CASSA AgriTec

Sustainable

Sourced & Manufactured in Victoria AUSTRALIA

Helping You Grow

BioEarth 7

Active Liquid Abalone Fish Soil Improver Fertilizer
Plus 7 Active Pro-Biotic Soil Rejuvenating Bacteria

BioEarth 7 is a locally sourced, sustainable Biological Liquid Fish Fertilizer with seven active pro-biotic bacteria. These beneficial soil bacteria act as bio-stimulants and biological inputs into the soil that increase yields, improve plant health, reduce disease and increase pest resistance.

BioEarth 7 significantly improves soil health and increases soil fertility by providing the primary nutrients and active micro-organisms necessary for plants to thrive. BioEarth 7 Soil Improver Fertilizer offers a source of burn-free nitrogen, along with other primary nutrients such as phosphorus and potassium. Unlike synthetic fertilizer, it also provides secondary nutrients such as calcium and active micro-organisms. Plants grown in soils abundant in active micro-organisms that receive a balance of primary and secondary nutrients experience strong and steady plant growth leading to vigorous healthy plants that can better withstand disease and pest issues. Our liquid fertilizer range are all free-flowing organic liquid that are easy to decant into mixing and irrigation tanks and are guaranteed to pass easily through all forms of spray equipment, which means no more spray nozzle blockages and wasted downtime. The improved efficiency of our easy flow fertilizers means our products are rapidly absorbed and deliver the nutrients evenly. BioEarth 7 is a completely natural, non-toxic organic product that is safe on all soils and plants.

Active Pro-Biotic Bacteria These beneficial microbes are a natural resource for plant health and nutrition. Endowed with tremendous genetic and metabolic diversity, it serves multiple ecological functions in soil ecosystem from nutrient cycling to conferring stress tolerance to plants. Further the active bacteria supports plants directly or indirectly through the acquisition of nutrients and overall improvement in growth by production of phytohormones, protection from pathogens and other abiotic stressors.

Available in 20L, 200L, 1000L

Healthier Soils = Reduced Disease = Stronger Faster Growing Plants = Higher Yields

BioEarth7 Soil Improver Benefits

- ☑ Biological fertilizer thats improves soil health, microbiology and fertility
- ☑ 7 Active bacteria that restore beneficial soil bacteria & stimulates biological activity
- ☑ Offers burn-free nitrogen with phosphorus, potassium, calcium & microorganisms
- ☑ Unlocks bound up nutrients in the soil to increases yields and plant health
- ☑ Decreases Plant Disease and Increases Pest Insect and Fungal Resistance
- ☑ Supports strong, vigorous plant growth and returns higher yields
- ☑ Regulates pH in acid and alkaline conditions
- ☑ Stimulates soil bio colonies to reproduce to improve bio-energy formation
- ☑ Improves soil oxygen levels and soil aggregation
- ☑ Extends strong root systems and nutrient absorption
- ☑ Reduces the need for NPK (inorganic) chemical fertilizers
- ☑ Reduces the toxic chemical compounds retained in the soil

All CASSA AgriTec microbes and enzymes are naturally occurring and sourced from nature. They are readily bio-degradable and have not been genetically modified. CASSA AgriTec microbes and enzymes are extracted using a proprietary enzymatic fermentation process avoiding chemical polluting treatments and carbon polluting methods.

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THE SCIENCE OF BIOEARTH7

SEVEN ACTIVE BACTERIA

Bacillus subtills 2 x 106 cfu/g	Bacillus subtilis improves soil structure, promotes plant growth and increases crop quality. These active bacteria form bio-films, which are dense organism communities that live at the air and water interface. These complex bacterial communities form a mutualistic interactions with the plant rhizome and are able to combat the impact of pathogens by releasing a number of natural enzymes, siderophores and antibiotics. Bacillus also functions as a fungicide on flower and ornamental seeds and on agricultural seeds including seeds for cotton, vegetables, peanuts, and soybeans. The bacterium colonizes the developing root system of the plant and in turn out compete certain fungal disease organisms. It contributes in replenishing soil nutrients by supplying the terrestrial carbon cycle and the nitrogen cycle in the soil. As a PGPR in soil it plays a key role in enabling biotic and abiotic stress tolerance in plants by induced biofilm formation, systemic resistance (ISR) and lipo-peptide production. Demonstrated to alleviate soil stalinisation stress by solubilising soil inorganic phosphate and myco-remediation of soil organic contamination it can also be implemented as a bio-remediating technology olution to purify metal contaminated soil.
Bacillus cereus 1 x 106 cfu / g	The bacteria Bacillus cereus increases crop yields as it promotes the growth of the plant root systems and enhances the capacity of the root systems absorption. This soil bacterium produces antibiotics able to suppress fungal diseases in the rhizosphere, the zone of soil surrounding a plant root. Bacillus cereus inhibits plant pathogenic bacteria breeding in vivo and in-vitro and reduces plant diseases and insect pests.
Bacillus licheniformis 2 x 106 cfu / g	Bacillus licheniformis cycles nutrients in the soil and increases water use efficiency (WUE) via growth stimulation in both normal and drought conditions. It can also be used to improve soil and the soil's micro-ecological environment and increase fertilizer efficiency. When applied as a seed coating it can enhance plant WUE by producing more biomass (particularly in the roots) under both well-watered and drought stress conditions. Bacillus licheniformis is also effective in preventing / controlling plant diseases.
Bacillus thuringiensis 1 x 106 cfu / g	Bacillus thuringiensis is a living micro-organism that has the ability to kill non-beneficial insects which are harmful to crops, forests and agriculture. This bacterium, due to its microbial properties, is included in the formulation as an organic insecticide and pesticide as it is a sporulating bacterium, which produces parasporal inclusions that are toxic to insects. It is highly effective as a control for major insect pests such as the European corn borer, southwestern corn borer, tobacco budworm, cotton bollworm, pink bollworm, and Colorado potato beetle and reduce reliance on conventional chemical pesticides.
Bacillus amyloliquefaceins 2 x 106 cfu / g	Bacillus amyloliquefaceins bacteria fertilize the plant by producing chemicals that initiate plant growth and provide nutrients that are in short supply. It also induces the plant to activate its own resistance mechanism supporting the plants control of pathogens. It is considered a root-colonizing biocontrol bacterium, and is used to fight plant root pathogens in agriculture, aquaculture, and hydroponics as it out competes other microbes in the soil and can inhibit the growth of both bacteria and fungi. Bacillus amyloliquefaceins has been shown to provide benefits to plants in both soil and hydroponic applications. This active bacteria improves the soil microbial community and improves the availability of minerals and hence enhances plant growth conditions. It also improves soil nutrient availability, including improving nitrogen supply, solubilising phosphate and potassium, and producing siderophores.
Trichoderma Reesei 2.4 x 105 cfu / g	Trichoderma is a beneficial fungus that helps to protect plants against molds and bacteria. The saprophytic fungus of the genus Trichoderma is a naturally occurring fungus found in many kinds of soils throughout the world that obtains its nutrients from dead and decaying plant matter. It is used as a biofertilizer due to its ability to stimulate the plant growth of many crops and offers growers an alternative to chemical fertilizers. Trichoderma Reesei plant endophytes also assist salt stress. The Endophytic fungus Trichoderma Reesei promotes plant growth under salt stress giving plants higher chlorophyll a and b, carotenoids and reducing glutathione (GSH).
Trichoderma harzianum 3.6 x 105 cfu / g	Trichoderma harzianum bacteria promotes the growth of plants while limiting the growth of plant pathogens. This soil-dwelling fungi is found over the world and is highly effective at colonizing many kinds of plant roots and inhibiting fungi that cause many types of diseases. It is an effective bio-fungicide that enzymatically degrades other fungi by producing anti-microbial compounds that kill pathogenic fungi and out competes pathogenic fungi for space and nutrients. It helps plants roots reach deeper into the soil and process nutrients better by acting as an extension of the plant's roots and as a regulator that improves consumption and use of nutrients from the plant's surroundings.

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APPLICATION RATES

Crop Type	Volumes	Frequency
Vegetables	2-4L per Ha into 150-300L water	**Short Crops** (less than 10 weeks) Once per crop rotation within 2 weeks of planting. **Long Crops** (over 10 weeks) Twice per crop rotation. First application within 2 weeks of planting, second application midway through crop cycle.
Pasture	2-4L per Ha into 150-300L water	Apply in spring and autumn
Fruit trees, Ornamentals (and all crop types)	2-4L per Ha into 150-300L water	Apply in spring and autumn

SPRAYING & MIXING

Apply 2-4L/Ha per application until the soil structure is in good condition & biological populations have increased.
Follow with 2L/Ha - 300 to 500L water thereafter
SPRAY IN COOL OF DAY. MIX / AGITATE BEFORE USE (**Minimum Dilution** 1:100 with Clean Water)

TYPICAL PRODUCT ANALYSIS

Major Nutrients	Unit (%)
Nitrogen (N)	2.7-3%
Phosphorus (P)	0.5%
Potassium (K)	0.5%
Sulphur (S)	0.16%
Carbon (C)	13-16%

Major Cations	Unit (%)
Calcium (Ca)	0.73%
Magnesium (Mg)	0.04%

Total Minerals	Unit (%)
Copper (Cu)	0.0061%
Zinc (Zn)	0.0052%
Iron (Fe)	0.0056%
Manganese (Mn)	0.028%
Cobalt (Co)	0.001%
Molybdenum (Mo)	0.0011%
Boron (B)	0.0052%

Active Bacteria	CFU Rate
Bacillus subtills	2 x 106 cfu/g
Bacillus cereus	1 x 106 cfu/g
Bacillus licheniformis	2 x 106 cfu/g
Bacillus thuringiensis	1 x 106 cfu/g
Bacillus samyloliquefaceins	2 x 106 cfu/g
Trichoderma Reesei	2.4 x 105 cfu/g
Trichoderma harzianum	3.6 x 105 cfu/g

Variation may occur between batches.

Product Concentrate
(no added water)
Specific Gravity 1.059
pH 3.8 (average)

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THE FACTS ABOUT SOIL

SOIL IS A NON-RENEWABLE VITAL RESOURCE. SOIL IS ALIVE AND SOIL CAN DIE...

Soil is considered a non-renewable resource, because it forms and regenerates very slowly, but can degrade rapidly. Some types of degradation, such as nutrient exhaustion, can be corrected. Soil is effectively privately owned across much of Australia, however, the influence of healthy soils on the environment as a whole, such as improving water quality, protecting biodiversity and mitigating excess greenhouse gas (GHGs) emissions, means that soil is also a large public global resource.

AUSTRALIAN SOILS With an area of around 7.5 million square kilometres, mainland Australia has a lot of soil but around 70% of our continent is classified as 'arid' or 'semi-arid', so there's not all that much productive soil available for the agriculture we depend on. The soil we do have is precious, and farmers can face significant challenges maintaining its quality. In Australia weathering has dissolved vast quantities of nutrients, and washed them away into the groundwater and/or rivers, leaving the soils depleted in nutrients such as phosphorous, calcium and potassium. The productivity of our old, nutrient-poor soils has also suffered because of some land management practices introduced since European settlement. Australia's soils are among the most nutrient poor and unproductive in the world. Very little of Australian soils are suited to agriculture, with most being shallow, high in salt and low in nutrients. Australia's ancient landscape has soils of exceptionally low fertility and deficiencies of all known nutrients have been recorded. Human society is dependent on the ecosystem goods and services mediated by soil organisms. Soils filter water, provide the growth medium for vegetation and crops, mediate global carbon and nutrient cycles, degrade xenobiotics, and are habitats for many organisms.

TOP SOIL & SOIL MICROBIOME

Soil is made up of many layers. Depending on the type of soil there may be several layers. Topsoil is considered the "A" horizon and this layer is the primary layer where plants and organisms live. Fertile Top soil is rich in organic carbon. This thin layer which covers only a small fraction of earth's crust. As humans we are dependent on fertile topsoil to survive, especially at our current levels of population and development. Topsoil is composed of a mineral particles and organic matter and usually extends to a depth of 13-25 cm (5-10 inches). Together these make a substrate capable of holding water and air which encourages biological activity. A healthy topsoil layer is a very rich microbiome that hosts a wide array of species. This complex microbiome hosts significant bacterial, fungal and entomological activity without which soil quality would degrade and become less suitable to sustain plant life. Bacteria and fungi can be essential in facilitating nutrient exchange with plants and in breaking down organic matter into a form that roots can absorb. These microbial communities are critical to plant health and their resistance to stressors, such as drought, heavy metal pollution and even parasitism. **Only 7% of the earth's surface has topsoil suitable for agriculture.**

BACILLUS IN SOIL

Bacillus-like species are gram-positive bacteria that are ubiquitous in soils. Many of Bacillus-like bacteria are demonstrated as beneficial microbes widely used in industry and agriculture. Bacillus as a natural resource for plant health and nutrition. The genus Bacillus is one of the predominant bacterial genera found in soil, and several species of this genus have been reported from diverse ecological niches. Endowed with tremendous genetic and metabolic diversity, it serves multiple ecological functions in soil ecosystem from nutrient cycling to conferring stress tolerance to plants. Bacillus' beneficial traits which help the plants directly or indirectly through acquisition of nutrients, overall improvement in growth by production of phytohormones, protection from pathogens and other abiotic stressors.

CARBON IN SOIL

Soil carbon storage is a vital ecosystem service, resulting from interactions of ecological processes. The amount and form of organic carbon plays an important role in soil process and function, the underpinning ecosystem service for agricultural and landscape productivity. Increasing the amount of carbon stored in agricultural soils can help mitigate rising greenhouse gas emissions. Human activities affecting these processes can lead to carbon loss or improved storage. Increasing the amount of carbon stored in agricultural soils can help mitigate rising greenhouse gas emissions while improving the productivity and resilience of agricultural systems. Farmers who adopt management practices that sequester soil carbon stand to gain a benefit from a more productive, sustainable and resilient farming system.

THE FACTS

- Soil is... complex and vital to life
- Soil is alive and soil can die
- Soil is a non-renewable vital resource
- In a teaspoon of good soil there will typically be several hundred million bacteria
- Soils are home to more than 25% of our planet's biodiversity
- The average acre of good cropland will be home to over 1 million earthworms
- It takes 500 years to form one inch of topsoil
- Soil is mostly made of the element's oxygen, silicon, aluminium, iron, and carbon
- Mistreated soil creates a huge amount of carbon emissions
- Well-managed soil can take tons of carbon out of the atmosphere
- 10% of the world's carbon dioxide emissions are stored in soil
- It is possible to over-farm soil and remove its nutrients and organic matter that plants will no longer be able to grow

SOIL FUNCTIONS

- Produces biomass and hosts biodiversity
- Produces 98.5%+ of the worlds food source
- Provides raw materials (clay, sand, gravel)
- Stores and filters water
- Stores and cycles nutrients
- Is a large carbon store
- Stores our geological, paleontological and palaeontological heritage

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