

CASE STUDY

AZOROOT

ISO Pak™

CUSTOMER NEED

- Decades of research on the root promoting microbe *Azospirillum brasilense*, but no way to commercialize
- An economic way to deliver fresh plant-beneficial microbes at the correct concentrations
- Microbes must be kept viable prior to turfgrass application
- Shelf life was limited in the current form
- In the 1990's BioJect attempted to ferment on site at golf courses
 - Allowed for growth of beneficial bacteria and injection into irrigation water
 - Equipment was large, unwieldy, and expensive



ACTION

- Adapted proprietary bag-in-box package for this product and use case
 - Unique design keeps dormant bacteria protected until activation
- Grows the microbe in package just prior to application
 - Maximizes viability and efficacy
- Testing to ensure microbes were protected
 - Tested and graphed results under different temperature and humidity conditions
 - Shelf-life testing
- Guaranteed analysis for label claims



RESULT

First-ever live-activated root growth microbe system for turfgrass

- 3Bar's design keeps dormant bacteria protected until activation
- 3Bar's design ensures microbe viability and efficacy, activated by the user just prior to application
- 3Bar's on-demand production fills orders quickly

Azo Root produces more roots and healthier turfgrass

Next step

- Market Adoption in the Turf and Hort Markets

Rapid
Commercialization

Extensive
Quality Tests



[Azo Root Activation: Watch Here](#)



Harrell's is committed to finding and developing innovative solutions for the turf and horticulture markets. Our partnership with 3BarBio on Azo Root has been a dedicated collaboration, allowing us to optimize the efficacy of a well-studied beneficial microorganism while overcoming significant supply chain and stability challenges. We are excited to see turf managers and growers across the country enjoy the plant health benefits of a true biologic with all the convenience and ease of use of traditional chemistries.

PAUL GIORDANO

Director of Agronomy, Harrell's



Our collaboration with Harrell's allowed us to truly showcase our capabilities. We are thrilled to partner with the insightful and innovative Harrell's team. We're looking forward to seeing Azo Root on golf courses all around America.

BRUCE CALDWELL

CEO, 3BarBio

About Harrell's:

In addition to being the nation's leading distributors of branded pesticides, Harrell's produces top-quality, custom-blended fertilizers, specialty liquids, and wetting agents. Harrell's guarantees stringent quality control procedures, tight manufacturing specifications, and careful selection of raw materials for each product that carries the Harrell's name. Additionally, Harrell's is proud to be the exclusive United States owner, formulator, and distributor of POLYON® controlled-release fertilizer.

About 3BarBio

Founded in 2013 by CEO Bruce Caldwell, 3BarBio offers increased profitability to discovery companies and distributors by guaranteeing viable microbes and creating a smarter supply chain. 3Bar addresses the major hurdle to further adoption of biologics by designing innovative packaging to deliver viable microbes to the ag market. With its proprietary Design. Develop. Deliver. process, 3Bar delivers on demand for partners around the world.