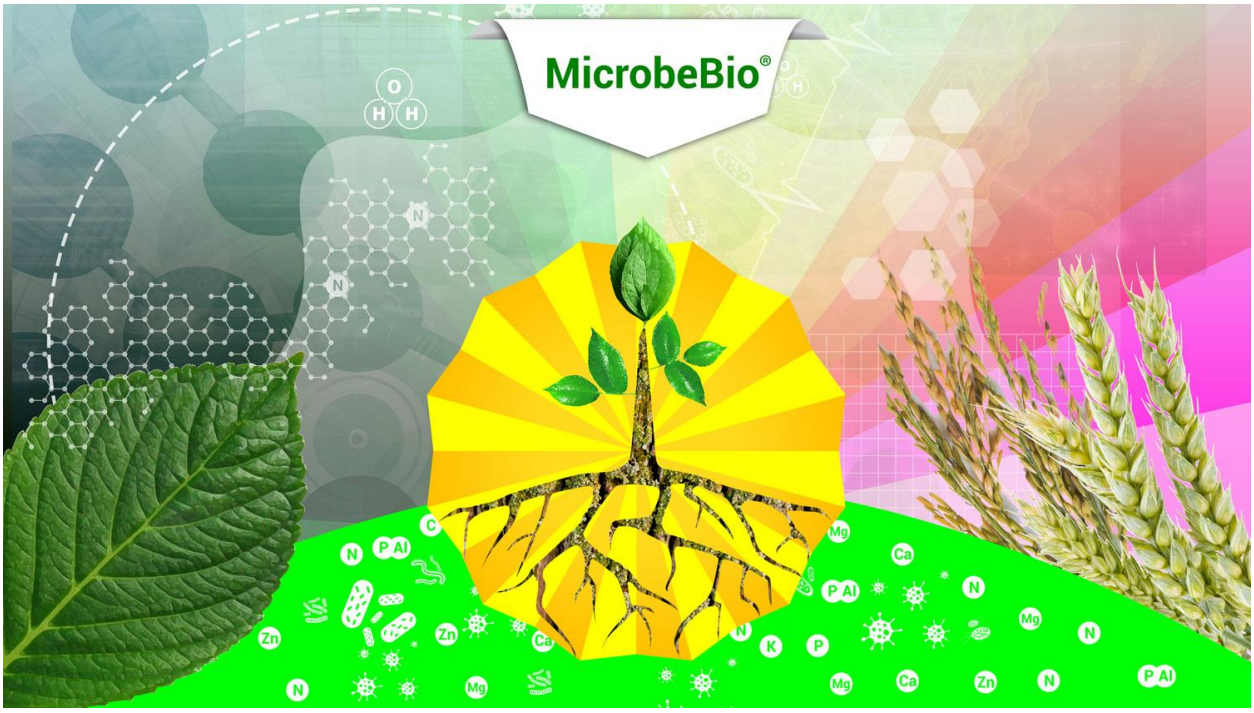

Microbebio Q & A

How Does Microbe Granular and Liquid Microbe Soil Enhancer Work?

What exactly is MicrobeBio soil enhancer? It is a formulation of beneficial microbes that complement each other to promote soil quality and plant health.

What are its agricultural benefits? Correct application and usage of our products can lead to significant increases in crop yields and reduce fertilizer use by up to 100%. It is also safe for humans, animals and the environment.

What kind of crops can it be used on? It can be used for any crop. Application, number of applications and concentration can vary by type of crop.

Are there any restrictions for its use? There are no minimum restrictions on the amount of water required per acre. There are no grazing restrictions or waiting periods after application.

How should it be stored? It can be stored for up to two years at temperatures between 40F and 85F. Protect it from freezing, as freezing will diminish the products performance.

What kinds of microbes are found in a typical field or turf grass and how abundant are they? The most numerous microbes in soil are the bacteria actinomycetes, fungi, soil algae, cyanobacteria and protozoa. These microbes are generally in huge abundance and their combined mass is also quite large. (It can range from several hundred to thousands of pounds per acre)

What beneficial processes do soil microbes carry out? Soil microbes are important in cycling nutrients like carbon, nitrogen, phosphorus and sulfur. They also regulate the amount of nitrogen that is available to plants. It is through the actions of soil microbes that the nutrients in organic fertilizers are released for plants and used by other microbes. They also degrade pest control chemicals and other hazardous materials that reach the soil.

What factors control the rates of growth and activities of soil microbes? Generally microbes grow best in soils that have a neutral pH (7.0), a balance of air and water filled pore space and abundant organic substrates. The most limiting factor for microbe growth in soil is the abundance of available organic carbon sources. The majority of microbes use organic carbon in order to oxidize it for energy and to build the organic constituents of their cell bodies.

What can we do to increase microbial activity in soil? To increase activity you need to create an optimal environment in terms of aeration, moisture, pH level and amount of organic substances needed to fuel the population. It's also known that that the amount of microbes in soil is directly proportional to the organic matter content.

Do inorganic fertilizers and other chemical inputs harm the soil microbial population? There is a misconception that chemical fertilizers will kill off microbes or sterilize the soil. Since there are so many types of microbes in the soil it would be extremely hard to exterminate all the microbes. Certain applications such as ammonia can cause reductions of microbial numbers in the immediate vicinity, but this quickly equilibrates with soil solutions in the form of ammonium ions.

Why are biological products more variable in producing desired results? Each soil has its own microbial population that is selected by the biotic and abiotic factors unique to that soil. This makes it difficult to add or displace microorganisms to a system. This means each soil has a stable community of microbes which makes it hard to get consistent results from biological products used across different soils.

What does 10 to 12th power mean? Our MicrobeBio soil enhancers guarantee at least 2.0 x 10^{12} CFU/Gallon of beneficial agriculture microbials. That is around 2 trillion bacteria ready to work in your soil.

Why is organic important? Or what is the key challenge that the agricultural industry faces today? There is a growing demand for organic agriculture farming products due to the overuse of chemical fertilizers and pesticides which has stripped the soil of its natural nutrients. The use of organic fertilizers will restore the soil back to its natural state and provide healthier and stronger plants.

What is the advantage of using MicrobeBio soil enhancer vs. chemical fertilizers? MicrobeBio soil enhancer doesn't contain any salt or other toxins that could damage the soils natural nutrients. Chemical fertilizers contain high levels of salt and other toxins that do not benefit the soil or plants and could cause more harm than good in the long run.

How does the cost compare with chemical fertilizers? The cost of organic fertilizers are more favorable then chemical fertilizers. Organic fertilizers are also more cost effective because they contain short and season long nutrient release properties.

Do MicrobeBio soil enhancer products need to be applied every year? It is recommended to apply MicrobeBio soil enhancer annually to reinforce microorganisms in the soil and to protect the plant rhizosphere.

How does MicrobeBio soil enhancer improve poor soil? MicrobeBio soil enhancer releases trapped nutrients and makes it available to plants. It also produces agglomerations with clay in the soil which leads to healthier soil and better organic matter in the soil.

What is the best time of day to apply MicrobeBio soil enhancer? The morning to early afternoon is the best time to apply the soil enhancer.

Can the products be applied with herbicide or pesticide? Yes, all products can be safely used with herbicides, pesticides, fungicides and insecticides without harming the microbials.

Are the products safe for children and pets when applied to the ground? Yes, our products are 100% safe for pets and children.

Do I need to wear protective gear when handling these products? No, protective gear is not needed when handling our products.

How should MicrobeBio soil enhancer be stored? MicrobeBio soil enhancer should be stored in a well-ventilated area and indoors if possible.

If I premix with organic matter how long do I have to use it? If the organic matter has a moisture content of less than 15% then you have at least a year to use it otherwise you should use it within 3 to 6 months.

Do I need any fertilizer? It is good to add fertilizer at the same time so you can accelerate the bacteria into their growth phase. Once they begin to divide they will start to convert unusable matter into nutrients for the plants and will require less fertilizer.

How long so the microbes live in the soil? They live for the entire season and then start to gradually decline in number after you have harvested since there is less sugar in the soil. Most of the bacteria will become dormant spores, but some will die off which is why it is a good idea to reapply the MicrobeBio soil enhancer in the next season.

Is MicrobeBio a fertilizer? MicrobeBio is not technically a fertilizer, it is a biological soil conditioner. MicrobeBio breaks down unusable matter in the soil so the plants can use it as nutrition and also increases the fertility of the soil.

How does MicrobeBio reduce the effects of soil salinity? When put into the soil the bacteria will start multiplying which breaks down organic matter and transforms it into organic acids. The acids then start to combine with various matter in the soil including salt. This is known as chelating. Chelation is when a coating is formed around matter such as salt or metals. This coating allows plants to absorb more nutrients from it while taking in less salt. As the bacteria continues to multiply and chelate, water starts to penetrate deeper which causes salt to move downward. This chain reaction allows water to reach deeper in the soil while also removing salt from topsoil and moving it deeper into the ground giving your plants access to more nutrients.

How much deeper will water penetrate my soil when I use MicrobeBio soil enhancer on my fields? MicrobeBio will drastically increase how deep water penetrates the soil. A recent sample from a field that was treated with MicrobeBio for 10 days showed that water was penetrating almost 12 inches into the soil. While another field under the same conditions, but without MicrobeBio, only penetrated 5 inches of soil.

Can I use too much MicrobeBio? Not really. We have had farmers use up to 6 times the recommended amount on troubled soil and they have had success with it. They believe the decrease in tractor time and water consumption more than pays for the heavy usage.

Why did some of my plants/ fields turn a little yellow after I first applied MicrobeBio? Some slight yellowing or wilting might occur when you first apply MicrobeBio. This happens when MicrobeBio is put into fields that has previous compost that has not been processed yet. The bacteria begins breaking the old compost down which deprives the plants of some nutrients like nitrogen. After a few weeks the nutrients is put back into the soil and your plants will return better than ever.

What are the benefits of healthy soil? You will have reduced water usage, improved nutrient cycling, increased drought resistance, deeper root growth, improved soil structure and increased disease resistance.

Can these products be used in a hydroponics system or other soilless media? Typically these products will benefit the biological processes in all operations that grow plants. For more detailed information feel free to contact us.

Why should I add soil microorganisms, aren't they already in my soil? Over used and over fertilized soils tend to lose their microorganisms. They are also lost due to fires, floods, drought and freeze. Soils under these conditions can see up to 99% loss in their microorganisms which has a major role in the health of your soil and plants.

What are Microbial Inoculants? Microbial inoculants are microorganisms that are added to the soil. The idea behind this is that adding more microorganisms will change the indigenous microbial community. Since microbes are the first stage of the food web, microbial inoculants change the dynamics of the soil.

What's the difference between microbial inoculants, biofertilizers, soil inoculants, biological soil amendments, soil probiotics, and probiotic fertilizers? There isn't much difference between any of these. They all describe the process of adding beneficial microorganisms to soil to improve soil quality and improve the health of the plants.

Where do the organisms in MicrobeBio come from? MicrobeBio soil enhancer contains natural occurring soil microorganisms. These microorganisms are isolated from soils using special techniques.

Are the organisms in MicrobeBio genetically modified? No, all the organisms in MicrobeBio are found naturally in the soil.

What is humus? Various organisms breakdown organic and mineral materials in the soil by enzymatic action and by taking the materials in as nutrients and metabolizing them further. Most of the breakdown products are used as nutrients by the plants. The breakdown products that are not used as nutrition become resistant to further decomposition and are more or less stabilized. This stabilized product is known as humus.

What do humic substances do for the soil? They increase absorption of minerals, increase absorption of organic compounds, increase the water holding capacities of the soil, increase the soils buffering capacity and they darken the color of the soil.

What is Leonardite and how is it used? Leonardite is a mined product that can contain up to 85% humic substances depending on the source and the processing. It contains both humic and fulvic acids. It is sold as a combination fertilizer, soil amendment and biological stimulant. The rate of

application is important as adding to much can tie-up soil nutrients and reduce their availability to plants.

What is humin? Humin is a highly condensed humic substance. It is an extremely stable material with a half-life that can extend into centuries. It is highly resistant to microbial attacks.

What are soil polysaccharides? Polysaccharides are non-humic polymers that have sugar like structures and they help stabilize soil aggregates and contribute to soil tilth. Around 25% of the

humus in soil is in this form. They are less complex and less resistant to microbial attacks than other materials of the humic group.

Why is MicrobeBio better than compost?

MicrobeBio has several advantages over compost. Including:

- **Healthier, sturdier plants.**
- **Healthier soil.**
- **Reduces soil erosion and nutrient runoff.**
- **Greater resistance to pest and disease.**
- **Improved water efficiency and holding capacity resulting in decreased water needs.**

Composting also has many shortcomings compared to MicrobeBio. Compost cannot usually be used on a commercial basis due to lack of materials, while MicrobeBio can be used on any plot of land small or large. Compost can carry risk of bacteria such as salmonella. MicrobeBio only introduces beneficial bacteria and microbes that feed of off bad bacteria. Composting creates salinity problems which can have negative impacts on the health of your soil. MicrobeBio is designed to combat salinity and make your soil healthier to produce bigger and healthier crops.

Q: Do your MicrobeBio soil enhancer products solve Carbon Dioxide problems?

Yes, the bacteria are able to take carbon atoms from organic compounds and convert them into organic acid chains. This means that they are able to take the carbon atoms from CO2 and link them together into organic acids that plants can benefit from in the soil. The bacteria decreases CO2 during carbon cycling and sequestration.

Q: How does carbon sequestration work from our products?

See above. C-C-C-C linkages occur to remove Carbon from Co2 before it emits the Co2 into the atmosphere. This directly reduces CO2 and carbon.

1. **What percentage of current CO2 emission can be directly traced to industrial and conventional agriculture practices? I don't know the number, but there have been a number of government studies that attribute a large proportion of CO2 emissions coming from Ag practices as well as from other industries like power plants. In the US, the EPA is expected to regulate CO2 emissions much more strictly in the near future, so this is an important topic in the US as well.**
2. **We collected some information that states: "The average conventional horticulture soil has been supplied by 1000 CFU to 5000 CFU (colony forming units) of profitable soil microbes. Organic farms are expected to heavily improve in the next 12 to 15 years, which could lead to microbial counts around 1 million CFU's per gram of soil." Should we use this information to explain our products? Yes, once microbial products are applied to soils consistently, microbial**

populations and CFU's will increase exponentially. This improves biodiversity and protection of the plants and roots. The more CFU's that are available in the soil then the more the plant will thrive and grow with a greater yield potential.

3. **How many strains of organisms in our nematode products are saprophytic? Saprophytic means they encumber all carbon sources, crop residue and dead roots in the soil. 4 out of 5 strains of nematode are strong saprophytes**
4. **How many days are in the plant parasitic nematodes life cycle? Pathogenic nematodes life cycles are approximately 30 days.**
5. **How many days do the nematodes protect the root? And what percentage of the root is protected? The biological nematode bacteria will protect the root for the first 2 days after they have been applied to the soil and root zone. The bacteria are able to control and reduce damage to the roots by >75% – 85%. It is important to apply when planting or very soon after planting to protect the germinating plant. The first 45 days of a plant's life cycle are the most important because of its immature immune system.**
6. **Do our nematode products kill nematode species such as Ring, Stunt, Stubby Root, Lance, Sheath, Dagger, Cyst, Root Knot, Spiral, Lesion, Sheathold and Sting? Would you please provide us with what general microbes will help protect against these? Yes, the bacteria is proven to control and protect the plants against all of the nematodes mentioned above. The Bacilli bacteria is one of the primary nematodes for controlling bacteria.**

Question of soil borne pathogens:

7. **Do our products solve the problem of soil borne pathogens? Yes absolutely. The bacteria we include in the bio fungal packages is very strong at containing and killing off fungal pathogens.**
8. **What microbes will work on soil borne pathogens in general? Many of the bacteria in our packages such as Actinomycetes, Pseudomonas and Bacillus work against soil borne pathogens.**

You answered that your MicrobeBio soil enhancer products can take Carbon Atoms from CO2 and link them together into beneficial organic acids that plants can utilize. Based upon that, what is the percentage increase of organic carbon in soil after 3 months, 6 months…? Our customers really need to know the analysis of this information. It can vary by type of soil and the original organic matter in the soil. However, if a healthy dosage of microbes are added to the soil, then it is not unreasonable to see improvements up to 15% – 60% over the course of a year or year and a half. It can be sooner if multiple treatments are applied.

I hope this helps. It is difficult to estimate, but if the program is implemented correctly then you should see strong and healthy increases in organic carbon.