertilizers produced using natural gas. Switch Bioworksâ?? technology introduces a new approach centered on a genetically encoded switch designed to overcome a long-standing biological limitation that has constrained microbial fertilizer performance.

The advanced research and development field trials will focus initially on corn, the largest crop grown in the United States, and will be conducted across multiple agricultural sites throughout the U.S. Midwest. Data generated through the trials will support optimization of the companyâ??s microbial discovery and engineering platform, originally developed from research at Stanford University, under real-world agricultural conditions.

Nitrogen fertilizer remains a cornerstone of modern agriculture, yet conventional production depends heavily on fossil fuels and globally concentrated supply chains. These dependencies have exposed farmers to significant market volatility and price fluctuations. Switch Bioworks aims to address these challenges by replacing fertilizer produced in industrial chemical facilities with precision-engineered microbes capable of drawing nitrogen directly from the air, converting it into ammonia, and delivering it at the root zone where crops can readily utilize it.

The companyâ??s microbial fertilizer is designed to integrate seamlessly with existing planting equipment and farming practices, minimizing barriers to adoption for growers.

The announcement comes amid heightened concerns over fertilizer affordability and supply chain security. Recent federal initiatives, including a Trump administration executive order focused on fertilizer and herbicide supply chains and the bipartisan Homegrown Fertilizer Act, have underscored growing recognition that fertilizer availability has become a strategic economic concern for U.S. agriculture.

â??Securing regulatory approval for field trials is a major milestone for Switch Bioworks,â? said Tim Schnabel, Founder and CEO of Switch Bioworks. â??Microbial fertilizer has long faced a fundamental biological challenge: microbes need energy to multiply on plant roots, and they need energy to produce fertilizer. Itâ??s impossible to do both things at the same timeâ??you cannot spend the same energy twice. Our approach is designed to let the microbes first establish themselves reliably on plant roots before switching into fertilizer production mode.â?

The field trials will evaluate the consistency with which the engineered microbes colonize crop roots and activate nitrogen production under commercial farming conditions. The program will also help refine performance across different genetic switch architectures and microbial production hosts.

â??Modern agriculture and our global food supply rest on a 100-year-old technology thatâ??s polluting the planet and threatening global food security,â• said Gareth Asten, General Partner at Acre Venture Partners. â??Reinventing fertilizer is one of the most consequential problems of our time, and Switch is one of the few companies with a real shot at solving it. Field trials are a major milestone on that path.â•

The trials further reflect growing federal and industry interest in alternatives to conventional fertilizer technologies as concerns mount regarding input costs, environmental sustainability, and supply chain resilience.

Switch Bioworks obtained approval for the field trials through established EPA and USDA biotechnology regulatory pathways, which are designed to facilitate the evaluation of advanced agricultural technologies while maintaining rigorous safety standards. The effort aligns with broader federal priorities aimed at reducing production costs, strengthening domestic agricultural resilience, and supporting innovation in biotechnology.

Data generated from the field program will support continued product development as Switch Bioworks advances its engineered microbial fertilizer platform toward commercialization, with the goal of strengthening U.S. leadership in both agriculture and biotechnology.