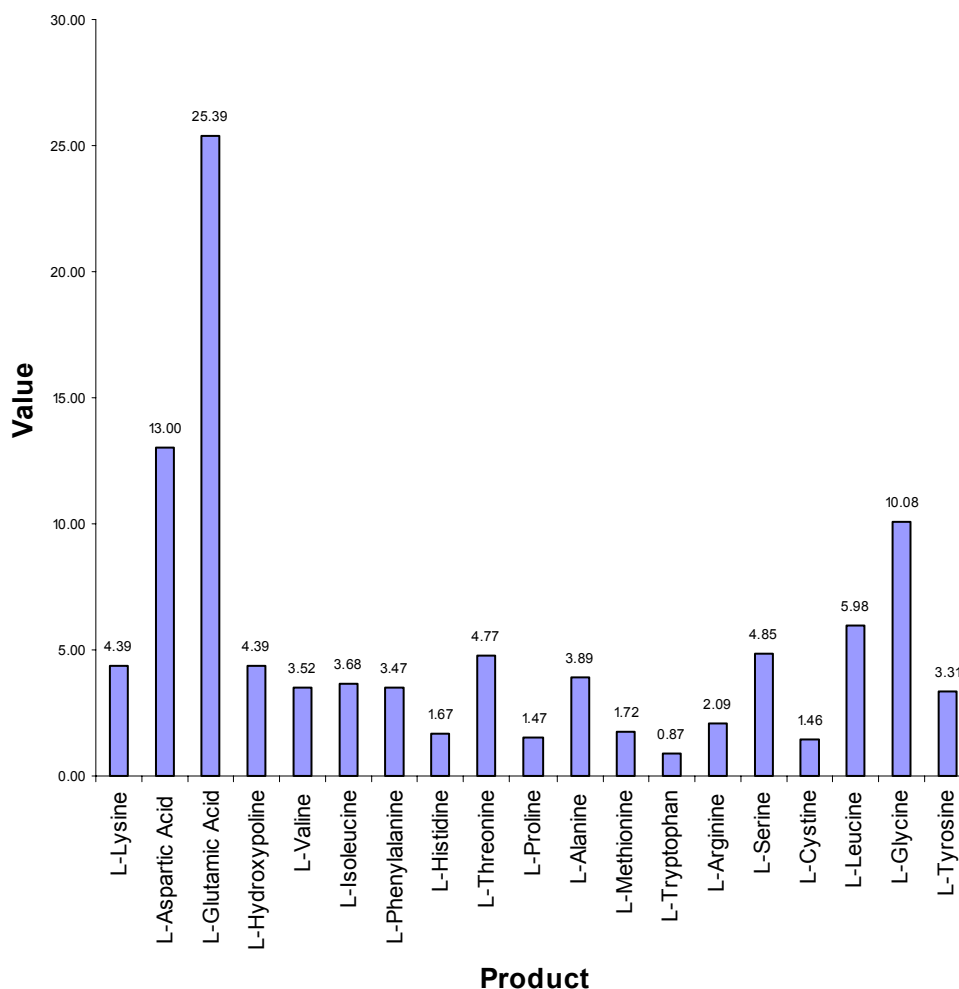
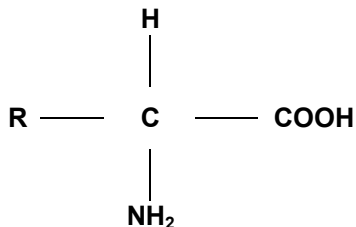


## Amino Acid Profile of *MicroOrgano Liquid, Amino Powder, Spurt & AminoStart*



Proteins are the basic components of living cells, it consists of over 50% of the dry weight and the genetic information is transmitted through proteins.

Proteins are formed by a sequence of amino acids, having a structure as follows:



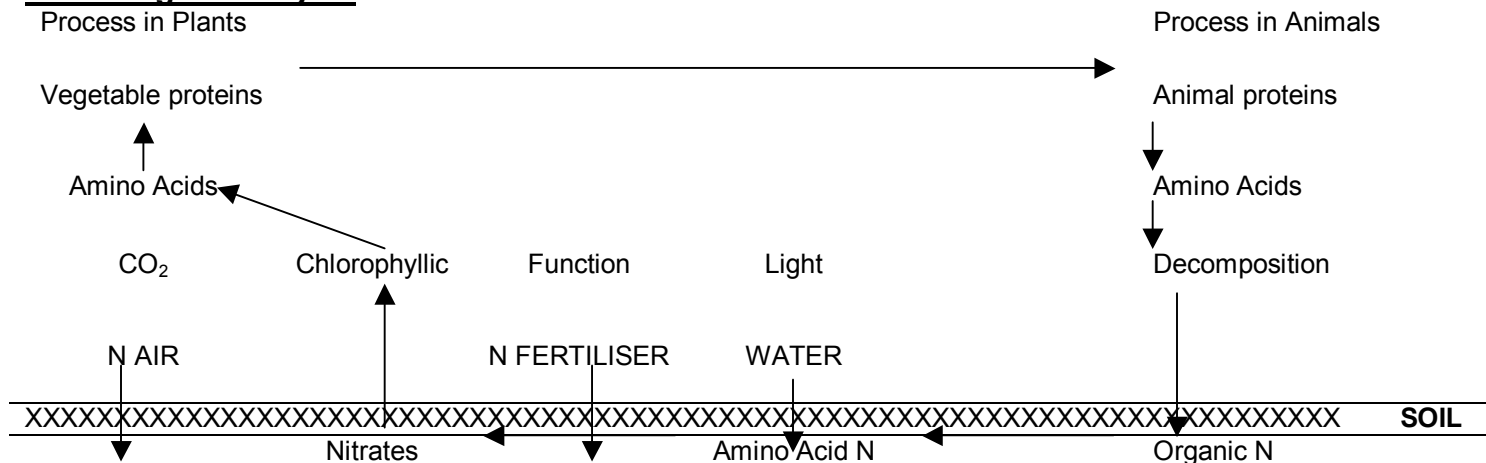
being R a radical variable for each amino acid.

Animals cannot synthesize amino acids from simple elements. The amino acids are obtained from food and are used to build their proteins.

Plants synthesize amino acids from the primary elements, the carbon and oxygen obtained from the air and hydrogen from water in the soil, forming carbon hydrates by means of photosynthesis and combining it with the nitrogen which the plants obtain from the soil, thus producing amino acids.

Living beings synthesize their proteins within the organisms due to availability of specific enzymes which catalyze synthesis reactions from amino acids.

## Following is the cycle:



The plants absorb nitrogen through its roots in the form of a nitrate (and a low percentage in the form of ammonia) which becomes nitric and then ammonia. The ammonia reacts with biochemical cellular compounds, giving rise to glutamic acids and aspartic acid, amino acids which through transamination gives rise to the other amino acids. By means of activating enzymes specific to each amino acid the process of protein synthesis begins in the cellular protoplasm.

The process of the synthesis of amino acids from nitrate obtained from the soil requires a great amount of energy. If there is a deficiency of nitrogen in the soil because of weak nitrification or if there are stress conditions present in the plant like pest attack, drought, frost it makes the process difficult causing serious prejudicial effect on crop yield. We can alleviate this by applying amino acids directly to the cell as a foliar spray.

### Foliar Nutrition with Amino Acids

Plants are capable of absorbing nutrients through their leaves. A solution of amino acids with molecular weight less than 400 gm per mole like **MICROORGANO** and **SPURT** can be applied through the leaves so that it can be incorporated into the sap, in such a way that there is great energy saving (which is needed for protein synthesis) and it helps in increasing efficiency of protein formulation.

The amino acids in **MICROORGANO** and **SPURT** are mainly absorbed through the stomas and incorporated into the sap as they are capable of penetrating the cellular membranes and incorporating themselves in to the metabolic routes of protein synthesis. In a few hours the amino acids in **MICROORGANO** and **SPURT** make their way towards the plants growing constituents. The season of application has little effect on the physiological state. It is the physiology of the plant which is of greater importance as the amino acids are totally assimilable.

Therefore the availability is independent of the chlorophyllous function facilitating the synthesis of organic substances and specifically nutrition, obtaining greater vigour and vegetative development with an increase in the firming of the fruit and larger size and precocity.

This is especially important when the plant is suffering from stress conditions which make the synthesis of amino acids more difficult. The application of **MICROORGANO** and **SPURT** allows a considerable saving of energy which affects weakened crops.

Therefore, foliar nutrition with **MICROORGANO** and **SPURT** leads to higher yields. Moreover, it can also be incorporated into the soil given that its amino acids are food of primary importance for the micro organisms in the soil in such a way that they favour its development and growth activation the assimilation of nutrients. This increase in bacterial flora results in a notable increase in soil fertility. It also helps in better root propagation and development of lateral root system, which helps in better absorption of nutrients and micronutrients. **AMINOSTART POWDER** and **AMINO POWDER** help to achieve this through its seed and soil application.

## AMINO POWDER, MICROORGANO, SPURT & AMINOSTART

### Their balance in Amino Acids

It is known that all amino acids do not have same importance inside the plants and that they are required in different quantities. For example, L-Lysine, L-Tryptophan and L-Methionine are needed in very low concentrations. L-Glutamic Acid and L-Aspartic Acid by transamination give rise to the rest of the amino acids. L-Glycine, L-Proline and L-Arginine are found in great quantities in plants.

Nevertheless they are all essential and interdependent in such a way that the excess or absence of one of them can block the synthesis of the others.

The evolution of the proportions of the different amino acids varies in any given species with the physiological state. Thus in citrus fruits, which is the most studied crop, the content of L-Glutamic Acid is 1.2 mg percent in the spring season and is 2.1 mg percent in lethargic period. Large concentration is produced during lethargic period as the rate of protein synthesis decreases and the free amino acids accumulate. IN growth time, these reserves are mobilised to synthesize proteins and the concentrations of free amino acids decrease. The most suitable time for applying **MICROORGANO** and **SPURT** is when crops show specific needs, such as growth, firming and increase in the size of fruits or when there are frosts, drought, diseases and pest attacks.

L-Proline and Hydroxyproline act mainly on the hydric balance of the crops, strengthening the cellular walls in such a way that they increase resistance to unfavourable climatic conditions. Moreover, the Proline helps in fertility of pollen.

Glycine is of special importance. This is a fundamental metabolite in the formation of vegetable tissue and so is the first component in chlorophyll synthesis.

Arginine has high biostimulant efficiency in development. It is known that the relative proportion in which amino acids are need is very important. In this way, only an adequate balance can be used to the maximum by the plant.

The process of perfect and controlled enzyme hydrolysis used to manufacture **MICROORGANO** and **SPURT** offers a balanced formula with the most suitable concentrations and proportions for vegetable physiology. It contains a large quantity of Glycine of vital importance in the synthesis of chlorophyll. It also contains a considerable amount of Proline which acts on the hydric balance. It is also notable for its glutamic acid content which as we know is an important precursor of other amino acids etc.

The efficiency of a suspension of amino acids does not lie in the total concentration of these but in the quantity in which each is applied, because as we see there are some which are required in greater quantities or have more metabolic functions while other may not be needed in large quantities. **MICROORGANO & SPURT** supplies the most suitable amount of each amino acid, in such a way that there is maximum efficiency in exploration.

### BIOLOGICAL SPECIFICITY OF MICROORGANO & SPURT

It is know that the amino acids present in nature show optical activity, that is, they can turn the plane of polarised light and that is because they have an asymmetric carbon atom with four different substitute groups, which are distributed around the carbon. Then can give two different arrangements or optical stereoisomer.

**Levo-type** a configuration similar to the L-glyceraldehyde which is sugar which is taken as reference.  
**Dextro-type** a configuration similar to D-glyceraldehyde.

So for example we have:



All the amino acids contained in **MICROORGANO & SPURT** have levo configuration where as those obtained through synthesis or insufficiently controlled or acid and alkaline hydrolysis are a mixture of levo and dextro rotatory racemic amino acids without optical activity.

This is because the amino acids synthesized in the vegetable cell are produced by enzymes which have stereochemical specificity (in the process of hydrolysis it starts from pre-existing organic material).

While the amino acids synthesised in the laboratory are racemics and their resolution or separation in D & L isomers would require laborious fractioning procedures which are not economical and are beyond the reach of current biotechnology. In the amino acids of insufficiently controlled hydrolysis, they tend to racemize and even to generate the shedding of ammonia, a symptom of the destruction of active principles.

If we analyse the amino acids present in the proteins of plants, we observe that they are all optically active and levorotatory in configuration and that they are biologically functional ones.

Therefore if we use levorotatory amino acids, like those of **MICROORGANO** & **SPURT** as foliar spray they will be perfectly assimilated and incorporated into the metabolic routes of synthesis. Only the levorotatory amino acids will be assimilated while the dextrorotatory will not be recognised by the enzymatic locus and therefore cannot intervene in the protein synthesis.

This explains as to why the synthesized amino acids are not so well assimilated. The mixtures with copper did not turn out to be as dangerous as if the amino acids come from controlled hydrolysis like **MICROORGANO** & **SPURT**. It is said that copper is phytotoxic if it is translocated excessively in the interior of the plants. The translocation and the penetration turns out to be very efficient with **MICROORGANO** & **SPURT**. Likewise the use of **MICROORGANO** & **SPURT** is recommended for Plum trees, in dilute concentration due to the fact that translocation of natural amino acids in this plant is too quick and could mobilise too many reserves.

### **Incorporation of AMINO POWDER & AMINOSTART POWDER in Soil**

It is well known that free amino acids are easily absorbed by the foliar route. It is also known that amino acids, given that they are ionizable compounds, can form part of a solution and penetrate the absorbent hairs of the roots. However, little is known of the assimilation of amino acids through the roots and whether the plant is capable of synthesizing proteins in this way.

Nevertheless, we do know that on applying free amino acids to the soil, we find an impressive flora of micro organisms and bacteria, which in general are fed from organic material from where they take proteins, hydrolyse them and obtain amino acids. Therefore, if we apply **MICROORGANO**, **SPURT**, **AMINO POWDER** & **AMINOSTART** to the soil, the above mentioned flora will feed avidly, as we are giving in easily digestible food; without peptide complexity we are contributing in this way to increasing the bacterial flora of the soil and therefore to increasing fertility.

For this reason, whether it is due to this effect or because an assimilation of amino acid is really produced through the roots, the fact is that the incorporation of **MICROORGANO**, **SPURT**, **AMINO POWDER** & **AMINOSTART** to the soil has a notable effect on a greater precocity in the crops and on a greater weight and yield.

### **PHYSIOLOGICAL ACTIVITY OF MICROORGANO AND SPURT**

Besides building up a rapidly available immediate reserve in the process of protein biosynthesis and being undoubtedly important metabolites, the amino acids in **MICROORGANO** and **SPURT** have a recognized physiological activity.

These amino acids act as natural stimulators of biological activity. They produce greater rapidity in the fixation of carbonic anhydride for photosynthesis and originate a smaller consumption or requirement of nitrogenous substances. They produce regulatory and balanced endocellular activities.

Moreover, the greater efficiency of the enzymatic system which it originates along with the stimulation of the organic acids improves the efficiency of the use of macro or micro nutrients present in the soil or provided by fertilizers. In this way the efficiency and assimilation of the fertilizers contribution is improved through the physiological activity.

On the other hand by situating the crops in the optimum conditions of metabolism and nutrition **MICROORGANO** & **SPURT** increases their resistance to the phytopathological and climatic adversities, which together with the energy saved in the protein synthesis with rapid recovery of weakened plants, make this the most suitable product in any situation for all plants.

The manifest physiological activity on plants shown by **MICROORGANO** and **SPURT** is obvious in:

- A marked increase in yield.
- Better sprouting and an increase in firming with a reduction in fruit fall, flower failure, etc.
- Advance in maturing of fruit or shortening of the productive cycle with better yields in dry material.
- Greater content in sugars and better quality, colour consistency, taste, resistance to ripening, etc.
- More abundant and more uniform flowering.
- Improvement in the efficiency of phytosanitary products, foliar fertilisers, etc. due to its synergic action of facilitating translocation.
- Greater uniformity in ripening and harvesting.
- It facilitates germination and rooting, increasing its development.
- It increases the permeability of vegetable membranes and therefore favours the absorption of nutrients.

- In short, there is a greater vigour in the crops, a higher yield, more resistance to adversities and greater capacity for recovery from there with heaviest and better quality fruits.

## **SUMMARY OF ADVANTAGES OF APPLYING MICROORGANO & SPURT**

- It consists of amino acids which are totally natural and biologically active; therefore its assimilation is rapid and complete. It incorporates itself into the metabolic cycle of the crops with the resulting saving in energy which the plant will use in increasing production.
- The incorporation of active amino acids is of special importance in the recovery of badly nurtured or weakened crops (stress from drought, frost, pests attack and infection, hail, floods, etc).
- Because of its high content in Glycine which constitutes the first link in the synthesis of chlorophyll, it will contribute to preventing the appearance of chlorosis.
- Its high content of Glycine, Proline, Alanine and Arginine is an important source of nitrogen which contributes to the saving of nitrogenous fertiliser.
- By increasing the permeability of cellular membranes and moreover acting as a biochemical stimulant, there is a greater absorption and assimilation of macro and micro nutrients.
- It stimulates the physiological functions of the crops in periods of great activity such as sprouting, flowering, pollination and firming as well as the development of fruits, roots, tubers and flowers.
- It facilitates the action of phytosanitary products such as fungicides, insecticides, herbicides, etc as it has a clear synergic action with an increase in translocation and penetration.
- Its relative balance and proportion of amino acids is the most suitable for vegetable physiology.
- Likewise it incorporates micro elements of rapid assimilation and participation in the metabolic processes as a result of which, there is a decrease in the appearance of deficiencies.
- Its application to the soil activates the microbial population which causes an increase in biological activity with greater processes of humification and therefore with a considerable increase in soil fertility.
- To sum up **MICROORGANO & SPURT** products of active amino acids of the greatest importance in plant nutrition for obtaining of higher yields, precocity and quality in every kind of crop.

## **USE AND DOSAGE**

**MICROORGANO & SPURT** can be applied to all crops whether they are extensive or intensive by foliar spraying or applied to the soil through irrigation water. In foliar spraying one should make the plants wet especially on the underside of the leaves.

## **CITRIC FRUITS**

The best times for applying **MICROORGANO & SPURT** are:

- 1<sup>st</sup> Spray** Before flowering in order to favour and stimulate flowering.
- 2<sup>nd</sup> Spray** At the time of fecundation (petals falling) to improve setting and firming of fruits
- 3<sup>rd</sup> Spray** When the fruits of small size are set.

It is advised in adverse conditions for the crop, thus helping its recovery.

It is advisable to apply it jointly with foliar fertilizers or insecticides, but not with growth retarding agents.

### **DOSAGE**

PRODUCT	Mixing Instructions	Soil Application	Irrigation Application
<b>MICROORGANO</b>	250 ml per 200 L of water per acre	3-4 L / hectare	Up to a total of 10-15 L per hectare during cultivation.
<b>SPURT</b>	100 ml per 200 L of water per acre	1-1.25 L / hectare	Up to a total of 5-6 L per hectare during cultivation.

## **FRUIT TREES**

In plum trees the translocation of amino acids of **MICROORGANO & SPURT** is too fast. Hence low dosage is to be applied. Stages of application are same as citrus fruit, at pre-flowering, at petal falling and at fruit setting.

### **DOSAGE**

PRODUCT	Mixing Instructions
<b>MICROORGANO</b>	250 ml diluted to 400 L of water per acre
<b>SPURT</b>	50 ml diluted to 200 L of water per acre

In other fruit crops and arboreal crops (bananas, avocados, olives, etc) it is applied as follows.

- 1<sup>st</sup> Spray** In the pre-flowering period to stimulate flowering.  
**2<sup>nd</sup> Spray** When petals fall (fecundation) in order to improve the fruit setting.  
**3<sup>rd</sup> Spray** During the development of fruit in order to increase its size.

The application of **MICROORGANO** & **SPURT** is recommended in young plantations for a rapid development of the trees reducing their non-productive phase. Likewise, its application is recommended in adverse conditions for the crops along with foliar fertilizers, insecticides, etc.

### **DOSAGE**

PRODUCT	Mixing Instructions	Soil Application	Irrigation Application
<b>MICROORGANO</b>	250 ml per 200 L of water per acre	3-4 L / hectare	Up to a total of 10-15 L per hectare during cultivation.
<b>SPURT</b>	100 ml per 200 L of water per acre	1-1.25 L / hectare	Up to a total of 5-6 L per hectare during cultivation.

## **HORTICULTURAL PRODUCTS AND STRAWBERRIES**

In horticulture for its rapid developments, a joint application of **MICROORGANO** or **SPURT** with phytosanitary products like pesticides or insecticides is carried out.

The ideal times are:

- 1<sup>st</sup> Spray** At the beginning of vegetation or after transplanting.  
**2<sup>nd</sup> Spray** In full development or before flowering.  
**3<sup>rd</sup> Spray** After flowering or two weeks before harvest.

It is also recommended to apply it in adverse conditions for crops in order to help its recovery.

In directly sown horticultural products it can be applied from the time the plants are 5-10 cm high. 3-5 treatment should be applied at times indicated.

### **DOSAGE**

PRODUCT	Mixing Instructions	Soil Application	Irrigation Application
<b>MICROORGANO</b>	250 ml per 200 L of water per acre	4-5 L / hectare	Up to a total of 12-16 L per hectare during cultivation.
<b>SPURT</b>	100 ml per 200 L of water per acre	1-1.25 L / hectare	Up to a total of 6-8 L per hectare during cultivation.

## **ORNAMENTAL AND FLORAL PRODUCE**

**MICROORGANO** & **SPURT** helps improve the development of plants and also their appearance and vigour. In the cultivation of cut flowers it increases colour intensity. It is advised to apply 3-5 treatments from the rooting of the cuts until 15 days before harvest.

### **DOSAGE**

PRODUCT	Mixing Instructions	Soil Application	Irrigation Application
<b>MICROORGANO</b>	250 ml per 200 L of water per acre	4-5 L / hectare	Up to a total of 12-16 L per hectare during cultivation.
<b>SPURT</b>	100 ml per 200 L of water per acre	1-1.25 L / hectare	Up to a total of 6-8 L per hectare during cultivation.

## **VINES**

**MICROORGANO** & **SPURT** are used on vines to prevent failure of the flowers and in rainy areas where due to too much sun, the grapes do not ripen well.

The ideal times are:

- 1<sup>st</sup> Spray** Pre-flowering  
**2<sup>nd</sup> Spray** When the fruits are setting  
**3<sup>rd</sup> Spray** During ripening (Saccharification)

Likewise it is also recommended after frost or hail to help in recovery.

## **DOSAGE**

<b>PRODUCT</b>	<b>Mixing Instructions</b>	<b>Soil Application</b>	<b>Irrigation Application</b>
<b>MICROORGANO</b>	250 ml per 200 L of water per acre	5-6 L / hectare	Up to a total of 15-16 L per hectare during cultivation.
<b>SPURT</b>	100 ml per 200 L of water per acre	1-1.25 L / hectare	Up to a total of 5-6 L per hectare during cultivation.

### **OTHER CROPS**

**MICROORGANO** & **SPURT** can also be used on beet root and potatoes in order to favour the weight gaining of subterraneous parts, on fodder crops for recovery and developments after each cuttings, on cereal during tillering (Ahijado) along with herbicides. On cotton at the time before flowering and at square formation, for development of capsules, etc.

### **COMPATIBILITY**

- **MICROORGANO** & **SPURT** can be mixed with insecticides, fungicides and fertilizers. It should not be mixed with cupric products due to its elevated translocation although in the olive due to the coriaceous nature of its leaves there is no problem.
- It should not be mixed with mineral acids and sulphur and alkali.
- In all cases we recommend that you seek advice from our Agricultural Technical Section.
- **MICROORGANO** & **SPURT** causes no problems with residue as it is a natural produce and totally assimilable and metabolizable.

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