

# Enhanced Performance with NexGen Biologix

## Overview

NexGen Biologix products are built on a foundation of science-backed ingredients, combining the power of humic and fulvic acids with specialized microbial strains to enhance crop production. By improving biological and chemical interactions in the soil, our solutions deliver consistent gains in productivity while promoting sustainability and long-term soil health.

## Mechanisms of Action

### Humic & Fulvic Acids

- Act as natural chelators and pH buffers
- Enhance nutrient availability, especially nitrogen and phosphorus
- Stimulate plant hormone-like effects (auxin, cytokinin activity)
- Improve soil structure and water-holding capacity

### Bacillus Microbes

- Boost enzyme production (e.g., phosphatases, nitrogenase)
- Promote root colonization and disease suppression
- Fix atmospheric nitrogen and solubilize phosphorus
- Improve resilience to drought and salinity

## Crop-Specific Benefits with Supporting Research

### Corn

Iowa State University (2023):
+15% yield increase
+22% nitrogen-use efficiency
→ Result: Lower fertilizer needs, higher net profit

### Soybeans

Field data shows improved nodulation and shoot biomass.
Application led to >20% increase in pod count and seed weight in pilot trials.

### Tomatoes & Peppers

UC Davis (2022):
+20% in fruit set
Maintains plant turgor under drought stress

### Sugarcane

Increased brix levels and biomass accumulation.
Improved soil microbial diversity enhances residual fertility.

### Leafy Greens

University of Florida (2024):
+30% increase in root mass
+25% increase in marketable yield

### Cotton

Field use reported stronger root systems and earlier flowering.
Increased boll count and fiber quality under dryland conditions.

**The Power of Bacillus Microbes**

Bacillus species are among the most effective plant-growth-promoting rhizobacteria (PGPR), offering a wide range of agronomic benefits. Research shows that:

- Bacillus subtilis and Bacillus amyloliquefaciens promote root elongation, induce systemic resistance, and solubilize phosphate
- Bacillus licheniformis boosts urease activity, aiding nitrogen metabolism and protein synthesis
- Bacillus pumilus enhances abiotic stress resistance, especially under drought and salinity conditions

These microbes:
- Produce enzymes and phytohormones (auxins, gibberellins, cytokinins)
- Fix nitrogen and solubilize minerals like phosphorus and potassium
- Form biofilms that protect roots and support colonization
- Stimulate root branching for increased nutrient and water uptake

**Why Combine Bacillus with Humic and Fulvic Acids**

Together, humic acids, fulvic acids, and Bacillus microbes create a powerful biological system:

- Humics improve soil structure and nutrient retention
- Fulvics chelate and shuttle nutrients across membranes
- Bacillus transforms and delivers nutrients while boosting stress resilience
This synergy underpins the performance of all NexGen Biologix solutions—delivering yield increases, improved soil biology, and a higher return on investment.

## Economic & Agronomic Advantages

- Boosts yield by 10–30%, depending on crop and conditions
- Reduces fertilizer inputs by 25% or more
- Enhances soil microbiome for long-term sustainability
- Improves water retention, reducing irrigation needs
- ROI backed by replicated trials and grower success stories

## Summary of Crop-Specific Benefits

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| --- | --- | --- | --- |
| Crop | Yield Increase | Key Benefit | Source |
| Corn | +15% | NUE efficiency | Iowa State University (2023) |
| Tomatoes | +20% | Fruit set & drought tolerance | UC Davis (2022) |
| Leafy Greens | +25–30% | Root mass & market yield | University of Florida (2024) |
| Soybeans | +20% | Pod count & nodulation | Internal Trials |
| Cotton | +15% | Boll count & root depth | Grower Trials (Dryland) |

Combining humic and fulvic acids with Bacillus microbes creates a powerful synergy that delivers greater benefits than using either component alone.

While humic and fulvic acids improve soil chemistry and plant nutrient uptake by chelating minerals and buffering pH, Bacillus microbes actively transform and mobilize those nutrients into plant-available forms. When used together, the acids create an optimal soil environment that enhances microbial proliferation and colonization, while the microbes in turn increase the bioavailability and assimilation of nutrients stimulated by the acids.

**How and Why it Works**

**Nutrient Cycling Synergy:** Humic and fulvic acids bind to essential nutrients like phosphorus, calcium, and magnesium. Bacillus microbes produce enzymes (phosphatase, urease) that mineralize and convert these bound nutrients into plant-accessible forms. This dual action results in enhanced nutrient efficiency and uptake.

**Root Development Synergy**: Humic substances stimulate root elongation and lateral branching via auxin-like activity. Bacillus microbes colonize these expanded root zones, increasing surface area for nutrient and water absorption while suppressing root pathogens. This interaction enhances both plant vigor and stress tolerance.

**Stress Resilience Synergy:** Humic acids improve water retention and soil porosity, buffering against drought. Bacillus strains such as B. subtilis and B. pumilus help regulate plant defense responses and produce metabolites that improve osmotic balance. Together, they increase plant turgor under water stress and improve survival in adverse conditions.

**Microbial Proliferation and Habitat Enhancement:** Fulvic acids, being lower molecular weight, rapidly stimulate microbial respiration and nutrient cycling. This accelerates Bacillus establishment and proliferation in the rhizosphere, enhancing biological activity.

Studies show that this synergistic combination improves yields, nutrient-use efficiency, and resilience more significantly than applications of humic acids or Bacillus alone. For example, a 2023 field trial comparing humic-only, Bacillus-only, and combined treatments on corn found that the combined product increased yield by 15%, versus 7% for humic-only and 6% for Bacillus-only applications.

The result is a more responsive and sustainable soil-plant system with measurable agronomic and economic benefits.

Figure: Yield Improvement Synergy – Combined Humic Acids + Bacillus Microbes

