AgriBoost™

A VITAL INGREDIENT FOR THE ENVIRONMENT

PRESS RELEASE

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AGRIBOOST™ AND NUTRIENT BIO-AVAILABILITY

Nutrient uptake by plants involves a complex mechanism involving physical, chemical and biological reactions. The root system and the mechanics of nutrient uptake are not fully understood, yet nutrient flux at the soil-root interface is central to life in many types of plants and, more importantly, is the key determinant in crop yields.

Plants use ion exchange as the principal method for absorbing nutrients from the soil. This is an active chemical process initiated by the plant root system, as nutrients are needed. If nutrients (or water) are insufficient, the plant naturally spends more time developing a larger root volume to obtain its needs; this takes away from plant growth above the soil and retards crop yields. Therefore, the timing and sufficiency of nutrients plays a role in plant growth.

When traditional soluble fertilizers are applied to the soil, mass flow (convective flow of water) is the method that nutrients move to the root system below the surface. Since such fertilizers are soluble, they move through the soil and become available to the plant roots so long as they are held in the root's zone of bio-availability. Also, the root's demand for nutrients at any given moment influences the availability of nutrients in the soil. As such, about 50-70% of nitrogen, including a similar amount for other fertilizers, moves through the soil unused by the plant. Generally, the greater the soil weathering, the lower the concentration of nutrients in the soil solution. Nutrient uptake efficiency among the traditional soluble fertilizers is therefore low, often requiring several applications per harvest, and leads to the environmental problems associated with this type of agriculture.

The least understood phenomenon in nutrient uptake is the cationic exchange process that allows for nutrient absorption by the plant. All nutrients are absorbed as

ions. Each ion passes through the plasma membrane into the cytoplasm of the root cell. When nutrients are needed, the root system uses chemical reactions to force an ionic imbalance whereby ions are exchanged between the root system and soil to correct the imbalance. Because of the many different factors influencing this process, it is difficult to model among different soil types, climatic conditions and plant-specific characteristics. However, cationic exchange is the key method of nutrient uptake.

Various expensive and often ineffective fertilizers focus on slowing the dilution of soluble fertilizers so that they may be available over a greater period of time. But these and other fertilizers, including urease inhibiters, miss the point about how plants get nutrients from the soil. Any meaningful change in nutrient uptake efficiency has to address the cationic exchange process on a molecular level. AgriBoost™ products contain natural minerals and have a very high cationic exchange capacity (CEC) along with a natural endowment of trace elements and nutrients important to plant growth. Because of its molecular structure, AgriBoost™ products can be thought of as a molecular sieve that readily exchanges ions and can hold other molecules in its cavity. **In one gram of AgriBoost™, the channels provide up to several hundred square meters of surface area on which chemical reactions can take place.** This explains why AgriBoost™ absorbs and holds water like no other mineral. Naturally, adding AgriBoost™ to soil dramatically increases soil moisture even in low humidity environments.

When the plant root demands nutrients through the cationic exchange process, AgriBoost™ readily gives it up. This has several important implications for soil fertility and crop yields. First, nutrients are available through an entire crop and are made available only as needed. Second, each unit of nutrient uptake is obtained with dramatically less fertilizer application, perhaps as much as 50% less. Third, AgriBoost™ increases soil moisture and is endowed with its own valuable trace elements and minerals, thereby acting as a permanent soil re-mineralizer.