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PROENZYME

Seaweed Extract enriched
with Amino & Humic Acid





What is Proenzyme

- Proenzyme is derived from a sea weed, *Ascophyllum nodosum* (a marine algae) , Humic Acid & Amino Acid
- **Marine Algae** is an ideal organic store house of naturally occurring plant growth nutrients and other related compounds.
- **Humic acid:** is a group of molecules that bind to, and help plant roots receive, water and nutrients. High **humic acid** levels can dramatically increase yields. **Humic acid** deficiency can prevent farmers and gardeners from growing crops with optimum nutrition.
- **Amino Acid : 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.



What is Seaweeds (Ascophyllum nodosum)

- Ascophyllum nodosum is a large, common cold water seaweed or brown alga in the family Fucaceae, being the only species in the genus Ascophyllum.
- It is a seaweed that only grows in the northern Atlantic Ocean,



Sea weeds An effective Bio-Stimulants

- The global amount of cultivable land available for agriculture is continuously shrinking due to urbanization and the adverse effects of climate change.
- In order to meet the ever-increasing demands of the growing human population, world food production must double by the year 2050
- To address the pressures associated with increasing agricultural productivity to subsequently meet the rising demands for food, producers have turned to excessive applications of synthetic (chemical) fertilizers and pesticides.
- These harmful chemicals pose both short- and long-term threats to the health of the entire biosphere
- Therefore, an effective, biological-based alternative is required in order to reduce dependency on synthetic fertilizers and pesticides.
- Plant bio-stimulants are a new class of crop input, offering a potential alternative to traditional, agro-chemical inputs, and, in most cases, can reduce the application rates of synthetic fertilizers and pesticides by enhancing their efficacy

Nutritional Value of Proenzyme for Plants

Proenzyme has six major components:

- Cytokinin
- Auxin
- Gibberellins
- Enzymes
- Betaines
- Hydrolysed protein complex

+

Natural advantages of sea weed:

- Organic in nature
- Over 60 minerals and elements
- 21 amino acids
- Simple and complex carbohydrates
- Essential plant growth nutrients & hormones
- Trace elements



Proenzyme

CYTOKININS

- Promote cell division
- Regulate root growth
- Control biosynthesis of other hormones thus induce flower initiation, fruit setting and maturation of seeds.
- Retard senescence in aging leaf tissues.
- Helps in synthesizing enzymes & structural proteins.



Proenzyme

AUXINS

- Promote cell elongation.
- Increase chlorophyll content and stimulate photosynthesis and respiration.
- Help in root initiation and development
- Control abscission.
- Delays aging of plant tissues.
- Ensures continues flow of carbohydrate for developing fruit and wood formation.

GIBBERELLINS

- Stimulate cell division
- Larger root system



Proenzyme

HYDROLYSED PROTEIN COMPLEXES

- Contains peptides and free amino acids and help in cell growth.

BETAINES

- Reduces the intensity of oxidation reactions that damages cell structure.
- Limits the stress on the plant, enhances crop growth and improves overall health of the plant.



Proenzyme

ENZYMES

- Activate and catalyze biochemical reactions of a cell.
- Help in break down of complex molecules into simpler ones which can easily be utilized by the plant.
- Enhances the plant metabolic activities.
- Improves uptake of complex molecules from soil ,Improves soil microbial activity.
- Induces faster and vigorous development of root mass.
- Improves uptake of previously unavailable nutrients and water from soil.
- Deep root growth also ensure that plants are able to cope with environmental stress.



Proenzyme

- **How is Proenzyme taken up by plants?**
- When applied Proenzyme is absorbed in the vascular system of plants through stomatal openings besides the lenticels and cuticular fissures.
- It has the ability to bypass the physiological barriers and thus enters the plants.



Treatment

Effects

Possible Mechanisms

Arial application

1. Seed Treatment
2. Seeding Dip
3. Foliar Spray

Growth Responses

1. Improved Shoot & Root growth
2. Higher flowering and fruit set
3. Better yield

Biotic stress resistance

1. Resistance to fungal, bacterial and viral pathogens
2. Resistance to insect pests

Abiotic stress resistance

1. Salt & Drought tolerance
2. Freezing & Chilling tolerance
3. Enhanced photosynthesis

Enhanced nutritional Quality *"Functional food"*

Suppression of soil borne diseases & nematodes

Improved Nodulation Promote Plant growth promoting rhizobacteria (PGPR)

Water and low temperature stress resistance

- ❖ Modulation of Phytohormones
- ❖ Increased photosynthetic efficiency and carbon assimilation
- ❖ Delayed senescence

- ❖ Anti-microbial
- ❖ Anti-feedent and insect repellent
- ❖ **Up-regulation of disease resistance genes** eg. PR-genes

- ❖ Reduced transpiration
- ❖ Enhanced stomatal conductance
- ❖ **Up-regulation of subset of stress resistance metabolome**

- ❖ Altered metabolism,
- ❖ **Up-regulation of bio- synthetic enzymes**

- ❖ Anti-microbial
- ❖ Enhanced growth of friendly microbes
- ❖ Anti-infective

- ❖ Altered metabolism,
- ❖ Modulation of root exudates
- ❖ Differential expression of signal molecules & bio- synthetic enzymes

- ❖ Altered root architecture
- ❖ Efficient water and nutrient uptake

Soil application

1. Incorporation of marine bio-products
2. Soil drenching
3. Addition of extracts to hydroponics

Humic acid

- Increased Nutrient Uptake
- Decreased Toxins
- Increased Water Retention
- Improved Microbial Growth
- Better Overall Soil Structure





Amino Acid for Plant

- **Amino acids** can play different roles in **plants**, such as stress-reducing agents, nitrogen source and hormone precursors
- Another important fact is the role of **amino acids** as a signalling factor of different physiological processes in **plants**.



Benefits of Proenzyme

- Improve plants natural self defense system, which results in healthier
- Crop with low pest pressure. Tolerance to stress conditions.
- Profuse branching/ tillering and increased foliage
- Profuse flowering and fruiting.
- Better development of grains/fruits (in size & weight)
- Better shelf life of produce, Reduced flower & fruit drop.
- Compatible with other products.
- Improves yield and quality.



Proenzyme Application

Foliar Application

Spray with any high volume sprayer, such as, knapsack sprayer till the Leaves are drenched completely.

For maximum advantage use at all critical phases of plant growth (early crop stage like seedling/immediately after transplant, pre-reproductive stage or flowering stage/peak flowering/fruit setting and fruit development stage)

Dosage

- Diluted at the rate of 1 ml in 1 lit of water .
 - Generally applied at the rate of 200ml per acre.
 - Shake bottle thoroughly before using
 - Spray during cool hours in the morning or evening
- Proenzyme is compatible with most of the commonly used fertilizers, insecticides, acaricides, fungicides, adjuvants/ surfactants except which are of highly alkaline nature. However, it should not be applied with growth retardants and herbicides.

Where to use : Proenzyme

Field Crops :

Paddy, Wheat, Jowar, Bajra, Cotton, Cumin, Opium, Jute, Sugarcane, Maize etc.

Pulses :

Red gram, Green Gram, Black gram, Horse gram, Bengal gram, Chick pea, Cow pea, Soyabean etc.

Vegetables :

Chilies, Beans, Brinjal, Okra, Onion, Pea, Potato, Sweet potato, Tomato, Cabbage, Cauliflower, spinach, Carrot, Reddish etc.

Plantations :

Arcanut, Coconut, Coffee, Rubber, Tea, Mulberry , Cocoa etc.

Horticultural Crops :

Apple, Banana, Citrus, Guava, Mango, Peach, Apricot, Ber, Grapes, Cashew, Melons, Papaya, Plum, Pomegranate etc

Oil Seeds:

Ground Nut, Castor, Linseed, Mustard, Safflower, Sesamum, Sunflower.

Spices, Black pepper, Cardamom, Coriander, Cumin, Garlic, Ginger, Tobacco, Turmeric etc.

Others: Lawns, Gardens, Golf course, Green house, floriculture, fodder crops etc.

Proenzyme : Caution

- Not to be applied with products that are of highly alkaline nature.
- Not to be applied with growth retardants and herbicides.
- Store at room temperature and avoid exposure to direct sun light.
- Keep the bottle tightly closed when not in use.
- Keep out of reach of children.



Proenzyme Usages

Crop	No. of sprays & stage/interval of application
Chilli & Tomato	3 sprays, at initiation of flowering and at 20 and 40 days after first spray.
Brinjal, Okra and Cucurbits	2 sprays, at 6-8 leaf stage and at the sign of fruit set.
Cabbage, Cauliflower, Turnip, Radish and Carrot.	2 sprays, at 6-8 leaf stage and at 15 - 20 days after first spray.
Soyabean, Pea, Cowpea, French bean and Cluster bean.	One Spray at 6-8 trifoliate leaf stage
Onion & Garlic	One spray at 25-40 DAS
Potato	One spray at 6-8 leaf stage
Ginger & Turmeric	2 sprays, at 45-50 DAS and at 21 days after first spray.

Proenzyme Usages

Crop	Number of sprays and stage/interval of application
Grapes (April pruning)	3 sprays , at 5 weeks after pruning and at 5 and 10 weeks after first spray.
Grapes (October pruning)	3 sprays, first spray before 1st GA application, second spray after fruit set and third spray at initiation of ripening.
Mango (Young trees up to 5 Years)	Spray once in 2 months.
Mango(bearing trees)	2 sprays, at first blossom and at fruit set stage.
Pomegranate	2 sprays, at fruit-set and 50% of fruit development.
Citrus	Spray once a month till harvest.
Apple	3 sprays, at green tip stage, at fruit-set stage and 4 weeks before harvest.
Plums and Peaches	One spray at early bloom stage

Proenzyme Usage

Crop	Number of sprays and stage/interval of application
Rose, Jasmine & Chrysanthemum	First spray at 30 days before bud formation and thereafter at 15 days interval till the end of flowering.
Tea	after pruning
Coffee	Coffee: during flowering
Tobacco	First spray 15 days after sowing and second spray can be given 20 days after transplanting

DAS: Days After Sowing
DAP: Days After Planting



Proenzyme : Price Information

Product	Pack	MRP (RS.)	DP
Proenzyme	250 ml	375	310

