



Neptune's Harvest

BioNatural Blooming Blossoms N-Fixing Products

BioNatural Blooming Blossoms is the first company to successfully use naturally occurring soil bacterial products to unlock nitrogen from the atmosphere for plant uptake by root and leaf. This essential element, N, is provided to the plant more easily and naturally than ever before resulting in superior plant growth, strength and yield. The products have nitrogen fixing capacity over the entire soil pH range from 4.5 to 9.

All products are 100% natural microbes for natural fertilizing and can be used as a supplement or substitute to chemical & synthetic fertilizers. Repeated uses of these liquid microbes can reduce the use of nitrogenous fertilizers by about 20 to 40%. Or, if used with fish products can totally replace the need for chemical N in soils with sufficient humus content. Repeated use can prevent disease before its occurrence.

Mode of Action

Bioplin – When mixed with water and applied near the roots, the dormant cyst forms germinate. The cells multiply in the root vicinity utilizing the oxygen and carbon obtained from the root exudates and/or soil to produce nitrogen, amino acids, vitamins of the B group and vitamins C and E. The bacteria fix about 30 to 50 lbs of nitrogen per acre depending upon the organic matter content of the soil.

NutriTech- When mixed with water and applied near the roots, the dormant cyst forms germinate unlocking the unused insoluble phosphate reserves in the soils and convert them to soluble plant available phosphates. The bacteria decrease the requirement of phosphate fertilizers by 30 to 50% and/or help in increasing the uptake efficiency of the organic or inorganic phosphates.

NutriFoliar – When mixed with water and used as a foliar spray the dormant cysts germinate and fix nitrogen on the leaves. These active cells metabolize and flourish on the leaf surface. The bacteria can function strongly for a period of 2 to 3 weeks after which their populations may decline. Therefore monthly sprays are advised, especially on high value crops. The bacteria produce amino acids and vitamins which boost the plant growth favorably by improving nutrient absorption. Used 45 – 30 days prior to harvest can provide the necessary N often not forth coming this time of year.



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BioNatural Blooming Blossoms products are...

- Backed by over 42 years of extensive research by a veteran crop physiologist
- Research team comprised of qualified and dedicated microbiologists
- Qualified for advanced, innovative world patented award winning technology
- First company in the world to introduce Azotobacter based liquid bio-fertilizers
- First company in the world to introduce microbial foliar sprays
- Leads the world in the development of a complete biological farming package

The BioNatural research team has proved that Azotobacter can be induced to form huge numbers of dormant cysts, which could be stored and would remain stable in a liquid medium for considerable periods of time. Such a breakthrough has numerous advantages over existing products, including the following:

- Many more species and strains are included in a single blend as dormant cysts, resulting in no inter-species competition. There also is no risk of contamination when dormant cysts are stored in a sealed container.
- A cyst-based liquid remains stable for two years, as compared to 3 days for rehydrated microbes and six months for those supplied in a compost medium.
- Natural growth hormones produced by Azotobacter are very sensitive and are often degraded in a composting or brewing process. Storage as dormant cysts help preserve the full hormonal capacity.
- Application costs are reduced, product cost is lowered and physical application is dramatically simplified.
- Bioplin, when applied to windrows of finished compost, greatly increases the N production of the compost when applied to soils.
- Finally, problems associated with sub culturing are avoided. Sub culturing occurs when Azotobacter in a compost or brewed situation continue to subdivide and multiply. After many multiplications it's common for subsequent generations to lose some of their desirable characteristics. By contrast, a cyst-based liquid delivers all species and strains as intended, with all beneficial qualities intact.

Strain selection & products

Strain selection is the key to this product's capacity to fix nitrogen in marginal soils, even in the absence of adequate organic carbon. Azotobacter, like all microorganisms, needs carbon or carbohydrates. In this case the nitrogen-fixing capacity is linked to the availability of simple sugars. Azotobacter needs the energy of 1 gram of sugar to fix 5 to 20 mg of nitrogen. The species in **Bioplin** are guaranteed to produce an average of 11 mg of nitrogen per gram of sugar.

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NutriTech utilizes the phosphate solubilizing characteristics of Azotobacter to the maximum. Numerous strains capable of operating in diverse conditions are combined in the form of stabilized, dormant cysts in a liquid medium. **NutriTech** species literally feed upon soil phosphate reserves similar to converting a frozen bank account into available funds. **NutriTech** can dramatically reduce the phosphate release time associated with the use of rock phosphate products.

NutriFoliar is a complex living microbial product specifically designed for foliar applications. After decades of extensive trials, the manufacturers and patent holders have been able to delineate a detailed cost analysis for this product, which involves an average *Investment-to-Benefit Ratio* of 1:5. This means you get five times return on your investment. **NutriFoliar** offers four distinct modes of action, resulting in a complex, multi-dimensional growth response.

1. **NutriFoliar** includes fine tuned nitrogen-fixers, which utilize carbon extrudates from the leaf surface to fix nitrogen from the atmosphere directly into the leaf. This is the first time that significant quantities of natural nitrogen have been supplied through microbial activity on the foliage.
2. **NutriFoliar** contains a range of beneficial bacteria that release natural growth hormones as metabolic by-products. These natural hormones are capable of generating powerful growth and yield responses.
3. **NutriFoliar** contains species that produce vitamins, including the B group, vitamin E and vitamin C. Recent American research suggests that several of the B vitamins can act as growth stimulants, and vitamins E and C are important for disease resistance.
4. **NutriFoliar** also includes a range of organisms that can provide protection against fungal disease. The explanation for this anti-fungal action is as follows:

* Azotobacter secretes low-molecular substances that bind available iron and make germination of pathogenic fungi difficult (Iron is an essential ingredient involved in the transformation of an inactive spore to an active pathogen).

* Azotobacter in sufficient numbers will out-compete pathogens for food.

* Azotobacter secretes an antibiotic-like discharge very similar to anisomycin, which is a documented fungicide.

Note: Some of the pathogens that have been controlled by Azotobacter in the soil and on the leaf surface include: Alternaria, Fusarium, Collectotrichum, Rhizoctonia, Microfomina, Diplodia, Batryiodiplodia, Cephalosporium, Curvularia, Helminthosporium and Aspergillus.



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Why BioNatural Products?

- Excellent repeated performance with documented success
- Significant improvement in the uptake of nutrients for excellent yields & quality
- Better balanced improved growth with even fruit set
- Helps reduce chemical inputs
- Cost effective – increased production and revenues
- Simple to use, just mix with water no brewing required – *Once a month application*

Performance (as experienced by growers)

- Multifold increase in plant root & shoot growth
- Substantial improvement in crop & plant quality
- 45% increase in fruit yields
- 50% increase in vegetable yields
- Less signs of Anthracnose and other fungal diseases
- Greatly improves nitrogen efficiency of compost
- Beneficial to price & quality conscious growers
- Applied directly on seed when adding fish and/or molasses

Advantages of Using BioNatural Products

- Provides significant amounts of Nitrogen in the form of ammonia, nitrates and amino acids without chance of over-dosage as N is not force fed – therefore the plant absorbs only what is necessary.
- Provides a stable source of N fixation – the plant grows at a stable rate and therefore stays much healthier. Supplements 30-55 lbs of N per acre.
- Helps plants better use their own root extrudates.
- Promotes plant growth & yield even in low phosphate soils.
- No inter-species competition, therefore there is no risk of contamination.
- Storage as dormant cyst preserves the full hormonal capacity.
- **BioNatural Blooming Blossoms products can be used at any time of the growing stage.**



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How To Apply

1. When using a liquid planter containing fish and/or molasses apply **Bioplin** and **NutriTech** on or near the seed.
2. If using a dry planter, broadcast spray fish and/or molasses with **Bioplin** and **NutriTech** over the field, incorporate and then plant into this mixture.
3. If crop is up, broadcast a **Bioplin** and **NutriTech** solution around the root zone when the crop is 3 – 6 inches tall with sufficient water to get solution into the root zone. This forms a strong mesh around the root system, helps the roots grow stronger, and improves the uptake of nutrients. Best if used with fish and/or molasses.

Foliar spray **NutriFoliar** with fish and/or molasses on **field crops** 20 – 30 days after crop emergence, directly on the foliage. Use sufficient water to cover.

Spray **NutriFoliar** on **high value crops e.g. fruits and vegetables** 20 – 30 days after crop emergence and apply every 30 days thereafter. Use sufficient water to cover.

NOTE: Applications at 45 – 30 days prior to harvest should increase yields by providing the Nitrogen Mother Nature withholds during the last of the season.

Product Clarification – by Phil Wheeler, Ph.D.

When you read the brochures and literature provided for the BioNatural Blooming Blossoms line, you will see that the 40 plus years of research and the company's method of use is based on the product being applied **after** an annual crop is up and growing using plenty of water because it is an **absolute necessity** to have **root extrudates** for the azobacter to feed on in order to prosper and fix nitrogen. So, **if used alone, the product must be applied after an annual crop is up and growing**. Bioplin and/or Nutritech will start providing N a short time after plant emergence and right up to harvest. The company's information states that at least 50 – 65 gallons of water is required to get the organisms down into the root zone for maximum efficiency, colonization and crop response. This also applies to foliar feeding as it's important to cover foliage thoroughly.

That being said, CSI has discovered that you can avoid the necessity of the “flush after emergence” step by **combining the microbes with fish and/or molasses** and placing the product in the row (liquid planter) at planting for annuals or broadcasting and/or banding on perennials. CSI has experienced that the addition of fish and/or molasses allows the organisms to survive and flourish sufficiently long to have the annual crop root extrudates begin to flow, thereby feeding the microbes and allowing them to provide N fixation. This is true when applying any of these microbial products – they do better with fish and/or molasses. These microbes live off the root or leaf extrudates and using fish and/or molasses can both stimulate the microbes as well as the plant.

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U of Florida Research

The significance of the breakthrough can be more easily grasped by considering a preview printed in the ACRES USA newspaper several years ago. Here, it was suggested that the "ideal" Azotobacter product contained 100 million organisms (per gram) of a good vigorous strain.

BioNatural Blooming Blossoms products contain a minimum of 1 billion microorganisms per gram, i.e. 10 times the ideal level, and counts of 5 to 10 billion per gram are regularly achieved. There is not just 1 vigorous strain here, but dozens of them, and they are the hardiest, most versatile, selected from the 126 strains developed by the research team over 40 years.

The products have been tested in various Universities and well known Institutions around the world including our **University of Florida**, Institute of Food & Agricultural Sciences. Here it has been quoted that "Drenching with BioNatural Products increased both shoot and root growth comparable to the full fertilizer rate without the BioNatural Bioplin. This suggests that the amount of chemical fertilizers can be reduced by half and still produce similar size plant shoots with BioNatural Products." Leading products were used in these tests for comparison.

The technology and products are substantiated by over 40,000 field tests in different agro-climatic zones.

All products contain plurality of strains, if one strain fails due to agro-climatic conditions, the other takes over the activity, making the products reliable in all conditions.

Brief Summary of the Evaluation of the application of *BioNatural Bioplin* during Production of *Viburnum Odoratissimum* in One Gallon Containers

R. C. Beeson, Jr.
MREC, IFAS, University of Florida

Summary

In a preliminary test with minimum replication, the addition of the Azotobacter (BioNatural Products) suspension applied as a soil drench shortly after potting significantly ($P>0.05$) increased both shoot and root growth compared similarly fertilized, but not drenched, plants during the six month growth period. When the fertilizer rate was reduced by half and Azotobacter applied as a drench, shoot growth was comparable to the full fertilizer rate without the Azotobacter, but root growth of drenched plants was significantly ($P>0.05$) greater. These results suggest there was a positive growth response of *Viburnum odoratissimum* to an Azotobacter (BioNatural Product) drench applied shortly after potting.



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Objective

To conduct a preliminary evaluation of the potential of the Azotobacter suspensions to stimulate the growth of *Viburnum odoratissimum* under simulated commercial nursery conditions.

Results and Discussion

To strengthen the statistical comparison among supplemental fertilizer treatments, the data was re-analyzed using only those treatments, which were supplied with Polyon. Among these three treatments, there were no differences in average canopy width, whereas the minimum mean increase in canopy size of the supplemented Azotobacter (BioNatural Products) fertilizer treatments was nearly 12-fold. However, plants drenched with the Azotobacter at potting were taller than plants without the drench.

Plants provided with the Azotobacter drench and full rate of Polyon had significantly ($P>0.05$) larger canopy volumes and shoot dry mass than those without the drench. This suggest that the amount of Polyon per container could be reduced by half and still produce similar size plant shoots if drenched with the Azotobacter initially after transplanting.

An interesting observation at harvest was that plants drenched with Azotobacter and given the full Polyon rate appeared visibly greener than the complimentary treatments without the drench.

Future research would be interesting and should examine nutritional aspects such as foliage nutrient content and nitrogen and phosphorous leaching from containers. If the benefits of BioNatural Bioplin continue to hold, a species trial would be in order.