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Amino acids. A fundamental tool in agriculture

Overview of amino acids

The amino acid is an organic molecule composed of carbon, hydrogen, oxygen and nitrogen. When a series of amino acids are joined by peptide or ionic bonds, the proteins are formed. Proteins are important macromolecules involved in all aspects of growth and development of plants.

Plants produce amino acids from the N absorbed as nitrate or ammonium that is in the soil. Clearly, the process of absorbing nitrogen from the soil is an important loss of energy for the plant. Therefore, the main reason why it is so important to apply these products in agriculture is the energy savings that they achieve. This energy will be used in other processes such as sprouting, flowering or fruit set and fruit fattening, so that will increase the quality and the production of the crop. Smart Organics products help take up the nutrients from the soil, so gaining energy, and helping the plant grow. Less blossom drop produces more produce.

Types

There are 20 types of amino acids that form proteins. We use 18 of them. There are certain types that are better for specific functions. Thus, the amino acids responsible for chlorophyll are Alanine, Arginine and Glycine. For the development of the root there are the Arginine and the Methionine. If we want to help the soil with its effect, and a better development of shoots and leaves, we will use the Glycine. For the resistance systems of the plant the best types are the lysine, the glutamic acid and the glycine. Finally, for the gibberellins we will use leucine and proline.

Aminograms, what they are and how they are interpreted

An aminogram is a schematic representation of the amino acid composition of a protein (or in our case of a crop aid management tool.) An aminogram can be qualitative (it is the different types of amino acids that the product contains) or quantitative (it is the amount of each amino acid).

Fertilizer companies use this diagram to give information about the amino acid content of the products. In addition, we bring also the amount of free amino acids in our products. This data provides very important information about the product quality. In the (process by which amino acids are obtained, and that will be discussed later) peptide bonds of proteins are broken, generating fractions of amino acids. These portions can be very heterogeneous, but only amino acids that are free can be absorbed by the plant, so this is one of the factors for evaluating the quality of a product.

Sources and methods of extraction

The main sources of amino acids are from vegetables, animals or synthetics. Amino acids of animal origin are usually produced from collagen and hair. Those obtained by plants, are extracted from vegetable waste of

soybean, cereals, etc. The aminograms presented by these types of products depend on the type of plant material used. Finally, it is possible to design a product with synthetic amino acids, that is, to buy specific amino acids in the chemical industry and make a product with the amount of each you want. This method is much more expensive, but the resulting products are of high quality and have a faster effect.

In agriculture they are mainly two types to obtain the amino acids. Acid hydrolysis and enzymatic hydrolysis (or enzymatic fermentation along with mechanical bonding).

Acid hydrolysis is the most rudimentary method and cheap. It consists in a prolonged boiling of the protein with acid solutions. This method is quite aggressive, so the resulting amino acid have low quality, due to there is a high percentage not free amino acids, and some are partially destroyed during the process. However, the improvement in manufacturing and the new techniques have managed to increase the quality of these products.

The enzymatic fermentation process is like the previous one, but much less aggressive. It is not necessary to increase temperature, and instead of an acid solution, a certain enzyme is used (usually of bacterial or fungal origin). The process is more expensive and complex, but the percentage of free amino acids is much higher, so most of the composition of these products is usable by the plant. Then when added bonding occurs from mechanics, the quality heightens to help the plants beyond what other amino acids can do.

Conclusions

The use of amino acids in agriculture is a tool that can be very useful to improve the production and the quality of the crop to overcome moments of stress due to low temperatures, droughts, etc., but it is necessary to have a knowledge of this type of products to buy the correct item for your crop.

In Smart Organics LLC there is a variety of products with amino acids. It will be a pleasure to answer the questions that can arise about which of our products is the best one in each case.