



**BIO-ORGANIC CATALYST**  
THE POWER IN NATURE®



**ENVIRONMENTAL SOLUTIONS**

WASTEWATER TREATMENT • WATER CLARIFICATION • INDUSTRIAL & COMMERCIAL CLEANING

# About Bio-Organic Catalyst

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## Mission Statement

Our Mission is to be the leading provider of bio-organic catalyst compositions to the world's water treatment systems, and to transform the entire field of the cleaning arts. Our guiding ethos leads us to value and honor the relationships which underlie all ecological systems. *Our work brings a better life to all life.*

## Our Company

Bio-Organic Catalyst, Inc. produces a line of proprietary product compositions, based upon its unique patented broad spectrum catalytic biochemistry, that establishes an entirely new platform technology for the chemical industry.

Our breakthrough bio-organic catalyst compositions (BOCs), are all manufactured to deliver the highest strength and quality biocatalysts, in highly concentrated liquid formulations. They provide a significant advancement over all other currently available chemicals, or biological agents, due to their total life cycle enhancement of the fundamental linkage between water and organic wastes, and are completely safe to use (USDA), or discharge into public waterways (US EPA).

Our products are directed at solving the most critical aspects of improving water quality and improving those that present the greatest challenges. The strength of the BOC technology is its ability to contribute unique solutions to enhancing the underlying biological and chemical processes that are universal to nearly all industrial cleaning, petroleum hydrocarbon remediation, water treatment and purification systems worldwide. Our bio-catalytic compositions are able to provide significant performance levels unmatched by any other chemical, or biologically based, agents.

We have been pioneers in the development of a new paradigm in biological enhancement of the underlying processes used in both water purification and wastewater treatment. This foundation has evolved to world leading capabilities in odor control and bio-gas optimization, furthering the foundation we have built in harnessing the power in nature to transform polluted waters and wastes into environmentally healthy water and soils.

The Company has extensively tested our compositions in numerous engineering studies and toxicity testing programs. Our products meet U.S. Environment Protection Agency and U.S. Department of Agriculture safety requirements. The United Nations Environmental Programme presented BOCs as a selected new environmental technology for the developing world markets. The TÜV Rhineland Institute for Environmental Protection and Energy Technology tested and documented the safety and effectiveness of BOCs, allowing our compositions to be imported into the highly regulated EU markets. Bio-Organic Catalyst, Inc. received a 2005 Frost and Sullivan Product Innovation Award for Advanced Catalysts, which recognizes a company's research and development program that has, or is expected to, bring significant contributions to the industry in terms of adoption, change, and competitive posture.

We strive to consistently provide the most innovative solutions to the most fundamental environmental challenges of our day, and a daily dedication to making demonstrable improvements in the "quality of life" of both our customers and their greater communities.

# Bio-Catalytic Technology

The bio-catalytic compositions (BOCs) of Bio-Organic Catalyst, Inc. offer an entirely new technological breakthrough within the traditional water treatment and cleaning chemistries marketplace. BOCs are all based upon a breakthrough technological understanding of how to unlock the inherent transformation power of natural biological pathways. The BOC products contain no bacteria, and are completely nontoxic and biodegradable.

BOCs are built upon the powerful bio-catalytic capabilities of a fermentation supernatant, derived from plants and minerals, offering a highly enriched and concentrated nutrient source. This is blended with surface modifying components into a very powerful liquid concentrate which, in water, create ultra-fine micro-bubbles that act as a platform for highly accelerated chemical and biological reactions for much higher conversion rates within water and solid waste treatment.

The functional mechanism of BOCs is attributed to molecules consisting of both a hydrophobic and a hydrophilic element. BOC's patented amphiphilic molecules will attach to components such as;

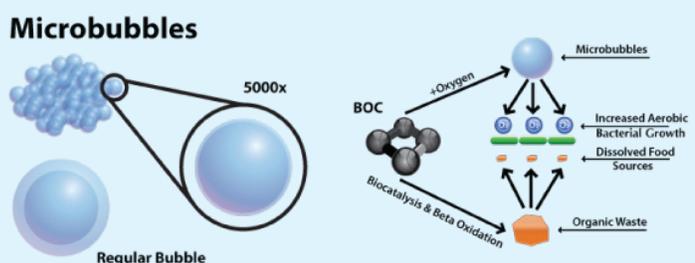
- Bacteria
- Organic Wastes
- Oxygen
- Foul Gases
- Byproducts of decaying organic matter (sulfides, amines, mercaptans, skatole, and other contaminants)

BOCs offer an extraordinarily powerful mechanism for allowing gases to cross membrane barriers, thereby increasing both biological processing vitality and reproduction rates. Rates of gas transfer are intimately tied to cellular respiration, and are a critical factor in the vitality of all aerobic and anaerobic biological processes. These ultra-fine micro-bubbles have very high gas transfer characteristics, with exponentially greater surface areas than are possible through mechanical aeration systems. The vastly improved gas transfer rates offer critical enhancement of the biological oxidation reduction rates of organic wastes and wastewater.

The breaking of molecular bonds, the enzymatic breaking of organic pollutants into more digestible components for microorganisms to consume as a food source, is also a critical element attributed to the gas transfer capability of BOCs, which we refer to as 'beta oxidation'. This is extremely important in the making organic pollutants soluble, breaking the wastes into their constituent components. This is especially critical with the chronically problematic insoluble wastes known as Fats, Oils, and Greases (FOGs).

This revolutionary bio-catalytic chemistry vastly important in a broad array of environmental and waste conversion objectives by addressing the fundamental limiting factors in biological treatment processes.

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# Bio-Catalytic Technology

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## Why Bio-Organic Catalyst?

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This revolutionary bio-catalytic chemistry vastly important in a broad array of environmental and waste conversion objectives by addressing the fundamental limiting factors in biological treatment processes. Want to see how BOC products work – view before and after pictures using Bio-Organic Catalyst products.

BOCs provide economically compelling benefits to environmental professionals, bringing practical and cost saving advancements to wastewater treatment, water clarification, industrial and commercial cleaning.

BOCs offer substantial operational optimization in the applications of:

- Agriculture
- Anaerobic Digestion
- Aquaculture
- Bio-Catalytic Cleaning
- Composting & Animal Care
- Hydrocarbon Cleaning/Remediation
- Odor
- Paper and Pulp
- Wastewater Treatment
- Water Clarification

## Why Bio-Organic Catalyst®?

- Establish the conditions for rapid oxygen penetration into the cell wall of the microorganisms.
- Increase the volume of biogas yields in anaerobic digestion system through increased solubilization of components of waste stream.
- Provide highly enriched bio-available nutrients required for optimizing biological transformation of organic pollutants.
- Significantly enhance the reduction of discharges in wastewater treatment facilities.
- Degrade biological film growth, improving healthcare safety, reducing contamination and corrosion.
- Degrade mineralization within tanks, pipes and filters.
- Cleave (hydrolysis) the molecular bonds of fats, oils and greases (FOGs) to glycerol and fatty acids.
- Offer superior performance in eliminating noxious and hazardous (odors) volatile organic compounds (VOCs).
- Has the ability to substantially speed up the remediation of petroleum hydrocarbons (TPH).
- Dramatically improves the microbial vitality in indigenous ecologies.

# Bio-Organic Catalyst Mechanisms of Action

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**Catalyzation:** Reduces the amount of energy required for biological or chemical reactions to occur, then participates repeatedly in these reactions while reducing the time and rate required for turnover (accelerates nature's degradation process 100-fold faster).

**Solubilization:** BOC solubilizes the cellular structure of organic waste, thereby increasing gas transfer rates, and making it easier for naturally occurring bacteria to digest organic substances and oxidizing agents to work.

**Oxygenation:** Seeds formation of micro-bubbles that act as a platform for biological and chemical reactions to occur, and creates a stable, time-delivered system to disperse oxygen throughout the water column thereby increasing the availability of oxygen beyond Henry's Law (more available oxygen enables aerobic reactions that will speed up the natural degradation process).

**Competitive Advantages:** The superior performance and broad applicability of BOC over traditional chemical agents, or biologically derived products, provides profound competitive advantages in the current marketplace. BOC patented bio-organic catalysts have the ability to exclusively meet the key performance objectives now faced by facilities management, such as nitrogen discharge reduction, increased carrying capacity, FOG treatment, sludge reduction, higher aeration capability, reduction of mineralization build-up, and reduction of total discharges.

**Convenience and Versatility in Multiple Applications:** The integrated nature of BOC products, combining multiple catalytic process elements, provides extraordinary versatility in application. While the actual process mechanism is founded on complex biochemical interactions, the methods for use are quite simple and do not represent a barrier to product acceptance.

**Significant Performance:** BOC products offer customers a means to achieve superior performance objectives, often improving the fundamental economics of the applicable process.

**Efficacy:** BOC products have independently demonstrated broad and significant efficacy in process and application enhancement. In the wastewater operation, it can reduce energy usage up to 40% and sludge disposal/ treatment volumes up to 30%, eliminate odors, clean FOG accumulation in lift stations, and help facilities reach regulatory discharge requirements.

**Non-Toxicity:** BOC products are non-toxic, non-caustic, non-corrosive, non-irritating, hypoallergenic, bacteria-free and biodegradable. The environmentally friendly features of the products substantially reduce exposure and liability to the user, its workers and the environment, and don't trigger costly OSHA or hazardous material handling requirements.

**Fast Results:** BOC offers dramatic improvements achieved very quickly. In wastewater treatment facilities, the early results odor control, FOG elimination, and aeration energy optimization are seen within a few days.

**Shifting The Nature of Biological Treatment:** The biological mechanisms of the treatment system are beneficially and fundamentally changed, thus reducing major organic contaminant loads from the waste stream. This results in dramatic improvements in reduction of collection system corrosion of concrete, steel, and aluminum surfaces from H<sub>2</sub>S gases, loading and throughput at the plant, and reduced energy costs, sludge disposal costs, maintenance and downtime.

**Displacing Capital Expenditures:** BOC can immediately increase the efficacy and efficiency of wastewater treatment systems, enabling capacity expansion to be deferred for years. The avoidance of capital costs, coupled with lowered operating costs, has the potential to significantly restructure water treatment project economics in favor of BOC biocatalysts.

# Economic Analysis

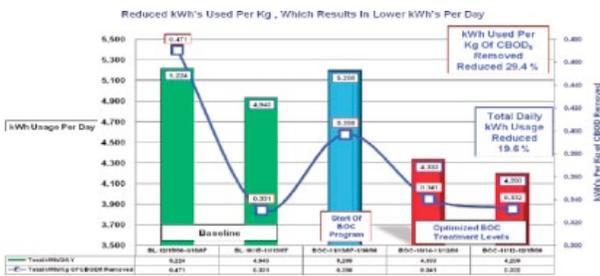
BOCs offer wastewater operators a viable and rapid solution that transforms the entire biological processing parameters of both the collection system and wastewater treatment facility, optimizing the entire system-wide operations. Eliminating odors, educing energy consumption, and increasing renewable energy yields are all benefits that are brought to operators by the BOC advanced bio-catalytic products.

Every wastewater system's economic model will be based upon their specific costs of odor and corrosion prevention, energy usage and biosolids disposal. Off-setting capital improvements and plant expansions can save municipalities and companies substantial investment monies. Improving discharges benefits our environment and regulatory compliance.

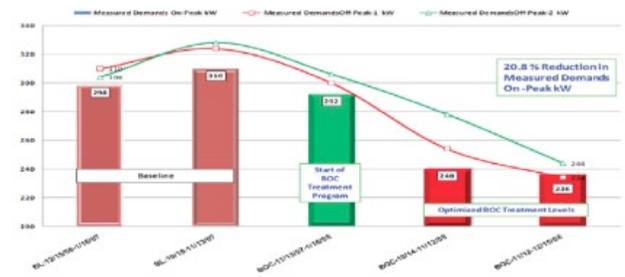
BOCs can be an integral part of facilities' upgrades and maintenance programs. Cooperative relationships with engineering design and build installations can provide improvements to the payback analysis.

## BOC Reduction of Electrical Costs

REDUCED KWH'S USAGE PER DAY, PER KG

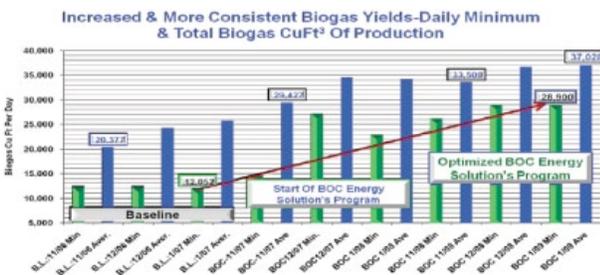


REDUCING MEASURED PEAK AND OFF PEAK KWH USAGE

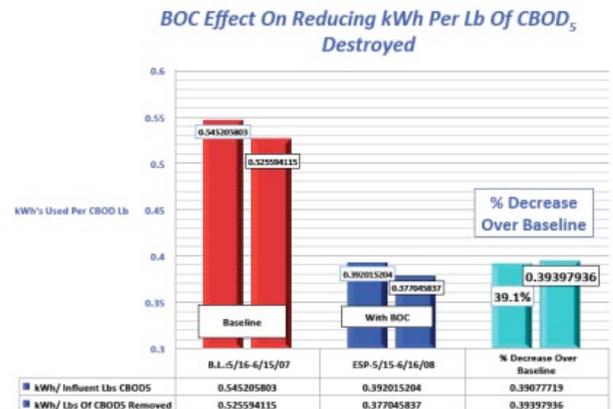


## BOC Methane Yield Improvements

INCREASED MINIMUM & DAILY AVERAGE BIOMETHANE PRODUCTION (CU FT3)



INCREASED MINIMUM & DAILY AVERAGE EFFECT ON INCREASING CU FT OF BIO-GAS PER GALLON OF PRIMARY FEED SLUDGE



## Bioaquatic Toxicity and Safety Studies

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The BOC Seal of Safety represents our commitment to meeting the highest standards of safety and bio-aquatic non-toxicity to all living organisms. BOC product formulations have undergone rigorous independent testing, including leading recognized EPA certified laboratories. *BOC product compositions have shown non-toxicity ratings far exceeding generally available green cleaners and traditional chemical based products.*

Not only are our BOC compositions extremely safe, they also have important benefits to the downstream systems or water bodies they impact. This is tied to the on-going bio-catalytic reactions of the molecular structure of organic contaminants.

There are many different aspects to consider when accessing the safety and toxicity profile of a chemistry:

- One, is the sensitivity of humans and animals to exposure to the chemistry (e.g., skin, eyes, lungs). BOC has shown to present little, if any, sensitivity in this regard.
- Second, is the biodegradability over time of the chemistry. BOC has shown an ability to accelerate the natural biological reduction rate within ecosystems or engineered wastewater treatment systems.
- Third, bio-aquatic toxicity testing of any chemical compound in EPA testing protocols is tied the toxicity of that compound on highly sensitive shell fish. This provides the basis for the EPA testing and ratings (LC 50). BOC showed ratings of over 200 ppm to 316 ppm—much higher than almost any chemical, green or otherwise, on the market today.

## Applications

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### Agriculture – Bio-Catalytic Soil Conditioning & Nutrient Optimization

Our technical breakthrough lies in the ability of Phyto-Catalyst® to facilitate a more aerobic, and therefore healthy ecological environment in soils and plants, through the reactions of our specially prepared bio-catalytic formulation. Phyto-Catalyst® is able to optimize the solubility of nutrients within the soil so that they are released and absorbed by the roots in a more efficient manner. This ability produces greater root growth, and an ability to reduce fertilizer requirements, as nutrients are more efficiently transported by the plants.

Phyto-Catalyst® has shown an ability to substantially reduce the use of toxic chemical agents in controlling insect infestations, and plant diseases, contributing to the better overall health of the soils and plants. Phyto-Catalyst® offers a new ecological model that improves plant growth and productivity, reduces chemical and fertilizer costs, and protects the health of both plants and people.

Benefits Include:

- Maintenance of irrigation systems,
- Microbial health of soils,
- Bioavailability of nutrients.
- Mitigation to the damages from plant diseases and pest infestations.
- Improving crop yields and plant vitality
- Reducing usage and costs of water, fertilizers and pesticides.

# Applications

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## Anaerobic Digestion – Optimizing Anaerobic Digestion Systems

BOC offers substantial improvement in anaerobic digestion, providing higher yields of bio-methane, improved sludge quality, reduction of total solids, and significant reduction of noxious sludge odors. BOC has shown, in municipal and industrial anaerobic digestion systems, that they act on the TVS and TS components, providing higher reduction rates over baseline values. BOC can increase bio-methane yields over 100%, with up to 30% reduction in total solids discharged. Sludge quality is enhanced due to more complete digestion and sludge odors will be greatly reduced, including odors in dewatering operations.

BOC accelerate the anaerobic digestion processes into more optimized conversion efficiency. Case studies show a much higher yield per pound, or kilo, of organic waste biogas, while clearing the internal accumulations that build up over time. BOC requires little capital equipment expenditure, as installations involve simple injection pumps, along with a reservoir of BOCs. Results become evident relatively quickly, as a faster release of high bio-methane value components of the waste material shifts the internal biomass within the anaerobic digester into the Methanogenesis phase, increasing the bio-methane yields and total consumption of volatile fatty acids.

Applications in municipal and food processing AD systems showed close correlations between higher TS and TVS conversion rates and higher bio-methane yields on a dry weight comparison, pointing towards an acceleration of the phased Methanogenesis cycle. This results in total overall enhancement of complete biomass vitality and microbiological population densities involved in the anaerobic processes required for optimal bio-methane yields and BTU values.

The combined total mass balance analysis shows improvements in obtaining optimal bio-methane yields, On a dry weight TVS basis, can run from 25% – 100% over comparable baselines. Additionally, the final biosolids quality and weight reductions (up to 25%), including substantial elimination of noxious biosolids odors, all indicate a more complete biological conversion of nutrient values.

Benefits Include:

- Increase bio-methane yields
- Allow more complete digestion of solids
- Reduce volume of solids
- Reduce odors from solids in dewatering operations
- Improve quality of solids

# Applications

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## Aquaculture – Improvement of Aquaculture Operations

AQ Plus & AQ C28: Improves water quality, clarity, reduces chemical usage, and improves fish mortality in aquaculture operations.

The BOC water treatment product line offers a powerful broad spectrum bio-catalyst that significantly accelerates the natural biological degradation rate of organic waste by up to 1000 times, and provides very high oxygen transfer characteristics, and accumulation of greater dissolved oxygen in water bodies.

Benefits Include:

- Improved available dissolved oxygen
- Biological reduction of sulfides, ammonia, phosphorus and nitrite
- Reduced environmental stress on stocks
- Reduced turbidity
- Reduced / eliminated phytoplankton growth
- Oil and grease eliminated
- PH regulated
- Reduced bacterial growth (Enhanced bio-security)
- Cleaner tanks / filters / reducing maintenance
- Reduces energy consumption (aeration system)
- Odor Control
- Beneficial to Recirculating Aquaculture Systems (RAS)
- Breaks Down Organic Binders & Mineralization

# Applications

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## Bio-Catalytic Cleaning – Advanced Bio-Catalytic Solutions

Bio-Organic Catalyst, Inc.'s biocatalysts (BOCs) are the next generation in green chemistry; where surface waste contaminants are both safely cleaned and then rapidly broken down via bio-catalysis into their fundamental constituents. BOCs offer the highest performance of any deodorizer, cleaner or degreaser; with a non-toxic and biodegradable (green) cleaning chemistry, combined with a virtually instantaneous catalytic breakdown (biodegradation) of the waste contaminants; yielding ultra-clean surfaces, substrates, and drainage systems.

The BOC biocatalyst technology represents a transformation for the cleaning industry, whereby all general cleaning, degreasing, hydrocarbon remediation, drain cleaning, odor elimination, and wastewater discharges are synergistically integrated. The total process becomes upgraded into a single and cost-effective environmental management model, benefiting staff, cleaning quality, and the bottom line.

Bio-Organic Catalyst:

- Eliminate microscopic organic bio-film growth ('biofilms'), as well as the residues of traditional detergents, chemicals and sanitation agents; resulting in a new standard in cleanliness and public health.
- Meet EPA and USDA requirements for use in food preparation and discharge into public waterways. Use of BOCs has demonstrated impressive results in reducing environmental pollutants and wastewater discharges.
- Are completely non-toxic, biodegradable, and non-allergenic.
- Will replace most cleaners, detergents, degreasers, and solvents. BOCs bring immediate elimination of septic conditions and noxious gases.
- The toughest stains and soils are deeply cleaned.
- Dangerous volatile gases and odors are immediately neutralized.
- Greases and oils are easily removed and rapidly catalyzed.
- Drains are made free-flowing.
- Wastewater discharges are treated 'at-source'.
- Microscopic bio-films that harbor toxins are quickly dissolved.
- Both surfaces and underlying substrates are left ultra-clean.

## Applications

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### Composting & Animal Care – Odor Control & Composting Rates

BOC provides exceptional values to any composting operation. It will, when sprayed onto a compost pile, instantly neutralize noxious odors. This can be accomplished at a range of dosage rates depending upon turnover of piles, nature of organic wastes, weather conditions, etc. Atmospheric misting is also extremely effective and will provide a much improved odor neutralization than any competing product, at a very competitive price.

Recent scientific studies have shown confirmation of the ability of BOC to accelerate composting rates, resulting in greater turnovers to operators and higher quality compost. Easily applied simply by adding to the water used to water compost piles, BOC offers a fundamental tool that any composting operation will find has compelling operational and economic value.

The use of BOC biocatalytic compositions to establish optimal Ecological Animal Care is an incredibly exciting area for us. Ecological Animal Care is built on our unparalleled performance in odor elimination, the resulting substantial reduction in insects and pests, and in enhancing the breakdown of animal's wastes on a highly accelerated basis. These capabilities are always a major factor to either the pet owner, or large animal feeding operations (CAFOs).

We offer the highest safety profile with superior performance. Urine odors are primarily an ammonia type compound, which with simple spraying is rendered immediately neutralized. Feces and their cleanup has never been more effectively handled due the capabilities of BOC biocatalytic compositions to breakdown the organic components which soak into substrates, such as cement floors or fabrics.

In stables and large animal feeding operations, including piggeries, the highest animal safety characteristics is combined with both the most effective odor neutralization agent on the market, but also a catalytic chemistry that breaks down the wastes. Effective at high dilutions either through spray down system, or manually applied, it is now possible to bring any facility to a state of being odor free and ultra-clean.

Benefits Include:

- Instant neutralization of odors on contact
- Accelerated composting rates
- Improved quality of compost
- Higher turnover of compost
- Reduced cost in operations

## Applications

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### Facilities Management – Environmental Solutions

BOC bio-catalytic compositions, EcoCatalyst Green® and Aqua-Catalyst® offer the highest level of performance in deep cleaning and odor control, combined with a safety profile that is unequalled in the industry. The array of benefits made possible with BOCs can be applied to all of the major environmental challenges encountered by the facilities manager.

Odors from grease interceptors and organic waste containers can be cost-effectively controlled with simple equipment set-ups. Pools and spas will be naturally kept cleaner and clearer, while reducing the fumes of traditional pool chemicals, all while substantially reducing fouling and mineralization build-up. The ultra-deep cleaning of the full spectrum of organic pollutants, including deeply embedded greases and oils, and hydrocarbons, enables the facilities manager to bring back deeply stained surfaces to their original cleanliness.

EcoCatalyst Green® can be added to kitchen and bar cleaning routines, parking garages and driveways, providing a solution to the deeply embedded stains, lingering odors, slippery floors, and drain cleaning, that no other cleaning product line has ever been able to solve.

Benefits Include:

- Ultra-Deep Cleaning of Kitchens, Floors, Bars, Garages.
- Instantaneous Odor Neutralization.
- Eliminate Hazardous Chemicals and Discharges.
- Dissolve Biofilms and other scum-like residues.
- Reduce maintenance time and equipment failure.
- Highest safety and environmental compliance standards.

# Applications

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## Hydrocarbon Cleaning/Remediation

NONTOX<sup>®</sup> offers a highly effective bio-catalytic cleaning agent for petroleum hydrocarbon (TPH) pollutants. NONTOX<sup>®</sup> acts on the full spectrum of petroleum hydrocarbon pollutants, providing very deep cleaning capabilities, especially within substrates, as it solubilizes these insoluble pollutants, rendering them more suitable for subsequent environmental treatment procedures.

NONTOX<sup>®</sup> is highly water-soluble and is able to be used effectively at extremely high dilutions through any water spraying or foaming systems. The safety and economy of using bio-catalytic compositions surpasses traditional harsh chemical agents in addressing the primary challenges and underlying ecological restoration mechanisms that are required in protecting the environment.

Benefits Include:

- Immediate action on insoluble TPH compounds
- Immediate rise of flash point of fuels
- Enhancement of subsequent remediation procedures of TPH pollutants
- Stimulation of indigenous microbiological populations
- Ultra-Deep cleaning of substrates of TPH pollutants

# Applications

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## Odor Control Management

BOC based VOC odor management systems provide the world's highest performance standards in eliminating noxious odors and hazardous VOCs.

BOC based systems are the next generation green chemistry, both exceptionally safe to use and able to provide accelerated bio-remediation of the toxic biological conditions which produce odors.

Benefits Include:

- Extremely cost effective due to the ability to be delivered through water based spray systems at high dilution levels.
- Used successfully in installations throughout the world to solve the toughest jobs.
- Simple, flexible, and immediately effective upon contact.
- Neutralizes ammonia, hydrogen sulfide and hydrocarbon type noxious VOC compounds in solid waste, organic compositing, and sludge treatment.

# Applications

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## Paper and Pulp

Bio-Organic Catalyst has introduced a green, non-toxic, chemistry model that combats slime formation, and its problems in paper processes, replacing the toxic biocides normally used in papermaking process.

Papermaking processes uses a huge amount of water, with most of it recirculating throughout the system. Recirculation increases the content of soluble and insoluble organic waste materials that are found in the raw pulp, including wood fiber fines, starch, organic polymers and others.

Due to this abundance of organic wastes within the paper process water, an excellent microbial broth for the development of a culture of microorganisms, especially slime producing bacteria. This slime can grow abundantly, and sticks all over the wet end section machinery, including: white water pit, head box, pipe slow flow sites like elbows, hanging from low vacuum boxes, every dewatering element (foils boxes) and frame.

Instead of being a bacterial killer, like normal biocides, BOC eliminates the formation of biological film growth by increasing oxygen transfer rates within the process water, and elevating the dissolved oxygen levels in water.

The ability of BOC bio-catalytic formulations to increase oxygen transfer rates has been proven scientifically, and is also a key factor in eliminating odors and enhancing aerobic biological conditions in water bodies, both important factors in paper manufacturing, where smells and lagoon discharge treatment are critical operational issues, especially in those processing recycled fibers.

It has been proven that machine producing paper from recycled fibers (test liner, corrugating medium, tissue) can be kept clean and free of slime adding BOC to process water. Another advantage when BOC is added in papermaking process is that it will benefit the wastewater treatment process by accelerating the oxidation mechanism.

In the papermaking process, BOC formulations have shown to substantially reduce the manufacturing downtime required in the cleaning of rollers due to their impact on dissolving the molecular structure of the starch that accumulates on the surfaces of rollers, requiring periodic cleaning with solvents. This economic aspect provides a strong incentive to the environmental aspects of replacing toxic biocides.

Benefits Include:

- Eliminates the formation of biological film.
- Increase oxygen transfer rates.
- Reduces manufacturing downtime for cleaning.

# Applications

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## Wastewater Treatment & Collection Systems – Aeration & Biosolids

BOC biocatalytic compositions provide numerous benefits to all of the biological processes (aerobic and anaerobic) used to convert waste loadings into high quality discharges. The array of benefits made possible with BOCs can be applied system-wide to bring critical solutions to the fundamental challenges of operators. Odors, improving dissolved oxygen levels, reduction of organic loadings and biosolids, and improvements in discharges, are all operating parameters that can be improved with use of BOC.

BOC will allow a higher conversion of organic wastes, reduce energy usage, and lower sludge volumes. BOC will therefore substantially expand a wastewater facility's total loading and capacity requirements. By greatly lowering the quantity of biosolids, processing and dewatering requirements are reduced. Transportation costs for hauling away these biosolids to landfills is likewise reduced.

BOC is unique in the ability to provide substantial improvements in dissolved oxygen levels, while simultaneously reducing the energy requirements of the aeration systems. This is both economically compelling, as well as critically important when the wastewater system is attempting to treat heavy organic loadings than the system is optimally designed.

BOC has phenomenal H<sub>2</sub>S gas (odor) reduction performance compared to other chemical or biological agent in the marketplace. Importantly, it also offers an ability to biologically reduce sewage upstream of wastewater treatment facilities. BOC is able to treat miles of sewer lines downstream of injection, cleaning the biological growth (slime layers) within the pipes which are the underlying biological sites for anaerobic conditions leading to Hydrogen Sulfide (H<sub>2</sub>S) formation, and creating higher bulk sewage dissolved oxygen levels.

Benefits Include:

- Elimination of odors
- Eliminates floating grease build-up
- Reduces sludge volumes
- Enhances biological processing (BNR)
- Cleans collection system (Odors, Slime & FOGs)
- Reduces oxidation chemicals
- Cleans concentrated animal feedlot operations (CAFO) lagoons
- Reduce chemical costs
- Much safer than harsh and toxic chemicals

## Applications

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### Water Clarification – Water Clarity & Mineralization Treatment

BOC has very synergistic characteristics that enhance water clarification and nearly all treatment systems used to purify water. Municipal water systems, agricultural irrigation, aquaculture ponds, cooling towers, lagoons, rivers, pools, and hot tubs are all systems where water purity quality are dramatically impacted by BOC, and where BOC has distinct and proven technical advantages over any other chemistry. BOC bio-catalytic technology works by increasing oxygen transfer rates and elevating the dissolved oxygen levels within water bodies (a key water quality measurement). This critical mechanism works in conjunction with a rapid breakdown of the organic wastes within the water column to create a higher purity of water.

BOC has shown the ability to eliminate the buildup of mineralization and biological film growth in water lines and tanks, reducing the organic waste by-products that feed pathogen growth and odorous conditions. The ability to increase dissolved oxygen levels has proven to be the key factor in the Company's success in eliminating odors in water bodies. The bio-catalytic capabilities provide a powerful broad spectrum enzymatic breaking of molecular bonds. A key feature of BOC products is the immediate elimination of noxious odors upon contact. Thereafter, BOC naturally accelerates the release of pollutant streams into a more readily consumable food source for ecological restoration.

Benefits Include:

- Clarification of water
- Reduction of sanitizing chemicals
- Reduction of waste by-products remaining in water column
- Reduction of chemical odors (VOCs)
- Elimination of mineralization buildup
- Elimination of organic growth and films

# Products

## Aqua-Catalyst® Crystal Clear Water Clarity - Spas and Pools



- Reduces Chemical Usage
- Helps Prevent Scaling
- Saves on Maintenance Costs
- Keeps Filters Cleaner
- Compatible with all filtration systems and other sanitizing chemicals

Aqua-Catalyst® is a breakthrough new green chemistry that leads to a new model in water care. They work by increasing dissolved oxygen levels and rapidly catalyzing organic contaminants, resulting in absolutely crystal clear water. This extraordinary capability makes it possible to substantially reduce the use of harsh chemicals and providing the highest level of water safety.

They are applied directly into the water or added to the filter system. They will begin to immediately break down any organic elements in the water, as well as preventing surface staining and mineralization scaling. Aqua-Catalyst® will decrease the need for chemicals, backwashing, scale removers, clarifiers, filter cleaners or acid washing.

### DIRECTIONS FOR USE:

**Spas:** add one cap full of Aqua-Catalyst® for each 500 gallons of water weekly.

**Residential Pools:** add one ounce of Aqua-Catalyst® for each 5,000 gallons of water weekly.

**Commercial Pools:** add one ounce of Aqua-Catalyst® for each 25,000 gallons of water weekly.

### PRODUCT SPECIFICATIONS:

Aqua-Catalyst® are non-toxic, non-caustic, and safe to handle with a recommended shelf life of two years. May be stored with confidence at temperatures below 125F /50°C.

### CONTENTS:

Water, highly purified bio-organic catalysts from plant and mineral sources, non-ionic surfactants.

### CAUTION:

Keep out of the reach of children. If product from this container splashes in eyes, rinse well with water.

# Products

## Eccomate®

### Municipal and Industrial Odor Control – Acceleration of Composting Rates



- Neutralize Odors on Contact
- Reduce VOC Emissions (Greenhouse Gases)
- Accelerate Composting Rates
- Ecological Restoration

Eccomate® will instantly on contact neutralize organic volatile organic compounds, offering exceptional noxious odor control and reduction of VOC emissions. It's a highly concentrated bio-catalytic composition designed to form highly reactive micro-bubbles within water that have extraordinary oxygen transfer capabilities across the membrane barriers of wastes.

Eccomate® can be used at extremely high dilutions within misting and spray systems, allowing adaption to every type of odor control program, including garbage trucks, conveyor belts, bio-solids dewatering, food waste processing, land fills, recycling facilities. It contains no bacteria, or active enzymes, but stimulates the vitality of indigenous microorganisms by providing substantial improvement in oxygen availability, oxygen transfer, and the release of waste components for consumption by indigenous microorganisms.

#### DIRECTIONS FOR USE:

Application rates that can be increased proportionately to the area being treated, generally at dilutions in water from 100 x 1 up to 2500 x 1.

#### PRODUCT SPECIFICATIONS:

Eccomate® is non-toxic, non-caustic, and safe to handle with a recommended shelf life of two years. May be stored with confidence at temperatures below 125F /50°C.

#### CONTENTS:

Water, highly purified bio-organic catalysts from plant and mineral sources, non-ionic surfactants.

#### CAUTION:

Keep out of the reach of children. If product from this container splashes in eyes, rinse well with water.

## Products

### EcoCatalyst Green®

#### Advanced Deep Cleaning & Odor Control Of Soils, Fats, Oils, & Greases



- Enhances breakdown of biological film growth, removing the residues that support septic & odorous gas formation.
- Keeps drain lines clean and free flowing
- Provides instant odor neutralization on contact.
- Dissolves mineralization in tanks and lines.

EcoCatalyst Green® is a revolutionary bio-catalytic cleaner that offers an ultra-deep cleaning of surfaces and embedded substrates with the highest green safety profile. It's a breakthrough cleaning model that takes the cleaning of all types of wastes to a new level of performance, where the waste components are catalytically broken down in the cleaning process, leaving no residues behind on surfaces and drain lines.

The use of EcoCatalyst Green® transforms any environment, home or commercial facility, to the most amazingly clean and odor-free state, far surpassing any other cleaning solutions available on the market. It's unique in its ability to change the underlying conditions that produce septic and biological film growth on surfaces and drain lines, eliminating the biological factors that cause unhealthy residues that support pathogen growth and drain line blockages.

#### DIRECTIONS FOR USE:

EcoCatalyst Green® should be used at 1 ounce to 30 ounces water in hand sprayers, at one ounce to 128 ounces water in mop buckets, and 1 ounce to 512 ounces of water in power washers.

#### PRODUCT SPECIFICATIONS:

EcoCatalyst Green® is non-toxic, non-caustic, and safe to handle with a recommended shelf life of two years. May be stored with confidence at temperatures below 125F /50°C.

#### CONTENTS:

Water, highly purified bio-organic catalysts from plant and mineral sources, non-ionic surfactants.

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# Products

## EcoSystem Plus®

### Optimization of Wastewater Treatment Biological Processes



- Improves Oxygen Transfer
- Increases Yields of Methane in Anaerobic Digestion
- Reduces Aeration Energy Consumption
- Reduces Solids and Sludge Volumes

EcoSystem Plus® is a breakthrough bio-catalytic composition designed to increase dissolved oxygen (DO) levels in the water column and break the ester bonds of organic wastes. It will improve the biological oxidation-reduction rates of wastewater treatment systems, improve the quality of discharges, and substantially reduce H<sub>2</sub>S odor levels.

EcoSystem Plus® will improve anaerobic digestion bio-methane yields and quality of bio-solids through releasing the power of bio-catalytic breaking of molecular bonds. It contains no bacteria, or active enzymes, but stimulates the vitality of indigenous microorganisms by providing substantial improvement in oxygen availability and oxygen transfer, along with releasing the bound nutrient values in waste streams.

#### DIRECTIONS FOR USE:

EcoSystem Plus® can be injected into water bodies, aeration devices, and sludge lines, as it is a highly concentrated composition. Dosage rates will vary depending upon numerous factors, including organic loading levels, with a basic metric being 1 ppm (part per million) for every 100 BOD (Biological Oxygen Demand) in organic loading.

#### PRODUCT SPECIFICATIONS:

EcoSystem Plus® is non-toxic, non-caustic, and safe to handle with a recommended shelf life of two years. May be stored with confidence at temperatures below 125F /50°C.

#### CONTENTS:

Water, highly purified bio-organic catalysts from plant and mineral sources, non-ionic surfactants.

#### CAUTION:

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## Products

### NONTOX®

#### Surface Washing Agent - Soils, Hard Surfaces, Marine & Environmental Clean-Up



- Breaks Molecular Bonds
- Accelerates Remediation Rates
- Reduces Volatile Organic Compounds (VOCs)

The cleaning and remediation of petroleum hydrocarbon contaminated water and soil is a fundamental environmental challenge that impacts most industries and transportation systems. NONTOX® is a specially formulated bio-organic catalytic composition which greatly accelerates remediation rates, at very low relative costs compared to traditional remediation technologies.

NONTOX® provides a superior cleaning capability when used to wash petroleum hydrocarbon based contaminants, then allows for their subsequent biological breakdown, so that the cleaning/ remediation process is combined together into a synergistic and complementary procedure. NONTOX® is a highly concentrated bio-organic catalyst composition formulated to provide instant protection from accidental hydrocarbon ignition during cleanup of petroleum spills and wastes. NONTOX® contributes oxygen to encourage indigenous microbial colonies to quickly consume and neutralize these hazardous compounds in both water and soil applications.

#### DIRECTIONS FOR USE:

NONTOX® should be applied to TPH contaminated soil directly in situ, ex-situ, or in enclosed treatment cells, at 8 ounces of NONTOX® to 1 gallon of water. In water bodies, application rates can be increased proportionately to the area being treated, generally at dilutions in water from 100 x 1 up to 500 x 1.

#### PRODUCT SPECIFICATIONS:

NONTOX® is non-toxic, non-caustic, and safe to handle with a recommended shelf life of two years. May be stored with confidence at temperatures below 125F /50°C.

#### CONTENTS:

Water, highly purified bio-organic catalysts from plant and mineral sources, non-ionic surfactants.

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## Products

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### Phyto-Catalyst®

#### Advanced Ecological Solutions in Plant Health & Pest Management



- Improves microbiological conditions in soil, directly impacting water percolation, root growth, and optimizing nutrient uptake to the plant.
- Plants grow faster, generate higher yields,
- Plants are more resistant to diseases and insect infestation.

Phyto-Catalyst's® effectiveness is built upon the powerful bio-catalytic capabilities of the BOC composition formulas. The BOC products are based on a specially designed fermentation supernatant, derived from plants and minerals, which is then blended with surface modifying compounds, into a very powerful liquid concentrate.

When introduced into water, the BOC product formulations create highly self-organized and ultra-fine micro-bubbles. These ultra-fine micro-bubbles exhibit highly energetic reactions in water, and within organic molecular structures, including soils, plants and insects. This bio-reactor platform allows an acceleration of a series of biological and chemical reactions to occur across multiple substrates. neutralize these hazardous compounds in both water and soil applications.

#### DIRECTIONS FOR USE:

Add 13 ounces of Phyto-Catalyst® into 55 gallons of water and apply every month during growing season..

#### PRODUCT SPECIFICATIONS:

Phyto-Catalyst® is non-toxic, non-caustic, and safe to handle with a recommended shelf life of two years. May be stored with confidence at temperatures below 125°F/50°C.

#### CONTENTS:

Water, highly purified bio-organic catalysts from plant and mineral sources, non-ionic surfactants.

#### CAUTION:

Keep out of the reach of children. If product from this container splashes in eyes, rinse well with water.

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All Bio-Organic Catalyst products are produced in the United State and must meet the highest standards of quality.

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