

## Artemis & Angel Co., Ltd.

99/296 President Park, Sukhumvit 24, Klongtoey,  
Bangkok 10110, Thailand

**Tel.:** (President) +66-86-329-6038; (Sales): +66-99-337-7866

**E-mail:** (Sales) [artemisandangelcoltd@gmail.com](mailto:artemisandangelcoltd@gmail.com) **Website:** [www.artemisthai.com](http://www.artemisthai.com)

## Technical Information about Bio-Plant and Pro-Plant and Company Information about Artemis & Angel Co. Ltd.



One-Litre Bottles

## Artemis & Angel Co., Ltd.

99/296 President Park, Sukhumvit 24, Klongtoey,  
Bangkok 10110, Thailand

**Tel.:** (President) +66-86-329-6038; (Sales): +66-99-337-7866 **Fax:** (Sales) +66-2-661-1752

**E-mail:** (Sales) [artemisandangelcoltd@gmail.com](mailto:artemisandangelcoltd@gmail.com) **Website:** [www.artemisthai.com](http://www.artemisthai.com)


### **The Specifications for Bio-Plant and Pro-Plant, 100% Organic, Liquid, Bio-fertilisers**

The specifications provided for Bio-Plant and Pro-Plant are generic specifications, which other companies may be able to match. The matter of specifications is very simple for chemical fertilisers, but they can be problematic for liquid bio-fertilisers made with bio-technology. For example:

1. In the case of Bio-Plant, labs usually carry out a simple test for NPK because they are not able to carry out a plate count when the bacteria are in endospores. Bio-Plant is not an NPK bio-fertiliser. It is microbial and this is its main feature and why it is so effective; not because of the NPK in it, which is similar to that in Pro-Plant. Consequently, although companies, such as SGS test it for NPK, we have decided not to use its levels of NPK as the standard, but rather the plate count instead.
2. When we culture the bacteria in Bio-Plant they are cultured in a way that makes them tolerate acidic soil, such as a pH of 4; and high environmental temperatures nearing 100 degrees Celcius. Consequently, the bacteria can flourish and multiply in adverse conditions. Moreover, the bacteria multiply at the rate of one cell into one million cells in the soil per day with a higher than stated plate count. But these characteristics cannot be included in the (generic) specifications.
3. Pro-Plant also poses a problem because it is made from fish and includes over 50 nutrients, but we only claim for the main ones, which include NPK, which is the usual exclusive measure. So, other companies might claim for many nutrients, but we only claim for the main nutrients.
4. The nutrients in Pro-Plant can all be absorbed by the leaves and the roots through microbial action resulting from what Bio-Plant does in the soil. Moreover, additional Nitrogen is provided by Nitrogen-fixing bacteria in Bio-Plant, which create nodules in the roots. Because there is over 30,000 MT of Nitrogen in the air above an acre of land, plants using Bio-Plant obtain far more Nitrogen than stated in the specifications for Pro-Plant. But this is not measurable.

The main point is this. We have provided generic specifications, which other companies may be able to achieve. But other products may not have the features and capabilities mentioned above, including the ability to clean the soil of chemicals through bioremediation, which Bio-Plant has.

My warmest regards,



Mr. Peter McAlpine  
Chief Marketing Officer



## Artemis & Angel Co., Ltd.

99/296 President Park, Sukhumvit 24, Klongtoey,  
Bangkok 10110, Thailand

**Tel.:** (President) +66-86-329-6038; (Sales): +66-99-337-7866 **Fax:** (Sales) +66-2-661-1752

**E-mail:** (Sales) [artemisandangelcoltd@gmail.com](mailto:artemisandangelcoltd@gmail.com) **Website:** [www.artemisthai.com](http://www.artemisthai.com)

### **The Micro-Organisms in Bio-Plant**

<b>Product Name</b>	:	<b>BIO-PLANT</b>
<b>Origin</b>	:	Thailand.
<b>Packaging</b>	:	1-litre bottle.
<b>Description</b>	:	Bio-liquid fertilizer.
<b>Physical Properties</b>	:	Concentrated brown black liquid.
<b>Process</b>	:	Fermentation.
<b>Produced From</b>	:	Pure Culture Microbial Liquid Molasses (Molasses from 100% sugarcane).
<b>Methods of Analysis</b>	:	Total plated count of micro-organisms by pour-plate and spread-plate.
<b>Result</b>	:	Total plate count: $1.5 \times 10^6$ CFU/ml (minimum amount).

#### **Micro-organism Genii in Bio-Plant:**

1. Bacillus
2. Streptomyces
3. Enterobacter
4. Nitrosomonas
5. Pseudomonas
6. Nitrobacter
7. Achromobacter

**Note:** Bio-Plant is 100% organic and guaranteed to be free of chemicals, toxins, and pathogens.

My warmest regards,



Peter McAlpine  
Marketing Manager  
Artemis & Angel Co. Ltd.



## Artemis & Angel Co., Ltd.

99/296 President Park, Sukhumvit 24, Klongtoey,  
Bangkok 10110, Thailand

**Tel.:** (President) +66-86-329-6038; (Sales): +66-99-337-7866 **Fax:** (Sales) +66-2-661-1752

**E-mail:** (Sales) [artemisandangelcoltd@gmail.com](mailto:artemisandangelcoltd@gmail.com) **Website:** [www.artemisthai.com](http://www.artemisthai.com)

### Certificate of Analysis of Pro-Plant

<b>Product Name</b>	:	<b>PRO-PLANT</b>
<b>Origin</b>	:	Thailand.
<b>Packaging</b>	:	1-litre bottle.
<b>Description</b>	:	Bio-liquid fertilizer.
<b>Physical Properties</b>	:	Concentrated brown black liquid.
<b>Produced From</b>	:	100% fish enzymes by MCP.
<b>Process By</b>	:	MCP (Micro-biological Complexation Process).
<b>Methods of Analysis</b>	:	AOAC (Official Methods of Analysis of the Association of Official Analytical Chemists).
<b>Contents</b>	:	Major and minor elements. 100% organic, free of chemicals, toxins, and pathogens.

#### Components of Bio-Liquid Fertilizer Pro-Plant (Minimum amounts):

Nutrients		Amount
pH	:	4.9
N	:	4.4 %
P <sub>2</sub> O <sub>5</sub>	:	0.5 %
K <sub>2</sub> O	:	0.7 %
MgO	:	0.1 %
CaO	:	2.5 %
S	:	0.3 %
B	:	0.006 %
Cl	:	5.4 %
Mn	:	0.0002 %
Zn	:	34.8 ppm
Fe	:	181.2 ppm
Cu	:	2.2 ppm
Mo	:	2.4 ppm

My warmest regards,



Peter McAlpine  
Marketing Manager  
Artemis & Angel Co. Ltd.



## **Technical Information about Bio-Plant and Pro-Plant**

### **Part 1: The Amount of NPK Provided**

- Plants receive more NPK from Pro-Plant than they do from chemical NPK. All of the NPK in Pro-Plant is absorbed whereas scientific studies have shown that 80% of chemical NPK is lost unabsorbed in the soil. However, it is made available to the roots through microbial action when Bio-Plant is used. (*See page 13.*)
- If one only looks at the lab analysis of Pro-Plant, NPK 4.4:0.5:0.7, which are the minimum amounts, (*see page 13*), one might think that the amount of NPK which the plants obtain is very small compared to chemical NPK 26:5:5. But firstly, 80% of the chemical NPK is not absorbed by the roots. Secondly, the plants obtain their NPK in a different manner to granular chemicals, i.e. through microbial action in the soil and by fixing Nitrogen from the air. Also, the plants obtain all the NPK in Pro-Plant because it is organic, not chemical NPK.
- We should not forget that plants need more than just NPK in order to be healthy and grow abundantly. Pro-Plant provides 50+ minerals (major, minor, and trace elements). In addition, Bio-Plant restores the soil food web and the nutrient cycle in the soil, which chemical agriculture damages, and also fixes additional Nitrogen from the air by microbial action.
- So, in practice, when farmers use Pro-Plant and Bio-Plant their crops obtain more than enough NPK; hence the good crop yields. In order to understand how and why this is so, it is necessary to understand the function of the bacteria genii and species in Bio-Plant. I have replaced the names of the genii and species with “1 XXX” “2 XXX”, etc.

### **Part 2: How the Bacteria in Bio-Plant Produce NPK and Improve Growth**

- This section shows how and why Bio-Plant provides plants the 80% of NPK left in the soil by chemical fertilizers. This NPK is in addition to the minimum amount of NPK (4.4:0.5:0.7) in Pro-Plant, which is already more than in the chemical NPK.

#### **2.1 The Role of Each Genus and Species**

- a) **1 XXX** is a bio-control agent, which degrades polymers, such as protein, starch, and pectin. Therefore, it is an important contributor to the Carbon and Nitrogen cycles, and acts as a bio-fungicide. It also produces amylase, which is important in the soil fertilization process.
- b) **2 XXX** produces enzyme nitrite reductase for the Nitrogen Cycle.
- c) **3 XXX** enhances the structure of soil and makes it crumblier and looser.
- d) **4 XXX** is beneficial in the Nitrogen Cycle and for increasing the uptake of minerals.
- e) **5 XXX** degrades pollutants and makes organisms attractive for controlled bio-remediation in nitrifying soils and waters.
- f) **6 XXX** releases organic acid to solubilize inorganic phosphate to phosphate anions, so that the plant can absorb it in an acidification reaction. It also enhances the use of Nitrogen and disinfects the soil.
- g) **7 XXX** is an Ammonium-oxidizing bacterium, which initiates nitrification in which nitrite is the end product. It proceeds to oxidize nitrite into nitrates.

#### **2.2 Overview of the Functions, Effects, and Benefits of the Bacteria**

- Together the bacteria provide the plants with sufficient Nitrogen, Phosphorus, Potassium, as well as minor and trace minerals. This includes dissolving the deposits of NPK left in the soil by chemical fertilizers.

a) **1 XXX**

- 1 XXX is a bio-control agent, which can degrade polymers, such as protein, starch, and pectin. Therefore, it is an important contributor to the Carbon and Nitrogen cycles, and acts as a bio-fungicide. It also produces amylase, which breaks down starches and produces sugars, and is beneficial to restoring the Nitrogen Cycle in chemical soil.
- It is used as a soil inoculant to promote plant health. It enables crops to resist several common crop diseases, and provides resistance against pathogens.
- It not only improves plant nutrition, but also promotes plant growth by stimulating plant hormone production. It forms symbiotic relationships with target crops and both parties benefit.
- The main habitat of endospore-forming 1 XXX organisms is the soil. 1 XXX is most commonly found in soil environments and in plant undergrowth. These mesophilic microbes have historically been considered strict aerobes. Thus they are likely to be found in O and A surface soil horizons where the concentration of oxygen is most abundant and temperatures are relatively mild.
  - **The O Horizon:** These are layers dominated by organic material, consisting of undecomposed or partially decomposed litter, such as leaves, needles, twigs, moss, and lichens, which has accumulated on the surface; they may be on top of either mineral or organic soils.
  - **The A horizon:** This is the top layer of the soil horizons, often referred to as 'topsoil'. This layer has a layer of dark decomposed organic materials, which is called "humus".
- 1 XXX supports plant growth. This bacterium often plays a role in replenishing soil nutrients by supplying the terrestrial Carbon Cycle and the Nitrogen Cycle.
- 1 XXX bacteria form rough biofilms, which are dense organism communities, at the air and water interface. The biofilms are beneficial and control of plant pathogen infections.
- 1 XXX biofilm communities form a mutualistic interaction with plant rhizome systems. The plant benefits because 1 XXX provides preemptive colonization. Preemptive colonization prevents other pathogens from infecting the plant because 1 XXX has the advantage of being at the site first.
- The biofilm communities form a mutualistic interaction with plant rhizome systems. 1 XXX biofilms found in the rhizosphere of plants promote growth and serve as a bio-controller. In this sense 1 XXX biofilm communities form a mutualistic interaction with plant rhizome systems. The plant benefits because 1 XXX provides preemptive colonization. 1 XXX benefits by deriving nutrients and surface area for biofilm formation from the plant's root structure.
- In addition, 1 XXX strains can act as bio-fungicides, which benefit agricultural crops and antibacterial agents.

b) **2 XXX**

- 2 XXX oxidizes ammonia to nitrites, and derives all its energy and reductant for growth from this process. The reaction catalysed is the first step in the oxidation of ammonia to nitrate. *(Please refer to the diagram of the Nitrogen Cycle on page 9 to see the role of ammonification in the Nitrogen Cycle.)*
- It is capable of degrading a variety of halogenated organic compounds, including trichloroethylene, benzene, and vinyl chloride. The ability of this nitrifying micro-organism to degrade some pollutants makes it attractive for controlled bio-remediation in nitrifying soils and water.

c) **3 XXX**

- 3 XXX produces an enzyme nitrite reductase for soil denitrification in the Nitrogen Cycle. It produces N<sub>2</sub>O from nitrites. *(Please refer to the diagram of the Nitrogen Cycle on page 9 to see the role of denitrification in the Nitrogen Cycle.)*
- It provides two kinds of copper for plants.



- It also provides amino acids and beneficial enzyme reactions, which are beneficial to the soil micro-biology.
- It makes the Nitrogen in the abundant NPK deposits left by chemical fertilizer available to the roots. By breaking up the deposits, the hard, chemical soil becomes softer and crumblier.

d) **4 XXX**

- 4 XXX is beneficial in the Nitrogen Cycle and for increasing the uptake of minerals.
- It grows both aerobically and anaerobically; it is active biochemically; it ferments (versus oxidizes) D-glucose as well as other sugars; and reduces nitrates to nitrites. *(Please refer to the diagram of the Nitrogen Cycle on page 9 to see the role of denitrification in the Nitrogen Cycle.)*
- It grows in humid environments on leaf surfaces or in leaf sheaths (phyllosphere), the soil, and root surfaces.
- It fixes Nitrogen in the soil. Nitrogen fixation is a process by which Nitrogen ( $N_2$ ) in the atmosphere is converted into ammonia ( $NH_3$ ). Nitrogen fixation is required to biosynthesize basic building blocks of plants, animals and other life forms, e.g., nucleotides for DNA and RNA and amino acids for proteins. *(Please refer to the diagram of the Nitrogen Cycle on page 9 to see the role of Nitrogen fixation in the Nitrogen Cycle.)*

e) **5 XXX**

- 5 XXX is an ammonium-oxidizing bacterium, which initiates nitrification in which nitrite is the end-product. It proceeds to oxidize nitrite into nitrates. It plays an important role in the Nitrogen Cycle by oxidizing nitrite into nitrate in the soil. *(Please refer to the diagram of the Nitrogen Cycle on page 9 to see the role of ammonification and denitrification in the Nitrogen Cycle.)*
- It also interacts with ammonium-oxidizing bacteria, which also play a key role in the Nitrogen Cycle. Ammonium-oxidizing bacteria initiate nitrification, in which nitrite is the end product. 5 XXX then proceeds to oxidize nitrite to nitrate.
- It plays a key role in the Nitrogen Cycle by converting nitrite to nitrate. Nitrite is the end product of ammonium oxidation during the nitrification process.
- It can grow in both aerobic and anaerobic conditions with nitrate as its electron acceptor during anoxic conditions.
- It derives its energy through nitrite oxidation and carbon dioxide fixation, which it can do simultaneously, thus acting as a chemo-lithoautotroph. In the absence of nitrite it uses solely carbon sources and acts as a chemo-organoheterotroph. It uses nitrate as an electron acceptor producing nitrite, nitric oxide and nitrous oxide. When oxygen is present it oxidizes nitrite to nitrate. It is capable of using nitric oxide and a substrate to produce NADH.
- It allows for the removal of significant amounts of Nitrogen from effluent wastewater through the use of biofilms.

f) **6 XXX**

- 6 XXX releases organic acid to solubilize inorganic phosphate to phosphate anions, so that the plant can absorb it in an acidification reaction. It also enhances the use of Nitrogen and disinfects the soil.
- 6 XXX enables plants to attain key nutrients, especially the NPK deposits which are left in the soil by chemical fertilizers, and which are inaccessible to the roots. These deposits harden the soil.
- It uses siderophores from other microorganisms to obtain iron, which increases their survival in iron-limited environments.
- It produces secondary metabolites that suppress plant disease.
- It suppresses pathogens via antibiotic productions.
- 6 XXX strains present bio-control properties, protecting the roots of some plant species against parasitic fungi such as *Fusarium* or *Pythium*, as well as some phytophagous nematodes.
- It produces viscosin, which is a peptidolipid that enhances anti-virality.

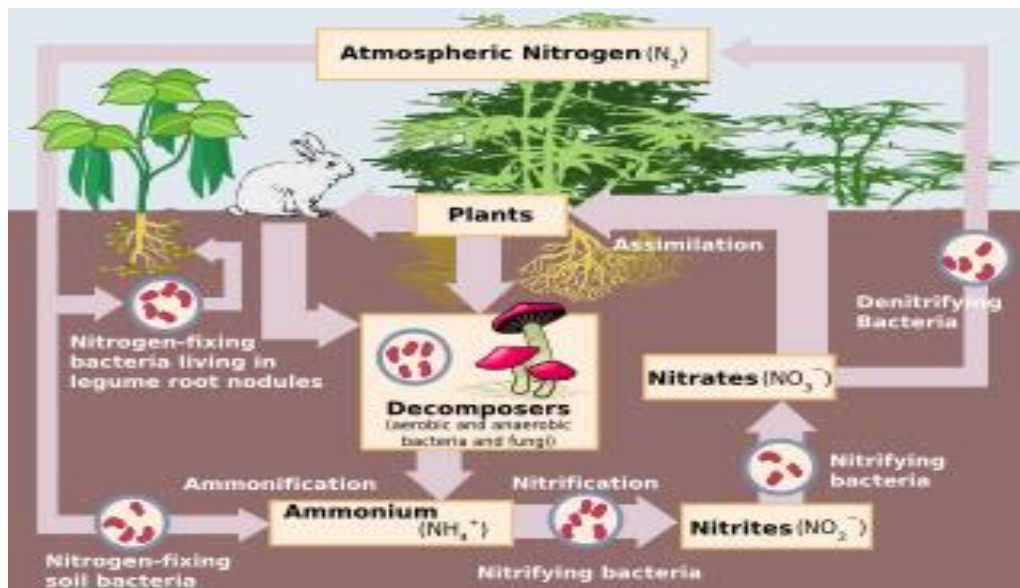
- One of many byproducts of plant cells includes active oxygen, such as superoxide, which are toxic to microbes. 6 XXX possesses superoxide dismutases to convert superoxide to hydrogen peroxide and catalases to convert peroxide to water.
- 6 XXX is beneficial in bio-remediation against several strains of plant pathogens. At high concentrations 6 XXX inhibits spore production by pathogenic plant fungi. Fungi such as *Alternaria* *Cajani* and *Curvularia* *Lunata* grow on plant surfaces causing disease and death of the plant. Plant treatment with 6 XXX can prevent these fungi from growing and spreading through spore production.
- 6 XXX grows at an optimum temperature of 25 degrees Celsius but can also survive in temperatures as low as 0 degrees C. Therefore, it is rarely pathogenic in humans, making it an effective microbe for treating crops since it is not able to survive in the human body.
- It is effective against mould-causing disease in produce, such as apples and pears. It is an effective alternative to chemical fungicides.
- Production of secondary metabolites plays an important role in plant disease suppression. Antibiotics, such as Pyrrolnitrin, Pyoluteorin, and 2,4-diacetylphloroglucinol that inhibit phytopathogen growth, are produced by 6 XXX. Diseases from *Rhizoctonia* *Solani* and *Pythium* *Ultimum* that affect cotton plants are inhibited by this strain.
- 6 XXX produces Hydrogen Cyanide and the siderophores pyocheline and pyoverdine which it uses to outcompete with many pathogenic bacteria for iron necessary for growth and suppress pathogens in the rhizosphere.
- The bacteria's degrading ability has been applied to pollutants. It possesses many extracellular hydrolytic enzymes that degrade polymers found in soil as well as hydrolases used on plant-derived carbohydrates. They are also capable of degrading and using components of plant tissues, such as hydrocarbon molecules, fatty acids and oils.
- It increases crop yield in saline-affected soils by enhancing saline resistance.

g) **7 XXX**

- 7 XXX is a safe, well-defined aspergillum. When in contact with energy sources 7 XXX secretes enzymes capable of converting complex organic molecules to simpler ones. 7 XXX is also high in several phosphatizing activities, which increasing the bioavailability of phosphate as an energy source to increase metabolism in the inoculated microbes in the surrounding environment.
- It provides additional sources of nutrition in the microbial colonization, by 7 XXX in particular, of the grasses and plant roots in the habitat that filter the polluted water and breakdown organic pollution.
- It is integral in the microbial ecology associated with the well-being of many trees and plants in our environment.
- It is used in the fermentation process for production of enzymes and other organic compounds.



## The Nitrogen Cycle



### Part 3: A Summary of How the Micro-organisms in Bio-Plant Produce NPK for Plants

#### 3.1 The 4 Groups of Micro-organisms

- Bio-Plant contains 4 groups of micro-organisms:
  - Group 1: Micro-organisms Which Produce Nitrogen
  - Group 2: Micro-organisms Which Produce Phosphorus
  - Group 3: Micro-organisms Which Produce Potassium
  - Group 4: Micro-organisms Which Produce Other Minerals
- Each kind of plant needs different minor elements. Naturally, these elements exist, but in an unusable form. They need some micro-organisms to transform them into a usable form. This is what Bio-Plant does. Pro-Plant and Bio-Plant together increase the amount of roots for the extra volume of minerals to be absorbed through. In rice plants an extra 20% of roots can be observed.

##### **3.1.1 Group 1: Micro-organisms Which Produce Nitrogen**

- Nitrogen is a major nutrient. When plants are Nitrogen deficient, they are marked by reduced growth and yellowing of leaves. Soil that is consistently cultivated always lacks Nitrogen since it easily decomposes in the form of chemical fertilizer. Microbial fertilizer can also fix Nitrogen from the air. These micro-organisms have the enzyme Nitrogenase, which transform Nitrogen gas into amino acid and other forms of Nitrogen that are useful for a plant. Plants not only obtain more Nitrogen from the soil as a result of the micro-organisms, but they also obtain extra Nitrogen by Nitrogen fixation from the air. This increases growth in a positive and environmentally safe and effective way.

#### **The Nitrogen Cycle**

- The Nitrogen Cycle is the continuous flow of Nitrogen through the biosphere by the processes of Nitrogen fixation, ammonification (decay), nitrification, and denitrification. Bio-Plant has a positive effect on the Nitrogen Cycle in crops and enables plants to obtain a larger amount of Nitrogen in a more efficient way than by piling on extra bags of NPK or Urea. Nitrogen is vital to all living matter, both plants and animal; and is an essential constituent of amino acids, which form proteins of nucleic acids, and of many other organic materials.

## **Nitrogen Fixation**

- Although the earth's atmosphere is 79% Nitrogen, free gaseous Nitrogen cannot be utilized by animals or by higher plants. They depend instead on Nitrogen that is present in the soil. Bio-Plant changes this by enabling Nitrogen fixation from the air to take place.
- To enter living systems, Nitrogen must be “fixed” (combined with oxygen or hydrogen) into compounds that plants can utilize, such as nitrates or ammonia. A certain amount of atmospheric Nitrogen is fixed by lightning and by some cyanobacteria (blue-green algae). But the great bulk of Nitrogen fixation is performed by soil bacteria of two kinds: those that live free in the soil and those that live enclosed in nodules in the roots of certain leguminous plants (e.g., alfalfa, peas, beans, clover, soybeans, and peanuts). Bio-Plant includes the free-living forms, some of which are saprophytic, i.e. it uses the energy from decaying organic matter in the soil to fuel soil processes, including Nitrogen fixation.
- Bacteria that live in the roots of legumes are also found in Bio-Plant. The rod-shaped bacteria enter the roots chiefly through the root hairs and then work their way to the inner root tissues. There they stimulate the growth of tumor-like nodules. Within the nodules the bacteria develop into forms called bacteroids, which live in a symbiotic (mutually beneficial) relationship with the green plant. The bacteroids take carbohydrates from the plant for energy to fix Nitrogen and synthesize amino acids; the plants take the amino acids elaborated in the nodule to build plant tissue.

## **Other Aspects of the Nitrogen Cycle**

- Decomposing animal remains and animal wastes also return organic Nitrogen to the soil as ammonia. Many different kinds of decay micro-organisms participate in ammonification. The nitrifying bacteria of the genus 5 (*page 7*) oxidize the ammonia to nitrites, and of the genus 7 (*page 8*) oxidize the nitrites to nitrates. Both are found in Bio-Plant. The nitrates can then be taken up again by the green plant. The cycle of fixation-decay-nitrification-fixation can proceed indefinitely without any Nitrogen being returned to a gaseous state.
- But still another group of micro-organisms, the denitrifying bacteria, can reduce nitrates all the way to molecular Nitrogen. Denitrification occurs only in the absence of oxygen and is not common in well-cultivated soils. Bio-Plant contains denitrifying bacteria.

### ***3.1.2 Group 2: Bio-Plant Contains Micro-organisms Which Produce Phosphorus***

- Phosphorus is a nutrient that is as important as Nitrogen for a plant. There is, of course, Phosphorus within the soil, but it is not applicable in soil with a pH that is too high or too low. Bio-Plant not only produces extra Phosphorus for plants, but it also restores the natural balance to soil so that the pH moves up or down to about 6.
- Bio-Plant consists of some kinds of micro-organisms that can absorb Phosphorus easily and can dissolve chemical fertilizer. Micro-organisms in this group include numbers 1, 6, and 8 in Part 1 above.

## **Phosphorus and the Phosphorus Cycle**

- In the early 1900s, chemists recognized that the critical component in bones was Phosphorus, which plants use in photosynthesis—the biological conversion of energy from the Sun into chemical energy. With this discovery came the realization that Phosphorus would make an even more effective fertilizer when treated with sulfuric acid, which makes it soluble, or capable of being dissolved, in water. This compound, known as superphosphate, can be produced from phosphates, a type of mineral. Bio-Plant replaces the need for this acid to be added to soil by dissolving Phosphorus left unabsorbed in the soil by chemical fertilizer.

## **The Phosphorus Cycle**

- Phosphates represent one of the eight major classes of mineral. All phosphates contain a characteristic formation,  $\text{PO}_4$ , which is bonded to other elements or compounds, for example,

with aluminum in aluminum phosphate, or  $\text{AlPO}_4$ . Phosphorus fertilizer is typically calcium phosphate, the most important industrial mineral produced from Phosphorus.

- The majority of Phosphorus in the earth system is located in rocks and deposits of sediment, from which it can be removed by one of three processes: weathering, the breakdown of rocks and minerals at or near the surface of Earth as the result of physical, chemical, or biological processes; leaching, the removal of soil materials that are in solution, or dissolved in water; and mining.
- Phosphorus is highly reactive, meaning that it is likely to bond with other elements, and for this reason it often is found in compounds. Micro-organisms in Bio-Plant absorb insoluble Phosphorus compounds (ones that are incapable of being dissolved) and, through the action of acids within the micro-organisms, turn them into soluble phosphates. This is one way in which Bio-Plant helps the soil. Algae and other green plants absorb these phosphates and, in turn, are eaten by animals. When they die, the animals release the phosphates back into the soil.
- A shortage of Phosphorus in the soil would make it especially difficult for a plant to manufacture flowers from which fruit appears. Inorganic Phosphorus in the form of the phosphate  $\text{PO}_4^{3-}$  plays a major role in biological molecules, Plants need phosphate from the soil to make their DNA.
- Phosphate-solubilizing micro-organisms, for example, 1, and which are in Bio-Plant, convert non-available inorganic Phosphorus present in soil into an available form utilizable by crop plants. These bacteria also produce iron chelating substances, called siderophores, which chelate the iron present in the root zone. As a result, this iron becomes non-available to harmful micro-organisms and, in this manner, crop plants are protected from them. In addition, certain fungi, e.g. Glomus, etc., form associations with plants roots; these are called mycorrhiza.
- By enabling plants to absorb the residues of Phosphorus, it minimizes the impact of the residues on surface water quality.

### ***3.1.3 Group 3: Micro-organisms Which Produce Potassium***

- Potassium is another major substance that plants get from the soil. It is used in protein synthesis and other key plant processes. Yellowing, spots of dead tissue, and weak stems and roots are all indicative of plants that lack enough Potassium.
- Plants need Potassium, a component of nucleic acids, phospholipids, and several proteins. It is also necessary to provide the energy to drive metabolic chemical reactions. Without enough Potassium, plant growth is reduced. Since Potassium has a major role in protein, carbohydrate and fat synthesis, the quality and quantity of crop yield depend on Potassium. Potassium in the soil is fixed, dissolvable, and exchangeable. The most rapid and appropriate way to use Potassium is by bio- and organic weathering by 1 organisms which tolerate the soil's ph. Bio-Plant contains these organisms and by making more Potassium available to the plants by dissolving it, it improves the quality of fruit in terms of texture and taste.

### ***3.1.4 Group 4: Microorganisms Which Produce Other Minerals***

- Each kind of plant needs different minor elements. Naturally, these elements exist, but in an unusable form. They need some microorganisms to transform them into a usable form. Bio-Plant contains micro-organisms that make these minor elements available to the plants.

## **3.2 Additional Benefits of Bio-Plant**

### **Decomposers and Detritivores**

- Most biogeochemical cycles involve a special type of chemical reaction known as decomposition, and for this to take place, agents of decomposition - known as decomposers and detritivores - are essential. The micro-organisms of Bio-Plant act as decomposers and this is one way that they make more nutrients available to the plants than chemical fertilizers do.
- Decomposition occurs when a compound is broken down into simpler compounds or into its constituent elements. This is achieved primarily by decomposers, organisms that obtain their

energy from the chemical breakdown of dead organisms as well as from animal and plant waste products.

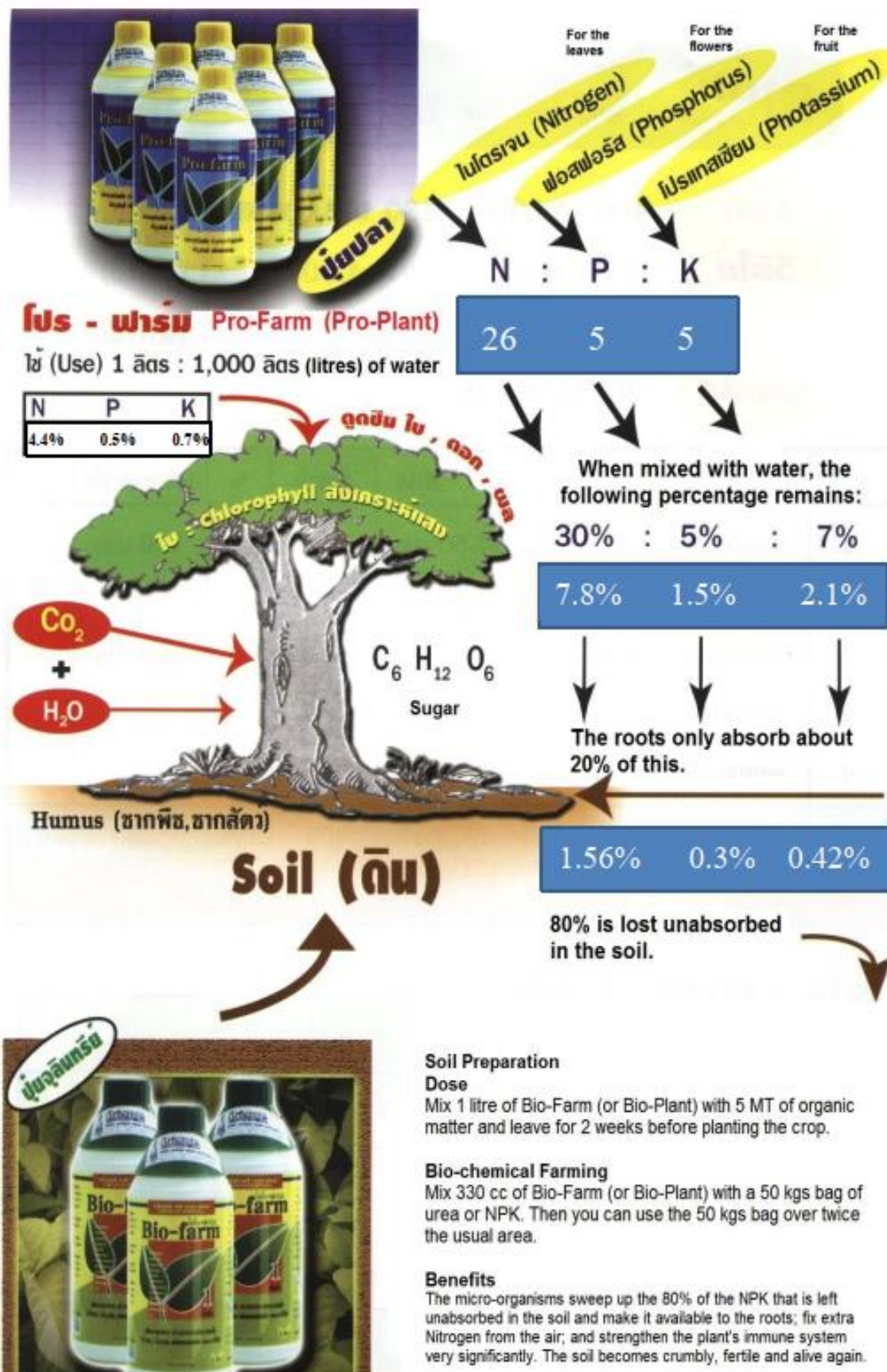
- The principal forms of decomposer are micro-organisms, bacteria, and fungi. These creatures carry enzymes, which they secrete into the materials they consume, breaking them down chemically before taking in the products of this chemical breakdown. They thus take organic matter and render it in inorganic form, such that later it can be taken in again by plants and returned to the biosphere.
- Detritivores are much more complex organisms, but their role is similar to that of decomposers. They, too, feed on waste matter, breaking this organic material down into inorganic substances that then can become available to the biosphere in the form of nutrients for plants. Examples of detritivores are earthworms and maggots. Detritivores are key players in the food web, the set of nutritional interactions - sometimes called a food chain - between living organisms. The activity of the micro-organisms in Bio-Plant breaks up the soil, making it crumbly and fertile, and this attracts back the detritivores that are no longer found in soil where chemical fertilizer has been over-used.

### **3.3 Losses in the Soil with Chemical Fertilizer**

- When chemical fertilizer is applied to the soil very little can be absorbed by the plants.
- In NPK 26:5:5, for example, only 30% of the N15 can be dissolved, 5% of the P15, and 7% of the K15, i.e. 4.5, 0.75, and 1.05 respectively. Of the 5:7:1.05 only 20% is actually absorbed by the roots, so NPK 26:5:5 becomes in practice NPK 1.56:0.3:0.42. The other 80% is lost in the soil. (*Please see page 13.*)
- The micro-organisms in Bio-Plant make this 80% NPK available to the roots of the crops.



## The Amount of Chemical NPK Which Is Lost in the Soil



## **Part 4: Benefits of Pro-Plant**

### **4.1 Pro-Plant**

- This bio-liquid fertilizer is a supplementary foliar spray for plant growth. It is produced from enzymes by a micro-biological complex process called MCP. It is composed of major, minor and supplemented nutrients.
- It is composed of major nutrients, including Nitrogen, Phosphorus, and Potassium, minor nutrients, and trace minerals. Altogether there are over 50 minerals, but we only claim for those mentioned on the lab analysis.

### **4.2 Properties of Pro-Plant**

- When it is sprayed in the early morning before around 9 a.m. while the stomata are open at their widest, the nutrients enter the stomata and become instantly usable by the leaves. Being in a liquid form, the NPK can be used much sooner than when the minerals are provided in a granular form through the roots. It thereby increases the absorption rate of nutrients.
- It stimulates the respiratory and photosynthesis system so that the plant can absorb nutrients as needed.
- It has a very beneficial effect during the growth period. It accelerates plant growth, blooming, and the fruiting stage.
- It stimulates fruit forming.
- It increases the quality and quantity of crop yield, resulting in increased income.
- It coats the leaves and helps to prevent fungi attacks and disease.
- The plant is healthy, resulting in tolerance to pests.
- It helps to improve the soil structure.
- It supplements the carbon dioxide fixing process.

### **3. How the Micro-organisms of Pro-Plant Work on Plant Leaves.**

- Pro-Plant contains the major and minor elements of fertile soil, and amino acids. These are all soluble in water. Pro-Plant also contains micro-organisms which protect the plants by acting as a natural herbicide and fungicide. Some of the micro-organisms are absorbed through the leaves and they improve the plant's immune system. Some micro-organisms stay on the leaves and protect the plant from attack by bacteria and fungi.
- When the solution of Pro-Plant and water is sprayed onto the leaves, buds, and flowers before the fruit appears, the minerals enter the plant through the pores under the leaf skin surface. The advantage is that the minerals are usable instantly by the leaves, buds, and fruit flowers. In comparison, in the case of granular fertilizer, it takes several days longer for the minerals in the soil to reach the leaves.
- The Pro-Plant solution that falls to the ground provides the plants with the range of minerals they need through the roots. The micro-organisms act as a herbicide and protect the roots and the plants from fungus.
- In cases where the farmers have crop diseases we would ask them to mix Bio-Plant with the Pro-Plant in water (at the ratio of 5 cc Bio-Plant + 20 cc Pro-Plant in 20 litres of water) as the extra input of micro-organisms will protect the plants from infecting fungi and bacteria and also improve their immune system.



## **Part 5: Effect of the Bacteria and Nutrients on Various Crops and the Soil**

### **5.1 Effects on Some Crops**

- **Rice:** Rice crops grown with chemical fertilizer do not compare with rice grown with the bio-fertilizers. The stems are stronger (so the rice plants do not lean over unlike rice grown with chemical fertilizer), there are 20% more roots, the roots are stronger and longer, the rice heads contain much more grain, the rice seeds do not fall off so much during harvesting, the quality of the rice is such that the seed becomes in demand as parent stock, the soil is softer and has a lot of worms and insect life, and there is little or no problem with the usual rice diseases (white spot, rust, etc.) because the rice plants develop immunity.
- **Fruit Trees:** Fruit trees produce more fruit, the fruit is larger, crispier, tastier, sweeter, and the vitamin C level is higher by about 20%. The fruit keeps longer after harvest.
- **Rubber Trees:** Rubber trees produce more latex and palm oil trees produce more oil. Bio-Plant can be used as a fungicide on the tapped area. It also makes the latex flow more smoothly.
- **Vegetables:** Vegetables grow larger, and are crispier and sweeter, and they keep longer.
- **Sugarcane:** The CCS of sugar cane is higher as the sugar is sweeter. The growth increases 25%-30 % on average in 100% organic farming. Costs go down 30%:35%.
- **Tea:** Tea contains less tannin with the result that the taste is less bitter. The plant produces more leaves and branches. The amount of leaves produced in 14- and 21-day cycles is more than what chemical fertilizer produces as the soil's fertility recovers. The leaves shine more and look fresher. There is more Vitamin C. The quality of the leaves and tea increase.
- **Tobacco:** Tobacco leaves grow longer and are more numerous.
- **Flowers:** Flowers keep fresher for longer and have more scent. The growth is stronger.
- **Grass and Pasture:** The effect on grass is that the grass and the soil become softer and the growth is better. They are very beneficial for golf courses where they lower the cost of maintaining the golf course, and can clean the golf course ponds.

### **5.2 Various General Benefits**

- Plants grown with the bio-fertilizers usually have about 20% more roots than plants grown with chemical fertilizers.
- Fruit and vegetables are free of chemicals at a lower price. The produce keeps longer after harvesting than the produce of chemical fertilizers.
- After one harvest the farmers can label the produce "Chemical-Free". After 3 years they can sell them as "100% Organic" and export the produce as "100% Organic".
- Organic fertilizers usually take 3 years to make a crop produce the same amount as chemical fertilizers. Bio-Plant and Pro-Plant surpass the yield of chemical fertilizers in one season.
- They alleviate rural poverty by making agriculture more profitable and successful. They prevent the drift into urban areas by rehabilitating the soil and reviving agriculture where it has failed due to over-use of chemical fertilizer and pesticides.
- **Bio-chemical Farming:** When 330 cc of Bio-Plant is mixed with a 50 kgs bag of chemical fertilizer and used for bio-chemical farming the farmers can reduce by 50% the amount of chemical fertilizer and pesticides that they use. The increase in the yield is usually 30% when Bio-Plant is used in the seed and soil preparation, and Pro-Plant is sprayed on the leaves. In Year 2 and Year 3 farmers can reduce their chemical fertilizer by 25% each year until after 3 years they are not using chemicals anymore and have a higher yield for much lower costs. Bio-chemical farming in this way enables farmers to make the changeover gradually.
- **100% Organic Farming:** In 100% organic farming usually the crop yield increase ranges between about 15% and 30% to begin with compared to chemicals, but in our experience the yield increases go up much higher depending on the situation and on how the farmers use the bio-fertilizers. Initial gains increase with each season as the soil is made more fertile. They effectively make chemical fertilizer technology obsolete.

- **Restoring the Soil:** Bio-Plant contains important bacteria genii needed to restore the soil. The micro-organisms in Bio-Plant bring life back to the soil, even poor sandy soil. One litre of Bio-Plant makes 5 MT of effective bio-compost that restores a hectare of soil. If farmers can make the effort to use this very strong, restoring bio-compost for a year, they will see their soil return quickly to natural fertility. Their fertilizer costs will go down further while the yield will increase. It is simple and much more effective than piling on more chemical fertilizer, which simply puts the farmers into more debt while making the soil weaker.
- Pro-Plant increases both the major and minor nutrients in the soil, and provides the essential minor nutrients that chemical fertilizers do not provide.
- Bio-Plant and Pro-Plant enable a country to break out of the vicious cycle created by chemical fertilizers. Not only do chemicals kill the micro-organisms of soil, but 80% of the NPK of chemical fertilizers is not absorbed by the roots and is deposited unused in the soil. As a result, the soil hardens and weakens, and this requires the farmers to buy and pile on more chemical fertilizer to get the same yield as before. This simply harms the environment, the country's economy, and makes the farmers poorer. The micro-organisms of Bio-Plant especially "sweep up" the deposits of NPK by making them absorbable by the roots. The soil starts to become aerated, to soften, and to become crumbly and fertile again.
- Desert soil can be transformed into arable soil when they are used.
- **Health of the Plants:** The bio-fertilizers strengthen the plant's immune system, immunize against pathogens, and greatly increase the plant's pest-resistance. When Pro-Plant is sprayed onto the leaves, the leaves are coated with micro-organisms, which protect the plant against disease. Also, during the first season Bio-Plant removes about 20% of harmful insects in the ground by breaking their life-cycle. After a few harvests those soil insects have gone.
- **Accelerating Growth:** The micro-organisms of Bio-Plant provide the plants with a lot of NPK. When Pro-Plant is sprayed onto the leaves before 9 AM when the pores are fully open, the nutrients enter the pores and become usable straight away. The nutrients activate and accelerate plant growth, and this becomes very noticeable during the blooming and productivity stages of crops. Bio-Plant and Pro-Plant provide farmers with flexibility. If they want extra yield, then they can spray every 10 days instead of 15 days.
- The effect is seen clearly with tea plants, where the increase in leaves is about 20% in every 14-day picking cycle compared to chemical fertilizers, and with rubber tree saplings, which grow about 20% faster.
- If the seeds are soaked in or mixed with Bio-Plant, the crop yield will increase 5%:10%.

## **Artemis & Angel Co. Ltd.**

99/296 President Park, Sukhumvit 24, Klongtoey,  
Bangkok 10110, Thailand

**Tel.:** (President) +66-86-329-6038; (Sales): +66-99-337-7866

**E-mail:** [artemisandangelcoltd@gmail.com](mailto:artemisandangelcoltd@gmail.com) **Website:** [www.artemisthai.com](http://www.artemisthai.com)

### **Material Safety Data Sheet for Bio-Plant Microbial, Liquid 100% Organic Soil Conditioner**

#### **1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME: Bio-Plant.

PRODUCT DESCRIPTION: Liquid, 100% organic soil conditioner made from fermented sugarcane molasses and cultured micro-organisms.

MANUFACTURER: Artemis & Angel Co. Ltd., 99/296 President Park, Sukhumvit 24, Klongtoey, Bangkok 10110, Thailand.

Tel.: +66-99-337-7866 (English); +66-86-329-6038 (Thai & English)

#### **2. COMPOSITION / INFORMATION ON INGREDIENTS**

INGREDIENT APPROX. % BY WT: This cannot be calculated as this is a liquid soil conditioner. The whole soil conditioner is beneficial to the soil and plants. No water or filler are added to increase the weight.

COMPONENTS:

##### **Microorganisms**

- Bacillus
- Achoromobactor
- Streptomyces
- Aerobactor
- Nitrobactor
- Nitrosomonas
- Pseudomonas

TOTAL PLATE COUNT:  $1.5 \times 10^6$  CFU/ml.

#### **3. HAZARDS IDENTIFICATION**

PHYSICAL APPEARANCE: Dark brown liquid.

IMMEDIATE CONCERNS: There are no specific hazards known to be associated with this product, although precautions should be taken to avoid unnecessary contact with eyes and mouth. There is no radioactivity.

#### **4. FIRST AID MEASURES**

EYES: Irrigate thoroughly with water for at least 10 minutes. If any discomfort persists, obtain medical attention.

SKIN: No need for concern or medical attention. Just wash skin with water and soap.

INGESTION: Wash out mouth thoroughly with water. Obtain medical attention because the bacteria would be in too high a concentration for the stomach.

INHALATION: No concern.

## **5. FIRE FIGHTING MEASURES**

GENERAL HAZARD: No hazard.

EXTINGUISHING MEDIA: We do not know how you could set it alight as it does not contain any chemicals. It is just fermented molasses. If you manage to set it alight, use either water spray, foam, dry chemical, or carbon dioxide.

## **6. ACCIDENTAL RELEASE MEASURES**

SMALL SPILL: No hazard. No need for appropriate protective clothing. Flush spillage down a drain or deposit it onto soil. There are no chemicals in it.

LARGE SPILL: No hazard. It can be disposed of on the nearest soil or down a drain. If it enters a waterway, there is no need for concern. The micro-organisms will help to clean the water.

## **7. HANDLING AND STORAGE**

HANDLING: No protective clothing is needed. You can handle it with your bare hands with no negative effect.

STORAGE: Store in a cool, shaded, dry place in original container. You can leave it exposed to the air without any concern.

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

EYES AND FACE: No need for appropriate clothing and eye protection.

RESPIRATORY: No need for appropriate clothing and eye protection.

PROTECTIVE CLOTHING: No special clothing is needed.

WORK HYGIENIC PRACTICES: If it gets onto your hands or skin, wash your hands or skin in case your hands touch your eyes later on.

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

PHYSICAL STATE: Liquid, made from fermented molasses

ODOR: Molasses

APPEARANCE: Liquid

COLOR: Dark brown

PH: 3.6

BOILING POINT: About 100 degrees Celcius.

FREEZING POINT: About 0 degrees Celcius.

MELTING POINT: Not relevant

SOLUBILITY: Liquid

## **10. STABILITY AND REACTIVITY**

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

HAZARDOUS DECOMPOSITION PRODUCTS: None

## **11. TOXICOLOGICAL INFORMATION**

TARGET ORGANS: There are no toxins or pathogens. No target organs.

CARCINOGENICITY: None.

IARC: None of the materials used in this product contain chemicals on the IARC list.

NTP: None of the materials used in this product contain chemicals on the NTP list as there are no chemicals in it.

GENERAL COMMENTS: The product has no carcinogenic properties or mutagenic or teratogenic effects. It is 100% bio-organic and chemical-free.

## **12. ECOLOGICAL INFORMATION**

GENERAL COMMENTS: Bio-Plant is 100% organic. You can pour it onto the soil and it will make the plants grow well. If it enters a waterway, it will not cause any harm, and the micro-organisms will merely clean the water. There is no concern for the environment.

## **13. DISPOSAL CONSIDERATIONS**

DISPOSAL METHOD: Throw it onto soil so that the soil and plants benefit. There are no chemical residues. Indeed, it will remove the NPK chemical residues in the soil and make them available for the plants while improving the soil's micro-biology.

## **14. TRANSPORTATION INFORMATION**

SPECIAL SHIPPING NOTES: This product is not regulated under national or international transport regulations.

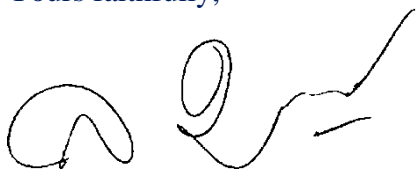
## **15. REGULATORY INFORMATION**

GENERAL COMMENTS: This product is not regulated by any known government agency as hazardous.

## **16. OTHER INFORMATION**

MANUFACTURE DISCLAIMER: The information supplied on this sheet is to the best of our knowledge accurate at the time of preparation. It does not relieve the user of this product of any responsibility to comply with local, national, or international laws relating to the handling or use of this product. The supplier does not accept responsibility for any claims resulting from the misuse of this product or failure to comply with the information stated within.

Yours faithfully,



Somkiet Panjanapongchai  
President  
Artemis & Angel Co. Ltd.



## **Artemis & Angel Co. Ltd.**

99/296 President Park, Sukhumvit 24, Klongtoey,  
Bangkok 10110, Thailand

**Tel.:** (President) +66-86-329-6038; (Sales): +66-99-337-7866

**E-mail:** [artemisandangelcoltd@gmail.com](mailto:artemisandangelcoltd@gmail.com) **Website:** [www.artemisthai.com](http://www.artemisthai.com)

### **Material Safety Data Sheet for Pro-Plant Microbial, Liquid 100% Organic Foliar Spray**

#### **1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME: Pro-Plant.

PRODUCT DESCRIPTION: Liquid, 100% organic foliar spray made from fermented fresh fish.

MANUFACTURER: Artemis & Angel Ltd., 99/296 Sukhumvit 24, Klongtan, Klongtoey,  
Bangkok 10110, Thailand.

Tel.: +66-99-337-7866 (English); +66-86-973-3813 (Thai & English)

#### **2. COMPOSITION / INFORMATION ON INGREDIENTS**

INGREDIENTS APPROX. % BY WT: This cannot be calculated as this is a liquid foliar spray.  
The whole foliar spray is the food for the plants. No  
water or filler are added to increase the weight.

COMPONENTS (Minimum Amounts):	N	:	4.4 %
	P <sub>2</sub> O <sub>5</sub>	:	0.5 %
	K <sub>2</sub> O	:	0.7 %
	MgO	:	0.1 %
	CaO	:	2.5 %
	S	:	0.3 %
	B	:	0.006 %
	Cl	:	5.4 %
	Mn	:	0.0002 %
	Zn	:	34.8 ppm.
	Fe	:	181.2 ppm.
	Cu	:	2.2 ppm.
	Mo	:	2.4 ppm.
	pH	:	4.9

#### **3. HAZARDS IDENTIFICATION**

PHYSICAL APPEARANCE: Dark brown liquid.

IMMEDIATE CONCERNS: There are no specific hazards known to be associated with this  
product, although precautions should be taken to avoid  
unnecessary contact with eyes and mouth. There are no  
chemicals in it. There is no radioactivity.

#### **4. FIRST AID MEASURES**

EYES: Irrigate thoroughly with water for at least 10 minutes. If any discomfort  
persists, obtain medical attention.

SKIN: No need for concern or medical attention. Just wash skin with water and soap.

INGESTION: Wash out mouth with water. Obtain medical attention for stomach- pumping if  
drunk.

INHALATION: No concern.



## **5. FIRE FIGHTING MEASURES**

GENERAL HAZARDS: No hazards.

EXTINGUISHING MEDIA: We do not know how you could set it alight as it does not contain any chemicals. It is just fermented fish. If you manage to set it alight, use either water spray, foam, dry chemical, or carbon dioxide.

## **6. ACCIDENTAL RELEASE MEASURES**

SMALL SPILL: No hazard. No need for any protective clothing. Flush down a drain or deposit on soil. There are no chemicals in it.

LARGE SPILL: No hazard. It can be disposed of on the nearest soil or down a drain. If it enters a waterway, there is no need for concern. The micro-organisms will help to clean the water.

## **7. HANDLING AND STORAGE**

HANDLING: No protective clothing is needed. You can handle it with your bare hands with no negative effect. It can touch your hands or skin with no harmful effects.

STORAGE: Store in a cool or shaded, dry place in original container. You can leave the foliar spray exposed to the air without any concern.

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

EYES AND FACE: No need for appropriate clothing and eye protection.

RESPIRATORY: No need for appropriate clothing and eye protection.

PROTECTIVE CLOTHING: No special clothing is needed.

WORK HYGIENIC PRACTICES: If it gets onto your hands or skin, wash your hands or skin in case your hands touch your eyes later on.

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

PHYSICAL STATE: Liquid, made from fresh fish

ODOR: Fish

APPEARANCE: Liquid

COLOR: Dark brown

PH: 4.9

BOILING POINT: About 100 degrees Celcius.

FREEZING POINT: About 0 degrees Celcius.

MELTING POINT: Not relevant

SOLUBILITY: Liquid

## **10. STABILITY AND REACTIVITY**

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

HAZARDOUS DECOMPOSITION PRODUCTS: None

## **11. TOXICOLOGICAL INFORMATION**

TARGET ORGANS: There are no toxins or pathogens. No target organs.

CARCINOGENICITY: None.

IARC: None of the materials used in this product contain chemicals on the IARC list.

NTP: None of the materials used in this product contain chemicals on

GENERAL COMMENTS: the NTP list as there are no chemicals in it.  
The product has no carcinogenic properties or mutagenic or teratogenic effects. It is 100% bio-organic and chemical-free..

## **12. ECOLOGICAL INFORMATION**

GENERAL COMMENTS: Pro-Plant is 100% organic, so you can pour it onto the soil and it will make the plants grow well. If it enters a waterway, it will not cause any harm, and the micro-organisms will merely clean the water. There is no concern for the environment.

## **13. DISPOSAL CONSIDERATIONS**

DISPOSAL METHOD: Throw it onto soil so that the soil and plants benefit. There are no chemical residues. Indeed, it will enrich the soil.

## **14. TRANSPORTATION INFORMATION**

SPECIAL SHIPPING NOTES: This product is not regulated under national or international transport regulations.

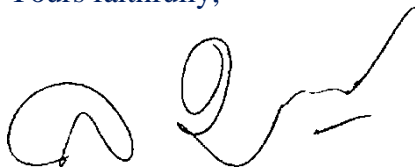
## **15. REGULATORY INFORMATION**

GENERAL COMMENTS: This product is not regulated by any known government agency as hazardous.

## **16. OTHER INFORMATION**

MANUFACTURE DISCLAIMER: The information supplied on this sheet is to the best of our knowledge accurate at the time of preparation. It does not relieve the user of this product of any responsibility to comply with local, national, or international laws relating to the handling or use of this product. The supplier does not accept responsibility for any claims resulting from the misuse of this product or failure to comply with the information stated within.

Yours faithfully,



Somkiet Panjanapongchai  
President  
Artemis & Angel Co. Ltd.



อาร์ทีมิส  
**Artemis**  
**& Angel Co., Ltd.**  
บริษัท อาร์ทีมิส แอนด์ แอนเจิล จำกัด