

What is TRICHO F-22 Biofertilizer

Today, biofertilizers are known by different names, such as bacterial fertilizers, phytostimulants, biopesticides, bioinoculants, among others. However, in fact, they do not function as fertilizers because they do not act directly on the nutrition of the plant. instead they are microorganisms such as bacteria, fungi, and green and blue algae that are packaged in an inert material (carriers).

Our Antimos Biofertilizer is a modern type of technology which involves inoculation of beneficial microorganisms that help nutrient acquisition by plants through fixation of nitrogen, solubilization and mobilization of other nutrients. Our biofertilizer is made from natural beneficial microorganisms. They are safe for all plants, animals and humans. Being beneficial to crops and the natural nutrient cycle, they are not only environmentally friendly but also help to save and reduce the high input of chemicals.

Advantage of F-22 Biofertilizer

- 1. F-22 is renewable source of nutrients.
- 2. It able to sustain soil health.
- 3. It able to act as supplement chemical fertilizer.
- 4. Replacing 25% 50% of chemical fertilizers.
- 5. In certain cases depends on crops it may able to increase yields by 10% or so.
- 6. It decomposes plant residues and stabilizes the C:N ratio of the soil.
- 7. It can also improve the texture, structure and water-holding capacity of the soil.
- 8. It does not adversely affect plant growth or soil fertility.
- 9. It able to stimulate plant growth by secreting growth hormones/enzymes.
- **10.** In some cases, substances similar to fungi and antibiotics can be secreted to provide biological control in attacking diseases.
- 11. It can solubilize and mobilize nutrients
- 12. It is an eco-friendly, non-polluting and cost effective method. (Lowering production costs).

Why do farmers and society need biofertilisers nowadays?



- The trend today is that a microbial green revolution is already underway. Compared to chemical fertilizers, our biofertilizers have their own advantages and are economically and environmentally friendly.
- ➤ With the increased demand for agriculture, it has become important for scientists and society to increase agricultural productivity through the use of various fertilizers, pesticides and insecticides. However, with the massive use of these products, the soil has been severely affected due to the depletion of essential minerals in the soil. Therefore, to overcome this problem, it has become very important to use different remedies to produce various fertilizers. Among them, our biofertilizers have the best economic value.
- The demand for our Tricho-F22 far exceeds the supply. It is estimated that by 2024, many people will switch to biofertilizers, which are more environmentally friendly and cost effective in the long run.
- Today, we can see the depletion of raw materials/fossil fuels (energy crisis) and the insane increase in the cost of chemical fertilizers. This makes it unaffordable for small and marginal farmers.
- Today, everyone is environmentally conscious and increasingly concerned about environmental hazards, which is why our Tricho -F22 is one of the best choices on the market.
- ➢ Our biofertilizers, also known as microbial inoculants, have great potential as a supplementary, renewable and environmentally friendly source of plant nutrients and are an important component of integrated plant nutrient systems in today's agriculture.
- Our biofertiliser is a ready-to-use, live formulation of this beneficial microorganism that is particularly beneficial to crops when applied to seed, roots or soil, mobilising nutrient supply through its biological activity and helping to build up the microflora, thereby promoting overall soil health. In addition, our biofertiliser is designed to improve the fertility of nitrogen and phosphorus in the soil, another unique feature is that it also helps to promote plant growth.

It is therefore worth mentioning that the microorganisms used in the application play a key role, as they minimize the impact of conventional fertilization and ensure the durability of sustainable agriculture, especially when conservation measures are prioritized and environmental impacts are reduced. **Question & Answer**

Any disadvantages of using biofertilizer?

- Most biofertilizers have a much lower nutrient density than chemical fertilizers. (However, we did prove that our biofertilizer, Tricho F-22, can help reduce the use of large amounts of chemical fertilizers, but still achieve healthy + green plants.
- Some claim that it requires large amounts of fertilizer for most crops.
 (We have done several trials and applied it to bulk crops in Asia and the results have shown that some crops do very well and also reduce their existing chemical fertilizer practices).
- Different types of machinery are needed to apply them, unlike those used for chemical fertilizers.

(Yes, but this is a one-off cost for some machinery. As our biofertilizers are liquid based, it is up to the user how they are applied. (We are happy to share our knowledge and help solve our customers' concerns and difficulties as we want to provide the best service to our customers).

- Skills in production and application are required.
 (You have the Antimos Group as professionals and also existing farmers who have been practising the use of biofertilisers for many years).
- There is a lack of awareness of the use and benefits of biofertilisers. (Here we would like to share our knowledge in order to help as much as possible, sharing knowledge is a noble course for us).
- We have not seen results in our crops after application.
 (The fact that your plants survived the application means that the reduction in fertiliser use is real, but your leaves are greener after the application, which is a physical quick result we achieved).
 (Please ask us for advice on application methods for better results).

Question & Answer

How Do Our Bio-Fertilizers Work?

- ✓ Our biofertilisers fix atmospheric nitrogen in the soil and in the root nodules of leguminous crops and make it available to plants.
- ✓ They solubilize the insoluble forms of phosphate, such as tri-calcium, iron and aluminum phosphates, into available forms.
- \checkmark They scavenge phosphates from soil layers.
- ✓ They produce hormones and anti-metabolites which promote root growth.
- \checkmark They decompose organic matter and help in the mineralization of soil.
- ✓ When applied to soils or seeds with certain conditions, our biofertilisers have a greater chance of increasing nutrient availability and increasing yields by 10% to 20% without adversely affecting the soil and the environment.

The following article, adapted from one of the journal papers, does a good job of explaining how one of our microorganisms works and the benefits of Trichoderma spp. to plants.

Another positive effect to the plant from Trichoderma applications has been the improvement of plant growth, development, and yield. In particular this result has been noted in terms of root growth promotion, although significant increases have also been observed in aboveground vegetative growth such as stem length and thickness, leaf area, chlorophyll content and yield (size and/or number of flowers and/or fruits) [5, 13, 21, 27, 77]. Numerous hypothesis have been proposed to explain this observation including the improvement of chemical solubilisation, sequester, availability (i.e. siderophores production) [65, 78, 79] and nutrient uptake by the plant [80], as well as the involvement of growth phytohormones from both plant and fungal origin [28, 81]. Not only do these processes improve plant growth, but they also stimulate plant respiration, thus enhancing photosynthesis or photosynthetic efficiency [64], as well as increasing the ability of the plant to withstand abiotic stresses such as drought, salinity, high temperature.

Much more recently, it has been demonstrated that the beneficial effects to the plant can be attributed to the capacity of many Trichoderma spp. to produce specific compounds, derived from secondary metabolism [82] that are antimicrobial, thus contribute to phytopathogen control, and/or positively affect the plant in aspects of growth promotion, increased yield and other desirable characters i.e. augmented anti-oxidant properties [78, 83]. It has also been demonstrated that Trichoderma during its interaction with plants can also play a crucial role in stimulating the production of plant volatiles that influence plant-insect interaction [84]. Major advantages to using Trichoderma derived bioactive compounds i.e. enzymes and other proteins, or secondary metabolites are: i) the removal of constraints associated with development, application and conservation of products containing living microbes; ii) the efficacy in the field is maintained and more precisely dependent on the dose of the active substance used; iii) some applications are more effective, such as foliar spray for the control of aerial pathogens; iv) the direct effect on the plant may be improved and be more reproducible ; v) a reduced sensibility to changing environmental conditions; and vi) the possibility of developing highly active synergistic mixtures containing both the bioactive substances and the living MBCA [57, 85].

TRICHO F-22 NATURAL BIOFERTILIZER

Question & Answer

What Is Special About Our Biofertilizer?

- 1. Natural Environmental Friendly.
- 2. We are purely vege origin.
- 3. Does not require many types of mixed microorganisms and does not contain animal feces.
- 4. Non-toxic to living organisms and composed of natural microbes.
- 5. Less than 5 types of microbes compared to those on the market that require so much variety.
- 6. It can be applied to crops in any creative way and can also be used in conjunction with other existing fertilisers.
- 7. Now you don't need to apply so many types of microorganisms, which are very expensive. This is because our biofertilizers are able to do everything that is available on the market.

S.N	Groups		examples
А	N2 fixing Biofertilizer		
	1.	Free-living	Azotobacter, Clostridium, Anabaena, Nostoc,
		Symbiotic	Rhizobium, Anabaena azollae
	3.	Associative Symbiotic	Azospirillum
В	P Solubilizing Biofertilizer		
	1.	Bacteria	Bacillus subtilis, Pseudomonas striata
	2.	Fungi	Penicillium sp, Aspergillus awamori
С	P Mobilizing Biofertilizers		
	1.	Arbuscular Mycorrhiza	Glomus sp. , Scutellospora sp
	2.	Ectomycorrhiza	Laccaria sp., Pisolithus sp., Boletus sp., Amanita sp.
	3.	Ericoid Mycorrhiza	Pezizella ericae
D	Biofertilizer for Micro nutrients		
	1.	Silicate and Zinc solubilizers	Bacillus sp.
E	Plant Growth Promoting Rhizobacteria		
	1.	Pseudomonas	Pseudomonas fluorescence

A more detailed classification of biofertilizers in the market is as follows:

Who Can Use Biofertilizers?

✓ Anybody who is involved in farming can use these biofertilizers in crops such as legumes, cash crops, cereal crops, fodder crops, oil seed crops, horticultural crops, vegetables, fruit trees, forest trees, medicinal, herbal and decorative plants.

Why Ours In Liquid?

- ✓ Currently, biofertilizers are provided to farmers in the form of carrier inoculants. As an alternative, liquid formulation technology has been developed, which offers additional advantages over carrier inoculants.
- ✓ The advantages of liquid biofertilizer over conventional carrier-based biofertilizers are listed below:
 - Longer shelf-life, In reality microbes will form cyst or spores which can keep for years and they are naturally design to survive in any harsh conditions in liquid form compare to dry form.
 - No loss of properties at storage conditions below 40° C
 - Greater potential to fight with native population
 - Easy to identify by typical very trace fermentation odors
 - Better survival on seeds and soil
 - Easy for farmers to use
 - Rapidly adsorbed into the soil and nutrients absorbed by plants
- Characteristic can refer to MSDS.
- Comparison of solid based and liquid based as below

Carrier-Based (Solid)	Liquid Based (Our Tricho-F22)
Cheap	Longer Shelf Life
Easier to produce	Effectiveness is much higher than Solid based
Less Investment	Temperature tolerant
Not very effective, high dosage is a waste	Optimum in usage , lesser dosage with High cell counts
	Environmental friendly

What Precautions One Should Take For Using Biofertilizers?

- Biofertilizer need to be stored in cool and dry place away from direct sunlight and heat.
- Combining biofertilizers with existing chemical fertilizers in the right way will not only help to save the cost of chemical fertilizers, but also give better results when used in the right way
- When using this product, the bottle needs to be shaken well before use.
- There is no need to worry about expiry, as microorganisms can survive in harsh conditions, but the nutrients remain in the liquid.
- Biofertiliser is a living product and care needs to be taken when storing it.
- Both nitrogen and phosphorus fertilisers should be used for best results.
- It is important to use biological fertilisers alongside chemical and organic manures.
- Biofertilizers are not replacement of fertilizers but can supplement plant nutrient requirements, depends on users some user able to slowly reduced their chemical fertilizer and yet biofertilizer can be another alternative to help farmers.
- For problematic soils, corrective methods such as lime or gypsum pelleting of seeds, or correcting the pH of the soil by using lime, or consult our experts. You can also slowly experiment with our fertilisers to improve the condition of your soil
- By supplying phosphorus together with our biofertilisers, the soil can become better.

Can One Mix Psuedomonas and Tricoderma sp. with Azozpirillum and Phosphobacteria For Applying In Paddy Fields?

- \checkmark In general, all beneficial microorganisms are compatible with each other.
- \checkmark They can be used safely in combination or separately as the situation requires.

Can We Use Biofertilizers With Chemical Fertilizers?

✓ There is a huge waste in the amount of chemical fertilisers applied and the actual availability to plants. Biofertilisers have been reported to increase the availability of these inorganic substances to plants. Thus, biofertilisers can be used together with chemical fertilisers.