GRENA®

BIOSTIMULANTS and FERTILIZERS

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BIOSTIMULATION WITH AMINO ACIDS

Proteins and enzymes are crucial to the cell's functioning, amino acids are the building blocks from which they are assembled. In the soil, amino acids thus.

1. increase root proliferation, promote various symbiotic processes associated with this plant organ (e.g. root nodules, mycorrhizae) and facilitate the synthesis of phytohormones. Amino acids benefit the growth of the root system thus increasing the plant's anchoring and absorption capacities.
2. increase chelating capacity in relation to the principal nutrient elements (N, P, K) but also meso- and microelements present in the soil or provided by solid GRENA biostimulants with fertilizing properties. In effect, these nutrients become more easily absorbed by the roots.
3. contribute to the plant's nourishment with a form of organic nitrogen that is energetically advantageous because of its direct utility for protein or enzyme synthesis. Mineral or other organic nitrogen forms in contrast first need to be turned into amino acid building blocks by the plant.
4. stimulate the activity of micro-organisms in the soil, which in turn promotes the organic mat-ter cycle (production and decomposition) increasing absorption and availability of nutrients in the root zone. The microflora of soil bacteria, fungi, algae and animals is profiting from amino acids as highly energy-efficient nutrient source and can quickly populate all ecological niches in the soil, thus making the treated fields more resilient against colonization and persistence of pathogenic species.

ROOT OF A CONVENTIONALLY FERTILIZED PLANT

ROOT OF A PLANT TREATED WITH GRENA BIOSTIMULANTS

CONVENTIONALLY TREATED PLANT

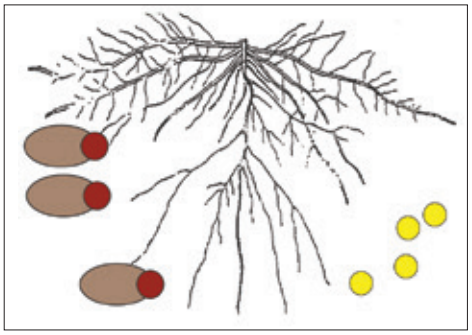
GRENA BIOSTIMULATED PLANT

GRENA eco-products are most effective due to the combination of nutritional as well as bio-stimulant functions. The diversity of amino acids and peptides, in concert with humic and fulvic acids in our biostimulants with fertilizer properties are ideally suited for:

- *Revitalization of fatigued soils, found in fields extensively fertilized in conventional fashion*
- *Combination or alternation with other qualities of organic inputs (farm fertilizers)*
- *Application in certified organic farming*

HUMIC AND FULVIC ACIDS: RESTORING PERMANENT HUMUS

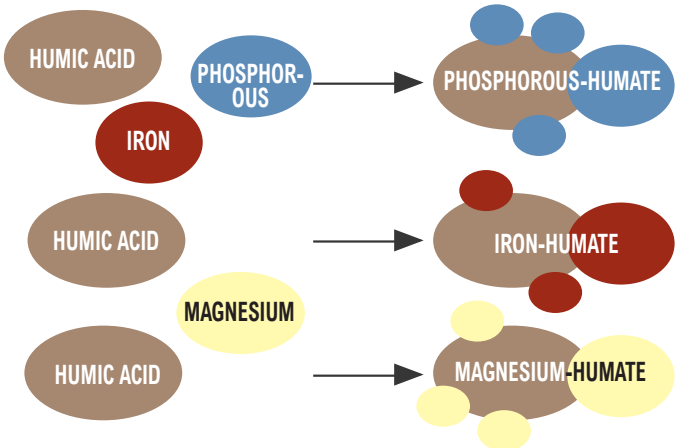
The structurally diverse group of humic and fulvic acids are naturally generated in soils due to the decomposition of organic scaffold compounds like lignin (wood) as well as cellulose and are formed during the GRENA THP® process. Their large surface area and slow decomposition rates in the soil pose an important property of the **permanent humus.** Humic and fulvic acids are responsible for the formation of organo-mineral complexes with poorly soluble elements (i.e. Fe, Mn) present in the soil and our solid biostimulants, thus facilitating their plant availability. **Humic and fulvic acids act as indicators of organic matter, moisture and trace element presence to plant roots and thus stimulate length and lateral radical growth as well as the forma-tion of secondary stands.** Biostimulation of the amino acids increases in efficiency thanks to the synergy with the humic and fulvic acids naturally contained within GRENA products. Complexation of macro, meso and micro elements on humic and fulvic acids applied to the soil, gives rise to compounds called "humates". In the soil, they increase the quantity of the elements mediated into solution, enabling the roots of the plants to absorb them and thus alleviates nutritional stress.



Calcareous soil; pH > 7:

= GRENA Humic-Iron: assimilable

= Iron in the soil: not assimilable



ECO-ORGANIC LIQUID BIOSTIMULANT

The active ingredients of the liquid biostimulant IDROGRENA are natural polyamines, they are utilized and occur ubiquitiously in the cells of all living beings. Polyamines such as putrescine, spermidine and spermine fulfill a crucial task, the stabilization of information molecules (such as DNA and RNA).
A fitting analogy of polyamine action is that of **"bookmarks in the hereditary information"**, keeping the sections currently relevant for the smooth conduct of the cell open and accessible.

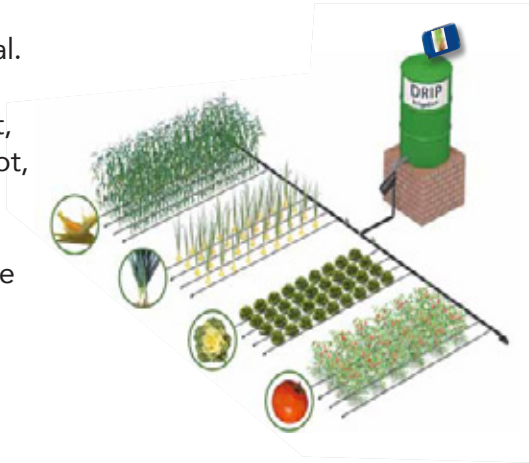
POLYAMINE APPLICATION SUPPORTS

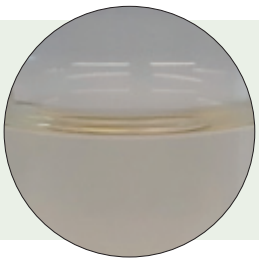
Duplication of the plant genome preceeding each cell division, thus germination as well as tissue, fruit and plant growth in general.

Changing between genetic programs during normal development, such as when different tissue types are being produced (root, shoot, tuber, leaf, flower or fruit development).

Swift adaption and deployment of stress specific response/defense patterns regardless of biotic or abiotic nature of the strain.

Flower attractiveness to pollinators while at the same time showing repellent qualities to mammals such as deer and boar.





IDROGRENA IS IDEALLY USED IN

- **Irrigation and fertigation** *to enable more effective nutrient uptake and assimilation as well as to provide stress resistance to heat, drought, high salinity but also frost and pests.*
- **Spray application** *with plant protection products to alle-viate detrimental side-effects and reduce recovery times.*

The universal biostimulative action of polyamines arises from facilitating and streamlining of DNA replication and transcription processes. These mechanisms are the very basis of cell division and tissue growth as well as transmission of commands from the nucleus to the cell. Understanding that the response patterns for changing environmental conditions and stress (i.e. due to drought, frost or pest attack) are encoded on the DNA allows to fathom the broad scope of polyamine application in agriculture.

MOMENTS OF STRESS

- At the start of the culturing period after sowing or transplantation, early application of biostimulant polyamines generates merit via advantages in growth that potentize over the course of the season.
- During and after events of extreme weather or adverse climatic conditions (frost, heat, drought) the use of polyamines in the Idrogrena product family can shorten the reaction time and improve recovery.
- In case of pest infestation, polyamines augment the natural defense-response of plants such as the production of phytoalexins against the attack of fungus pathogens.
- Periods of morphological change such as flowering, fruitification and fruit matu-ration, demand the adaption of genetic pro-grams to be executed signifying high energy demand for the plant – optimally supported by polyamine application.

WHY TO USE OUR BIOSTIMULANTS

GRENA STANDS FOR SUSTAINABLE AGRICULTURE

Farming is going through one of its toughest moments as the market requests increasingly higher product quality in terms of taste and sustainability while continued synthetic fertilizer (over) use has deteriorated soil health and quality. In light of new, responsible environmental regulations the challenge in modern agriculture is still to produce “bigger and better”, but in a sustainable fashion.

GRENA organic biostimulants with fertilizer function

- convey macro and microelements in a ecosystem-compatible way and activate the soil’s natural regeneration from the get-go without compromising on yield
- mediate a diverse supply of organic matter activating the microflora of the root zone to guarantee natural authenticity of aromas
- integrate perfectly into every existing agricultural practice.

GRENA UNDERSTANDS LASTING VALUES

Over the past few years, GRENA has worked tirelessly to make the production of our fertilizers sustainable. The effort, both of economic resources and of human capital, has been and continues to be considerable, but it goes hand in hand with our wish for constant improvement. Today, we can guarantee a production as environmentally friendly as possible. Something that has never changed is our focus on the use of renewable resources: the organic matter of food-origin, from where all GRENA products arise. This solid foundation has meant that updates in our production process have not compromised the biostimulating quality that sets GRENA products apart from the rest.

GRENA MINDS ENVIRONMENTALLY SOUND PRODUCTION

The thermal energy demand of our production, essentially for the hydrolysis process and the pressing of pellets is met with energy from clean, renewable sources. As a matter of principle, excess thermal energy is shared via district heating lines to surrounding structures. We pay particular attention to rigorous control and continuous reduction of all emissions.

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GRENA ULTRA MICRO

PERMITTED IN ORGANIC FARMING

BIO

GRENA MICRO ULTRA was created for distribution on soils not subject to subse-quent tillage (such as grassy vineyards and orchards). The micro-pellet formulation allows natural organic nitrogen to be readily available for plant nutrition. Thanks to the fast mineralization time, GRENA ULTRA MICRO is also ideal for last-minute fertilizations. The product meets the need for agriculture with a lower environmental impact: obtainable through a significant reduction in dosages, thanks to the natural presence of amino acids and humic and fulvic acids that facilitate the assimilation of nutrients. With GRENA ULTRA MICRO, the distribution is uniform and of low visual impact, excellent with transplanters. The presence of calcium enhances the organoleptic qualities of the vegetable tissues as well as increasing of preservability and crispness of the fruit. In vineyards, it promotes the development of regular internodes and a net increase in the final Babo grade.

ORGANIC ECO-PRODUCT MICRO BIOSTIMULANT

Product to be used in all situations where there is no tillage, such as grassy orchards and/or vineyards, or last-minute fertilization, designed speci-fically for localized distribution and low visual impact (golf courses)

SOURCE
Hydrolyzed proteins

Physical state: *micro 2 mm*

Packaging available:
25 kg bags - 500 kg big bags

AMINO ACIDS	
Aspartic acid	2.51 g/100 g
Glutamic acid	3.25 g/100 g
Alanine	2.05 g/100 g
Arginine	1.73 g/100 g
Phenylalanine	1.13 g/100 g
Gycine	1.89 g/100 g
Hydroxyproline	0.45 g/100 g
Isoleucine	1.24 g/100 g
Histidine	0.63 g/100 g
Leucine	2.20 g/100 g
Lysine	1.13 g/100 g
Proline	1.70 g/100 g
Serina	1.74 g/100 g
Tyrosine	0.65 g/100 g
Threonine	1.18 g/100 g
Valine	1.61 g/100 g
Cysteine and cystine	0.38 g/100 g
Methionine	0.39 g/100 g
Tryptophan	0.19 g/100 g

FREE AMINO ACIDS	
Glutamic acid	0.12 g/100 g
Alanine	0.24 g/100 g
Leucine	0.11 g/100 g

MICRO-ELEMENTS	
B	4.62 mg/kg
Fe	661 mg/kg
Mn	37.2 mg/kg
Cu	5.75 mg/kg
Zn	67.2 mg/kg

COMPOSITION	
Organic substance	**45%**
Amino acids and proteins	37.5%
Humic and fulvic acids	13%
Humidity	7%
Total nitrogen (N)	**6%**
Organic nitrogen (N)	6%
Total phosphoric anhydride (P_2O_5)	1%
Total potassium oxide (K_2O)	1%
Organic carbon (C) of biological origin	26%
Calcium (CaO) natural origin	8%
C/N	5,3
pH	7.2

CROP	TIMING*	APPLICATION*	DOSAGE/HA*
Vineyards	Mid-autumn to late spring	Localized distribution per row	400-500 kg/ha
Orchards (pome fruits, stone fruits, citrus fruits etc.)	Mid-autumn to late spring	Localized distribution per row	400-500 kg/ha
Vegetable crops	Pre-sowing or pre-transplant	Scatter the product in soil preparation	600-800 kg/ha

* guidelines only, for the correct use of our products, please consult a specialist.

GRENA LIFE
4.6.10 S (2MgO)

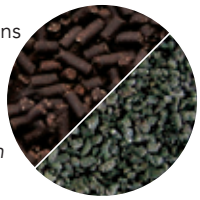
PERMITTED IN ORGANIC FARMING
BIO

GRENA LIFE is obtained by reaction between the organic matrix and mineral materials: soft ground rock phosphate, potassium sulphate and dolomite – all are allowed in organic farming. The balanced allocation of organic nitrogen, phosphorus and potassium, makes GRENA LIFE an excellent product for the maintenance of lawns and gardens in the autumn-winter period. The presence of mineral magnesium activates the amino acids in the organic GRENA MATRIX, thus supporting the growth of plants and enhancing the taste of the fruit, while simultaneously building up the defenses of the plant. GRENA LIFE is available in micro-pellets (2 mm).
The small size allows for a significant reduction in quantities and a homogeneous distribution of low visual impact, an important feature were GRENA LIFE to be used on grassy orchards and vineyards, or ornamental lawns and sport fields. Guaranteed totally free of weed seeds, coliform bacteria, antibiotics, patho-gens.

ORGANO-MINERAL ECO-FERTILIZER WITH POTASSIUM SULPHATE BIOSTIMULANT

Recommended for long-term maintenance and soil preparation

SOURCE
Organic: hydrolyzed proteins
Mineral: soft ground rock phosphate, potassium sulphate, dolomite



Physical state: *pellet 4 mm micro 2 mm*

Packaging available:
25 kg bags - 500 kg big bags

AMINO ACIDS	
Aspartic acid	1.25 g/100 g
Glutamic acid	1.62 g/100 g
Alanine	1.02 g/100 g
Arginine	0.83 g/100 g
Phenylalanine	0.56 g/100 g
Gycine	0.95 g/100 g
Hydroxyproline	0.22 g/100 g
Isoleucine	0.62 g/100 g
Histidine	0.31 g/100 g
Leucine	1.10 g/100 g
Lysine	0.56 g/100 g
Proline	0.85 g/100 g
Serina	0.87 g/100 g
Tyrosine	0.33 g/100 g
Threonine	0.59 g/100 g
Valine	0.80 g/100 g
Cysteine and cystine	0.18 g/100 g
Methionine	0.19 g/100 g
Tryptophan	0.09 g/100 g

FREE AMINO ACIDS	
Glutamic acid	0.06 g/100 g
Alanine	0.12 g/100 g
Leucine	0.05 g/100 g

MICRO-ELEMENTS	
B	2.30 mg/kg
Fe	330 mg/kg
Mn	16.6 mg/kg
Zn	33.6 mg/kg

COMPOSITION	
Organic substance	**39%**
Amino acids and proteins	20%
Humic and fulvic acids	4%
Humidity	7%
Total nitrogen (N)	**4%**
Organic nitrogen (N)	4%
Total phosphoric anhydride (P_2O_5)	**6%**
Total potassium oxide (K_2O)	**10%**
Organic carbon (C) of biological origin	23%
Sulphuric anhydride (SO_3)	21%
Magnesium oxide (MgO) of mineral origin	**2%**
Calcium (CaO) natural origin	**2%**
C/N	5,7

CROP	TIMING*	APPLICATION*	DOSAGGIO/HA*
Vineyards	Mid-autumn to late spring	Scatter the product in soil preparation	500-600 kg/ha
Orchards (pome fruits, stone fruits, citrus fruits etc.)	Mid-autumn to late spring	Scatter the product in soil preparation	600-800 kg/ha
Vegetable crops	Mid-autumn to late spring	Scatter the product in soil preparation	800-1000 kg/ha

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IDROGRENA

PERMITTED IN ORGANIC FARMING BIO

IDROGRENA is a fluid organic biostimulant with polyamines (2-PHE and Spermi-ne). The effectiveness of the product is given by the rapid availability of organic compounds which can be immediately absorbed by the plant as well as by the useful microorganisms at root level. IDROGRENA is therefore considered ideal for use in foliar and irrigation applications (e.g. drip irrigation). **The amines, once in contact with the roots, promote cellular reproduc-tion and the issue of numerous secondary roots.**
The distillation process makes it free of salts and creates no phytotoxicity. **IDROGRENA allows to perform many small applications** to continuously encourage sustained and balanced nutrition throughout the productive time of the plant. If IDROGRENA is used preventively, it stimulates the immune system of plants, with ananti-parasitic effect. This curative effect of IDROGRENA is also expressed in a greater production of phytoalexins by the plant itself, making for a quick response against the attack of pathogens. Polyamines in IDROGRENA perform key roles, including but not limited to

Polyamines in IDROGRENA perform key roles, including but not limited to:

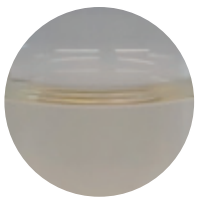
- resistance to stress in transplanting, drought and water stress, and in the event of adverse climatic conditions (frost, hail), radical asphyxia, and weeding;
- increase of the Brix (°Bx) Grade – indeed, polyamines have been acknowledged as modulators of various "channel" receptors, such as that of potassium;
- encouraging pollinator insects (bees, butterflies, moths, beetles) to approach the plants.

When used as a carrier in weeding, IDROGRENA speeds up the process and allows for better control of the most resistant species, in particular Persian speedwell (Veronica persica), Plantago spp.

ECO-ORGANIC LIQUID BIOSTIMULANT

Recommended for drought and stress, shortening recovery times and alleviating stress symptoms

Idrogrena, activates the micro-organisms in the soil. It is ideal in drip-irrigation or, where the system is not in place, in foliar application.



Specific weight: 1.03 kg/l
Color: cloudy
Density: *watery fluid*

Packaging available:
500 ml - 1 l - 5 l -25 l - 200 l - 1000 l

ORGANIC POLYAMINES	
Tryptamine	1.1 – 9.2 mg/kg
2-Phenylethylamine (2-PHE)	1.3 – 3.4 mg/kg
Cadaverine	3.6 – 5.1 mg/kg
Putrescine	1.1 – 9.1 mg/kg
Spermidine	1.5 – 2.4 mg/kg
Spermine	0.5 – 3.6 mg/kg

COMPOSITION	
Total nitrogen (N)	**3%**

CROP	TIMING*	APPLICATION - DOSAGGIO/HA*	
Vineyards	Pre-flowering to harvest every 20 days (min. 3-4 applications)	5-6 l/ha	10-12 l/ha
Orchards (pome fruits, stone fruits, citrus fruits etc.)	Pre-flowering to harvest every 20 days (min. 3-4 applications)	5 l/ha	10 l/ha
Vegetable crops	Pre-flowering through the entire production cycle	5 l/ha	10 l/ha

* guidelines only, for the correct use of our products, please consult a specialist.

ENERGY IDROGRENA

PERMITTED IN ORGANIC FARMING BIO

ENERGY IDROGRENA is a fluid organic biostimulant with polyamines (2-PHE and Spermine), enriched with meso- and micro-elements.
This represents an innovative product, unique in the range of liquid products available to the farmer for the copresence of calcium and iron and biogenic amines, The organic amines exercise a complexing power with respect to iron (Fe), calcium (Ca), and zinc (Zn) promoting their activation, which is at the basis of plant wellbeing.
The presence of calcium (EDTA) 1% improves the resistance and the productivity of plant tissues. Boron (B) intensifies the assimilation and translocation of the micro-elements already activated by the EDTA agent, in order to activate fundamental metabolic processes at the root of plant wellbeing. In addition to the significant benefits of the base product, ENERGY is a great carrier of foliar products and it helps increase the physiological activities of the plant. The chelated micronutrients allow the deployment of an intense metabolic activity, as a direct result of a regular enzymatic activity and of a uniform vegeto-productive development.

Metabolic processes, phenological phases and specific actions of micro-nutrients:
- **Fe + Ca**, respiration, chlorophyll, photosynthesis, nitrogen fixation, protein metabolism, nitrate reduction, influence on cell membrane resistance, increased tissue resistance;
- **Zn**, metabolism of auxins, germination, synthesis of pigments and colo-ring of fruits;
- **B**, development of pollen grain, fruit set, cell division, metabolism of phytohormones, meristematic growth, protein synthesis, transport of sugars,

ECO-ORGANIC LIQUID BIOSTIMULANT ENRICHED WITH MESO- AND MICROELEMENTS

recomended for boosting the energy of your crops Foliar application only: particularly suitable in pre-flowering and fruit set

ORGANIC POLYAMINES	
Ammine biogene	>6.6 mg/kg

MESO- AND MICRO-ELEMENTS	
Ca	1% (EDTA)
Fe	1% (EDTA)
Zn	0.5% (EDTA)
B	0.5%

Specific weight: 1.12 kg/l
Color: dark red
Density: *watery fluid*

Packaging available:
5 l -25 l - 200 l - 1000 l

CROP	TIMING*	APPLICATION DOSAGE/HA*
Vineyards	Alongside protection treatments	2.5-3 l/ha
Orchards (pome fruits, stone fruits, citrus fruits etc.)	Alongside protection treatments	2.5-3 l/ha
Vegetable crops	Pre- and post-flowering	2.5-3 l/ha

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