

## BiOWiSH® Fertilizer Enhancement

### OUR PRODUCT

The world's first microbial-based Enhanced Efficiency Fertilizer (EFF) Technology with EXTENDED shelf life and BROAD compatibility. BiOWiSH® is a blend of proprietary microbial cultures that is coated onto dry fertilizers or mixed with liquid fertilizers to create a new class of EEFs.

#### ADVANTAGES

- Arrives on-farm, ready-to-use — no fermenting, special equipment or mixing required
- Consistent performance across a broad range of crops, climates, soil types, and management practices
- Proven, reliable approach using root associated pathway to enhance beneficial microbes in the rhizosphere
- Superior value at an input cost that makes sense for high production agriculture

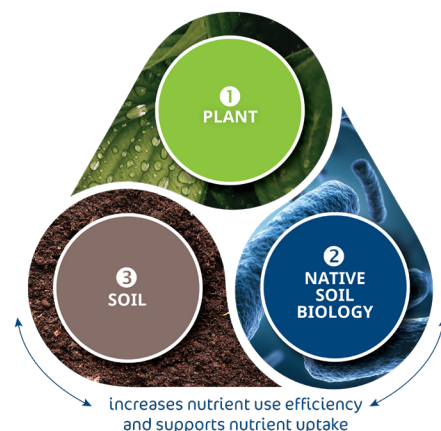
### HOW IT WORKS

BiOWiSH® endophytic *Bacillus* deliver soil nutrients to crops through the rhizophagy cycle creating a symbiotic relationship between the plant and soil microbes. BiOWiSH® works in three different ways.

#### TECHNOLOGY IN ACTION

- 1 PLANT BASED MODE OF ACTION**  
BiOWiSH® microbes can optimize yield potential by improved nutrient uptake through the rhizophagy cycle. This entails the microbes being taken into root cells where they are stripped of nutrients, then deposited back into the soil where the cycle begins again within other roots.
- 2 MICROBIOME BASED MODE OF ACTION**  
BiOWiSH® helps promote the release of root exudates (sugars and enzymes) that enhance beneficial microbes in the rhizosphere.
- 3 SOIL BASED MODE OF ACTION**  
The BiOWiSH® *Bacillus* stimulate native microbes, which mobilize bound nutrients. This improves soil conditions for increased plant vigor.

#### HoloGene 3™ Technology Plant - Microbiome Shift



## FAQS

How does BiOWiSH® get to the root zone?	BiOWiSH® microbes ( <i>Bacillus</i> ) are applied as dormant endospores. Once they are exposed to sufficient levels of nutrients, soil moisture and soil temperature, the spores will germinate. Like your nutrients, these spores cannot move on their own. When water levels are sufficient, vegetative cells can move passively by leaching or evapotranspiration.
How do BiOWiSH® microbes affect native biology?	BiOWiSH HoloGene 3™ technology supports the expression of natural plant processes evolved to stimulate native, beneficial soil microbes in the root zone. Plants are not prone to stimulate microbial communities that result in negative outcomes for the plant.
How does BiOWiSH® differ from soil inoculant?	BiOWiSH HoloGene 3™ technology is not a soil inoculation. When BiOWiSH® endophytes enter the roots of their host plants and deliver their load of soil nutrients, it triggers a cascade of effects. The process of root exudation drives the rhizophagy cycle while also enhancing beneficial microbial activity in the rhizosphere. This collection of native soil microbes is sometimes likened to a “garden” tended by the plant, and may express natural functions that increase nutrient use efficiency and support nutrient uptake.
How long will BiOWiSH® microbes remain active in the soil?	Because BiOWiSH® organisms are strongly root associated, they are expected to remain viable and active in the rhizosphere throughout the life of the plant. It should be noted that BiOWiSH® microbes are not intended to populate the bulk soil with BiOWiSH® <i>Bacillus</i> ; rather, they partner with their host plant’s rhizosphere to augment the hologenome of the plant-microbe partnership.

## PERFORMANCE RESULTS

Meta analysis of more than 200+ independent, replicated field research trials supports the performance of the BiOWiSH® EEF across a variety of crops and environments.

### PERCENT YIELD UPLIFT FOR STANDARD FERTILITY PROGRAM + BiOWiSH®

Standard fertilizer rates with the addition of a BiOWiSH® treatment win over the Control 86.2% of the time on average, with an average yield uplift of 7.7% over the Control (no BiOWiSH®) treatments.

Each bar represents the average value of three or more replicates in the BiOWiSH® treatment per trial.

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