Naturamin®WSP

Unique biostimulant

Stimulates growth and protects against adverse conditions for maximum productive potential

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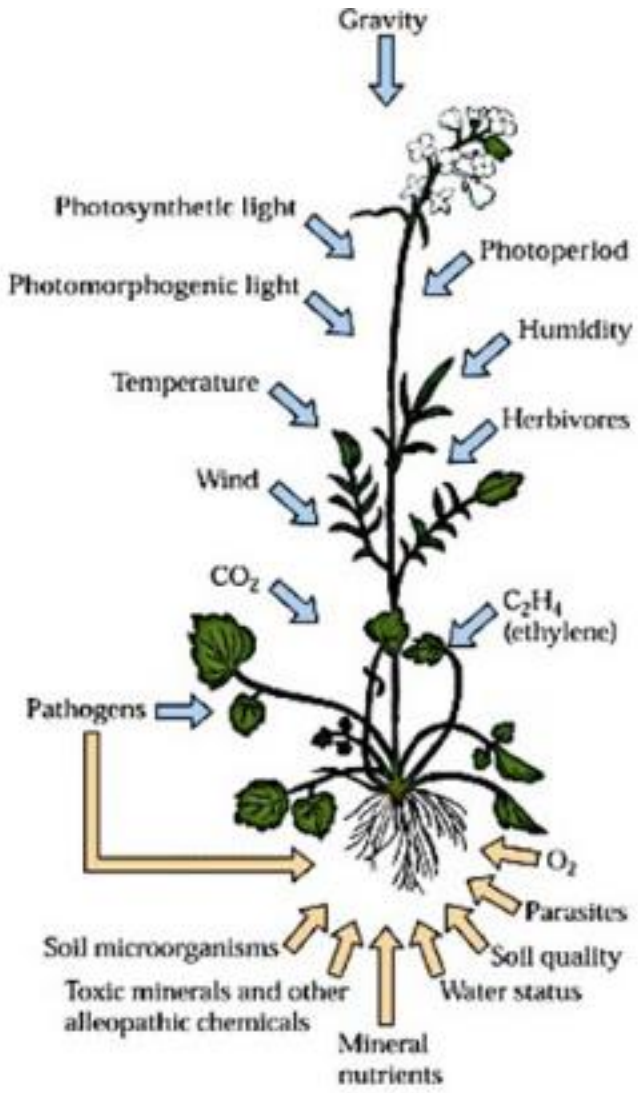
Introduction: Plant stress

- Plants are rarely under optimum environmental conditions, and are subjected to situations where they are forced beyond the optimum limits.
- The study of plants under those conditions is known as plant stress physiology.
- **Stress** is usually defined as an external factor that exerts a disadvantageous influence on the plant. These can be environmental or abiotic factors that produce stress in plants, although biotic factors such as weeds, pathogens, and insect predation can also produce stress. In most cases, stress is measured in relation to plant survival, crop yield, growth (biomass production) or the primary assimilation processes (CO_2 and mineral uptake) which are related to overall growth. ***Taiz and Zeiger, 2010.***
- Plants respond to stress conditions by modifying their physiology and metabolism.

Abiotic and Biotic environmental stress factors



- ✓ **Climatic stress:**
- ✓ Water
- ✓ Light
- ✓ Salt / pH
- ✓ High / low temperature
- ✓ Heavy metals / Nutrients
- ✓ Pollutants

- ✓ **Stress linked to crop cycle:**
- ✓ Trasplant
- ✓ Sprouting
- ✓ Flowering
- ✓ Fruit set
- ✓ Fruit growth

- ✓ **Other stress:**
- ✓ Plant damages
- ✓ Phytotoxicity due to pesticides application
- ✓ Damages caused by pathogens

Why bother about stress?

- ✓ As human population increases, agriculture must feed more people while competing with urban development for premium arable land.
- ✓ If record yields can be assumed to represent plant growth under ideal conditions, then the losses associated with biotic and abiotic stresses **can reduce the average productivity**.

Effects of stress

- ✓ Photosynthesis ceases
- ✓ Decrease of metabolite synthesis
- ✓ Increased respiration
- ✓ Start or acceleration of foliar senescence
- ✓ Increased protein degradation
- ✓ Increased ABA synthesis:
- ✓ Inhibits protein synthesis, stops growth

Characteristics

- Highest concentration in free aminoacids on the market
- Instant solubility of microgranules
- Total compatibility.
- Easy to handle and transport.
- High efficacy (Fast and Effective).

Modern quality control

100% of free amino acids are L-amino acids

Sanitary control

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Characteristics

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Approved for European Agency of Medicines

Pharmaceutical degree

Absence of Genetically modified organisms (GMO)

Absence of BSE/TSE

Unique certifications for a Biostimulant

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Effects on the crop

Anti-stress action. Greater resistance to stress situations: cold, plagues, the plant arrest periods are less.

Faster recovery following a period of stress.

Stimulating action: greater root, vegetative and reproductive development. Antioxidant, hormonal precursor.

Higher Yield

Added to the treatment spray with insecticides, fungicides or foliar fertilizers, improve absorption through leaves and transport of active substances and, therefore, their efficacy.

Faster vegetative development
Increase of Yield

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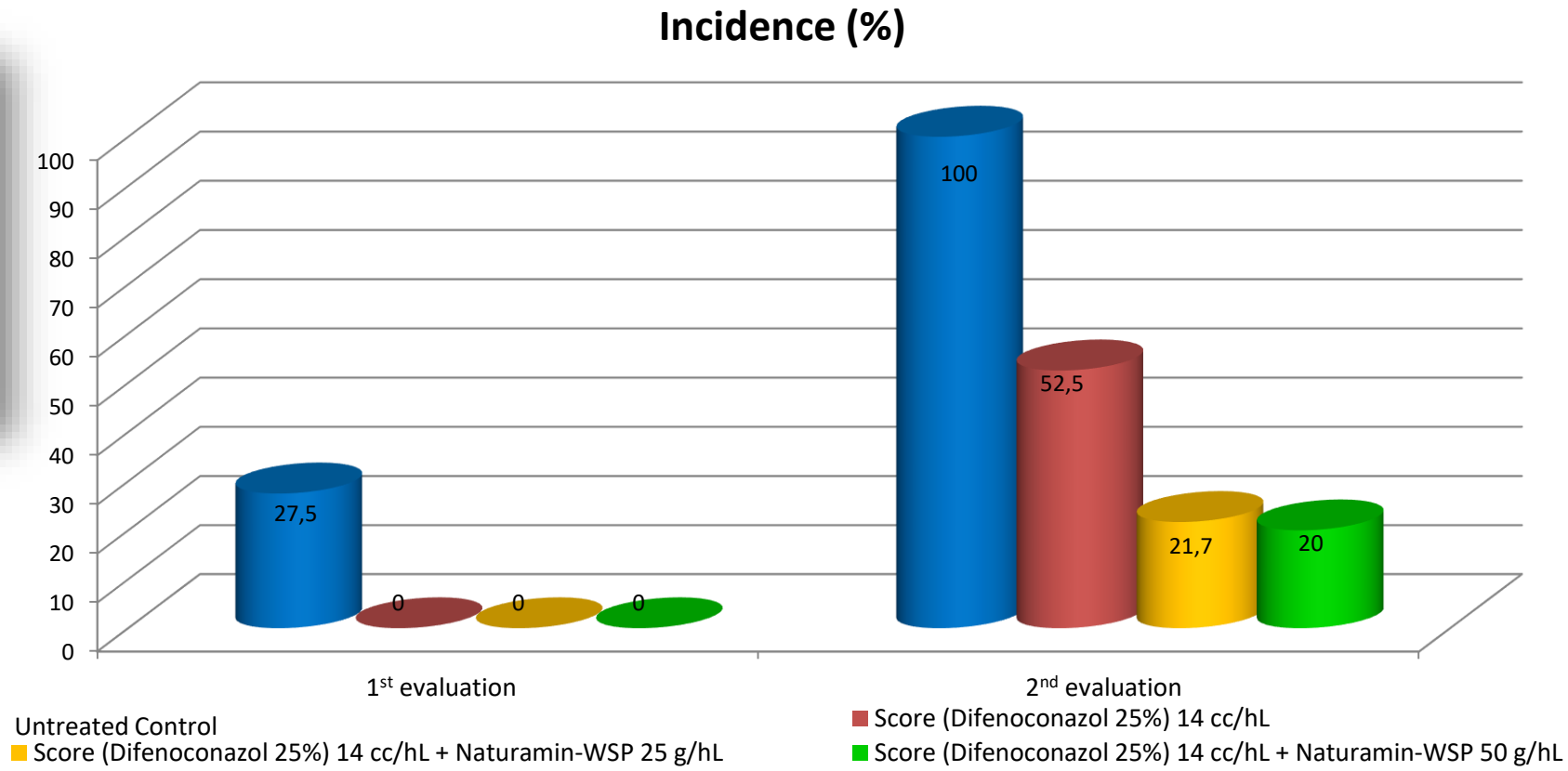
Apple scab control trial



Naturamin-WSP improves Score function efficacy (DIFENOCONAZOLE 25% [EC] W/V).

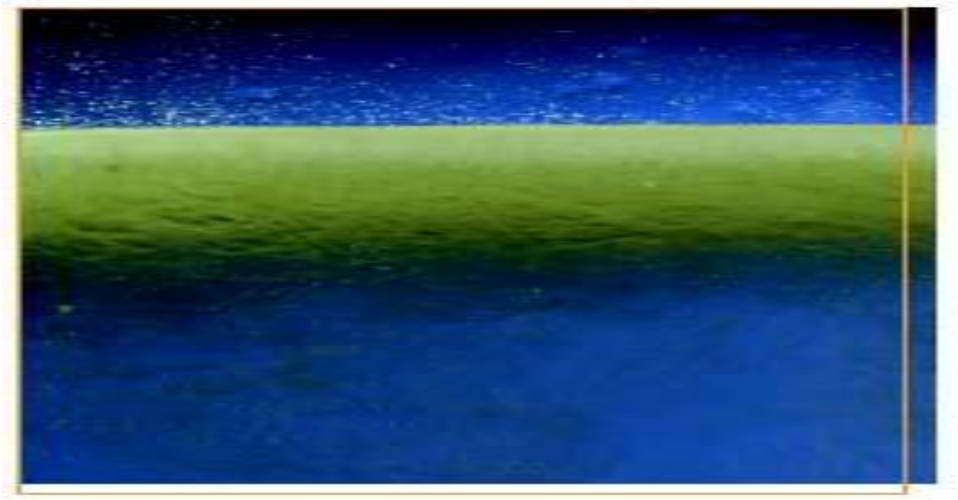
Organic Farming

According to organic farming Regulation NOP (USA) and JAS (Japan).

Characteristics

WSP Formulation

Excelent solubility

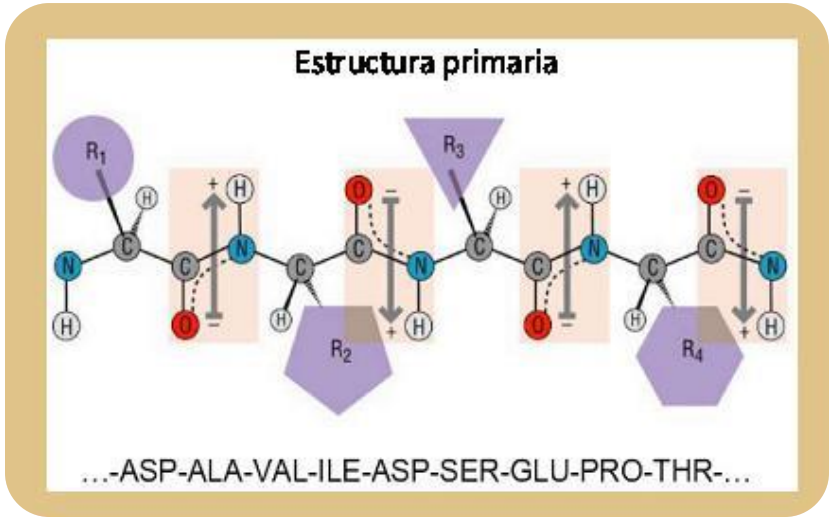


Easy dosification

Amino acids

Amino acids are essential for the nutrition of any living organism as they are structural protein units.

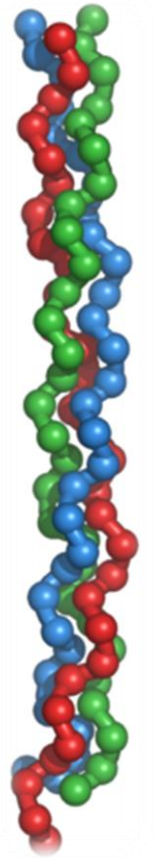
Most important properties that characterize proteins and control many physiological processes are determined by amino acids: enzymatic, store, constitution, make-up of the chlorophyll, etc.

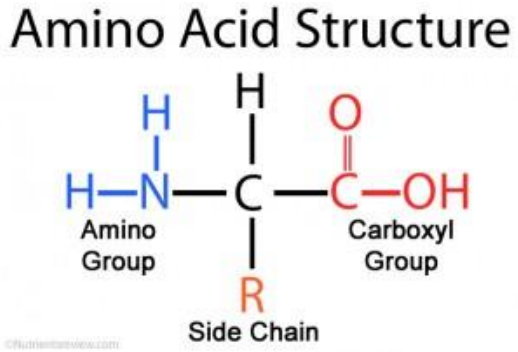


Amino acids

- Amino acids are elementary components of proteins assimilated by plants in a direct way. They are organic molecules containing 2 functional radicals: NH_2 (amino group – alkaline) and COOH (Carboxyl acid group) .

- Proteins define the biochemical indentity of the cell chemistry.
- There are about 20 amino acids in Nature.



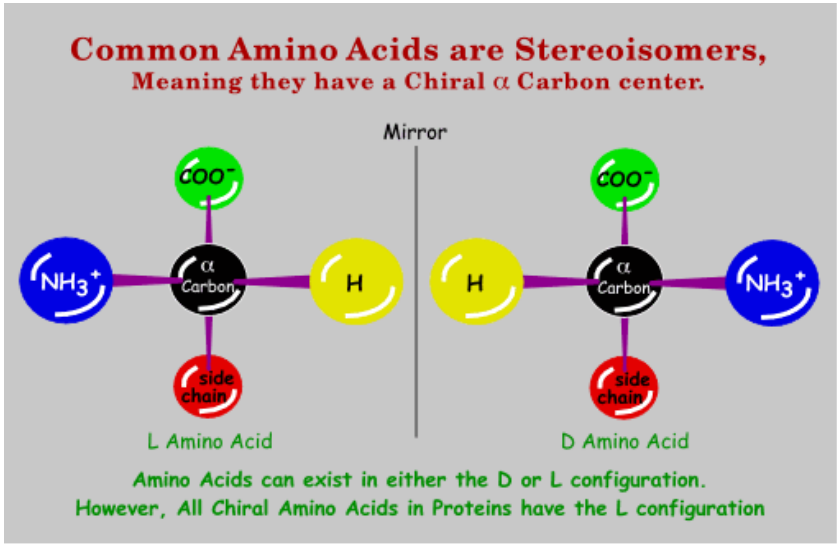


Characteristics

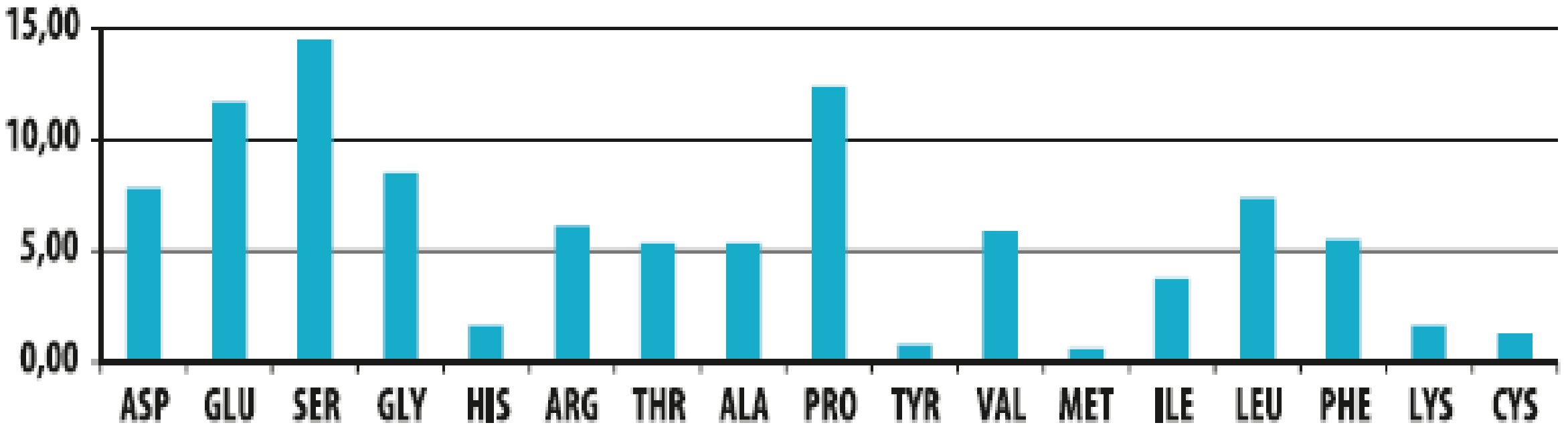
Amino acids can occur in L- and D-forms, but only L-forms are used by cells.
Every amino acid (except glycine) can occur in two isomeric forms, because of the possibility of forming two different enantiomers (stereoisomers) around the central carbon atom. By convention, these are called L- and D- forms, analogous to left-handed and right-handed configurations.

Only L-amino acids are manufactured in cells and incorporated into proteins.

All Amino acids present in Naturamin WSP are L-amino acids, available for the plant.



Aminogram



The Aminogram is very important: Every aminoacid have a different mode of action on the plant.

Benefits

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Anti stress effect

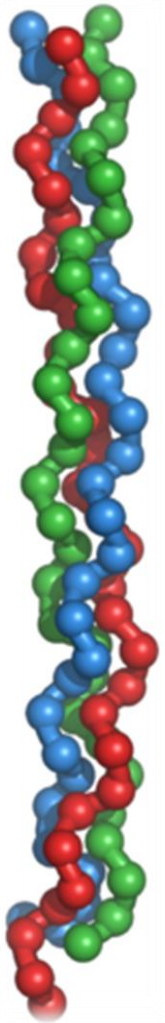
Biostimulant effect

Energy safe

Carrier effect (nutrients and pesticides)

Nutrition supply

Improves quality



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Anti-stress

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Glycine: Esential for chlorophyll synthesis.

Alanine: Intervenes in physiological processes that give rise to chlorophyll molecules.

Glutamic Acid: Intervenes in the development of meristems and anti-stress response. Intervenes in nitrogen transport.

Arginine: Intervenes in root development and chlorophyll synthesis

Serine: Regulates the water balance and anti-stress response. Precurso r to the main known osmoprotectant, glycine-betaine.

Phenylanaline: Precursor to lignin synthesis.

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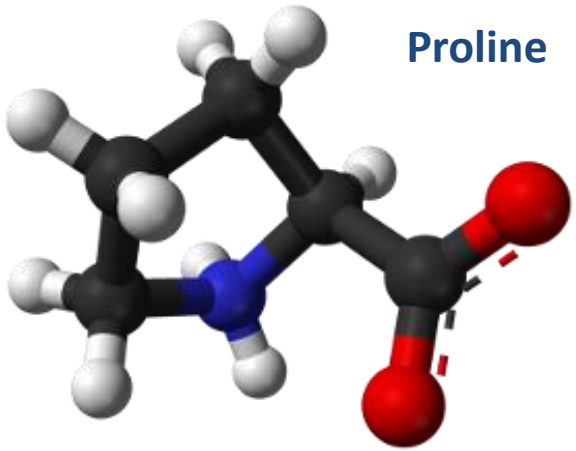
Anti-stress

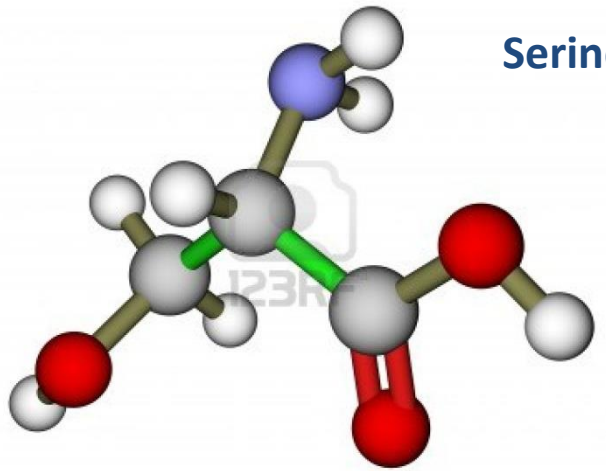
Proline: Improves pollen fertility and provide consistence to the cell walls. Protects the membranes and proteins from the adverse effects of high concentrations of inorganic ions and high temperaturas, preventing denaturation, salt and water stress. It is a very important Osmoprotectant.

Serina: Regulates the hydric equilibrium and the termal stress response. Es el precursor del principal osmoprotector conocido, la glicina-betaína.

Proline



Serine



Compounds with Anti-stres effect of Naturamin WSP

Biostimulant effect

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1. 100% free aminoacids in L-form. This isomer is the active substance that allows the plant to recover from critical situations.

2. Natural biostimulant of roots, leaves, flowers, fruits…. for all crops

3. Hormone-like effect: rooting, pollen germination…

some Amino acids of Naturamin WSP are precursors or activators of phytohormones and growth factors.

4. Higher Photosynthesis. Glycine and Glutamic Acid are fundamental metabolites in the process of formation of vegetable tissue and chlorophyll synthesis. Naturamin WSP help to increase chlorophyll concentration in the plant leading to higher degree of photosynthesis.

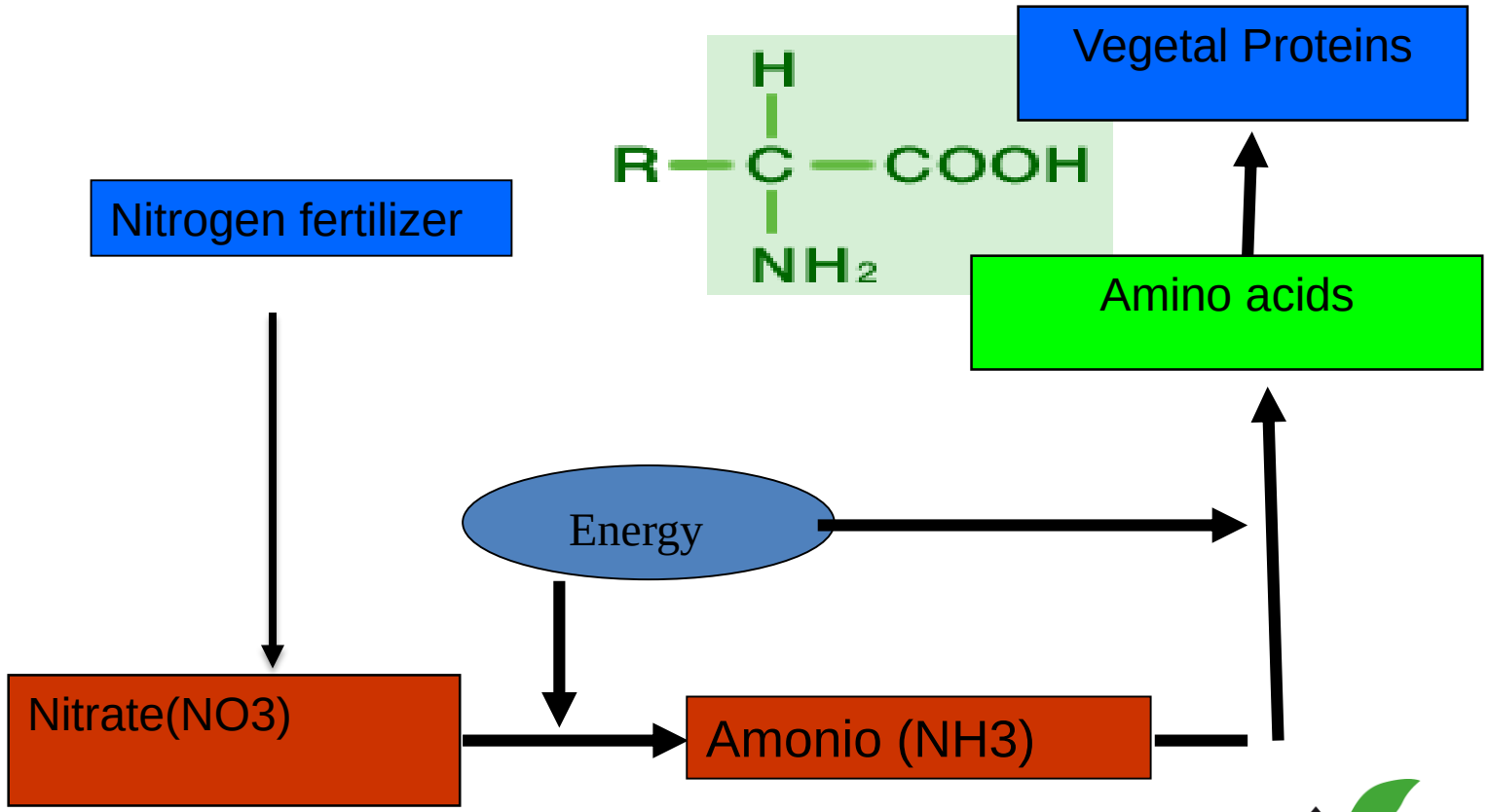
Energy

Energy

The processes that plants use to synthesize amino acids (amination and transamination) are particularly expensive in terms of Energy. The application of Naturamin WSP allows plants to **save this extra energy** since they don't have to synthesize amino acids and **can invest it in other processes.**

Less recovery time: this **reduces the recovery time** for crops in adverse situations.

Greater speed of uptake: free amino acids are characterized by their low molecular weight, and are easy to adsorb.



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Carrier effect

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L- amino acids from Naturamin WSP have a complexing capacity with micronutrients, improving penetration and assimilation of micronutrients, agrochemical products and fetilizers.

1. Small and neutral molecules
2. Penetrate easily
3. Don’t require energy to penetrate
4. Not linked to cholophyll activity
5. Complexing agent of micronutrients.

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Nutrition supply

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Supply of Nitrogen and better microelements uptake by leaves

Improves uptake of nutrients by the roots

Boosts enzymes activity, favouring the incorporation of Nitrogen to proteins

Provide readymade building blocks for Protein synthesis.

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Effect on quality

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Increases quality (size, uniformity, sugar content, color)

More chlorophyll activity

Stimulates physiological processes (sprouting, blooming, pollination, fruit growth, etc.)

Protection against stress and resistance vs diseases

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Naturamin®WSP is different because…

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Hydrolysis liquid Amino acids	Naturamin products	Benefits
Heterogeneous raw material	Homogeneous raw material	Constant quality
Variable aminogram	Constant aminogram	Constant effectiveness
Skewed aminogram	Balanced aminogram	Total activity on root, flowers and vigour

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Uses:

- Favour the crop activity in moments of high development.
- Help the crop to overcome stress situations caused by phytotoxicity, drought, pests, diseases, frost, hail, etc.
- Improve efficacy of pesticides and nutritional in spray mixings.
- Mixed with Cytoplant-400 to increase of the number of basals per plant in roses.

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THANK YOU

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