BIO-ORGANIC CATALYST

THE POWER IN NATURE®

ECOCATALYST GREEN®

FIELD MANUAL

ADVANCED BIO-CATALYTIC DEEP CLEANING & ODOR CONTROL OF FATS, OILS, GREASES, SOILS & HYDROCARBONS

EcoCatalyst Green®

Product Profile

EcoCatalyst Green® is one of a line of patented bio-organic catalytic (BOC) formulations, produced by Bio-Organic Catalyst, Inc., formulated to break down organic waste contaminants, along natural biological pathways, on a highly accelerated basis. These BOC biocatalysts have been shown to reduce the energy required for chemical and biological reactions to occur within a broad spectrum of water and wastewater processes.

EcoCatalyst Green® is designed to breakdown anaerobic slime layers and grease clogging within collection and drainage systems, eliminate grease layers in clarification channels, enhance biological processes, increase dissolved oxygen (DO) levels, eliminate hydrogen sulfide gas formation, and reduce expensive pump out and disposal expenditures within municipal, industrial, and commercial, wastewater treatment and collection systems.

EcoCatalyst Green® is a bacteria-free, broad-spectrum biocatalyst, which will cleave the ester bonds to catalyze fats, oils, and grease (FOG) wastes, causing a rapid breakdown of the FOG lipids into a carbon food source for the heterotrophic microorganisms within the collection system and wastewater treatment facility. EcoCatalyst® provides significant benefits to enhancing the aerobic conditions within the collection stream.

EcoCatalyst Green® is able to offer superior odor reduction attributes over bacterial, oxidation, or nitrite chemistries within the collection and drainage system, grit chambers, residuals handling, as well as elimination of noxious odors in sludge dewatering, solid wastes receiving and transport facilities. Biofilms are broken down, and surfaces, such as flooring and containers, will clean down deeply into their substrates, eliminating a source of odors, corrosion, and pathogens, that exist at the microscopic level. In addition to grease catalyzation, EcoCatalyst® will breakdown the slime layer that buildup within sewage pipelines that are a major contributor to the production of anaerobic gases.

EcoCatalyst Green® is a highly concentrated liquid additive which can be injected into a wastewater stream to very quickly reduce FOG components prior to entering the primary clarifiers and other channels, or applied through water/air foggers, water hoses, and other types of spray systems, on a highly diluted basis, directly onto accumulated organic wastes and noxious odorous conditions.

What is it and how does it work?

EcoCatalyst Green® is a broad-spectrum biocatalyst that utilizes a breakthrough technology (gas transfer beta oxidation) that catalytically breaks the molecular bonds that form Fat, Oil, and Grease (FOGs). These waste components are what clog drain lines, accumulate within the substrates of flooring, and are the primary source of odors from garbage containers.

EcoCatalyst Green will keep grease traps and interceptors, drains, garbage disposal and compactors, pump stations, and septic systems free flowing and odorless. Restaurant floors and loading docks will be deep cleaned, reducing slippage and chronic dingy appearances. EcoCatalyst Green® is the revolutionary deep cleaning, odor control, and drain line product that solves the most challenging environmental issues of the facility manager.

Application Uses

- Kitchen Drains: For Grease Buildup and Odor Control.
- Kitchen floors and all Surfaces: Use in Mop Buckets. Gets rid of slick floors and keeps drains clean and free-flowing.
- Bar Drains: Odor and fly control.
- Washing down receiving dock area: Cleans and controls Odors.
- Grease traps and Grease Interceptors.
- Ice Machine Drains: slime and odor control.
- Room Drains: Slime layer and odor control.
- Eliminates the use of hazardous chemicals that can harm plumbing and can be dangerous if in contact with people.
- Ultra-Deep Cleaning of any Surface.
- Bio-Organic Catalyst Odor Control: Not a Masking Agent.
- Cleaning Bathrooms: Eliminate Ammonia Odors and salt buildup.
- Pour into toilet tank to maintain and control slime layer buildup.
- Power wash parking lots and around trash containers.

The treatment of grease lines, interceptors, and lift stations is done through injection of EcoCatalyst Green® into the most suitable drain. Strategic drain line(s) locations should be selected within kitchen and beverage operations for injection into the drain line(s). Injection location will be equipped with a pumping device, including timer, to dose the proper amounts of product at defined intervals (duration and time of day).

Odor eliminated with EcoCatalyst Green®

Odors are instantly neutralized, upon contact, and the biofilms and residues that cause odors are removed for long-term odor control and optimal healthy conditions.

Odors emanating from a garbage dumpster.

Odor vapors are neutralized by oxygen transfer when treated with EcoCatalyst Green®.

Dispenser Applications

Bio-Organic Catalyst has a strategic equipment dispensing systems relationship with DEMA Engineering. We offer several types of dispenser solutions for all your environmental needs:

- Mop buckets & Foam guns
- Spray systems & Power washers
- Direct pump injection
- Any type of wash down system, at various dilutions depending upon the application being treated

Dispenser Applications

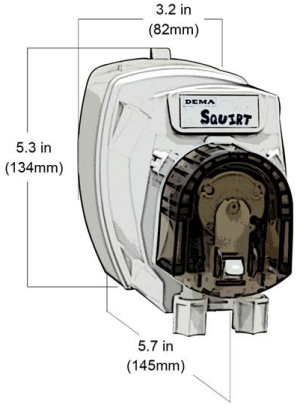
DEMA's drain and odor control systems have a proven track record second to none. Built using the proven Viking drain systems or Olympian pump platform, these systems deliver exceptional reliability, durability and value. And the broad offering ads flexibility to meet most any need. Choose between systems to meet small space, large or small chemical output, spray or dosing and plug or battery power options.

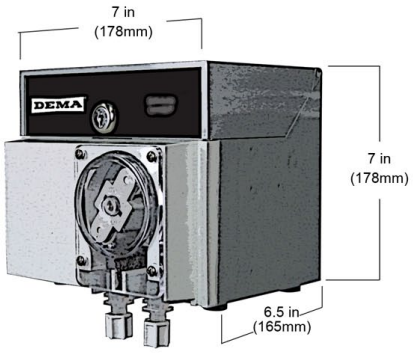
- Splash resistant ABS enclosures
- Electronic timer for Squirt and Drain Chief and mechanical timer for Pro Scentnal
- Multiple tube options include EPDM, viton, silicone and PVC to handle virtually any chemical
- Squirt and Drain Chief available with 12v plug-in transformer or battery power option and use common easy to find D cell batteries
- Pro Scentnal features a brass spray nozzle for greater durability in tough environments
- Applications include almost any drain maintenance and odor control including dumpsters and trash chutes. Typical environments include food service, lodging, food processing, lift stations, waste processing and water.

Squirt's enclosed back and rubber boot protects timer from tampering and the environment

Drain Chief's battery pack nests inside locking, splash resistant cabinet

Pro Sentnals manual timer makes programming easy and enclosed in locking cabinet





Drain Chief & Pro Sentnal

Dosing Rates

For proper treatment of grease lines, lift stations, and grease interceptors, the amount of EcoCatalyst Green® product suggested is based on the size of the grease interceptor (in gallons). This dosage rate of EcoCatalyst Green® has proven effective in many facilities however; the recommendations may need to be adjusted based on the water flows and accumulated grease and slime buildup within the drain lines.

1. WEEK ONE: 128 ounces (1 gallon) will be administered for the first 150 gallons of interceptor capacity. An additional ounce (1 oz.) will be added for every additional 20 gallons of capacity.
2. WEEK TWO & ONGOING: 34 ounces will be administered for the first 150 gallons of interceptor capacity. An additional ounce (1 oz.) will be added for every additional 20 gallons of capacity.

The following EcoCatalyst Green® dosing rate model is calculated for a hotel property with one 2500 Gallon Grease Interceptor.

1. WEEK ONE: 246 ounces for the week, or 35 ounces per day (.27 gallons)
2. WEEK TWO/ONGOING: 152 ounces for the week, or 22 ounces per day (.17 gallons)

If used in your cleaning routine or introduced at multiple locations, the amounts identified above is the total quantity required. Even distribution should be considered to achieve the dosing quantities identified.

EcoCatalyst Green® Cost Comparison for Grease Interceptor (Size: 2500 gallons).

Current Operational Expenses	Operating Expense with BOC
$2,000 (Quarterly pumping @ $500 each)	7366 Total Annual ounces required
$2,400 (Quarterly jetting service @ $600 each)	12 - 5 gallon drums required
$280 (internal staff time for support of above services 8 hours at $35/hr.)	$208.00 retail price (plus S/H)
$Current cost of grease line chemicals, if used.	---
$4,680 Current estimated annual cost	$2,394 Estimated annual cost with BOC

Techinical Disccusoion

EcoCatalyst Green® solubilization capability is part of a sequenced process in which lipid ester bonds are instantaneously cleaved, reducing their molecular structure to both glycerol and fatty acids. Glycerol is water soluble and readily degradable by wastewater microorganisms. Essential fatty acids, released from the lipids, can then be metabolized through biological processes as a high-energy food and source of carbon for nitrification reduction processes.

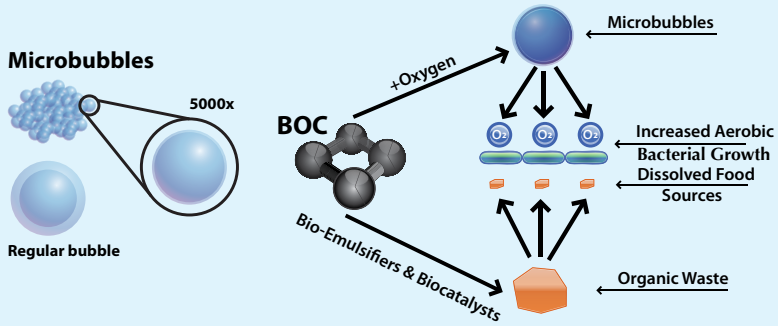
The fats and oils produced by plants and animals are described as lipids. The term lipids describe all substances that are:

- ✓ Relatively insoluble in water but soluble in organic solvents such as benzene, chloroform, acetone, and ether; and
- ✓ Related either actually or potentially to organic compounds such fatty acid esters, fatty alcohols, sterols and waxes; and
- ✓ Can be used as a source of energy and carbon to support the metabolism of a variety of different organisms.

Cleaning Organic Wastes

Bio-Catalytic Factors For Exceptionally Deep Cleaning

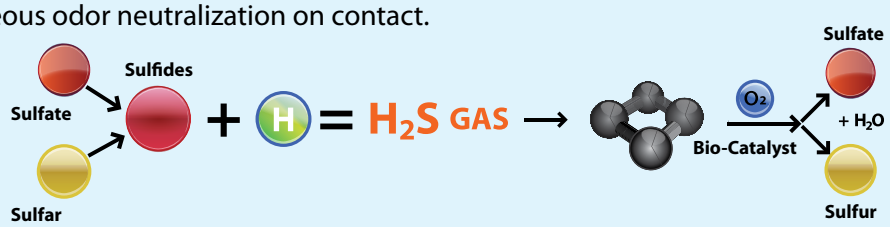
- Initiates an immediate catalytic breakdown of wastes,
- Eliminates the accumulation of organic slime growth and microscopic scum,
- Maintains drains and interceptors free flowing with no odors.



Odor Elimination

Superior Odor Control

- Oxidizes noxious gases through oxygen transfer,
- Establishes more oxygenated and healthy aerobic biological conditions,
- Instantaneous odor neutralization on contact.

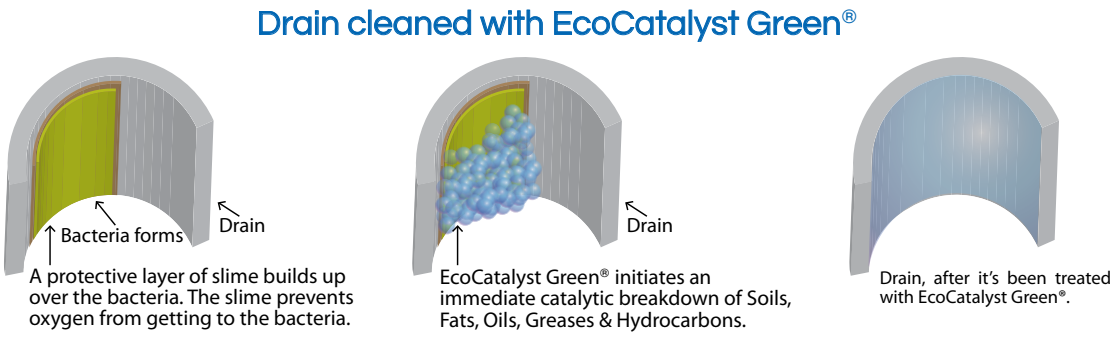


The most common group of lipids encountered in nature is neutral fats (acylgycerols), which serve as the major components of energy storage in plants and animals, especially in vertebrate animals as an adipose (fat) tissue. A neutral fat or lipid molecule consists of a glycerol (CH2OHCH2OHCH2OH) molecule to which fatty acid (RCOOH) chains have been attached by esterification to form fatty esters (RCOOR').

The most abundant neutral fats in nature are the triglycerols (triacylglycerol) with a fatty acid attached to each of the three hydroxy (OH) group of glycerol. Triacylgylcerol is very insoluble in water and as a consequence cannot be degraded by wastewater treatment microorganisms until it is broken down into its components: glycerol and fatty acids. The ester bond linking glycerol to fatty acids is subject to cleavage by hydrolysis, which can be accomplished by very low pH, very high pH, or by the activity of BOCs which are also capable of cleaving ester bonds.

Lipases are a specific group of enzymes, which initiate the first step in the breakdown of lipids by cleaving the ester linkage between glycerol and fatty acids. There are also non-specific esterase's that can attach the ester bonds present in a variety of organic molecules, including some lipids.

A few substances with an esterase activity are not enzyme in the conventional sense, but still have the ability to reduce the energy required to cleave an ester bond by hydrolysis. These substances are called bio-organic catalysts (BOCs), and are thought of to function by several distinct mechanisms.



Bio-Organic Catalyst 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.

A few substances with an esterase activity are not enzyme in the conventional sense, but still have the ability to reduce the energy required to cleave an ester bond by hydrolysis. These substances are called bio-organic catalysts (BOCs), and are thought of to function by several distinct mechanisms. After lipids have been broken down into glycerol and fatty acids, microbial degradation of these two lipids components can take place even though they have markedly different characteristics. Once glycerol is released from a lipid it becomes very miscible in water and will not be detected by the analytical methods used for the quantitative analysis of fats, oils and greases (FOG). Due to its high solubility in water, wastewater microorganisms rapidly metabolize glycerol.

EcoCatalyst Green® will stimulate beta-oxidation by:

- ✓ Beta-oxidation is an aerobic process and BOCs have been shown to increase the mass transfer of oxygen into fluids.
- ✓ BOCs contain some of biochemical precursors required by microorganisms to synthesize factors used in beta-oxidation.
- ✓ BOCs contain small, but detectable, concentrations of CoA.

In conclusion, the treatment of fats, oils, and greases (FOG) components, the lipids, and other non-solubilized organic wastes with EcoCatalyst Green® can have a number of beneficial effects. First, lipids are solubilized, preventing their accumulation on surfaces. This solubilization is part of a sequenced process in which lipid ester bonds are instantaneously cleaved, reducing the molecular structure to glycerol and fatty acids. Glycerol is water soluble and readily degradable. EcoCatalyst Green® also acts by creating an increase in dissolved oxygen (DO) levels that improves the ability of aerobic conditions to predominate within wastewater collection and drainage pipelines.

Seal of Safety

The Bio-Organic Seal of Safety is our commitment to offering the highest bio-aquatic safety on the market today. Our products are not only completely safe and non-toxic, but offer a new model for green chemistry that improves the ecological health of ecosystems.