

A CEO's Guide to Biologicals

Al is Helping Define What Comes Next



The biologicals market is evolving rapidly

Moving from a loosely defined, variable category to a more structured and data-driven industry. Al is accelerating this shift—not by replacing traditional product development, but by refining how biologicals are discovered, formulated, and integrated into farm systems.

Al-driven screening is reducing R&D timelines by 30-50%, giving early adopters a speed advantage.

Al-powered biomarker tracking (as seen in Syngenta's TraitSeq partnership) is helping companies move beyond generic "plant health" claims to targeted, measurable performance metrics.

AI has become a game-changer in biological formulations, dramatically enhancing stability and effectiveness—often by as much as 40–60% across varying environmental conditions. This leap in performance isn't just incremental; it's transforming farmer adoption by building trust and confidence in biological products that previously struggled with consistency.

Al-driven agronomic modeling is helping define when and where biologicals work best, ensuring they are positioned as high-value inputs rather than niche products.

Source: https://www.no-tillfarmer.com/articles/14111-syngenta-acquires-novartis-assets-to-strengthen-position-in-ag-biologicals

Companies investing in Al-powered validation today will define the **next era of crop inputs**



Biologicals are no longer an alternative - they're an extension of agronomic science. Al is helping define their place in the modern input stack



For Input Manufacturers & AgTech Leaders

The biologicals market is projected to grow from \$12B in 2024 to \$30B by 2030—but growth alone won't define the winners. The key question is: who can turn biologicals into a predictable, ROI-backed agronomic tool?

Al is de-risking biological investments by allowing companies to validate performance pre-commercialization, reducing failure rates and increasing margins.

Companies without an Al-driven biological pipeline risk falling behind as the market moves toward more tested, validated, and integrated bio-based solutions.



For Agronomists & Ag Retailers

Al is improving how biologicals are positioned and applied, making agronomists more confident in their recommendations.

Retailers who embrace AI-backed biologicals in their sales strategy could see a significant edge, potentially boosting their margins by as much as 10-20% compared to those still anchored to traditional synthetic inputs.

Al-powered rebate and bundling programs are helping biologicals follow the same adoption curve as synthetic chemistries, ensuring they become part of standard agronomic programs rather than standalone decisions. Retailers and agronomists have struggled with the credibility of biologicals. Al is making them easier to position and sell





Farmers don't want "biologicals." They want products that solve a problem. **AI is helping companies make that distinction**

For Farmers

Farmers are not looking for biologicals—they're looking for proven ROI. AI is helping define that value by determining which biologicals work best, in which conditions, and at what timing.

Al-backed microbial solutions are improving nutrient use efficiency, helping optimize nitrogen application and reduce input costs by \$20-\$50 per acre.

Al-powered biologicals are making regenerative agriculture more profitable, unlocking new revenue streams through carbon credits and sustainability-linked incentives.

AI is Helping Biologicals Transition from Broad Claims to Targeted Agronomic Solutions

The early days of biologicals were marked by overpromising and underdelivering. Today, leading companies are moving away from broad, vague claims and toward precision-formulated biologicals backed by data.

Al-powered biomarker analysis is making biostimulants more specific to plant stress responses, increasing consistency.

Al-driven microbial modeling is optimizing how biologicals interact with soil and plants, improving their impact on nitrogen fixation and phosphorus availability.

Companies like Corteva, Syngenta, and Bayer are integrating Al-driven biologicals into their broader agronomic platforms, ensuring biologicals fit within precision ag tools rather than as standalone inputs. Al is helping biologicals move from "spray and pray" to targeted, tested applications that fit within an agronomic program



Waiting for biologicals to "mature" is a risk. The companies that invest in Al-backed validation today will shape how this market develops



THE MARKET IS CHANGING

For Input Manufacturers & Investors

Speed matters. All is reducing biological product development timelines from 7-10 years down to 3-5 years.

Market positioning matters. The companies winning in biologicals will be those that treat them like an extension of agronomy, not a separate category.

Regulatory risk is lower. Al-backed biologicals offer a pathway to faster regulatory approval compared to synthetic chemistries.

For Agronomists & Ag Retailers

Biologicals need to fit into agronomic models—not compete with them. Al-backed validation is making this integration easier.

Al is helping agronomists understand the exact conditions where biologicals provide ROI. This makes them easier to position alongside synthetic inputs.

Retailers who wait for perfect adoption models will lose ground. Al-driven rebate programs and precision application tools are accelerating adoption.

The companies making biologicals easier to sell and integrate—not just develop—will win



The best biologicals won't be the ones with the biggest marketing budgets—**they'll be the ones backed by data**



For Farmers

Al is improving biological product placement, ensuring they are used in ways that deliver measurable returns.

Al-powered biologicals are making regenerative agriculture a more financially viable strategy, helping farmers reduce input costs without sacrificing yield.

The future of biologicals isn't just about sustainability—it's about farm economics. Al is making that connection clearer.

Key Shifts in Biologicals CEOs Should Watch



From broad claims to targeted applications



From niche product to standard agronomic tool



From intuition-based sales to Al-driven placement and validation



