

## Soil Vitality

Soil vitality is a type of hi-tech deployed activating beneficial microbial flora ,the product function based on crop soil conditions, such as soil compaction, reduced fertility, destruction of the original micro-ecological balance in crop rhizosphere soil, serious soil-borne diseases, etc.,. The product flora can combine with the soil local flora forms an effective PGPR system , which perform the functions of promoting plant growth, preventing and controlling plant diseases, and improving the soil environment. It is a bio fertilizer, rich in a variety of microbial flora and biological enzymes.



### Function & Features

1. Activate the beneficial microbial flora in the soil, to form an effective PGPR effect with local species in the soil, enhance root vitality, promote growth, effectively prevent soil-borne diseases, and reduce the occurrence of plant diseases.
2. Improve the soil, increase fertility, dissolve phosphorus, potassium, and fix nitrogen, to promote the balanced release of soil nutrients, enhance the ability of balanced fertilizer supply, and degrade pesticide residues and other toxic and harmful substances in the soil.
3. Promote the absorption and utilization of nitrogen, phosphorus and potassium by crops, increase the utilization of nutrients by crops, and increase crop yield by 5-10%.
4. Improve the ability of crops disease resistance and relieve stress, reduce the occurrence of powdery mildew, root rot, rust, gray mold, anthracnose, blight, damping-off and other harm.
5. Reduce the damage of grubs, golden needle insects, mole crickets, cutworms and root knot nematodes to crops.

### Application method

Before spring soil preparation: Apply 1-2 bags per mu(China land unit, equals 666m<sup>2</sup>), mix with organic fertilizer and sprinkle it as base fertilizer into the cultivated layer.

Seedling period: use 1 bag per mu on seedbed, mix it with base fertilizer before sowing and then spread it or mix it with nutrient soil before fake planting, and then put it into a nutrient bag or plastic grid plate. Floating seedlings are mixed with an appropriate amount of water and then added to the nutrient solution, which is beneficial to promote growth, seedling formation, strong seedlings, and disease prevention.

Growth period:

1. Base fertilizer: mix 1 bag per mu on seedbed with 3-5 kilograms of fine soil and mix it into organic fertilizer as base fertilizer.
2. Top dressing: early application and near-root application are better, which is beneficial for early onset, stable growth and disease resistance.
3. The dosage in the affected area is doubled, and the control effect is better.

After harvest in late autumn: 1-2 bags per mu, suitable for returning straw to the field.

### Precaution

1. Prohibited for mixing with chemical fungicides and insecticides, and the interval must be more than 3-5 days.
2. Avoid direct sunlight ,and store in a cool and shaded place.

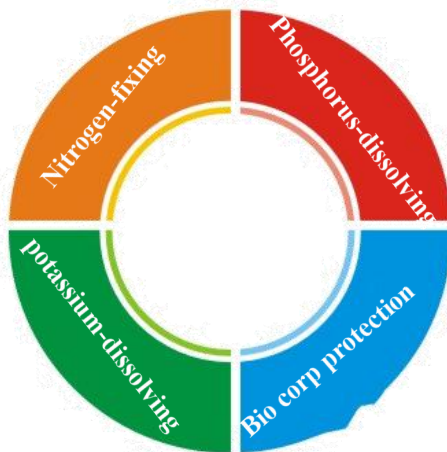
# Bio Functional organic microbes



The product is a functional probiotic rich in natural nutrients. The formula is scientifically designed. After application, the beneficial microorganisms can quickly colonize, decompose and activate insoluble mineral elements,

Improve crop nutrition, promote crop growth, and enhance disease resistance. Long-term use of this products, can greatly improve soil fertility and water retention, cultivate the land fertility and optimize crops nutrient conditions, improve fertilizer utilization, increase production and income.

**Product ingredients: functional strain like nitrogen-fixing strain, phosphate-resolving strain, potassium-resolving strain, and anti microorganism etc.**



## Function & Features

Nitrogen-fixing strain can independently fix nitrogen in the soil and can secrete auxin to promote plant growth and fruit development. Phosphorus-dissolving and potassium-dissolving strain can convert invalid potassium and invalid phosphorus that are not absorbed by crops in the soil into available potassium and available phosphorus, that can be absorbed and utilized by crops, and release selenium, manganese, zinc, molybdenum and other elements in the soil at the same time. Improve the nutritional level, produce bio active substances such as gibberellin, cytokinin, indole acetic acid and so on in life activities, which can effectively stimulate the growth and development of crops.

After rapid inoculation in the soil, the antibiotics produced can effectively inhibit more than 30 common soil-borne diseases in the soil, the product has a unique disease prevention and seedling protection effect on crop growth, and can secrete a large amount of plant growth regulator substances, which can increase production and income. Improve the quality of crops and use it on continuous crops to effectively reduce the continuous cropping obstacles of crops. Year-round use can effectively improve soil structure and Micro-ecological environment.

## Apply method

Take 1kg of 20 billion CFU /gram functional microbes, dose with 1 ton composted organic fertilizer (moisture contents  $\leq 30\%$ ), mixing evenly, then made the microbial organic fertilizer, which comply with the Agriculture industry standards NY884-2012

## Noted

1. Do not mix with bactericides and insecticides, keep more than 3-5 days apart
2. Avoid direct sunlight and store in a cool and dark place

# Tobacco Potassium Rich

## Function & Features

Tobacco Potassium Rich is a kind of scientifically formulated new-type potassium silicate microbiological fertilizer according to the growth environment of tobacco. After applying, the silicate bacteria multiply and activate in the soil in large quantities, the organic acids produced by growth and metabolism convert the potassium accumulated in the soil (normally cannot be absorbed by tobacco) into quick-acting potassium, which can be absorbed by tobacco, then quickly replenish the quick-acting potassium in the soil. Applying 0.5kg of the product per mu (China land unit, equals 666m<sup>2</sup>) in tobacco is equivalent to applying 30kg of potassium sulfate per mu. And the output of premium cigarettes has increased significantly, and the output of tobacco can be increased by about 10%. The product produces secondary metabolites such as hormones, amino acids, polysaccharides and other substances, which promote the growth of tobacco. At the same time, potassium bacteria multiply in the soil, inhibit the growth of other pathogens and effectively reduce tobacco pests and diseases occurrence.



## Working mechanism

1. Utilize the organic acids produced by growth and metabolism, it can dissolve the insoluble potassium and phosphorus of minerals in the soil, benefits the tobacco and the microbes itself. The rich potassium rich in the microorganism is absorbed by the tobacco after the death of the strain.
2. The hormones, amino acids, polysaccharides and other substances produced during the reproduction process promote the growth of tobacco. It multiplies in the soil to form a space-occupying effect, which effectively inhibits the occurrence of tobacco black shank, brown spot, damping-off and bacterial wilt.
3. Silicate bacteria has strength to fix nitrogen, reduce the amount of nitrogen fertilizer used, and avoid soil compaction.
4. It has the effect of PGPR, which forms beneficial microbial flora in the tobacco rhizosphere, promotes tobacco growth and reduces the occurrence of pests and diseases.

## Application method

1. Seed dressing method: Seed dressing for 1 mu (China land unit, equals 666m<sup>2</sup>) of land, need product 0.5kg. Not seeds burning, buds burning, and more close to the roots, better the buds developed
2. Root dip method: When the tobacco is transplanted, take 2kg products, mixed with about 15kg of water, mixed evenly, and planted by dip root.
3. Hole application method: When tobacco planted, apply the product in the hole, the dosage is 3-5kg per mu (China land unit, equals 666m<sup>2</sup>). The products can be mixed with organic fertilizer and applied evenly into the hole or seedling roots. After application, should be sealed in time, and the effect will be better.
4. Ditching method: The ditch is 10-15cm deep and 10cm wide. The amount of application depends on the tobacco planting density and growth period. The seedling stage is 0.5kg/mu, the growth stage is 1kg/mu, and the post-maturity stage is 0.5kg/mu. It is better to cover soil and irrigate in time after application.

## Precaution

1. When Tobacco potassium rich applied as top dressing can be mixed with urea, potassium sulfate, potassium chloride and other chemical fertilizers. When mixing can blend the product with a small amount of fine soil, then mixed with other fertilizers, for ready preparation.
2. Do not mix with chemical fungicides and pesticides;
3. Avoid direct sunlight, keep in a cool place away from light;
4. Avoid mixed use with strong alkaline substances, which will affect the effect.





# Bacillus Subtilis(B.S)



Polyglutamic acid, a natural material produced by *Bacillus subtilis*, is a protective film for the soil, which effectively prevents the loss of fertilizer and water; it releases the high-activity decomposing enzyme decomposes difficult-to-decompose macromolecular substances into usable small molecular substances ; Synthesize a variety of organic acids, enzymes, physiological activities and other substances, as well as other nutrients that can be easily utilized; occupy space advantage and inhibit the growth and reproduction of harmful bacteria, pathogenic bacteria and other harmful microorganisms.



## Function & Features

1. Fast reproduction, fast metabolism, 100,000 times multiplied in four hours, standard strain can only multiply 6 times in four hours.
2. Strong vitality: in the dry condition, it can withstand low temperature  $-60^{\circ}\text{C}$  , can stand high temperature  $100^{\circ}\text{C}$  , as well as strong acid, strong alkali, antibacterial disinfection, high oxygen resistance (aerobic reproduction), low oxygen resistance (anaerobic reproduction).
3. Large occupation: The volume is four times larger than the general pathogenic bacteria molecule, occupying a space advantage and inhibiting the growth and reproduction of harmful bacteria.

## Application method

1. In produce of bio-organic fertilizer and compound microbial fertilizer that meet industry standards (effective microbial count  $\geq 20$  million CFU/g). Take the products spec of 20 billion/gram as example, need 1000 grams per ton of organic fertilizer to blend.
2. It is recommended that the application rate per mu (China land unit, equals  $666\text{m}^2$ ) is 1-2kg, and the effect is better before sowing and after harvest.

## Precaution

1. Avoid applying with chemical fertilizers, to avoid affect the reproduction speed of the microorganisms in the soil.
2. It is forbidden to mix with chemical pesticides, bactericides and insecticides to avoid microbial death.
3. The best application time is morning or evening. Avoid place the product directly under strong sunlight.

## Bacillus licheniformis(B.L)

After B.L being applied to the soil, Bacillus licheniformis quickly breaks the dormant state, rapidly multiplies and expands, occupying space advantages, and produces zeatin and antibacterial insecticides during the reproduction process, thus has a unique biological oxygen deprivation mechanism that can inhibit pathogenic bacteria.



### Function & Features

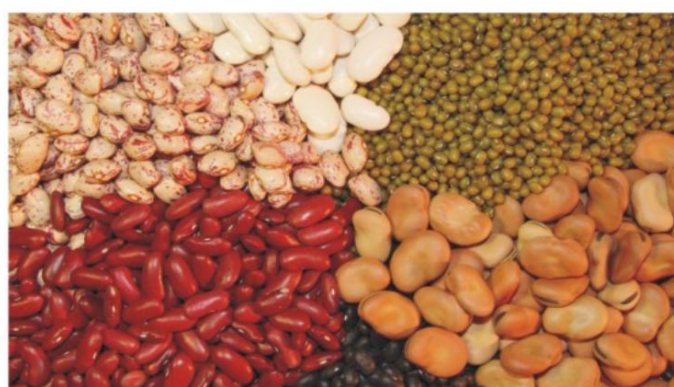
1. Inhibit the reproduction of pathogenic bacteria in the soil and the invasion of plant roots, reduce plant soil-borne diseases, and prevent the outbreak of various pests.
2. Improve the germination rate and seedling preservation rate, prevent the genetic diseases of the seeds, increase the survival rate of crops, and promote the growth of roots.
3. Improve soil aggregate structure, improve soil, increase soil water and energy storage capacity, effectively increase ground temperature, and alleviate obstacles of repeating cropping.
4. Promote the decomposition of organic matter in the soil into humus, which greatly improves soil fertility efficiency.
5. Promote the growth and maturity of crops, reduce costs, increase yield & income.
6. After being applied to the soil, the flora quickly breaks the dormant state, rapidly multiplies and expands, occupying space advantages, and inhibiting the growth of harmful bacteria.
7. Zeatin and antibacterial, the green insecticides are produced during the reproduction process, which can effectively inhibit and kill some soil-borne disease pathogens, such as root rot, fusarium wilt, blight, etc.
8. It has a good control effect on root knot nematodes.

### Application method

1. In produce of bio-organic fertilizer and compound microbial fertilizer that meet industry standards (effective microbial count  $\geq 20$  million CFU/g). Take the products spec of 20 billion/gram as example, need 1000 grams per ton of organic fertilizer to blend.
2. It is recommended that the application rate per mu (China land unit, equals 666m<sup>2</sup>) is 1-2kg, and the effect is better before sowing and after harvest.

### Precaution

1. Avoid applying with chemical fertilizers, to avoid affect the reproduction speed of the microorganisms in the soil.
2. It is forbidden to mix with chemical pesticides, bactericides and insecticides to avoid microbial death.
3. The best application time is morning or evening. Avoid place the product directly under strong sunlight.



# Bacillus Mucilaginosus (B.M)



The strain reproduces and grows in the soil and produces metabolites like organic acids and capsular polysaccharides, destroying the lattice structure of aluminosilicates, insoluble phosphorus compounds, etc., Decompose the above to release soluble phosphorus & potassium elements and small amounts of calcium, sulfur, magnesium, iron, zinc, molybdenum, manganese, etc. elements, which not only improve soil fertility, also provide nutrients that can be absorbed and utilized for crops, produce gibberellin, fine Cytokinin, enzymes, bacterial polysaccharides and other physiologically active substances, which can promote nutrient absorption and promote growth, with metabolism of crops, therefore to improve crop performance, Attain the ability to resist stress & pests harm.

## Function & Features

1. The microbes has the functions of dissolving phosphorus and potassium, can increase the content of soil available phosphorus by 90.5-110.8% and increase the content of available potassium content by 20-35%.
2. It has the effect of activating elements of silicon, calcium and magnesium in the soil.
3. It has the increasing effect of supplementary efficiency of the elements such as iron and reduce the amount of chemical fertilizers.
4. Extend the fertilizer effective period, cut down the chemical fertilizer consumption. The application of 1 kg of strain per Mu (China land unit, 666 m<sup>2</sup>) equals the effect as 15-20 kg phosphate and 7.5-10 kg of potassium sulphate for increasing crops production.
5. Effectively improve crop resistance, prevent or reduce diseases, such as wheat powdery mildew, cotton wilt, and yellow wilt.
6. The effect of increasing production is significant. The average yield of grain crops such as wheat and rice increased by more than 10% per Mu (China land unit, 666 m<sup>2</sup>). Peanuts, soybeans, sesame, and potato like crops by 15-30%. Cucumber, cabbage, tomato, broccoli, spinach, leeks, cabbage, eggplant, celery, The yield increase rate of vegetables, peppers, grapes, etc. is 20-50%. In addition, it has a good application effect on gardens, flowers, Chinese herbal medicines and other plants.

## Apply method

1. The production of Microbial fertilizers and compound microbial fertilizers, to comply with industry standards (effective microbe count  $\geq 20$  million CFU/gram). Take the product of 10 billion CFU/gram For example, Dose 2 Kg per ton of organic fertilizer.
2. It is recommended that, application of the fertilizer product 1-2 Kg per Mu (China land unit, 666 m<sup>2</sup>), better effect before sowing and after harvest, once application will be effective for the whole growth period.

## Noted

1. Avoid using with chemical fertilizers, so as not to affect the reproduction speed of microorganisms in the soil.
2. It is forbidden to mix with chemical pesticides such as bactericides and insecticides to avoid microbial death.
3. The best application time is morning or evening. Avoid place the strain directly under strong sunlight.



## Bacillus Megaterium(B.M)

The nitrogen assimilation system and absorption pathway formed by Bacillus megaterium through long-term evolution almost all are absorbed and used by plants. For those with poor mobility and slow movement in the soil quantitative elements also have the effect of enhancing absorption. Form PGPR (A type synthetic bacterial flora, that lives in the rhizosphere of plants has the ability to stimulate plant growth and inhibit plant pathogenic bacteria, etc. referred to as PGPR), Especially it can resist root nodule disease, parasites, plant root diseases and pests such as soil nematodes. Plant root diseases and pests such as soil



### Function & Features

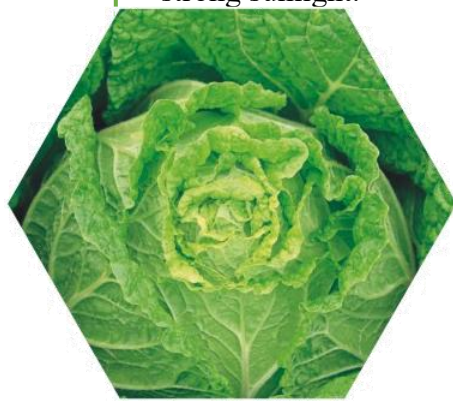
1. Inhibit the reproduction of pathogenic bacteria in the soil and the invasion of plant roots, reduce plant soil-borne diseases, and prevent the outbreak of various pests.
2. It has strong effects of fixing nitrogen, dissolving phosphorus and potassium, reducing the consumption of chemical fertilizers, and can reduce the consumption of nitrogen fertilizers by 80%.
3. Improve soil aggregate structure, improve soil, increase soil water and energy storage capacity, effectively increase ground temperature, and alleviate obstacles to repeated cropping.
4. Special flavor enhancement effect, use product made into a water preparation, applying to tobacco leaves, will has the enhancement of fermentation and flavor of tobacco leaves.
5. Promote the growth of crops, bloom in advance, enhance bloom, increase the fruiting rate, can increase the yield by more than 10-30%.
6. It can improve the quality of crops, such as increasing the content of protein, sugar, vitamins, etc.

### Application method

1. In produce of bio-organic fertilizer and compound microbial fertilizer that meet industry standards (effective microbial count  $\geq 20$  million CFU/g). Take the products spec of 20 billion/gram as example, need 1000 grams per ton of organic fertilizer to blend.
2. It is recommended that the application rate per mu (China land unit, equals 666m<sup>2</sup>) is 1-2kg, and the effect is better before sowing and after harvest.

### Precaution

1. Avoid applying with chemical fertilizers, to avoid affect the reproduction speed of the microorganisms in the soil.
2. It is forbidden to mix with chemical pesticides, bactericides and insecticides to avoid microbial death.
3. The best application time is morning or evening. Avoid place the product directly under strong sunlight.



**Mixing the microbes(strain ) with oil effect,good solution.**

