
Aspe
TECHNICAL REPORT
STYM
25

content

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ASPE AGROBIOLOGICO, S.L. is a Spanish company with more than 30 years of experience in the Agrochemical Industry. Our activity is focused on the development and selling of fertilizers and phytosanitary products worldwide.

ASPE products are present all over Europe, South America, North Africa and Asia by official dealers. Our catalog is needed in nowadays agriculture, therefore our products have been developed with the latest technology and following all quality regulations: bioinsecticides, biopesticides, bionematicides, bioplaguicides, biofungicides, phytoregulators, EC fertilizers, organic fertilizers, etc.

ASPE is concerned about the environment and as a result we have developed ecological products in our division of ASPE ORGANIC and we offer our clients fertilizers and bioplaguicides completely compatible with ecological agriculture and that follow international regulations.

STYM 25 is a natural bio-activator product made with amino acids gotten from the enzymatic hydrolysis. That makes STYM 25 more effective than other products which come from a chemical process. It is recommendable for all kind of crops and at any time of the year, especially when the plants need an extra energy input.

- **PRE-FLOWERING**
- **FRUIT SETTING**
- **FRUIT SIZING**
- **VEGETATIVE GROWTH**
- **THERMAL, HYDRIC AND SALINE STRESS**

Its formula makes the plant nutrient uptake be faster. It activates the microbial flora in the soil providing vitamins and other substances. The amino acids facilitate the uptake of micronutrients of micronutrients that are blocked in the soil.

STYM 25 is the only product in the market that incorporates **I.S.I.** (Inmunological System Initiator) made with salicylate derivates that **boost the plant resistance to diseases.**

FOLIAR

SOIL

STYM 25 formulation, with amino acids extracted from the enzymatic hydrolysis, makes this bio-activator much more effective than any other amino acids which come from a chemical process or the ones that come from alkaline or acid hydrolysis. Its natural ingredients make STYM 25 a product harmless for health, although it has to be used following the guidelines. It can't be mixed with cupric, sulphur or oily products.

The hydrolysis process is made by protein enzymes acting over the Casein (a protein with great biological value). This process makes the protein soluble but without denaturating it. All the amino acids that are obtain by the hydrolysis are highly soluble and they take part in the growing process of the plants.

STYM 25 OBTEINED BY ENZYMATIC SYNTHESIS	AMINO ACIDS OBTAINED BY ACID OR ALKALINE HYDROLYSIS
20 essential amino acids are obtained.	16-18 amino acids are obtained.
All the amino acids are in the L-form (natural form) and are rapidly and easily absorbed by the plants.	Not all the amino acids are in the L-amino acids, some are in D-shape, which cannot be absorbed.
No cycling of Glutamates, which is important for metabolism energy.	Cycling of Glutamates.
No destruction of Asparagine, which is involved in plant respiration.	Destruction of Aspargina.
Tryptophan in L-form, which initiates the synthesis of auxins (growth hormones).	The tryptophan is destroyed, affecting the synthesis of auxins.
Serine and theronine in L-shape.	Serine and theronine are partially destroyed.
Aspertic and glutamic acid, which are two of the most important amino acids, are availablle.	Aspartic and glutamic acids are not in an available form for plants.
Not form amides. Great biological and nutritive value.	Nitrogen amines are formed. The biological and nutritional value is severely affected.
No presence of inorganic nitrogen (ammonium cloride).	Inorganic nitrogen is present as ammonium chloride.
Low dosages.	High dosages.

composition and physico-chemical features

Amino acids are part of plants; they are the structural unit of the protein. Proteins are organic compounds that take part in DNA synthesis, hormonal and metabolic processes related to the different phenological stages of the plant as well as in the fruit development.

STYM 25 provides the ideal quantity of amino acids the plant needs to achieve an increase in production, to improve the quality and also avoid the negative effects of heavy metal accumulation in the soil, iron-induced chlorosis, low temperatures, etc...

The present free amino acids make that STYM 25 has numerous positive effects on the plant. ASPE AGROBIOLOGICO, S.L. guarantees the composition and contents.

COMPOSITION %w/v

Free amino acids (guaranteed minimum)	25,00
Total Nitrogen (N)	2,50
Organic Carbon	14,35
Total organic matter	25,0
Inorganic nitrogen (ammonium chloride)	absent
Vitamins, Folic acid, choline, niacin, Ac. Pantothenic, Pyridoxine, Riboflamina Thiamine, Biotin, Inositol (0,6%)	0,96
I.S.I. (Inmunological System Initiator)	3,00

PHYSICO-CHEMICAL PROPERTIES

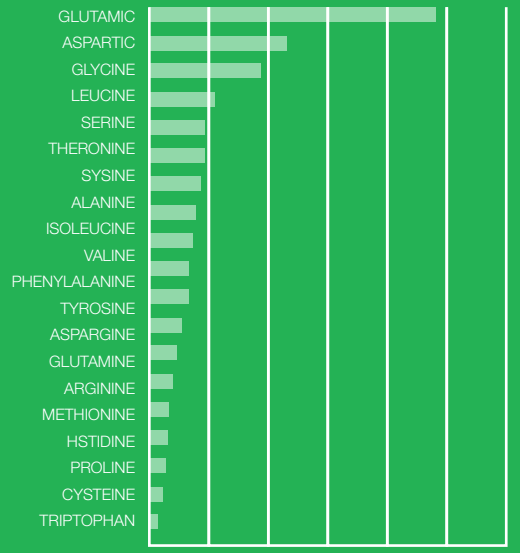
Description	Dark liquid
Solubility (water 25º)	100% soluble
Extract dry	44-46%
pH	6,7
Density g/L	1,16
Phytotoxic substances	absent
Stability	3 years

OUTSTANDING IN THEIR FUNCTIONS

- GLUTAMIC: it is involved in the processes of growth of young leaves
- Serine: it improves the resistance to the plant in stressful situations
- ARGININE and ALANINE: involved in the symthesis of chlorophyll
- PROLINA: particulary important for its anti-stress effect (water, cold, salinity, etc...)
- TRYPTOPHAN: intervenes in the rooting and fruit set

Free aminoacids %

Glutamic	25,1	Phenylalanine	3,5
Aspartic	13,0	Tyrosine	3,3
Glycine	10,1	Aspargine	2,2
Leucine	6,0	Glutamine	2,2
Serine	4,9	Arginine	2,1
Threcnine	4,8	Methionine	1,7
Lysine	4,4	Histidine	1,7
Alanine	3,9	Proline	1,5
Isoleucine	3,7	Cysteine	1,5
Valine	3,5	Tryptophan	0,9



benefits of STYM 25 application in crops

THE APPLICATION OF STYM 25 IS NOT ONLY BE

POSITIVE EFFECTS FOR PLANTS

Direct uptake increasing protein assimilation.

Bio-activator for processes related with germination, development, sprouting, flowering and fruit development.

Hormonal effects (chlorophyll absorption, IAA) improvement in sugar and vitamin levels.

Improves foliar uptake of nutrients.

POSITIVE EFFECTS FOR THE SOIL

Activator of microbial flora.

Chelating effect, helping the uptake of micronutrients.

Improvement soil texture and ventilation.

Activation of sugar and polyphenol uptake.

Improves organic matter breakdown.

NEFICIAL FOR THE PLANT BUT ALSO FOR THE SOIL

OTHER POSITIVE EFFECT OF STYM 25

FROST RESISTTANCE

The increased protein synthesis is reflected in energy savings that the plant uses to fight against low temperatures.

DROUGHT RESISTANCE

Some amino acids favor the water balance of the plant, increasing its resistance in times of drought.

DECREASE OF HEAVY METAL CONTAMINATION

These metals can combine with localised compounds localised in the root zone (amino acids), decreasing the toxicity of those elements on the plant.

DECREASE OF IRON CHLOROSIS EFFECTS

The chelating action of the amino acids increase the amount of iron that the plant is able to assimilate.

Iron is the fourth most common element on the earth's crust, however a lack of this element in plants is often the main cause of nutritional problems that a crop can undergo.

Iron-induced chlorosis affects plant growth and crop yield, especially for crops like tomatoes, citrus, fruit trees, etc.

Iron chlorosis manifests itself as a yellowing in the internervial spaces of the young leaves of the affected plant, due to the incapacity of the plant to synthesise chlorophyll, a molecule that contains iron in its composition.

The causes of iron chlorosis are complex, but it usually appears in sensitive crops in soils with a high pH level and with a high limestone content; under these circumstances, even though iron is abundant in the earth's crust, it precipitates in the ferric oxides form, isn't available for the plant.

The most commonly used iron-based fertilizers are synthetic chelates, that although are expensive, they are the most effective at keeping the iron soluble in the soil even when the environment is not the most favourable. Nevertheless, these chelates are only effective in the soil level are not once the iron the iron is introduced inside the plant.

STYM 25 and iron nutrition

Amino acids also form chelates with iron and although they are not as stable as synthetic chelates, they have a radicular effect promoting the development of absorbent hair and increasing membrane permeability, demostrating a synergic effect in combination with iron. Furthermore, it keeps the activity inside the plant, allowing a greater movement into the leaves.

The iron inside the plant can remain still becoming part of the reserve substances (fitoferritina), and the presence of certain ions such as carbonate or nitrate, can provoke an pH level increase in the cells reducing the quantity of soluble iron. The accumulation of acid substances, such as amino acids, is a response that some plants have to decrease the cellular pH and maintain a higher quantity of soluble iron.

ASPE AGROBIOLOGICO, S.L. together with the University of Alicante, the National Agrarian Univeristy - La Molina (Lima - Peru) and The University Federico II (Naples - Italy) are developing the field of research: “The study of amino acids as synergetic action compounds with iron chelates”

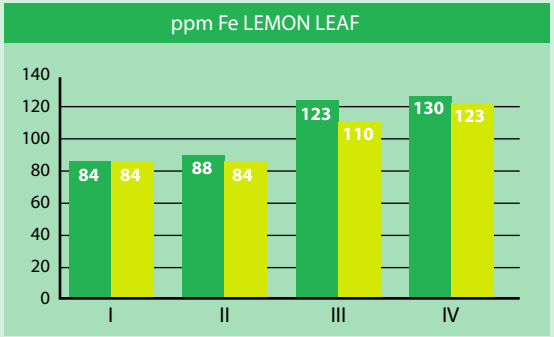


Figure 1. Sampling.

This research is carried out in crops that are specially sensitive to iron chlorosis, such as citrus. With the application of iron chelates Fe-EDDHA along with amino acids, a higher iron concentration in the leaves is obtained, correcting the effects of the chlorosis in the plant.

Figure 1. The application of synthetic iron chelates together with the amino acids is also reflected in the improvement in the fruit weight (Figure 2) or in the vitamin C content (Figure 3).

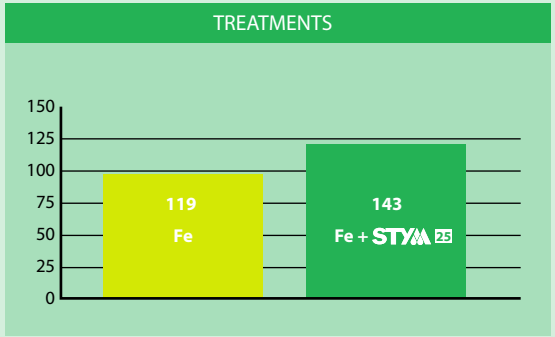


Figure 2. Average weight fruit lemon.

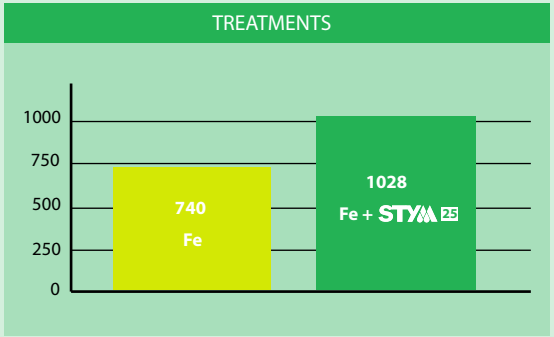


Figure 3. Vitamin C mg/100 ml. In lemon fruit.

recommendations for use by crop

VEGETABLES

Time of application	Dose cc/100L	Benefits
Transplantation	200	Fruit size
Beginning of bloom	200	Vegetative development
2 app. Every 15 days	200	Reduces effect of cold

STRAWBERRY

Time of application	Dose cc/100L	Benefits
Transplantation	200	Improvement size
Beginning of bloom	200	Colouring of the fruit
App. every 10 days	200	Vegetative development Reduces effect of cold

TUBERS

Time of application	Dose cc/100L	Benefits
App. every 15 days	250	Favors rooted Vegetative development Reduces the stress of transplantation

FRUIT TREES

Time of application	Dose cc/100L	Benefits
Swollen buds	200	Prevents deformation of the fruit
Petals fall	255	Improves the action of the gibberellic acid
Fruit sizing	300	

BANANA TREE

Time of application	Dose cc/100L	Benefits
Applied every 15 days	250	Reduces the effects of cold, water, salt, nutritional stress

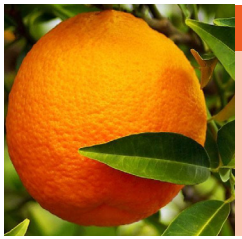
OLIVE

Time of application	Dose cc/100L	Benefits
Beginning of move	200	Greatest olive size
Flowering	300	Greatest oil yield
Olive	250	Greatest growing in autumn
Autumn	200	

TABLE GRAPE

Time of application	Dose cc/100L	Benefits
Beginning of move	250	Resistance to stress
Beginning of bloom	250	Improvement the action of chelates
Grape	250	

CITRUS



Time of application	Dose cc/100L	Benefits
Beginning of bloom	200	Stress resistance
Fruit setting	250	Improves the action of the chelates
Fruit sizing	300	

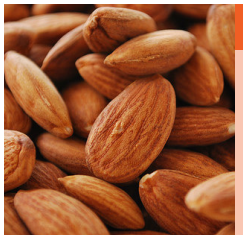
VINE

Time of application	Dose L/Ha	Benefits
Beginning of bloom	2,0	Increase in production
Grape	2,0	Improved sproutling and ripening

BEET

Time of application	Dose L/Ha	Benefits
5-6 true leaves	2,5	Increase production
2 app. every 15 days	2,5	Increase of sugar

NUTS



Time of application	Dose cc/100L	Benefits
Swollen buds	250	Resistance to stress
Petal fall	250	Improvement action of chelats
Fruit sizing	250	

COTTON

Time of application	Dose cc/100L	Benefits
10 days after sprouting	300	Increase production
First flower	300	Vegetative development
20 days after	300	

LUCERNE

Time of application	Dose L/Ha	Benefits
After each cut with more than 10 cm of height	2,5	Increase production

ORNAMENTAL

Time of application	Dose cc/100L	Benefits
Transplantation	200	Resistance to stress
Apply every 15 days	200	Improvement action of chelates

LAWN

Time of application	Dose cc/100L	Benefits
After sowing	3-5 (L/Ha)	Favors implementation
Beginning of flowering	300	Resistance to stress
Apply every 10 days	200	Improvement action of chelates

STRAWBERRY

Time of application	Dose L/Ha	Benefits
Transplantation	4	Better rooted
Beginning of flowering	4	More flowers
Apply every 10 days	4	Improvement the action of chelates

FRUIT TREES

Time of application	Dose L/Ha	Benefits
Swollen buds	6	Increase production
Falling petals	6	Best bud
Fruit sizing	6	Reduces effects of stress

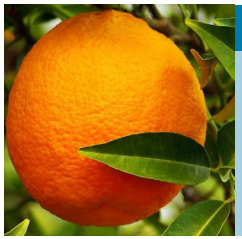
BANANA TREE

Time of application	Dose L/Ha	Benefits
Every 15 days between March and June	6	Reduces the effects of water, saline, cold and nutrition stress

OLIVE

Time of application	Dose L/Ha	Benefits
Beginning of move	18	Best bud
Flowering	18	More flowering
Fattening olive	18	Best fertilization

CITRUS



Time of application	Dose L/Ha	Benefits
Beginning of bloom	12	Stress resistance
Fruit set	12	Improves the action of auxin and others hormones
Fruit sizing	12	

TABLE GRAPE

Time of application	Dose L/Ha	Benefits
Beginning of move	5	Increased production
Beginning of bloom	5	Improving the sprouting
Grape	5	Larger cluster

COTTON

Time of application	Dose L/Ha	Benefits
10 days after sprouting	6	Improves the rooted
First flower	6	Speeds up production
20 days after	6	

NUTS

Time of application	Dose L/Ha	Benefits
Swollen bud	5	Higher production
Petal fall	5	Increased curd
Fruit sizing	5	Invigorates the tree

ORNAMENTAL

Time of application	Dose L/Ha	Benefits
To transplant	4	Improving the rooted and germination
Apply every 15 days	4	Greater number of flowers

I.S.I. activator disease resistance

When a plant is infected by an organic pathogen (a producer of disease: virus, bacteria, fungus...) the following can occur:

A. In susceptible plants. The reproduction of the pathogen is not limited, which spreads through the plant causing considerable damage, and even the death of the plant.

This lack of resistance can result in an incapacity of the plant to identify the infecting organism and implement successful self-defense mechanisms.

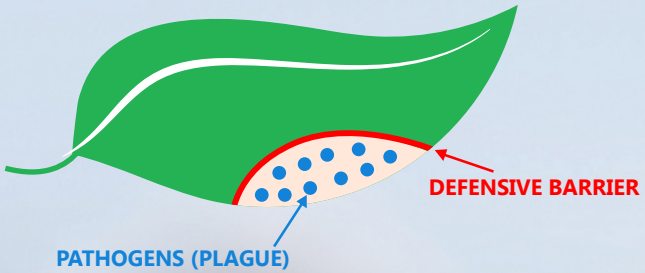
B. In resistant plants. This identificator does take place, and then put in action pysiological and biochemical mechanisms which limit the spreead of the pathogen to restricted zones, therefore avoiding the damage that could occur.

This process is called: HYPERSENSITIVE RESPONSE (HR) and it is comprised of two processes:

1. Pathogen isolation to a limited zone, close to the infected area.

2. Necrosis (death) of the tissue surrounding the infected area.

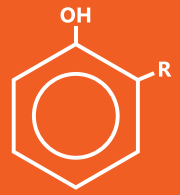
HYPERSENSITIVE RESPONSE (HR)



HOW TO ACTIVATE THE PLANT'S SELF-DEFENSE MECHANISM

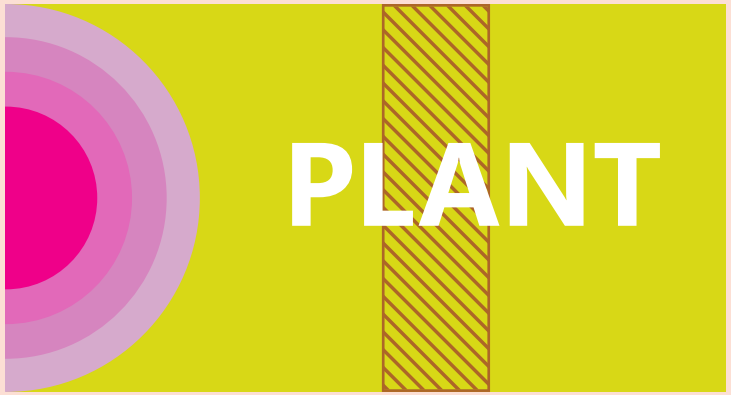
Current evidence, derived from multiple scientific studies (Stevenson, 1994; Bergmann, 1992; Sánchez-Andreu 2000), demonstrate that between these self-defence instigators, a group of compounds can be found, synthesised by the plants and therefore not alien to them:

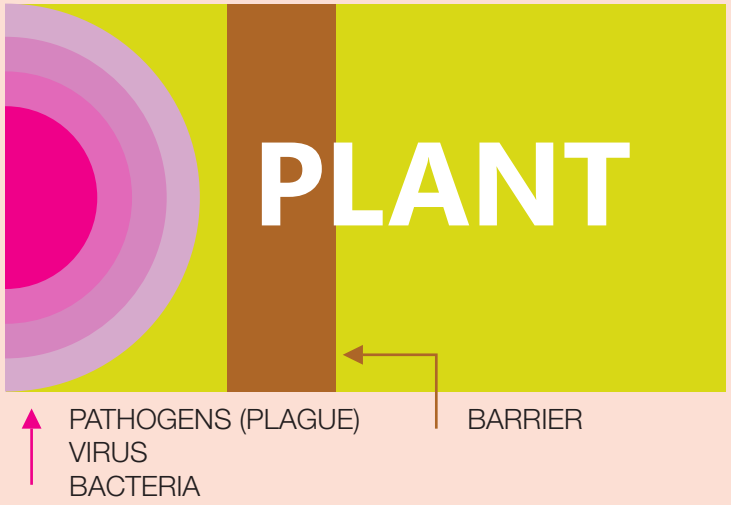
The polyphenols, little molecules made up of an aromatic ring substituted for hydroxyl groups (OH), or their derivatives.



The effects of these compounds on plants are diverse: In this way, they influence the germination, flowering, and growth of the fruit, closing of stomates and glycolysis. But in the last few years, it has laso been shown that a group of these phenolic compounds, the derivatives of salicylic acids (salicylates) are the instigators of the HR self-defence mechanism. That is to say when an infection is produced, if **I.S.I. (Inmunological System Initiator)** salicylates are present within, these initiate a series of biochemical and physiological processes in the plant, which results in the detection, isolation and elimination of the infection.

I.S.I. DETECTS INFECTION AND ACTIVE BARRIER





OTHER EFFECTS OF I.S.I.

Salicylate derivatives forming part of the molecules that we have called **I.S.I.**. have other benefits on the plant in addition to activate the resistance to diseases since it has an impact on the following:

STIMULATES

- Growth and plant development.
- Photosynthesis and perspiration.
- Take and transport of nutrients.

PROTECTS

- Front to ozone and ultraviolet light.

REDUCES

- Oxidative stress.
- Saline stress.
- Osmotic stress.

Based on these principles, ASPE, adds to its range of products STYM 25 (extract amino acids, obtained by enzymatic hydrolysis) a group of molecules registered by ASPE AGROBIOLOGICO, S.L., and called **I.S.I.**, capable of the various functions that we have just seen.

This confers STYM 25 an advantage additional, unique in the world market, which makes it doubly recommended.


Aspe