BIO CATALYST
THE POWER IN NATURE

ECOLOGICAL TREATMENT OF WATER AND WASTE

www.bio-catalyst.eu

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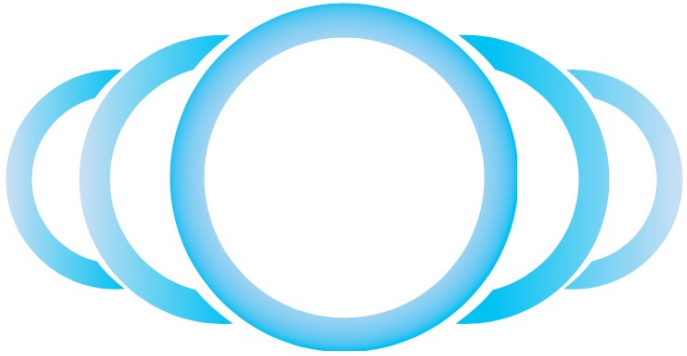
INTRODUCING



BIO-ORGANIC CATALYST

THE POWER IN NATURE®

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What is BOC?

- BOC's are based on the powerful bio-catalytic capabilities of a plant and mineral derived fermentation supernatant with a non-ionic surfactant.
- Accelerates chemical and biological reactions.
- Solubilizes and degrades organic matter quickly.
- Increases the oxygenation of the water and acts as a reliable source of nutrients.
- BOC's proprietary amphiphilic molecules attach to components such as;
  - Biofilm
  - Organic residues
  - Oxygen
  - Odorous greenhouse gasses
  - Hydrocarbons

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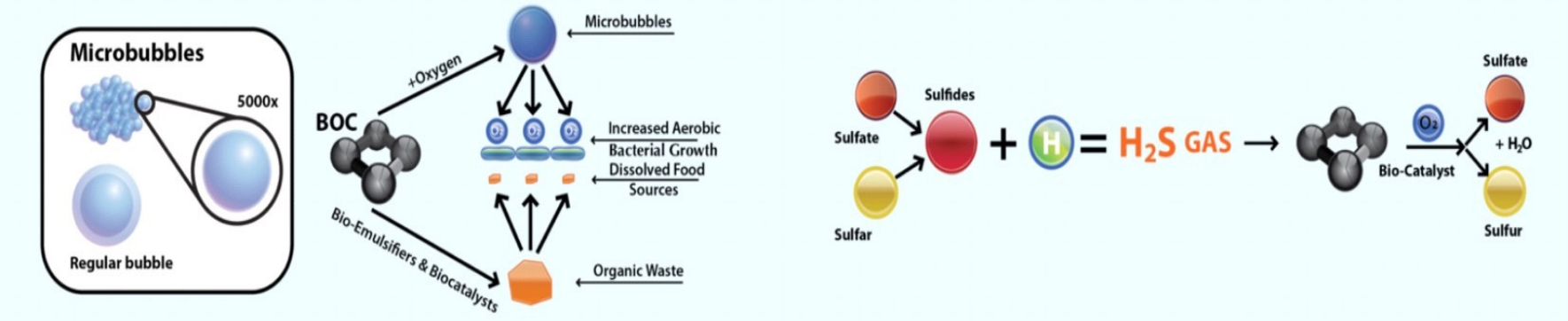
How does it work?

- **Oxygenation:** The formation of micro- & nanobubbles that act as a platform for biological and chemical reactions to occur.
- **Solubilization:** BOC solubilizes the cellular structure of organic waste, increasing gas transfer rates.
- **Catalysis:** Reduces the amount of energy required for biological or chemical reactions to occur (accelerates the degradation process of nature 100 times).



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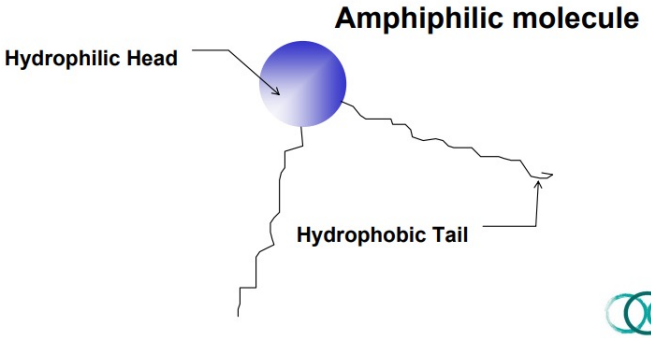
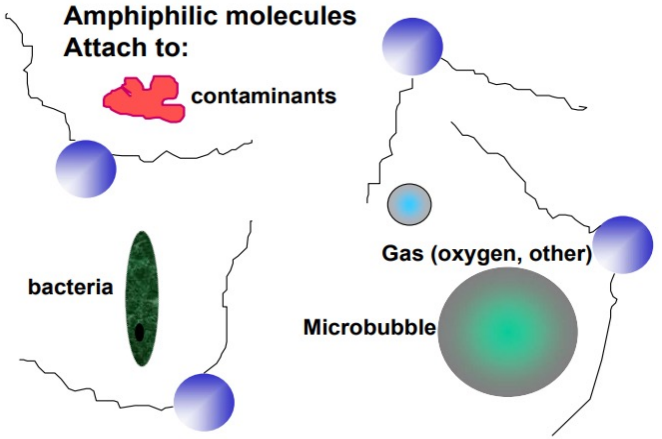
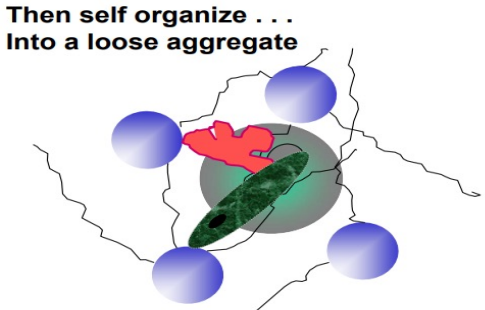
How Does the Bio-Organic Catalyst Technology Work?







With all the elements for a biological reaction together, reduction of the contaminant proceeds rapidly

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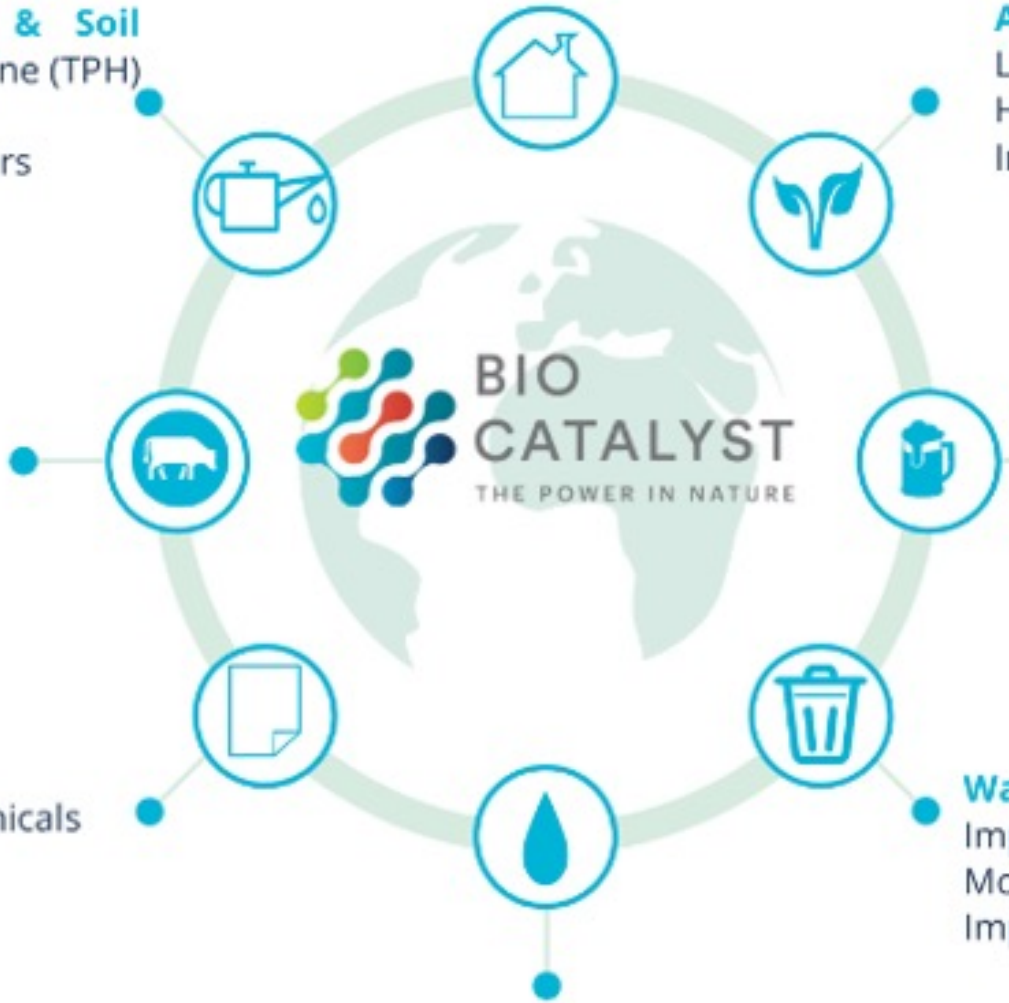
Benefits of BOC vs other microorganisms

Bio-Organic Catalyst®	Bacteria and Enzyme Product
Broad spectrum	Very specific
Stable (works at any temperature from 1 to 99°C)	Unstable
Catalyzes immediately	Takes time
Safe for humans, animals and marine	Health exposure
Dissolved oxygen increase	No increased dissolved oxygen
Breaks down VOCs	No effect on VOC
Eliminates odor	Masks odor

Facility Management & Home
Green Cleaning of surfaces and tubes
Elimination of odor
Pools, Spa's, Fountains

Contaminated water & Soil
Crude oils, Diesel, Kerosine (TPH)
Improved nitrification
Remediation lakes & rivers

Agriculture
Lower water & energy usage
Higher Yields
Improvement of soil conditions



Odor & GHG Control
Livestock, Water,
Waste & Soil
H2S, NH3, CH 4, CO2

Food Processing
Breakdown of FOG
Biofilm elimination
Less harsh Chemicals

Paper Industry
Fewer biocides & chemicals
Energy savings
Less fiber loss

Waste to fuel
Improved Hydrolisis in AD
More production of biogas & CH4
Improved compost rates & quality

Waste & Process Water treatment
Lower energy consumption
Sludge reduction
Odor elimination
Less chemicals and biocides

BOC usage in waste management

- **Odor control:** BOC's have the ability to break down VOC's and/or treat the source of the odor by improving aerobic conditions. (NH3, H2S, CH4 & more)
- **Biological treatment of waste water/percolate:** Reducing the use of energy, chemicals, biocides, polymers and sludge reduction.
- **Anaerobic digestion:** Improving hydrolysis rendering higher yields, OLR's and Hydraulic retention time.
- **Compost:** Accelerating compost rates, improving quality and breaking down odors

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中广测

CMA 180000300714

检 测 报 告

TEST REPORT

样品名称：	BOC天然异味净-2	报告编号：	2021003985-3 a
Sample Name：	BOC Natural Deodorant-2	Report №.：	
样品批号：	20210322	检测日期：	2021-3-24 至 2021-4-8
Sample Lot №./Batch №.：		Testing Period：	24-Mar To 8-Apr
样品性状：	液体	样品数量：	500mL
Sample Appearance：	Liquid	Sample Quantity	
其他信息：	——		
Other Information：			

分析检测结果

Test Results

分析项目 Item	检测结果 Result		试验条件下的除臭效率 Deodorizing efficiency under the test condition(%)	检测方法 Method
	处理前浓度 Concentration before treatment (mg/m^3)	处理后浓度 Concentration after treatment (mg/m^3)		
氨 Ammonia	1.58	0.21	86.7	CJ/T 516-2017/6.21
硫化氢 Hydrogen sulfide	0.16	0.018	88.8	

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备 注 Note	常温常压条件下，将污染物气体，以1L/min的流量，通过装有10mL样品的大型气泡吸收管，采集处理后的气体，分析浓度，计算除臭效率。 Under the normal temperature and pressure, the pollutant gas is collected through a large bubble absorption tube with 10 mL sample at 1 L/min flow rate, and the concentration of the treated gas is analyzed to calculate the deodorization efficiency.

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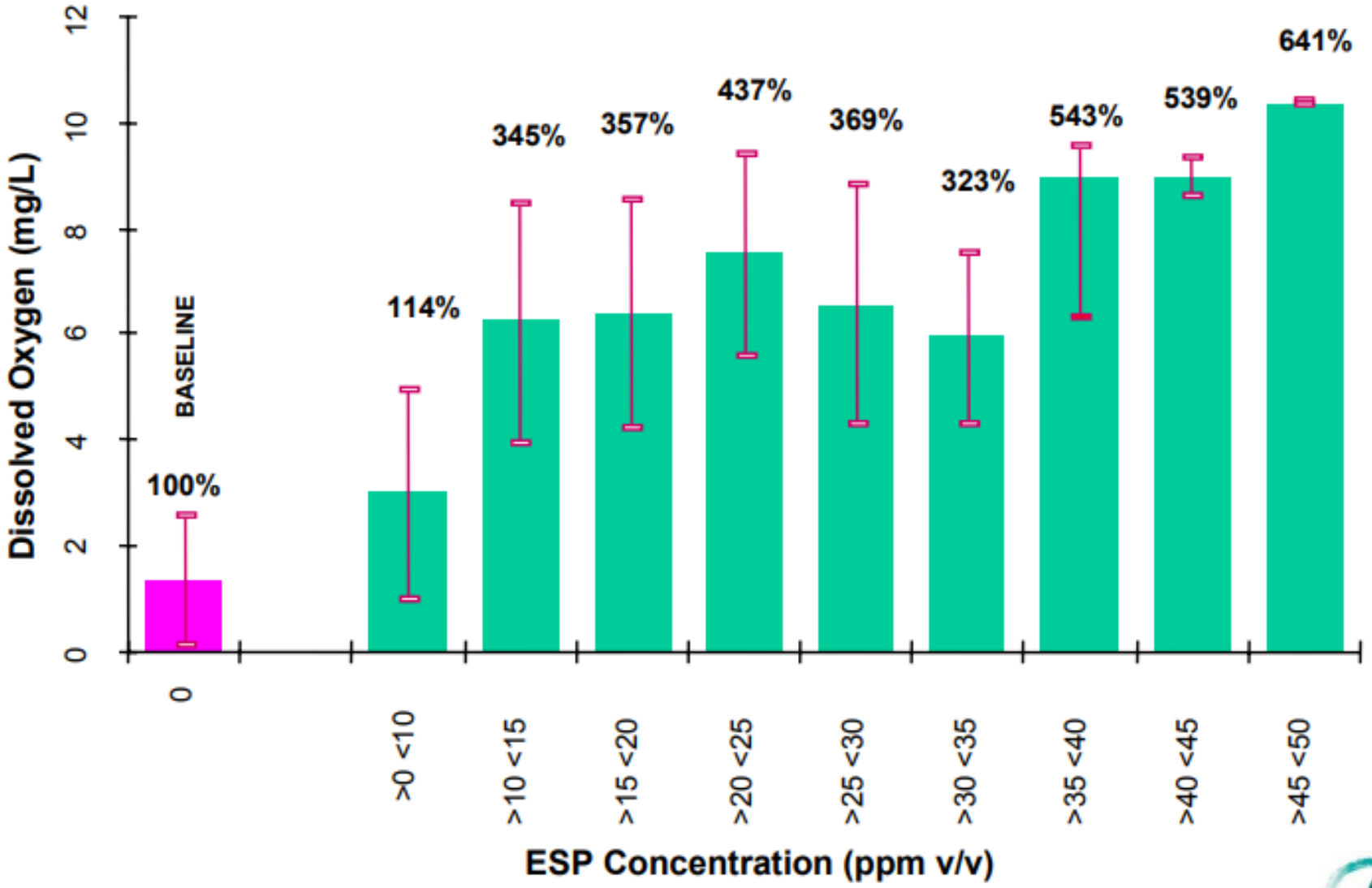
Increase in D.O. with Treatment

Kikkoman Soy Sauce WWT Plant



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Successful case
Treatment of percolate

Before treatment
Superficial clogging of fats
offensive odors
COD 35000 ppm

After treatment
Decreased surface cream of fat
Control of odor precursor gases
COD 15100 ppm

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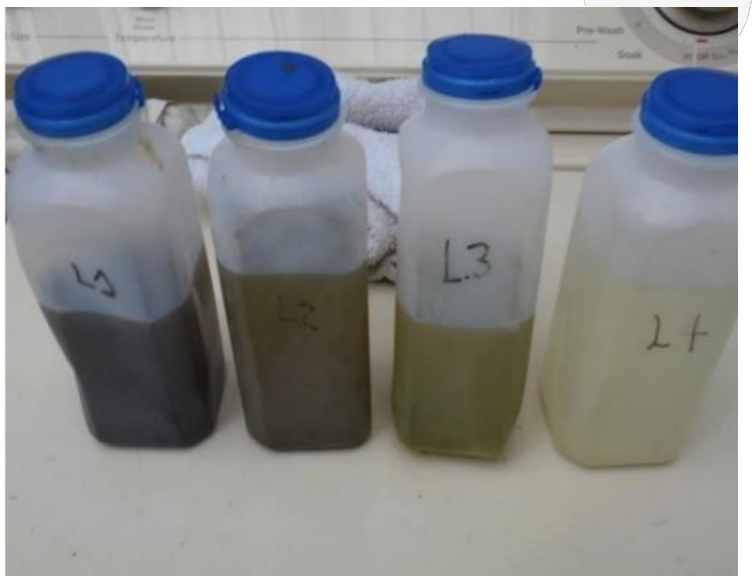
Succesfull Case
Landfill



Parameter	Before BOC	After BOC
BOD	1850 mg/L	388 mg/L
COD	2680 mg/L	844 mg/L
TSS	1200mg/L	185 mg/L

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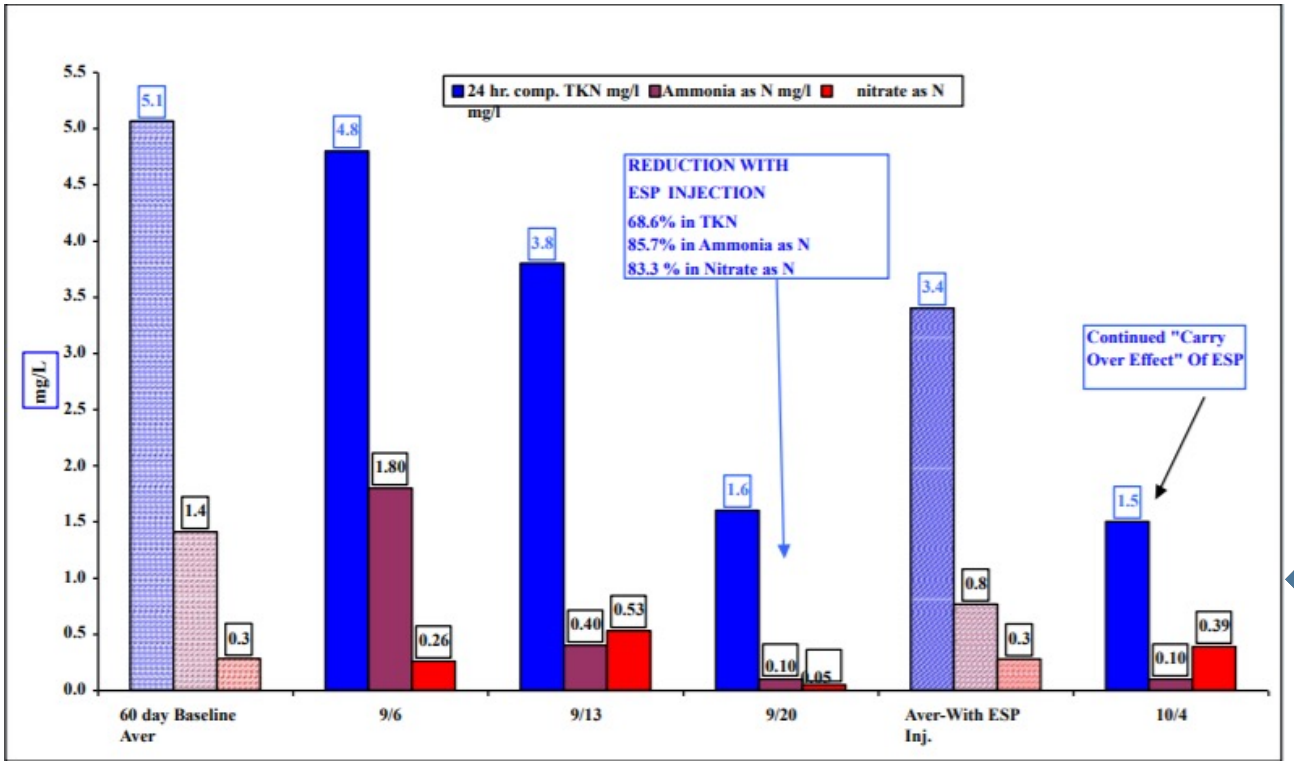
Significant reduction of final discharge levels of TKN, NH3-n and nitrates in secondary aeration lagoons

Final Discharge Level Reductions:

68,6% in TKN mg / l

85,7% in NH-3 mg / l

83,3% in N mg / l



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Successful case
Odor control, improve granulometric quality and acceleration of times

Before ammonia concentration

15 Days later with Catalyst

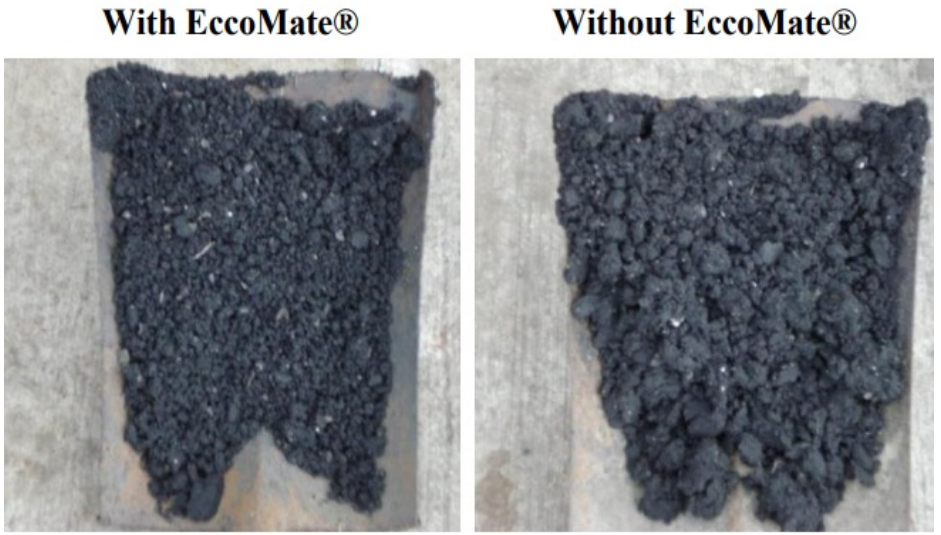
Successful case
Odor control, improve granulometric quality and acceleration of times

The mesophilic phase I is accelerated

The function of the bio-catalyst does not allow the release of C into the atmosphere, favoring the accumulation of C in organic forms within the compost. Organic carbon increased with 51.2%

The percentage of humidity of the composting is between 60-70%

The nitrogen in the young compost registered an increase to 1.64%



Reduce viscosity and improve digestibility at a biogas plant in Leicester, UK

Problem

Problems with the viscosity of the digestate resulting in incomplete AD processing of swine slurry

Solution

Feedstock pretreatment and proprietary reactor additives with Bio-Organic Catalyst for:

- Increase the overall decomposition rate
- Reduce FOS/TAC
- Increase CH4 concentration
- Increase the organic load rate (OLR)

Results

- More stable digester
- 70% more biogas production
- 5% higher methane concentration
- 20% higher OLR.
- Incremental income of more than €120,000 per year.

Hemmet Bioenergy, Denmark

Situation

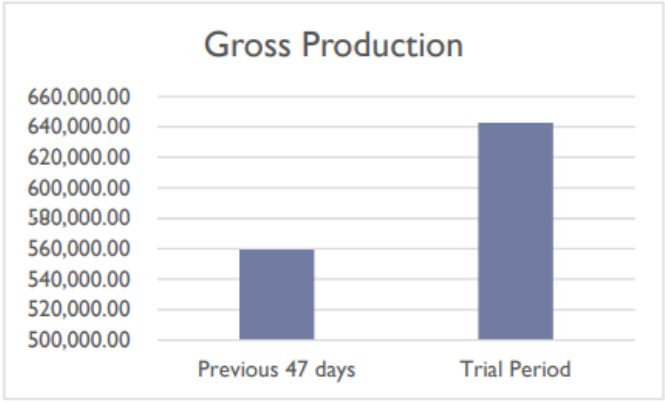
A 2.3 mW plant in Denmark,

Feed: high energy crops and chicken waste

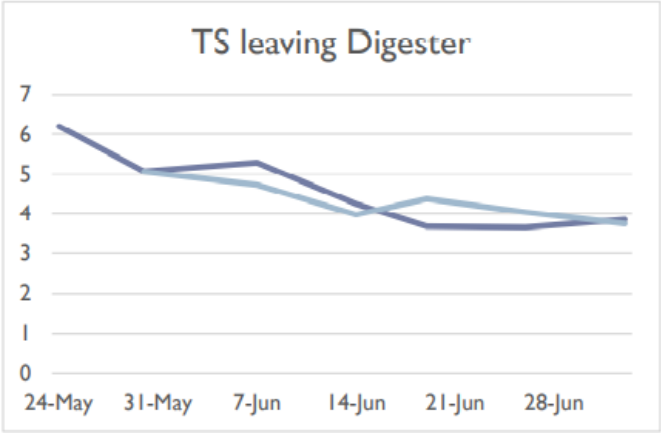
Objective

Increase biomethane yields by increasing gas potential with the release of cellulosic energy through solubilization of lignin structures and observe the reduction in energy demand of mixing activity by reducing shear within digesters.

The plant is a gas to grid



Production increased by 83,151m3 or 15%



Willen Biogas, Enfield, London

Situation

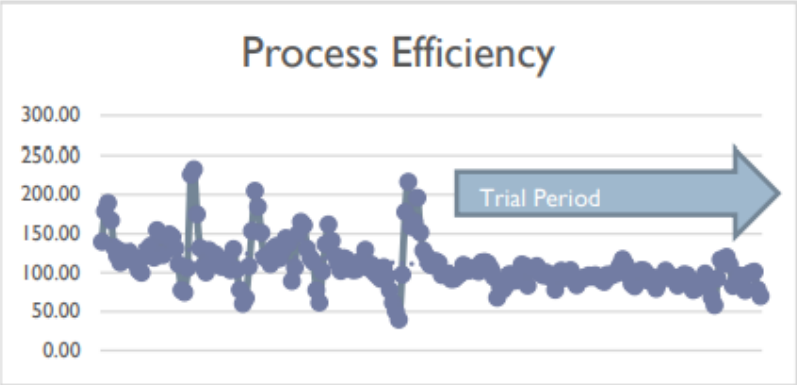
A biogas plant in London, England

Feedstock: Organic fraction municipal waste

Objective

Increase production and stabilize the plant

Dosage: 250 ml ml/T oDM



Detail	Units	Value
Methane Yield at start of Trial	M^3	143
Methane Yield at 3/3/18	M^3	175
Overall Yield Increase (22%)	M^3/tFM	32
Total FM Influent in Trial period	t	2,705
Total Increase in Methane	M^3	86,551
Resultant Energy MW		329
Gross Revenue attributed to Yield Increase		£ 39,467.06
Cost of Trial (Consumables 62 days)		£ 12,834.00
Net Increase in Gross Revenue		£ 26,633.06

Table 1.2: An average yield increase expectation based on 5-day avg.

Microuwas - Valoriza

Situation

A pilot biogas plant in Valencia, Spain

Feedstock: Organic fraction municipal waste

Objective

Improve gas production and map microbes involved in the process.

CH4 L	Baseline	40 ml	30 ml	20 ml	10 ml
Promedio CH4 L/dia	621,12	775,62	687,20	744,03	704,74
%increase		24,9%	11%	20%	13%

Total gas	Baseline	40 ml	30 ml	20 ml	10 ml
Promedio total gas L/min	0,73	0,88	0,93	0,91	0,88
%increase		21%	27%	25%	20%

Production of VFA's, University of Cadiz

Situation

Lab test with University of Cadiz (UCA) on Dark Fermentation

Objective

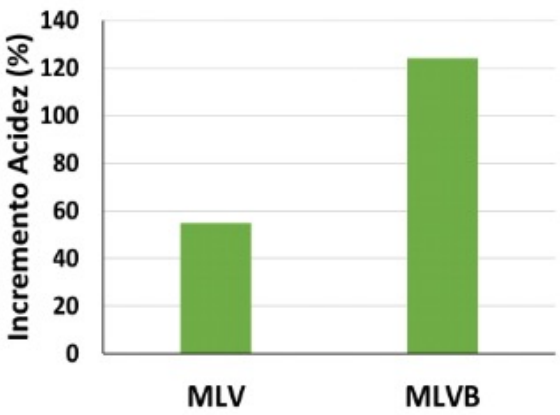
Produce VFA's and bio-hydrogen

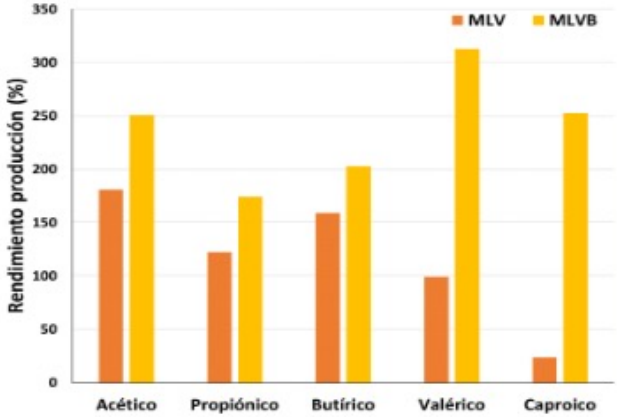
Objective

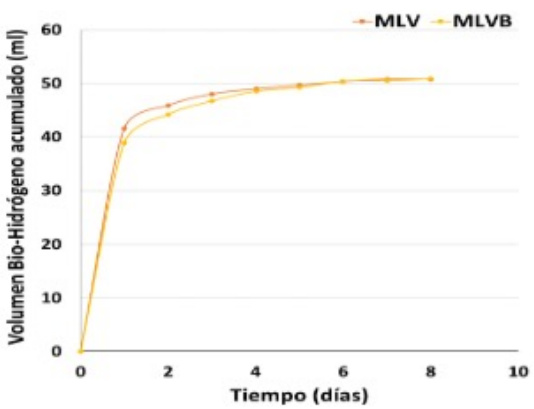
Increase in total acidity of 69% compared to the control. Individual VFA, higher production in the longer chain acids

(C≤4) butyric (4.5 g/l) valeric (1.3 g/l) and caproic (0.2 g/l), with yields higher than 250%.

MLV: Mezcla Lodos/Vinazas **MLVB:** Mezcla Lodos/Vinazas + Biocatalizador







Benefits of Bio-Organic Catalyst in anaerobic digestion

1) Accelerates the degradation / solubilization of organic matter
   - Hydrolysis = limiting stage of the A.D. process.
   - Biotechnology allows rapid hydrolysis
   - Increased biogas production

2) Maintains optimal conditions for micro-organisms
   - Biological stability of the process ("healthy and alive" microorganisms)

3) Improves the quality of biogas produced
   - Better methanogenesis = higher CH4 content
   - Lower H2S production
   - Reduces need for subsequent H2S treatment
   - H2S toxic for methanogenic bacteria → Higher CH4

Our solution to
eliminate bad odors

NO CURE
NO PAY SOLUTION

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