TECHNICAL PAPER

RX GREEN TECHNOLOGIES' NUTRIENT TECHNOLOGIES

NITROGEN ASSIMILATION

In plant nutrition, there is an ideal ratio of nitrate nitrogen (NO_3) to ammonium nitrogen (NH_4). This ratio is 2:1-4:1. NO_3 is used more efficiently in chlorophyll production, but when a plant is stressed it uses more NH_4 because it is easier to break down to NH2. This inhibits plant metabolism of other nutrients, including calcium.

There needs to be a balance of carbon and nitrogen inputs to allow for efficient photosynthesis and nutrient utilization. The chloroplasts are cells within the plant that convert nitrogen sources into smaller molecules used in chlorophyll production. This is where assimilation occurs.

»**TAKE HOME: This technology assists (through proprietary process) the enzymes used to break down N so urces required in chlorophyll production and protein synthesis.**

SULFUR ASSIMILATION

Plants take up sulfur in the form of sulfate (SO_4) through the roots. There are other forms of sulfur out there, but none that plant roots will absorb. They can also take up organic sulfur molecules, or sulfone, foliarly and through the roots. Sulfone also stimulates SO_4 uptake. Sulfur is a necessary component in the biosynthesis of flavor and color, as well as protein synthesis.

The ideal balance of N:S is 10:1, but it can vary. If S is deficient, plants will exhibit yellowing of the leaves, typically mistaken as N deficiency. This is because S is a required component of disulfide bonds in chlorophyll molecules, and chlorophyll is a pigment molecule that makes plants appear green. Many other protein molecules rely on S for stability and structure as well.

»**TAKE HOME: This technology provides sulfur in the form the plant will most readily use, and assists in chlorophyll production and terpene synthesis.**

PHOSPHORUS UPTAKE ENHANCEMENT

Phosphorus can be taken up as PO_4 in minimal amounts through the leaves, and as PO_3 through leaves and roots. PO_4 is very reactive chemically, is quick to precipitate out and can be problematic in a solution. Plants do not require as much P as the industry pushes. Soil P levels will self-regulate to 0.3 ppm, and providing excess will affect cation uptake, specifically with trace elements. That said, a plant's P demand will increase as much as 500% during the reproductive stage. This P needs to be made available before the plant requires it, or a deficit will occur and inhibit flower and seed production.

P_2O_5 is the form of phosphorus delivered in a fertilizer application, but this can be sensitive to oxidation over time. The trick to providing P before the plant needs it while protecting against oxidation is the patented technology we offer.

»**TAKE HOME: This technology provides sulfur in the form the plant will most readily use, and assists in chlorophyll production and terpene synthesis.**

CHLOROPHYLL BIOSYNTHESIS STIMULATOR

This is a highly protected patented technology that provides a specific proprietary molecule that increases the efficiency of the biosynthesis of the chlorophyll molecule. The limiting factors of chlorophyll production are phosphorus, magnesium, sulfur and proteins. This molecule enhances the absorption and utilization of those compounds to boost the metabolism and subsequent biosynthetic pathways in chlorophyll production.

»**TAKE HOME: A highly specialized proprietary molecule that will improve the biosynthesis of chlorophyll, which has a huge impact on vegetative development.**

ORGANIC ACID/FULVATE/HUMATE STABILIZATION

Organic acids are typically stable at a range of pH 4-10. Fulvates are more plant active molecules, stable at pH <6, while humates are soil active molecules, more stable at pH >8. While both provide benefits to plants, there is a great chance of instability in many systems, which will affect the plant's ability to utilize the benefits of the organic molecules provided in these materials. The organic acids are used to stabilize the fulvates and humates, making them more accessible at a wider pH range.

»**TAKE HOME: This technology uses organic acids, which are by-products of the plant's metabolic processes, to stabilize cations (positively charged ions, such as trace elements), stimulate plant metabolism, and stabilize the chemistry in the nutrient solutions.**

STRESS MITIGATORS

Plants naturally contain compounds that aid in stress responses. These consist of defensive proteins, which respond to biotic and abiotic stress, and osmoregulants, which respond to osmotic stress and transpiration stress. This technology contains molecules required to construct those compounds that are needed in a stress response within the plant's cells.

»**TAKE HOME: This technology provides precursors for a plant's natural response to stress, whether it is biological attack (disease, pests) or environmental stress (excess/deficient water, extreme heat/cold/humidity).**

MICRONUTRIENT COMPLEXATION

Trace elements (micronutrients) are very susceptible to reactions and lock out from other nutrients, especially phosphorus. They are essential to many plant biosynthetic pathways, including those in photosynthesis, chlorophyll production, and terpene production. While the technologies in our products do not contain limiting amounts of phosphorus, external inputs (i.e. additives, growing media, etc.) may contain elements that would affect the bioavailability of micronutrients. Organic acids are used in conjunction with amino acids to complex, or bind with, trace elements so that they are not available for reacting with other elements that would interfere with their bioavailability.

»**TAKE HOME: This technology combines naturally occurring organic acids with amino acids to bind with trace elements, protecting them from lock out from other elements. This insure the micronutrients' bioavailability for the plant's use as it is needed in metabolic processes.**