



*One handful of healthy soil  
contains more living organisms  
than the world's population.*

*Does yours?*

  
**Byo Soil**®  
*Improving the World's Soils  
Naturally.*

*"It is our work with living soil that provides sustainable alternatives to the triple crisis of climate, energy, and food. No matter how many songs on your iPod, cars in your garage, or books on your shelf, it is plants' ability to capture solar energy that is at the root of it all. Without fertile soil, what is life?"*

- Vandana Shiva

Many years of poor farming practice, contamination with chemicals, oils and salts, over-fertilization with salt-based conventional fertilizers, and depletion of organic content have damaged much of the world's soils and thus the food produced from these soils. To turn the tide, we need to address poor soils from both a chemistry and biological perspective.

High-quality soil generates higher yields with less effort. Plant roots fully develop with less effort and a stable soil structure promotes rainfall infiltration and water storage for plants to use later – reducing runoff and erosion. Good soils are well drained and allow oxygen to reach the root zone to promote optimal root health. Healthy soils have an abundance of beneficial soil microorganisms that help plant growth and nutrient uptake along with a stable population of earthworms and fungi.

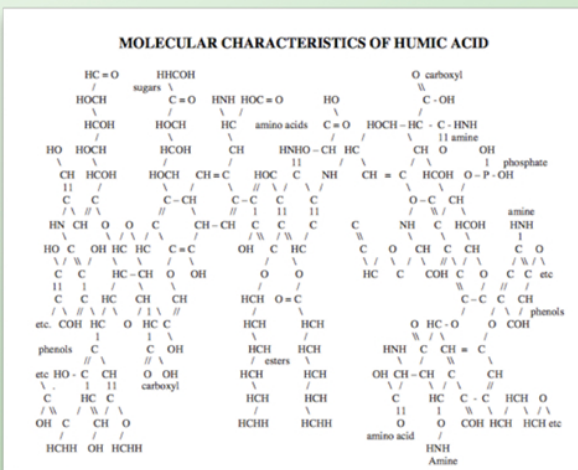
### WHAT is ByoSoil®?

ByoSoil® was developed by combining the OMRI-certified biostimulant, Byo-Gon PX-109® with humic acid products to accelerate soil salt remediation. Remediation success in the oil and gas industry was limited by the time required to achieve results. By adding Byo-Gon PX-109® to the formulation, full remediation time was cut by 90% and is now the preferred technology for this application. Based on this success, ByoSoil® was born.

ByoSoil® products are non-plant food products that are produced from humic acids. These humic acids are naturally formed from decomposition of organic matter centuries ago and they play a pivotal role in soil health.

### HOW DOES ByoSoil® WORK?

Depending on the specific need, the individual ByoSoil® product is formulated with ByoGon® PX-109, highly concentrated humic acids, a dense soil microbe package, a salt encapsulation enzyme blend, or other specific additives. **There are three primary formulations of ByoSoil®: 1) ByoGrow 2) ByoDetox 3) ByoHumic.**



The humic acid molecule is very complex with many active sites. These sites provide a very high ion exchange ratio, allowing for rapid and effective chelation of essential soil minerals. These sites can be chemically modified to achieve the unique needs of the soil.



## **BETTER GROWTH AND HIGHER YIELD**

**ByoGrow** contains a humic acid base with the largest concentration of 10 specific soil microbes available on the market. This advanced formula increases natural biological activity, accelerates root development for critical nutrient storage, protects against pathogenic diseases, and transports valuable nutrients from the soil into the cell membrane of the plant. These microbes have specific functions within the soil and are the power behind the increased growth performance of treated soils:

### ***The ByoGrow formulation contains over 200 million cfu/ml each of the Bacillus strains:***

**subtilis** (4 strains): bacteria known for strong disease fighting properties and cellulose degradation.

**polymyxa**: known for its ability to convert calcium and iron into immediately available forms, degrade cellulose and remove thatch.

**thuringiensis**: generates an endotoxin lethal to insects.

**licheniformis**: known for aggressive conversion of primary and minor nutrients.

**megaterium**: an agent for the biocontrol of plant diseases

**amyloliquefaciens** noted for potent enzymatic production, exceptional high protein export capacities, and biocontrol of pathogens causing *Rhizoctonia solani*.

### ***Benefits of ByoGrow:***

- Significantly increases beneficial microbes within the soil
- Absorbs vital plant nutrients and trace minerals.
- Increases nutrient and water storage
- Promotes plant growth
- Increases plant resistance to disease
- Natural ingredients – Safe for use around children and pets

# **ByoGrow**



### ***Case Study – 46% Increased Wheat Yield***

A wheat farmer had a 40 acre field impacted by salt from a prior drilling operation. His goal was to bring the hard-hit field back to productivity, and cut his fertilizer cost in half during a severe drought. He applied 56 pounds of nitrogen per acre instead of the recommended 200+ pounds. The winter wheat was sprayed with ByoGrow and liquid fertilizer at the recommended dosage. A wheat sample was collected and analyzed for protein content. Two weeks later, a second sample was collected and a forage analysis was performed: Protein content rose 26% and yield increased to 28 bushels per acre compared to previous 15 bushels, A 46% increase. The farmer saved over \$120 per acre on fertilizer, wheat heads measured 4.75 inches versus an untreated 1.75 inches. He noted the heavy clay soil benefited from humic disaggregation, allowing moisture to penetrate instead of ponding.



### ***Case Study – Increased Yield for Corn and Pumpkins***

Approximately 50% of a corn maze used for fall harvest activities was treated with ByoGrow at one gallon per acre. The corn was sprayed with diluted product when the plants were approximately 3-4 inches high. An adjacent pumpkin patch was treated at one gallon per acre shortly after planting. Results in the corn maze indicated increased corn growth rates were sustained in the treated portion of the fields. Representative samples of corn stalks were evaluated and treated stalks circumference was measured at 5.25 inches compared to 3.5 inches for untreated stalks. Additionally, most of the sampled stalks from the treated areas were 1.5 to 2.0 feet higher than untreated with some treated stalks having three ears of corn compared to untreated stalks with two. Pumpkins in the treated areas were ripe for market in early August, approximately one month before untreated pumpkins. Most pumpkin stalks in the treated areas had more and larger pumpkins than untreated areas.

## CONTAMINATED SOIL

**ByoDetox** (formerly SaltBind) contains a specifically-modified humic acid formulation that works to detoxify soils. It was originally designed as a oil field salt remediation product to remove salt spills from oil field pump and battery tank areas and restore soils back to productive use. The product was reformulated for agricultural and consumer use to be effective in soils that have been negatively impacted by excess salts, fertilizer use, oil, chemical, herbicide and other contamination.

**ByoDetox** works by providing an organic substructure with an extremely high ion exchange capacity that the Na<sup>++</sup> and Cl<sup>-</sup> ions can bind to and be charged neutralized via an ionic bond. The carbon chain then becomes a food supply for the natural soil microbes, which over time encapsulates the salts. Special enzymes significantly increase the degradation process by facilitating the transfer and uptake of nutrient by the microbial population.

### ***For the soil chemist:***

**ByoDetox** is extremely chemically reactive with soil hydrocarbons via direct chemical reaction, microbial stimulation, and catalytic action. Hydrocarbons are fractionated into sugars, fatty acids, and amino acids, all of which act as plant nutrients. ByoDetox, by it's very nature, wets the soil to reduce the water repellency caused by hydrocarbon contamination treated solely with microbes, restoring water absorption into the soil.

### ***Benefits of ByoDetox:***

- Bonds and eliminates salt ions
- Detoxifies the soil of accumulated toxins associated with fertilizers
- Increases plant beneficial microbes within the soil to promote growth.
- Absorbs macronutrients and micronutrients
- Food grade ingredients safe for use around children and pets

# ByoDetox

### **Case Study - Cotton Productivity**

A Texas plot of drip-irrigated cotton was used to test ByoDetox. It was clay soil that had not seen a crop rotation in eight years. It was divided into three 6-acre strips. One was left untreated and 75 pounds per acre of nitrogen was added. The two remaining strips were treated with ByoDetox at 0.75 and 1.5 gallons per acre. applied one time through the drip system. No fertilizer was applied to the ByoDetox treated strips.

- Yield increased more than 10% on the treated strips.
- Treated plants were taller and averaged more bolls per plant .
- Treated plants had increased heat tolerance
- Treated plants had uniform growth and were healthier.
- Treated areas averaged over 400 lbs/acre increased production.



### **Case Study - Blueberry farm saved**

A blueberry grower in Yakima, WA established an operation on 15 acres of old orchard ground that had previously had heavy herbicide and pesticide applications. The high salt content of the soil (900-1600ppm total soluble salts) also caused plant yellowing and poor yields in the first few years of operation. The grower planned to replace over 200 plants but treated the soil through his drip irrigation system and then spot sprayed with ByoDetox to attempt to save his farm. In two months of treatment the plants were restored to health with renewed vigor and production with 80% plant yellowing eliminated. After seeing excellent results in the blueberries, the grower treated pink lady apples and mint with similar success.



## **HEAVY CLAY OR VERY SANDY SOIL**

**ByoHumic** products are organically certified (OMRI registered) humic acid products produced from high quality leonardite with lower levels of ash and toxic materials from a vegetative source of materials from what once was a fresh water bog in central Canada many years ago.

**ByoHumic12** is a highly concentrated liquid humic acid product used in organic agricultural and landscaping operations. One of the highest organically- certified concentrates available in the marketplace.

ByoHumic12 is primarily targeted to applications where soil texture/structure is problematic such as high clay soils. The large concentration of humic acid in the product increases the ability for sodium (Na+) to be absorbed on the humic molecule and assist with changing the electrical surface charge on the clay platelet to impact disaggregation.

**ByoHumicGT** is a granular humic acid product that is at an 85% concentration and available in a dry form. The product has two grinds – Turf and AG. The turf particle is a smaller granule and more useful for turf and golf course green applications. The larger AG grind is used in general agricultural, plantings, and fairway/rough treatments. ByoHumicGT is an effective form of slow release humic substances that contain humic acids and fulvic acids that act as natural chelating agents binding to soil nutrients. Plant roots absorb these humic acid nutrient compounds over time, increasing growth efficiency. Additionally, when added to the soil of new plantings, ByoHumicGT can improve soil conditions, disaggregating clay to improve drainage or can also add organic matter in sandy soils to impact plant growth and microbial health.

**Topdressing Humic GT** is an effective alternative to conventional fertilizers as the humic acid will increase soil health and uptake of nutrients already in the soil. This reduces the frequency or amount of fertilizer needed to maintain plant growth.

### ***Benefits of liquid ByoHumic12:***

- Disaggregates clay soils by neutralizing sodium and calcium ions
- Reduces soil compaction, improves drainage and permeability
- Root injectable, liquid application to increase soil organics
- One of most highly concentrated humic acids on market

### ***Benefits of granular ByoHumicGT:***

- Granular application, slow release humic and fulvic acids
- Can be applied with conventional fertilizers
- Effective soil conditioner added when planting trees and shrubs
- Applied as topdress on soil, turf and golf course greens (fine grind).

### **Case Study – Landscaper application**

Highly impervious clay soils in the South Carolina lowcountry caused premature failure of ornamental plantings and trees because of poor soil drainage. Landscapers applied both ByoHumic12 through root injections and included granular ByoHumicGT when planting to disaggregate clay soil and improve drainage. Zero loss of plant material has occurred since regular use of ByoHumic products has been established.

# *ByoHumic*



## WHO NEEDS ByoSoil®?

**Home gardeners** use ByoSoil products to use less fertilizer, less herbicides, less fungicides, and other chemicals. Healthier soil Microbes mean healthier fruits and vegetables. Flowers bloom more abundantly and fruits & vegetables taste better when treated with ByoSoil.

**Landscapers** use ByoSoil products for a 100% natural microbial treatment for all GREEN landscaping needs. Each type of microbe plays an essential part in improving soil health. Problems such as fairy ring, brown patch, dry spot and other fungal diseases and improved drainage and soil conditioning are addressed with ByoSoil.

**Composters** use ByoSoil products to double the rate of composting by impacting moisture and temperature, controlling factors for success. When composting takes place, soil microbes break down the organic matter in the compost pile, making an excellent organic fertilizer.

**Farmers and Growers** use ByoSoil is a great way to save money and increase yields on alfalfa, corn, cotton, blueberries, strawberries, apples, wheat, and other crops. By applying to the soil prior the planting, spraying from a tractor, or injecting into pivot or drip irrigation systems, farmers can directly impact soil performance and reduce expensive fertilizers. Better soil moisture retention reduces water demand and irrigation costs.

**Remediation contractors** of oil and salt spills use ByoSoil products to manage where the problem occurs without the need to dig and haul contaminated soils. ByoSoil is particularly effective in breaking down hydrocarbons and is the preferred technology in many states for salt remediation of oil field operations. Excessive fertilizer use increases soil salt levels, negatively impacting root zone performance – ByoSoil encapsulates these salts and restores growth.

### WHY IS ByoSoil® BETTER?

ByoSoil products offer a combination of environmentally safe benefits:

- Improves soil aeration, tilth, workability and water filtration
- Increases soil water holding capability during drought conditions
- Increases water uptake – less runoff
- Stimulates plant top growth, along with root mass
- Increases nutrient uptake via improved microbial activity
- Makes plant nutrients bioavailable
- Improves pest and disease resistance
- Reduces absorption of herbicides in plants.

**ByoSoil® - improving the world's soil problems..... naturally**

For more information and application to your specific situation, please contact us:

Phone: 888-ByoGon-1 / 843-822-3415

Fax: 843-606-6318

Email: [info@byogon.com](mailto:info@byogon.com)

Web: [www.byogon.com](http://www.byogon.com)

