

Nitrogen Fixation with Sequester®

Sequester® is formulated with nitrogen-fixing autotrophs (microbes that are able to provide their own energy through photosynthesis) called Cyanobacteria. They are powered by the sun. They work by taking nitrogen from the air and converting it to a bioavailable form for plants. Cyanobacteria have been in existence for nearly 2 billion years, are the source of much of the atmosphere's oxygen and are the biological construction crew of the microbial world. Sequester® contains four different strains of Cyanobacteria.



When applied according to instructions, synthetic fertilizer applications can be substantially reduced, and with a proper transition, look to eliminate the application of synthetic fertilizers fully.

The continued application of synthetic fertilizers will result in Cyanobacteria turning off their nitrogen fixing and other important activities because they can sense the applied chemicals, and recognize there is no need for them to expend energy on something that isn't needed, even though they can provide these nutrients for free.

Sequester® is fully compatible with other biofertilizers, manures and compost. If you have historically used manure or compost, you can safely eliminate, or reduce the application rate by 50% or greater when Sequester® is used.

Microbial inoculation is required under regenerative practices. There are three common methods of soil inoculation: 1) grazing; 2) apply compost/manures; and 3) apply microbial extracts and biofertilizer. (The biofertilizer is required to feed the microbial extracts).

If inoculated and operated with regenerative practices that feed and maintain the soils microbial biomass such as planting cover crops between cash crops, the volume and health of the soils microbial biomass will flourish. However, interruptions such as deep and heavy tillage, lack of cover crops, use of synthetic fertilizers and concentrated chemicals, and more, can continually antagonize, limit, or damage the soils microbial biomass.

The Cyanobacteria in Sequester® can serve as a "MicroCover Crop™." Because Cyanobacteria are autotrophs, they do not need biofertilizer to flourish in the soil. Soil particles aggregate, water use efficiency improves, and nutrient uptake improves meaning less irrigation and added nutrients are required.

Cyanobacteria can also function as heterotrophs when they are deeper in soils where light does not penetrate. In this case they populate the rhizosphere (plant roots), utilize root exudates for energy and grow along with the plants as they correlate to temperature and moisture conditions (plants exude through their roots 25% to 40% of the carbohydrates they fix through photosynthesis).

During winter months, cyanobacteria slowly hibernate as the soil temperatures cool. In spring, a high percentage emerge from dormancy and continue to perform as soil temperatures begin to rise. However, when restoring depleted soils, applying Sequester in the spring will keep the soil restoration moving forward at an accelerated pace. After 3-years, you can expect to reduce the amount of Sequester applied as the soils base microbial biomass will be sustainably functional and need only supplemental applications to keep it above a critical-for-functionality and population density.

Question 1: I thought Sequester was a soil amendment, not a fertilizer.

Sequester® is applied in a soil amendment formulation, but atmospheric nitrogen is fixed and available to plants through Cyanobacteria's natural functioning in soil nutrient cycling. As microbial soil health improves, more nitrogen and other nutrients will be available to the plants naturally. Research indicates that cyanobacteria also boost plant growth regulators and enhance soil organic matter, nitrogen and phosphorous in soil.

Question 2: What is the difference between microbial nitrogen fixers and cyanobacteria?

The Cyanobacteria in Sequester® function like rhizobacteria that populate legumes and perform a critical function for the plant by taking nitrogen from the air and converting it to a plant available form. However, Cyanobacteria fix nitrogen using its own energy when sunlight is available or associate with any plant roots (they are not limited to a specific species of plant) and utilize the root exudate energy to deliver nitrogen to the plant as needed during the growing season. Sequester® also work synergically with other nitrogen fixing bacteria in the soil. Cyanobacteria have a dual mode of action through support of other nitrogen fixing microbes and working on its own.

The Sequester Team!