



Bio-Organic Catalyst



Biological Process Optimization.

Reduce aeration requirements, improve dewatering, enhance biogas yields, and improve discharges.

A non-toxic biocatalyst — not a microbe, not an enzyme — that makes the biology already working in your sewers, lagoons and aeration basins work faster. Less H_2S , less aeration energy, less sludge, cleaner discharge. Dosed at 1–4 ppm into water you already move.

In commercial service in more than ten countries — including municipal systems in the US, the Gulf and Latin America.

– 34%

aeration energy per tonne of BOD,
110,000 PE plant*

> 95%

less H_2S at a works inlet,
Dubai**

86 → 11

mg/l BOD — out of consent to in
consent in 12 weeks, Wales***

11 days

to dissolve a 95-foot fatberg,
Boston†



THE PRESSURE

Four costs that only move in one direction

For a municipal operator, none of these get easier on their own. Energy prices, sludge gate fees, consent limits and public tolerance for odour all move the same way — and the assets you have to meet them with were designed for a smaller city.

1

Energy, and most of it is air

Aeration alone can account for 50–60% of a treatment plant's electricity. It is the single largest controllable cost on most sites, and it rises with load.

2

H₂S, odour and corrosion

Sulfide in the collection system drives complaints, planning objections and a live worker-safety exposure — and quietly eats concrete, metal and lift-station assets.

3

Sludge you pay for twice

Solids must be aerated, dewatered, hauled and disposed of. Volumes grow, gate fees rise, and every tonne is handled more than once.

4

Capacity and consent headroom

BOD, COD, ammonia and nutrient limits tighten while population grows. Buying headroom normally means buying concrete.

Aeration share of plant energy per Bio-Organic Catalyst technical materials and widely reported water-industry benchmarks; the exact share varies with process type, loading and plant age.



THE SOLUTION

BOC — a catalyst, not a chemical

BOC is a patented, plant- and mineral-derived biocatalyst. It contains no bacteria and no active enzymes. It makes the microbial population already living in your sewers, lagoons and basins work substantially faster.

01

Not a bug in a jug

No new organisms to seed, monitor or re-inoculate. BOC works with the biology already present in your system.

02

Works at 1–4 ppm

Tiny doses do the work. No bulk chemical logistics, no hazardous storage, no handling burden on operators.

03

Drop-in, no capex

Dosed at a manhole, lift station, headworks, lagoon or digester feed through a small pump. No plant, no retrofit, no downtime.

04

Non-toxic and certified

Ecocert EU and USDA organic attestations on PC3 Organic. NSF food-safe certification on Eco-Cat. Made in the USA.

Composition: water, plant and mineral extracts, highly purified yeast fermentation by-products and a non-ionic surfactant. No live bacteria. No active enzymes. Nothing that needs a permit to store.

Source: Bio-Organic Catalyst product technical data and Safety Data Sheets, bio-organic.com. Dosing guidance is per product label; site-specific rates are set during assessment.



HOW IT WORKS

Three actions, one dose

BOC does three things at once in the same water. Together they take material that would otherwise sit as FOG, sludge, sulfide and ammonia and drive it through to gas, stable solids and inert nitrogen.

01

Solubilise

Amphiphilic molecules break open fats, oils, greases and slime, releasing locked-up carbon and exposing solids to microbial attack.

95-ft FOG mass dissolved · 11 days
Fats solubilisation · + 1,240%

02

Catalyse

Lowers the activation energy of each biological step, so the microbes already present drive organics and ammonia through faster.

TKN at final discharge · – 68.6%
Ammonia as $\text{NH}_3\text{-N}$ · – 85.7%

03

Oxygenate

Micro- and nano-bubbles with loose, porous shells raise oxygen transfer, forming aerobic conditions that suppress H_2S and drive nitrification.

H_2S at a works inlet · > – 95%
Aeration energy per t BOD · – 34%

The nitrogen route: $\text{NH}_3 \rightarrow \text{NO}_2^- \rightarrow \text{NO}_3^- \rightarrow \text{N}_2 \text{ gas}$. BOC accelerates every step — including simultaneous nitrification and denitrification inside a single lagoon or biofilm.

Supporting figures: FOG mass, MWRA Deer Island, Boston. Fats solubilisation, Aqua Enviro (2009). TKN and ammonia, secondary aeration lagoons at a global food manufacturer. H_2S , Bio Catalyst Middle East, Dubai. Aeration energy, Kinnegar WWTP, Northern Ireland. Detail on slides 5 and 8–14.



SIGNATURE CAPABILITY

Nitrogen, driven all the way to nitrogen gas

Ammonia is the parameter that puts most plants closest to their consent. BOC accelerates every step of the nitrogen cycle — and can drive nitrification and denitrification simultaneously inside a single lagoon or biofilm.



Measured at a full-scale plant — final discharge, secondary aeration lagoons	
Sixty-day baseline average vs. the treated period	
Total Kjeldahl nitrogen (TKN)	– 68.6%
Ammonia as NH ₃ -N	– 85.7%
Nitrate as N	– 83.3%

Why it matters to a utility

Nitrogen headroom is compliance headroom. Removing ammonia biologically is the cheapest capacity a plant can add — and it arrives without a capital programme.

Carry-over: reductions persisted after dosing paused.

Source: Bio-Organic Catalyst case study — reduction in final discharge levels of TKN, NH₃-N and nitrates in secondary aeration lagoons following EcoSystem Plus injection (boc_improving_wastewater_treatment.pdf, bio-organic.com). Percentages are against a 60-day pre-treatment baseline average at the same site; there was no separate untreated control. Results vary with loading, temperature and process configuration.



WHERE IT FITS

Four dosing points across one system

BOC follows the water. You can start at any one of these points and add the others as the numbers come in — each is a dosing pump and a protocol, not a project.

Collection network

Injected at manholes, lift stations or via atomiser nozzles upstream. Turns the sewer into a pre-treatment extension: H₂S down, FOG broken up, slime and corrosion reduced.

DOSE

1–4 ppm · at lift stations

Headworks & primary

Dosed into the influent channel. FOG and grease dissolved before they reach clarifiers, screens and channels — and before they become a fatberg.

DOSE

1–4 ppm · continuous

Aeration basin & lagoon

Into the aeration zone or across the lagoon surface. Higher DO per kilowatt, faster BOD and ammonia removal, activated biomass, more load per basin.

DOSE

1–4 ppm · continuous

Digester & solids handling

Into digester feed or at dewatering. Faster solids destruction, more gas, less H₂S in the biogas, lower volatiles and less cake to haul.

DOSE

250–1,200 mL / t VS

No new plant. No process change. A small dosing pump and a protocol we set with your operations team.

Dosing points and rates per Bio-Organic Catalyst technical materials and distributor field practice; site rates are confirmed during assessment. Collection-system pre-treatment as described in [boc_improving_wastewater_treatment.pdf](#) ([bio-organic.com](#)).



THE RETURN

Where the money actually shows up

Every figure in the left-hand column was measured on an operating municipal or high-strength water treatment site. Sources and caveats are given on the case-study slides that follow.

Measured change

Aeration energy per tonne of BOD

Kinnegar WWTP, Northern Ireland

– 34%

H₂S at a works inlet

Municipal system, Dubai

> – 95%

Ammonia-nitrogen in final effluent

Municipal plant, Sharjah

– 87%

BOD in final discharge, back within consent

Wastewater plant, Wales, UK

– 87%

H₂S in a sewer reline project

Fountain Valley, California

– 85%

Sludge pressed for disposal

Food manufacturer's lagoons

– 28%

The energy line

Aeration is the largest controllable cost on most plants. BOC works on both sides of it.

Aeration, share of plant energy
50–60%

Oxygen demand
falls as BOD and TKN clear faster

Oxygen delivered per kW
rises with micro-bubble transfer

– 34%

aeration energy per t BOD, measured

Sources by row: Kinnegar WWTP, Northern Ireland, 110,000 population equivalent, report by Alps Ecoscience UK (2019/22); Bio Catalyst Middle East project reports, Dubai and Sharjah (2023–25); Kiewit sewer relining project, Fountain Valley, California; wastewater plant in Wales, UK, Dec 2023 – Mar 2024, BOD 86 → 11 mg/l against a 20 mg/l consent; global food manufacturer secondary aeration lagoons, 57,065 → 40,892 lb/day (2006). Results depend on loading, temperature and operating conditions.



Hydrogen sulfide cut at source, in three different systems

Sulfide is where most municipal odour complaints, most corrosion and most operator-safety exposure come from. BOC is injected upstream and treats the sewer itself, rather than masking what arrives at the works.

Three deployments in collection systems

San Francisco, California

H₂S reduction achieved across five miles of city sewers

Major reduction

Fountain Valley, California

Injected 1.5 miles upstream of a reline pit through three fine atomiser nozzles

– 85% H₂S

Gillette Stadium & retail complex

Replaced Bioxide and VX-456. EcoSystem Plus injected with aeration into two wet wells; complaints stopped and H₂S treatment cost fell 50–60%

Odour eliminated

And verified in a government lab

China National Analytical Center, Guangzhou — Eco-Cat tested for odour neutralisation, April 2021

Hydrogen sulfide, at 1:1000	88.8%
Hydrogen sulfide, at 1:500	87.3%
Ammonia, at 1:1000	86.7%
Ammonia, at 1:500	86.2%

Neutralisation efficiency in a static chamber. In a live sewer, circulation improves on it.

Sources: Bio-Organic Catalyst case studies in boc_improving_wastewater_treatment.pdf; laboratory results per the Institute of Analysis, Guangdong Academy of Sciences (China National Analytical Center, Guangzhou), April 2021, testing Eco-Cat at 20°C and 1 atm on 0.15 mg/m³ H₂S at 1 L/min through a bubble absorption tube. The San Francisco and Gillette Stadium field results are reported qualitatively by the operators; the 85% figure is from the Kiewit reline project at Fountain Valley.



CASE STUDY • MWRA DEER ISLAND, BOSTON

A 95-foot fatberg gone in eleven days

A dense, hardened FOG mass had filled the secondary clarifier influent channel at one of the largest treatment works in the United States — 95 feet long, 6 feet wide and 5 feet deep, with plastics embedded through it.

Secondary clarifier influent channel

Before treatment

FOG mass dense and hard, filled with embedded plastics

95 ft × 6 ft × 5 ft

After 11 days

FOGs eliminated, floating plastics separated and removable

Channel clear

And the FOGs cannot reform — the ester bonds are broken, not emulsified.

Why FOG is a municipal cost

Grease is the root of blockages, overflows, emergency jetting and much of the odour in a sewer. Conventional surfactants emulsify it, so it reforms further down the line. BOC breaks the ester bonds instead, cutting the long chains into fragments the local microbiology can eat.

+ 1,240%

fats solubilisation, Aqua Enviro (2009)

Source: Bio-Organic Catalyst case study, Massachusetts Water Resources Authority, Deer Island, Boston, in boc_improving_wastewater_treatment.pdf (bio-organic.com). Dimensions and the eleven-day result are as reported with before-and-after photography; the published material does not include instrumented FOG mass measurements. Fats solubilisation figure from Aqua Enviro (2009) laboratory work.



CASE STUDY · KINNEGAR WWTP, NORTHERN IRELAND

A third off the aeration bill at a 110,000 PE works

The cost line that matters most to a utility finance director is electricity, and most of that electricity is blower power. Kinnegar is the reference where that was measured properly, normalised per tonne of BOD treated.

Measured at full scale	
Aeration energy per tonne of BOD removed the normalised measure — not raw kWh	– 34%
Plant size population equivalent served	110,000 PE
Capital works required dosing pump and protocol only	None

How the saving arises

Less oxygen demanded, because BOD and TKN clear faster — and more oxygen delivered per kilowatt.
Blowers hold the same dissolved-oxygen setpoint at lower frequency or shorter run time — the same control philosophy, less power.

– 34%
per tonne of BOD removed

On a plant of this size, a third off the largest energy line is a permit-free capacity and carbon improvement — delivered by a dosing pump.

Source: Kinnegar wastewater treatment works, Northern Ireland; report by Alps Ecoscience UK (2019/22). Figures are as reported in that assessment, normalised per tonne of BOD treated. Savings at any other site depend on process type, loading, blower control and starting efficiency — which is why we baseline before dosing.



CASE STUDY · WASTEWATER PLANT, WALES, UK

Out of consent, and back in, inside twelve weeks

A 62,500 litre-a-day plant treating domestic sewage together with restaurant and laundry waste was failing its BOD consent and had come onto the regulator’s radar. Fats and grease from the kitchens were overwhelming the biology. Dosing started on 18 December 2023.

Final discharge against consent

Parameter	Before → after	Change
Biochemical oxygen demand (BOD) consent 20 mg/l — was failing	86 → 11 mg/l	– 87%
Suspended solids consent 30 mg/l	29 → 12 mg/l	– 59%
Ammoniacal nitrogen (NH ₄) consent 20 mg/l	4.9 → 3 mg/l	– 39%

What the operator saw

Dissolved oxygen, biozones 1 · 2 · 3
2.0 · 12.0 · 13.0 mg/l

COD, within three weeks of dosing
300 → 200 mg/l

“The liquor has gone from a creamy white appearance to a clear liquor with a lovely dark brown biomass.”

— site engineer, two weeks in

Dosing ramp: 18 Dec, 400 ml/day (6 ppm) → 17 Jan, 500 ml/day (7.5 ppm) → 27 Feb, 750 ml/day (11.3 ppm). Eco-System Plus first, then Eco-Cat. No capital works.

Source: Bio-Organic Catalyst field test report, wastewater plant in Wales, UK, 18 December 2023 to 15 March 2024 (boc_case_study_wastewater_uk_wtp.pdf, bio-organic.com). Customer name available under NDA. This is a 62.5 m³/day package plant, not a municipal works — the influent is domestic sewage plus kitchen and laundry waste. There was no untreated control, dosing of a low-oxygen bacterial product was stopped before BOC began, and readings fluctuated during the trial (ammoniacal nitrogen reached 6.3 mg/l on 8 March before settling at 3). Figures are operator and laboratory results as reported in the discharge summary.



CASE STUDY • WASTEWATER TREATMENT FACILITY

From 450 ppm of H₂S to under 50, in two months

A treatment plant with severe hydrogen sulfide, murky water and a steady stream of odour complaints from neighbouring residents. Aeration alone had not fixed it. BOC was dosed into the existing process, and the plant tracked the numbers for several months.

Hydrogen sulfide over time

At baseline before dosing	> 450 ppm
After two weeks 2 ppm shock dose	307.6 ppm
After two months 1 ppm of the BOD load, continuous	< 50 ppm

An 85%+ reduction overall — and the community odour complaints stopped with it.

And alongside it

Total nitrogen
7.2 → < 1 mg/L
Phosphate phosphorus
0.7 → < 0.1 mg/L
Water clarity
turbidity and solids down
— 30%
energy, on better oxygen transfer

It corroborates Kinnegar: two unrelated plants, in different countries, both reporting roughly a third off the energy line from the same mechanism — more oxygen transferred per kilowatt.

Source: Bio Catalyst Middle East case study, “Seeing is Believing: A Case Study on BOC’s Impact” (bio-organic.com). Plant name and location are not stated in the published material, and the figures are as reported by the distributor rather than independently audited. Dosing was an initial 2 ppm shock for two weeks, then 1 ppm of the BOD load continuously. The 30% energy figure and the reduction in aeration maintenance are the plant’s own observations; there was no untreated control.



CASE STUDY · GULF COOPERATION COUNCIL

Odour and ammonia, under instrumentation

Our GCC distributor, Bio Catalyst Middle East, runs BOC across municipal wastewater, sewerage networks and facilities in the UAE — with logger-baselined measurement rather than operator impression.

Dubai · sewerage network

H₂S logged to establish a baseline, then dosed at 1–2 ppm for three months

H₂S at the works inlet

> – 95%

Sulfide is generated in the line, so it is best treated in the line. Dosing upstream removed the load rather than scrubbing it at the works — which also takes the corrosion pressure off the network assets.

Sharjah · municipal treatment plant

Effluent quality measured over the first 30 days of dosing

Ammonia-nitrogen in effluent

– 87%

Total nitrogen

– 70%

Achieved inside a month, on the existing process, with no capital works and no change to the plant’s control philosophy.

Locally credentialled: ISO 9001 and ISO 14001 held in our GCC operation, with Dubai Municipality approval — alongside lake and lagoon management, district cooling and facilities programmes running on the same chemistry.

Source: Bio Catalyst Middle East project reports, Dubai and Sharjah (2023–25); biocatalystme.com. Figures are as reported by the distributor from site instrumentation and laboratory analysis; they are not third-party audited. Client names withheld. Results vary with network length, retention time, temperature and influent strength.



Odour and organic load, in public utility service

Our Colombian distributor, TQI, runs BOC products across public water utilities, sewer collectors and landfill leachate treatment — the same three problems every municipality has, in a different climate and regulatory system.

Bogotá · public utility, domestic wastewater

Ecocatalyst and Bioenergyzer applied in service

Perceived odour

organoleptic assessment

up to – 80%

COD (DQO)

removal of the organic load parameter

– 30%

Surface grease

crust broken up and dispersed

Cleared

Also deployed for odour control in the Cúcuta collectors during network works.

Landfill leachate

Nontox and Bioenergyzer, Bogotá

COD removal, without
biotechnologies

16%

COD removal, with BOC
programme

38.1%

Improvement

+ 22.1 points

Pairing aeration with the biocatalyst raised oxidation of organic matter and cut chemical dosing at the plant.

Source: TQI (tqi.co/casos-de-exito), Bio-Organic Catalyst's Colombian distributor. Figures are as published by the distributor from operating sites; they are not independently audited, and in each case BOC products were applied alongside a complementary bioremediation product, so results belong to the programme rather than to BOC alone. Odour reduction is an organoleptic (perception) assessment.



BOC vs. calcium nitrate for odour control

Most utilities already dose calcium nitrate (Bioxide) somewhere in the network. It works on the smell — but it sends the bill downstream to the treatment works.

	Calcium nitrate (Bioxide)	BOC — Bio-Organic Catalyst
Nitrogen load	Adds nitrogen load to the treatment works	Lowers organic and nitrogen loading downstream
Aeration energy	Can raise aeration electricity by up to 50%	Cuts aeration energy — 34% measured at Kinnegar
FOG and slime	Does not address fats, oils, grease or slime	Dissolves FOG and removes slime build-up in the line
Corrosion	Sulfide suppressed chemically; slime remains	Removes a major source of sulfide and corrosion
Mechanism	Chemical control of the symptom	Shifts the microbiology to aerobic conditions
Handling	Bulk chemical logistics and storage	1–4 ppm, non-toxic, no hazardous storage

Source: Bio-Organic Catalyst, “BOCs vs. Calcium Nitrate (Bioxide)”, in boc_improving_wastewater_treatment.pdf (bio-organic.com); aeration energy comparison at Kinnegar WWTP per Alps Ecoscience UK. The characterisation of calcium nitrate is Bio-Organic Catalyst’s, based on field experience at sites that switched; the two products are not directly equivalent and site conditions differ.

SAFETY & CERTIFICATION

Safe for operators, for the receiving water, and for the biosolids

The first question any process manager or environmental regulator asks about a new input is what it does to the receiving water, to the people handling it, and to the sludge that goes to land.



Bio-aquatic toxicity	LC ₅₀ of 203 ppm in marine fish and 316 ppm in mysid shrimp, against typical use at 1–4 ppm — a margin of more than fifty times. Tested under EPA protocols at independent EPA-certified laboratories.
Readily biodegradable	More than 75% degradation in 28 days under OECD 302B, with low bioaccumulation potential. Not mutagenic in Salmonella typhimurium testing.
Certified and quality-assured	Ecocert attestations to EU Regulations 2018/848 and 2021/1165 and the USDA National Organic Program on PC3 Organic. Eco-Cat is NSF certified food safe. Made in the USA.
Nothing hazardous to handle	Non-toxic, non-caustic, non-corrosive and biodegradable at use concentration. No hazardous-material handling or storage burden on plant staff.



The Bio-Organic
Seal of Safety™

The Bio-Organic Seal of Safety™ is Bio-Organic Catalyst's own mark. LC₅₀ figures are from testing under EPA protocols at EPA-certified laboratories (Menidia beryllina, 96 hr; Mysidopsis bahia, 48 hr); they are not an EPA product registration. Safety Data Sheets for the US, Canada, EU and Spain, and REACH dossiers, are published for every product at bio-organic.com/safety-data-sheets.



COMMERCIAL TRACTION

In service today — and expanding reach and volume

BOC is not a pilot looking for a home. It is in paid commercial service in more than ten countries, backed by two decades of development, a US manufacturing base and a growing regional distributor network.

10+

countries in commercial use

20+

years of development

1–4 ppm

typical municipal dose

USA

manufacturing base

Regional partners already delivering municipal work

Gulf Cooperation Council

Bio Catalyst Middle East, Dubai — municipal wastewater, sewerage networks and lagoon management. ISO 9001 and ISO 14001; Dubai Municipality approval.

Colombia

TQI — public utilities, sewer collectors, landfill leachate, potable and process water, odour control.

United States and Europe

Direct supply and project support from Bio-Organic Catalyst, Inc., California.

The same chemistry, elsewhere

Municipal work sits alongside proven service in adjacent streams that most utilities also touch:

- Anaerobic digestion & biogas
- Food processing effluent
- Industrial & pulp and paper
- Lake and lagoon remediation
- Agriculture and irrigation

Sources: bio-organic.com; Bio Catalyst Middle East (biocatalystme.com); TQI (tqi.co). Country count and years of development are as stated by Bio-Organic Catalyst, Inc.



HOW WE START

Assess, trial, scale

BOC is already in commercial supply in multiple countries. Adding a works or a catchment is a protocol change, not a capital project.

01

Assess

2–4 weeks

We review one site: flows and loads, energy use per tonne of BOD, sludge tonnages and gate fees, H₂S hotspots in the network, and your consent margins. You get a written model built on your numbers, not ours.



02

Trial

8–16 weeks

One catchment, one lagoon or one basin. Dosed at 1–4 ppm through a small pump. We baseline first, then measure to protocol. No capital works, no process change, no disruption to service.



03

Scale

ongoing

We supply direct or through regional partners, and hold the protocol as you roll it across the network. Volumes and commercial terms are set at this point.

What we bring to your site is measurement. Energy per tonne of BOD, H₂S at the inlet, ammonia at the outfall and sludge to the press — baselined before we dose, so the numbers end up being yours rather than ours.

Trial design, sampling regime and success criteria are agreed in writing before dosing begins.



Let's put a number on your treatment works.

We are expanding reach and volume across municipal water and wastewater worldwide. If you want these numbers for your own network, we will build them with you — on your flows, your energy prices and your consent limits.



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100 patents world-wide,
21 patents pending.