TECH NOTE SERIES

OceanFert

Granular Seaweed Fertiliser

SLOW RELEASE FERTILISER

An organic seaweed fertiliser derived from fresh, Ascophyllum nodosum. OceanFert® is BioGro certified.

CERTIFIED INPUT FOR ORGANICS bio gro NZ CERT 4547

PRODUCT DESCRIPTION

For use in all horticultural and vegetable crops, ornamentals, nurseries, lawns and turf as a slow release fertiliser and naturally derived soil conditioner to support plant growth, increase crop yield and quality, and support plants against abiotic and biotic stress.

Plant and soil benefits from consistent use:

- Rich in organic matter, amino acids, polysaccharides, phytohormones and macro & micro nutrients.
- Improves growth, yield and quality of crops.
- Improves availability and composition of major and minor nutrients.
- Promotes greater root growth and development.
- Increases vigour and resilience to biotic and abiotic stress.
- Enhances soil microbial activity.
- Improves soil pH, texture, aeration and drainage.
- OceanFert® is meant to be used as part of your conventional fertiliser program and is certified for use on organic crops. Final recommendations should be based on soil tests and soil specific conditions.

Pack sizes: 25kg and 1000kg

OceanFert® is derived from fresh Ascophyllum nodosun, sustainably harvested from the North Atlantic Ocean. It is a natural storehouse of major and minor nutrients, carbohydrates, amino acids and natural plant growing promoters such as cytokinins, gibberellins and auxins.

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Grosafe

- OceanFert® is manufactured by converting fresh, raw seaweed into a fertiliser granule using a patented fermentation process and mechanical granulation.
- OceanFert® is a slow release fertiliser. Soil micro-organisms breakdown and decompose the solid granules over a long period of time, slowly releasing nutrients and compounds as the growing plants require them.
- OceanFert® is a naturally derived soil conditioner. It will increase soil organic matter, improve soil physical structure and enhance fungal and bacterial activity in the soil.

Storage: Store under dry conditions and away from direct sunlight. Store in the original packaging, and do not mix with other fertiliser products while storing the product as this could affect shelf stability.

Compatibility: OceanFert® is compatible with all conventional and organic fertilisers.

Crop safety: OceanFert® is safe to apply to all crops, at all development stages. It can be mixed with seedlings directly, without burning roots.

WHAT IS ORGANIC MATTER?

We often think of organic matter as the plant and animal residues we incorporate into the soil. We see a pile of leaves, manure or plant parts and think we are adding a lot of organic matter to the soil. This is actually organic material, not organic matter.

The difference between organic material and organic matter is organic material is anything that was alive and is now in or on the soil, whereas for it to become organic matter, it must be decomposed into humus. Humus is organic material that has been converted by microorganisms to a resistant state of decomposition. Organic material is unstable in the soil, changing form and mass readily as it decomposes. As much as 90% of it disappears quickly because of decomposition.

Organic matter is stable in the soil. It has been decomposed until it is resistant to further decomposition. Usually, only about 5% of it mineralises yearly. That rate increases if temperature, oxygen and moisture conditions become favourable for decomposition, which often occurs with excessive tillage. It is stable organic matter that is analyzed in the soil test.

What are the Benefits of Organic Matter

Nutrient Supply

Organic matter is a reservoir of nutrients that can be released to the soil. Each percent of organic matter in the soil releases 9 to 14 kgs of nitrogen, 2 to 3 kgs of P_2O_5 and 1 to 1.5 kgs of sulphur per year. The nutrient release occurs predominantly in the spring and summer, so summer crops benefit more from organic matter mineralisation than winter crops.

Water-Holding Capacity

Organic matter behaves somewhat like a sponge, with the ability to absorb and hold up to 90% of it's weight in water. A great advantage of the water-holding capacity of organic matter is that the matter will release most of the water that it absorbs to plants. In contrast, clay holds great quantities of water but much of it is unavailable to plants.

Soil Structure Aggregation

Organic matter causes soil to clump and form soil aggregates, which improves soil structure. With better soil structure, permeability (infiltration of water through the soil) improves, in turn improving the soil's ability to take up and hold water.

AMINO ACIDS - A FUNDAMENTAL TOOL IN AGRICULTURE

Overview of amino acids

Amino acids are organic molecules composed of carbon, hydrogen, oxygen and nitrogen. When a series of amino acids are joined by peptide bonds proteins are formed. Proteins are important macromolecules involved in all aspects of growth and development of plants.

Types

There are 20 types of amino acids that form proteins. There are certain types that are better for specific functions. Thus, the amino acids responsible for chlorophyll synthesis are alanine, arginine and glycine. For root development or to delay senescence the amino acids required are arginine and methionine. If we want to achieve a chelating effect on the soil and better development of shoots and leaves, glycine is required. For the resistance systems of plants the amino acids involved are lysine, glutamic acid and glycine. Finally, for the synthesis of gibberellins, leucine and proline are required.

Effect of Amino Acids on Plants

Every plant, like any organism, needs certain components for growth over and above the soil, sun rain and air. The basic component of living cells is proteins, with building block material, amino acids. Proteins are formed by sequence of amino acids.

The requirement of amino acids in essential quantities is well known as a means to increase yield and overall quality of crops.

Amino acids are fundamental ingredients in the process of protein synthesis. About 20 important amino acids are involved in the process of each function. Studies have proved that amino acids can directly or indirectly influence the physiological activities of plants.

Amino acids are also supplied to plants by incorporating them into the soil. It helps in improving the microflora of the soil thereby facilitating the assimilation of nutrients.

Protein Synthesis

Proteins have a structural function, metabolic function (enzymes), a transport function and a stock of amino acids function.

Only L - amino acids are assimilated by plants. Hence amino acids obtained by organic synthesis are not well assimilated.

Stress Resistance
Stress such as high temperature, low humidity, frost, pest attack, hail storm and floods have a negative effect on plant metabolism with a corresponding reduction in crop quality and quantity.

The application of amino acids before, during and after the stress conditions, supplies the plants with amino acids which are directly related to stress physiology and thus have a preventative and restorative effect.

Effect of Photosynthesis
Plants synthesise carbohydrates by photosynthesis. A low photosynthesis rate implies a slow growth rate leading to death of the plant. Chlorophyll is the responsible molecule for the absorption of light energy.

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 a higher degree of photosynthesis. This makes crops lush green.

Action on the Stomas
Stomas (stomata) are the cellular structures that control the hydric balance of the plant, the macro and micronutrient absorption and the absorption of gases.

The opening of the stomas is controlled by both external factors (light, humidity, temperature and salt concentration) and internal factors (amino acids concentration, abcisic acid etc.).

The stomas are closed when light and humidity are low and temperature and salt concentrations are high. When stomas are closed photosynthesis and transpiration are reduced (low absorption of macro and micro nutrients) and respiration is increased (carbohydrate destruction). In this case the metabolic balance of the plant is negative. Catabolism is higher than anabolism. This implies slow metabolism and stops plant growth.

L - glutamic acid acts as a cytoplasm osmotic agent of the "guard cells". Thus favouring the opening of the stomas.

Chelating Effect
Amino acids have a chelating effect on micronutrients. When applied together with micronutrients, the absorption and transportation of micronutrients inside the plant is easier.

This effect is due to the chelating action and to the effect of cell membrane permiability.

L - glycine and L- glutamic acid are known to be very effective chelating agents.

Amino Acids & Phytohormones
Amino acids are precursors or activators of phytohormones and growth substances. L - methionine is precursor of ethylene and of growth factors such as espermine and espermidine, which are synthesized from 5 - adenosyl methionine.

L - tryptophan is precursor for auxin synthesis. L - tryptophan is used in plants in L - form only. L - tryptophan is available only if hydrolysis of protein is carried out by enzymes.

If hydrolysis is carried out by acid or alkali, as is done in many European countries, L - tryptophan is destroyed. L - tryptophan induces synthesis of flower and fruit related hormones.

Pollination and Fruit Formation
Pollination is the transport of pollen to the pistil, so fecundation and formation of the fruit is possible.

L - proline helps in fertility of pollen. L - lysine, L - methionine, L - glutamic acid are essential amino acids for pollination. These amino acids increase the pollen germination and the length of the pollen tube.

Equilibrium of Soil Flora
The equilibrium of microbial flora of agricultural soil is a basic question for good mineralisation of organic matter and also for good soil structure and fertility around the roots.

L - methionine is a precursor to growth factors that stabilize the cell walls of the microbial flora.

General
L - glutamic acid and L - aspartic acid, by transamination, give rise to the rest of the amino acids.

L - proline and hydroxy proline act mainly on the hydric balance of the plant strengthening the cellular walls in such a way that they increase resistance to unfavourable climatic conditions.

L - alanine, L - valine and L- leucine improve fruit quality.
L - histidine helps in proper ripening of fruits.

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OceanFert
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DIRECTIONS FOR USE

Use higher application rates for low organic matter and low pH soils.

TIMING	APPLICATION METHOD	RATES	COMMENTS
Fruit trees & vines			
At planting	Plant hole	0.5 - 1 kg/tree	
Established	Top / side dressing	2 - 5 kg/tree 300 - 600 kg/ha	Apply once in spring and again in autumn. Target tree drip line.
Vegetables - field			
Pre-plant	Broadcast	300 - 600 kg/ha	Apply 10 - 14 days prior to planting. Apply before a rainfall event or irrigate to assist with granule breakdown prior to planting.
At planting	Plant furrow side dressing	150 - 250 kg/ha	
Established	Top / side dressing	150 - 250 kg/ha	Time applications for flowering, or for leafy vegetables (e.g. lettuces) 30 days after planting.
Vegetables & ornamentals Greenhouse / under structure / potted			
Pre-plant	Beds - broadcast Potted plants - top dressing	100 - 300 g/m² 20 - 40 g/litre of soil	Apply 10 - 14 days prior to planting. Water in to assist with granule breakdown prior to planting.
At planting	Plant hole	200 - 500 g/plant hole	
Flowering & established	Beds - broadcast Potted plants - top dressing	100 - 300 g/m² 20 - 40 g/litre of soil	
Notes: Pot size: 1L - 15cm diameter pot, 2L - 18cm, 3L - 21cm, 5L - 24cm			
Lawn & turf			
Pre-plant	Broadcast	60 - 120 g/m²	Water in following application.
At planting	Broadcast	60 - 120 g/m²	Water in following application.
Maintenance	Broadcast	60 - 120 g/m²	Apply late winter, early spring.

Guaranteed Analysis	
Alginic Acid	≥ 4.0%
Organic Matter	≥ 45.0%
Total Nitrogen	1.0 - 3.0%
Phosphorous (P_2O_5)	1.0 - 3.0%
Potassium (K_2O)	0.5 - 1.5%
N + P_2O_5 + K_2O	≥ 5.0%
Ca / Mg / S	≥ 10.0%
Fe / Zn / B / Mo	≥ 0.2%

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ANALYTICAL REPORTS

Macro and Trace Elements

Independent analysis conducted by
Eurofins Food Analytics NZ

SAMPLE: OceanFert

Sample Code: 816-2019-00319670
Product Type: Fertiliser
Reporting Basis: Wet
Reception date: 06-12-2019
Analysis ending date: 11-12-2019

FERTILISER LABORATORY TEST RESULTS				UNITS	RESULTS
NU122	Dry Matter (DM)			%	89.5
MACRO ELEMENTS				**UNITS**	**RESULTS**
NU361	Total Nitrogen			%	2.93
NU353	Total Carbon			%	25.3
	Organic Matter	multiply by 1.724	=		43.61%
NU064	Total Carbon to Total Nitrogen Ratio			Number	9
NU266	Phosphorus			%	0.64
	P2O5	multiply by 2.291	=		1.47%
NU278	Potassium			%	0.43
	K2O	multiply by 1.205	=		0.52%
NU339	Sulphur			%	1.24
NU061	Calcium			%	7.81
NU186	Magnesium			%	0.99
NU323	Sodium			%	0.56
TRACE ELEMENTS				**UNITS**	**RESULTS**
NU167	Iron			mg/kg	10000
NU106	Copper			mg/kg	24
NU045	Boron			mg/kg	38
NU195	Manganese			mg/kg	320
NU391	Zinc			mg/kg	93
NU096	Cobalt			mg/kg	<10
NU231	Molybdenum			mg/kg	<10
NU291	Selenium			mg/kg	<10

Amino Acid Results on Protein Hydrolysates

Independent analysis conducted by
AgResearch Limited

SAMPLE: OceanFert

Lab Number: 19/115-1
AA Hydrolysate: 19738
SAA Hydrolysate: 19731
Try Hydrolysate: 19724

AMINO ACID	mg/g	%total
Aspartic Acid	10.78	13.34
Threonine	4.62	5.71
Serine	4.27	5.28
Glutamic Acid	10.57	13.08
Proline	4.63	5.72
Glycine	5.37	6.64
Alanine	5.45	6.74
Valine	5.91	7.31
Isoleucine	3.97	4.92
Tyrosine	2.41	2.98
Phenylalanine	4.49	5.56
Lysine	3.64	4.51
Histidine	0.86	1.06
Arginine	2.68	3.31
Cystine	2.62	3.24
Methionine	1.31	1.61
Tryptophan	0.89	1.10
Totals	80.83	100.00

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