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Fulvic Acid: A Miracle Worker

My wife gave me a great Christmas present this year; a book entitled Organic Soil Conditioning by Dr. William Jackson (958 pages), full of facts that are beneficial to agriculture. This information may help farmers cope with higher fertilize prices.

"Mother Nature" hates to waste soil nutrients so she designed two natural organic humic compounds to improve nutrient utilization. Fulvic acid has an open carbon structure that is a light weight compound (low molecular weight) with almost miraculous properties! It comes from lightly digested plant and microbial byproducts and is not just one carbon compound, its many varied compounds. Its composition is very similar all over the world, yet it differs slightly depending upon soils, plants, weather, microbes etc. Fulvic acid, over time gets degraded, digested, and transformed into Humic acid which has a denser and tighter carbon structure (high molecular weight). These two organic compounds (fulvic and humic acid) are full of essential soil nutrients, making soils fertile while improving plant growth and crop yields. This article will focus on Fulvic acid.

Fulvic acid is a chelator, which ties up short-term many important elements including nitrogen (N), phosphorus (P), potassium (K) plus calcium (Ca) and magnesium (Mg). Sulfur is tied up mainly by Humic acid. These elements plus carbon, oxygen, and hydron make up 98% of the essential plant elements needed for plant growth. Fulvic acid also chelates the other elements (2%) needed for improved biological activity. Metallic ions with positive charges like iron (Fe), zinc (Zn), copper (Cu) and manganese (Mn) plus essential anions with negative charges like boron (B), chlorine (Cl), and molybdenum (Mo) are absorbed with fulvic acid. Fulvic acid binds these nutrients into plant available forms by balancing positive and negative charges.

Due to its open structure and high oxygen content, fulvic acid improves plant roots and leaves permeability so that essential elements can be easily absorbed and moved into the plant's vascular system. Fulvic acid is a chemical transformer that protects the naked and highly reactive element (like a blanket) until it finds a suitable biological partner. Suitable partners like proteins turn into enzymes which speed up plant metabolism, leading to higher crop yield. Here are a couple of specific things fulvic acid does for plants.

Fulvic acid binds and enhances calcium seed uptake needed for improved seed germination and growth. It's a growth regulator, increasing root and shoot length and branching. Fulvic acid contains sugar amino acids (high in nitrogen), increasing both N and K plant uptake. It chelates

Fe and Mg into a usable form, moving them into the plant. Iron (Fe) is the central element in an enzyme that makes chlorophyll. Extra Fe and Mg in a plant will turn plants dark green! Magnesium (Mg) is the central element for making chlorophyll, the biological engine for converting the sun's rays into food.

Soil phosphorus (P) and zinc (Zn) are like two fighting brothers. Too much P ties up Zn and too much Zn ties up P. Fulvic acid acts like their "Mother" to make them behave and work together to increases plant concentrations of both elements. Copper, manganese, and nickel have similar positive charges and similar reactions to fulvic acid. Fulvic Acid also enhances plant uptake of the negatively charges anions (B, Mo, Cl). Fulvic acid again speeds up plant metabolism by producing essential proteins and enzymes, leading to higher yields.

The benefits keep piling up. Fulvic acid buffers pH, helps with drought tolerance by holding and conserving water, and reduces fungal plant diseases. Fulvic and humic acid together make soils more friable, breaking up hard pans and compacted soil while improving soil drainage. Fulvic acid also detoxifies soil from harsh chemicals and toxic elements. Microbes and fulvic acid weather clay particles, extracting many essential soil nutrients from the clay minerology. In other words, fulvic acid makes new soil by increasing soil fertility through the weathering of rocks and clay particles.

Fulvic acid is a natural soil organic (carbon) compound. However, farmers should be regularly adding fulvic acid to their fertilizer products. Fulvic acid is often mined and produced from soft coal deposits (Leonardite). It increases nutrient efficiency by increasing plant nutrient uptake. Either less fertilizer can be used or the extra fertilizer gets utilized to increase yields. Application rates will vary depending upon crop and soil type, so talk to your fertilizer dealer. Avoid adding too much fulvic acid, because it can be detrimental to plant and soil health. Fulvic acid is like a "miracle worker", benefitting agricultural production while increasing food nutrient density. Hopefully my Christmas gift can be used by everyone to improve their health and prosperity!