



Agriculture Production – MicroOrgano Liquid, Amino Powder, AminoStart & Spurt

Agriculture production is a very intensive business and is related to better quality and better yield which leads to better profitability. Every farmer dreams of achieving this goal. However to achieve this goal with advancement of technology use of fertilizer and pesticides is not adequate. Now is the time to look at bioenergetics and biochemical aspects of plants, to achieve the goals of farmers.

Every plant like any living organism needs certain components for growth over and above soil, sun, rain and air. The basic component of living cells is protein, with building block material, amino acids. Proteins are formed by sequences of amino acids. Plants synthesize amino acids from the primary elements, carbon and oxygen obtained from air, and hydrogen from water in the soil. This forms carbon hydrate by means of photosynthesis and by combining it with the nitrogen which the plants obtain from the soil, leads to synthesis of amino acids, by collateral metabolic pathways. Only L-Amino Acids are part of these proteins and have metabolic activity.

The requirement of amino acids in essential quantities is well known as a means to increase yield and overall quality of crops. The application of amino acids for foliar use is based on its requirement by plants in general and at critical stages of growth in particular. Plants absorb amino acids through stomas and it is proportionate to environment temperature.

Foliar nutrition in the form of protein hydrolysate (known as amino acids liquid) and foliar spray provide ready made building blocks for protein synthesis. Amino acids are also supplied to plant by incorporating into the soil. It helps in improving the microflora of the soil facilitating the assimilation of nutrients. Amino acids are also supplied to plants by incorporating into the soil. It helps in improving the microflora of the soil facilitating the assimilation of nutrients.

Amino acids are fundamental ingredients in the process of protein synthesis. About 20 important amino acids are involved in the process and each function. Studies have proved that amino acids can directly or indirectly influence the physiological activities of the plant.

Effects on Plants:

1) Protein Synthesis

Proteins have a structural function, metabolic function (enzymes), a transport function and a stock of amino acids function. Only L-Amino Acids are assimilated by plants. D-Amino Acids are not recognised by the enzymatic locus and therefore can not participate in protein synthesis. Hence amino acids obtained by organic synthesis are not well assimilated.

2) Stress Resistance

High temperature, low humidity, frost, pest attack, hailstorm, and floods have negative effects on plant metabolism with a corresponding reduction in crop quality and quantity. The application of amino acids before, during and after the stress conditions supplies the plants with amino acids which are directly related to stress physiology and thus has a preventing and recovering effect.

3) Effect of Photosynthesis

Plants synthesize carbohydrates by photosynthesis, and chlorophyll is the molecule responsible for the absorption of the light energy. A low photosynthesis rate implies a slow growth leading to death of the plant. Glycine and glutamic acid are fundamental metabolites in the process of formation of vegetable tissue and chlorophyll synthesis. These amino acids help to increase chlorophyll concentration in the plant leading to higher degree of photosynthesis. This makes crops lush green.

4) Action on the Stomas

Stomas are the cellular structures that control the hydric balance of the plant, the macro and micronutrient absorption and the absorption of gases. The opening of the stomas is controlled by both external factors (light, humidity, temperature and salt concentration) and internal factors (amino acid concentration, abscisic acid, etc).

The stomas are closed when light and humidity are low and temperature and salt concentrations are high, when stomas are closed photosynthesis and transpiration are reduced (low absorption of macro and micronutrients) and respiration is increased (carbohydrate destruction). In this case the metabolic balance of the plant is negative. Catabolism is higher than anabolism. This implies a slow metabolism and stop in the plant growth. L-Glutamic acid acts as a cytoplasm osmotic agent of the “guard cells”. Thus favouring the opening of the stomas.

5) Chelating Effect

Amino acids have a chelating effect on micronutrients when applied together with micronutrients, the absorption and transportation of micronutrients inside the plant is easier. This effect is due to the chelating action and to the effect of cell membrane permeability. L-Glycine and L-Glutamic acid are known to be very effective chelating agents.

6) Amino Acids and Phytohormones

Amino acids are precursors or activators of phytohormones and growth substances. L-Methionine is precursor of ethylene and of growth factors such as Spermine and Spermidine, which are synthesized from 5-Adenosylmethionine. L-Tryptophan is precursor for auxin synthesis. L-Tryptophan is used in plants in L-Form only. L-Tryptophan is available only if hydrolysis of protein is carried out by enzyme. If hydrolysis is carried out by acid or alkali, as done in many European countries, L-Tryptophan is destroyed. L-Arginine induces synthesis of flower and fruit related hormones.

7) Pollination and Fruit Formation

Pollination is the transport of pollen to the pistil, so fecundation and formation of the fruit is possible. L-Proline helps in fertility of pollen and L-Lysine, L-Methionine, L-Glutamic Acid are essential amino acids for pollination. These amino acids increase the pollen germination and the length of the pollinic tube.

8) Equilibrium of Soil Flora

The equilibrium of the microbial flora of the agriculture soil is a basic question for a good mineralization of the organic matter and also for a good soil structure and fertility around the roots. L-Methionine is precursor of growth factors that stabilize the cell walls of the microbial flora.

9) General

- L-Glutamic Acid and L-Aspartic Acid, by transamination give rise to the rest of the amino acids.
- L-Proline and Hydroxyl-Proline act mainly on the hydric balance of the plant strengthening the cellular walls in such a way that they increase resistance to unfavourable climatic conditions.
- L-Alanine, L-Valine and L-Leucine improve quality of fruits.
- L-Histidine helps in proper ripening of fruits.

MICROORGANO LIQUID, AMINO POWDER, AMINOSTART and SPURT have a natural blend of 20 amino acids. **SPURT** has 12.5% sea weed extract along with amino acids. These products are formulated by Agrowchem Inc., leading manufacturer and exporter of protein hydrolysate solution. Protein Hydrolysate is manufactured by enzymic hydrolysis which keeps all amino acids in free state and L-Form amino acids (like L-Tryptophan, L-Cystine, L-Arginine) which are important amino acids for plant nutrition are available for plants.

More about seaweed extract

Seaweed extract is obtained from *Ascophyllum nodosum*, a weed grown in Norwegian Sea by alkaline hydrolysis using cold process. Seaweed extract is a stress alleviator, effective in biotic and abiotic stress conditions of plants, maximising both crop yield and quality.

Beneficial effects of seaweed extract

- Increased crop yield
- Improved shelf life of fruit
- Improved root development
- Increased uptake of inorganic nutrients from the soil
- Improved seed germination
- Increased resistance to stress conditions

Seaweed consists of cytokinin, auxins and betaines. Betaines are methyl donors which the plants convert to formaldehyde which leads to better immunity in crop system. Betaines are shown to play a major role in reducing root knot nematode infestation. Seaweed extract is found to be effective in the following stress conditions:

1) BIOTIC	<u>Root Knot Nematodes</u>	<ul style="list-style-type: none"> • Reduces Root Attack • Reduces egg laying capacity • Reduces egg hatching
	<u>Potato Cyst Nematodes</u>	<ul style="list-style-type: none"> • Reduced egg hatching
	<u>Red Spider Mite</u>	<ul style="list-style-type: none"> • Reduction in numbers
	<u>Mildew in Capsicum</u>	<ul style="list-style-type: none"> • Increased resistance
	<u>Chlorophyll retention</u>	<ul style="list-style-type: none"> • Significant reduction in chlorophyll degradation i.e. increased metabolism
	<u>Increased uptake of nutrition</u>	<ul style="list-style-type: none"> • Increased shelf life

2) ABIOTIC	<u>Water utilisation efficiency</u>	<ul style="list-style-type: none"> • Alleviates draught conditions • Increases root growth (depth)
	<u>Increase frost resistance</u>	
	<u>Alleviates salt stress</u>	
	<u>Temperature stress</u>	

Seaweed extract application is effective more by root for biotic stress condition, even though foliar use also results in beneficial results.

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