



Green and Healthy Aquaculture - Biological Solutions

SG Crop Solutions

07/2022



Our Goal

With a green and healthy aquaculture, we can reduce:

- Water and soil pollution
- Climate anomalies
- Diseases

Our biological products, invented and manufactured in the USA, have proven their efficacy around the globe from the Americas to Europe and all the way to Asia.



Biofloc

Biofloc technology (BT) is defined as "the use of aggregates of bacteria, algae, or protozoa, held together in a matrix along with particulate organic matter for the purpose of improving water quality, waste treatment and disease prevention in intensive aquaculture systems."

EcoPro

ECOPRO is a blend of selected strains of beneficial microbes listed by AFFCO for use in animal feeds in the USA, a 100% organic balanced nutrient formula to multiply the strains of ECOPRO and an organic chlorine neutralizer. The strains in ECOPRO include bacteria and yeast at 1×10^{12} cels/kg.

Advantages:

- Contains selected probiotics and 100% organic nutrients
- Water purification, bacteriostasis, reformulation and growth promotion
- Breaking down mucopolysaccharide
 - Rapid absorption of ammonia nitrogen and nitrite

EcoPro: Low and High Temperature



Different from similar products:

- a. The market is a single strain, a single direction of action.
ECOPRO is a variety of beneficial bacteria, which can achieve the best effect in proportion.
- b. Unlike other available products which are in high-temperature type only, EcoPro is available in both high and low temperature.

EcoPro: Mechanisms Summary

- Probiotics break down organic particles in water by releasing extracellular enzymes.
- The breakdown of mucopolysaccharides produced by gram-negative bacteria creates a physical barrier of oxygen at the bottom of the pool, leading to the creation of anaerobic deposits.
- More effective use of soluble nutrients than gram-negative bacteria to prevent the growth of gram-negative bacteria.
- Rapid absorption of ammonia nitrogen and nitrite dissolved in water.
- Reduce populations of harmful bacteria (vibrio, etc.) by competing for nutrients and producing antibacterial active products.
- Improve the production of digestive enzymes (amylase, lipase, trypsin, etc.) in the digestive system of cultured animals, improve the conversion efficiency of feed and protein, reduce feed cost, and promote the growth and production of cultured animals.
- Reduce or eliminate the need to change water, save energy, and reduce the risk of introducing harmful microorganisms into farming systems.

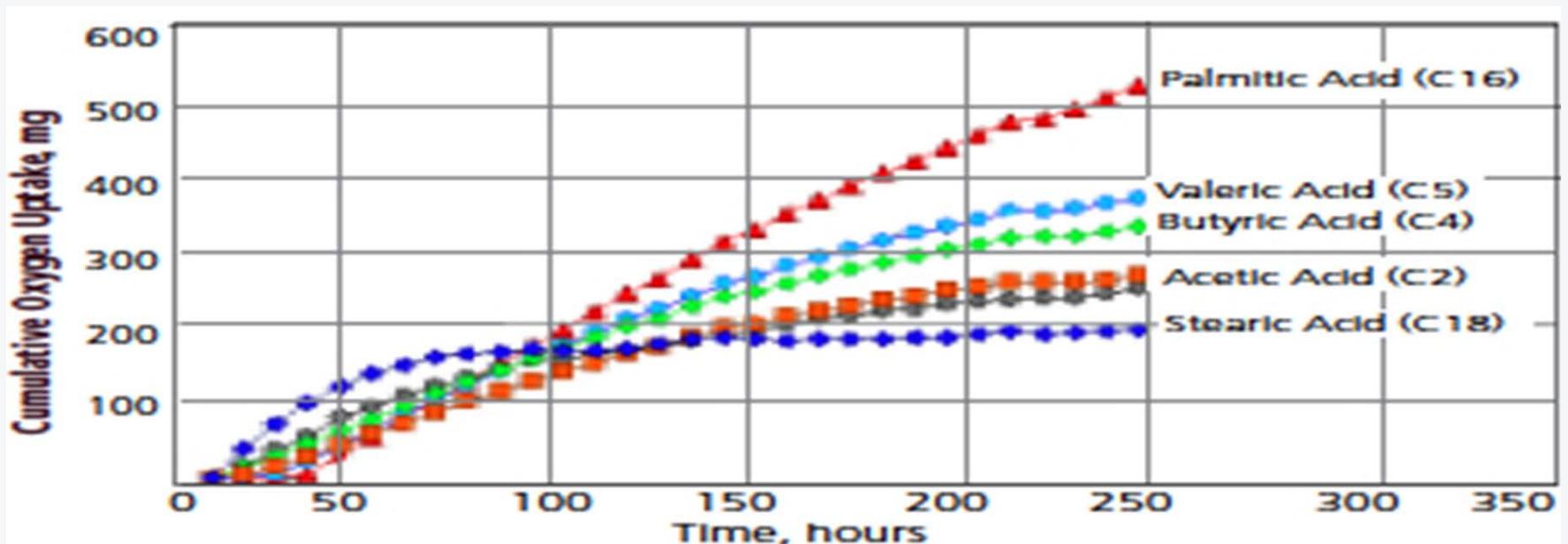
Reduce mucopolysaccharide membranes

Degradation of particulate organic matter through enzymes. Degrades mucopolysaccharide layer produced in bottom of ponds that make bottom anaerobic.



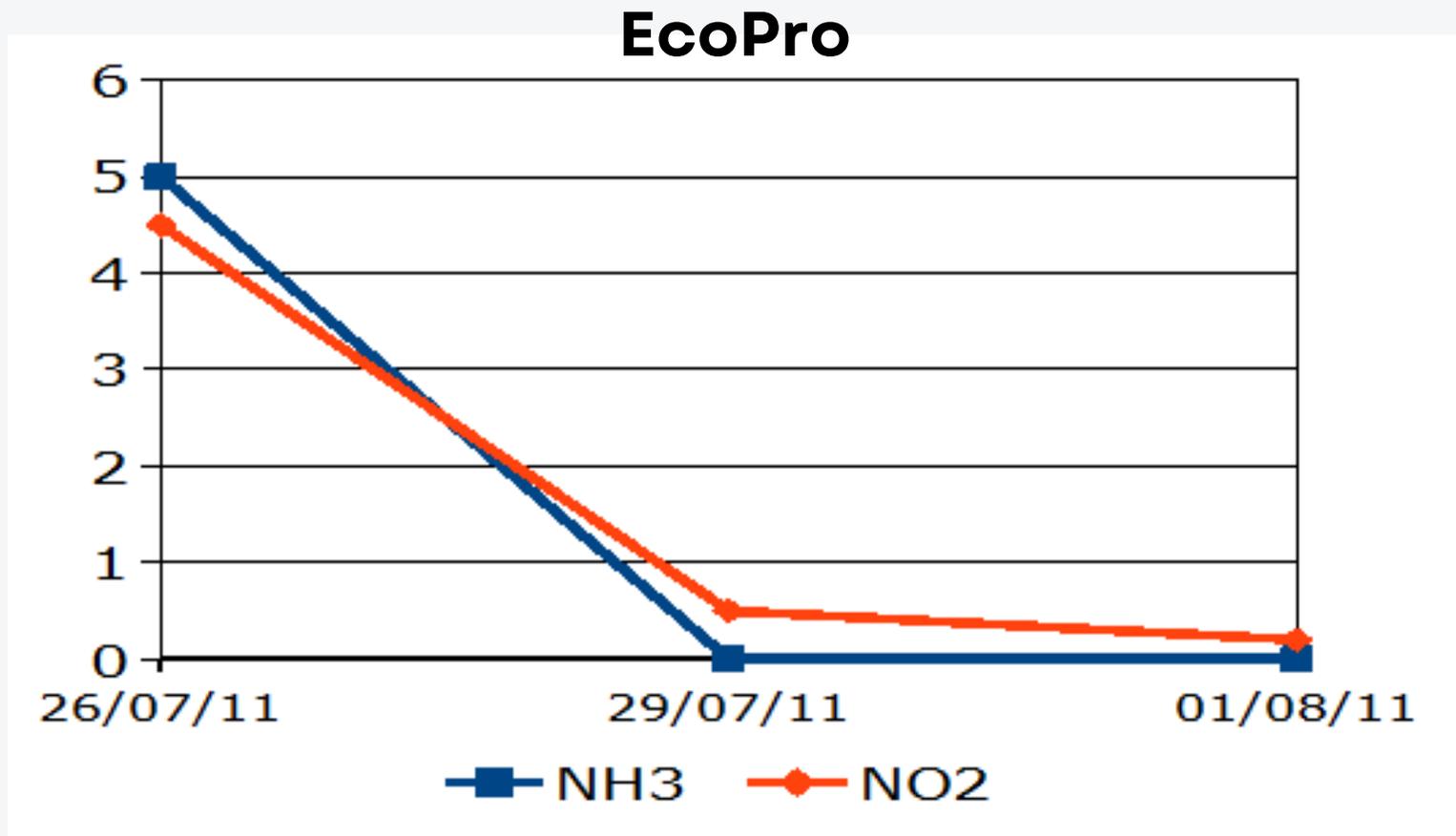
Sludge accumulated during shrimp cycle with probiotics

Degradation of organic acids measured by oxygen uptake



Degradation of organic acids depends on temperature and oxygen availability.

Absorbs NH₃ and NO₂ that are toxic to aqua creatures



Degradation of soluble organic matter



EcoPro degrades and absorbs dissolved organic matter (DOM).

Time(h)	DBO5	% Efic	O & G	% Efic
0	5495.4	0	2639.2	0
17	1240.8	77.4	1534.8	41.8
40	786.8	85.7	487.8	81

Untreated and ECOPRO treated effluent

**Conventional
culture system**



**EcoPro culture
system**



EcoPro helps control diseases

- Dissolved Organic Matter that is food of pathogens which increases oxygen
- Reduces stress by keeping clean water, clean sediments and high oxygen
- Produces natural antibiotics
- Produce polysaccharide that protect fish and help them heal wounds



CONTROLS PATHOGENS AND DISEASE



United States Field Trials

Vibrio control with 1 dose ECOPRO at ORAFARM - Largest marine ornamental producer in USA

ECOPRO: 1 application @ 0.79 ml/L (7.9 mg/L dry product). Final counts 1 week after application
The results showed that the decrease of vibrio was significant.

SAMPLE STATION	INITIAL COUNTS (CFU/ml)	FINAL COUNTS (CFU/ml)	REDUCTION
1	> 800	4	99.50%
2	3330	12	99.60%
3	660	4	99.40%
4	410	28	93.20%
5	300	12	96%
6	1530	0	100%

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ECOPRO treatment:

1. Improved water quality

2. Reduced *Vibrio*

3. Did not control virus

} Reduced stress

▶ White Spot Virus
Present

→ No disease



ZORHEK AQUAFARMS – Florida, USA – Tilapia



ZORHEK AQUAFARMS – Florida, USA – Tilapia

Farm setup:

- 24 round tanks 45 m³
- 2 raceways 165 m³
- 30 kg fish/m³
- Flow through – No floc

Problems:

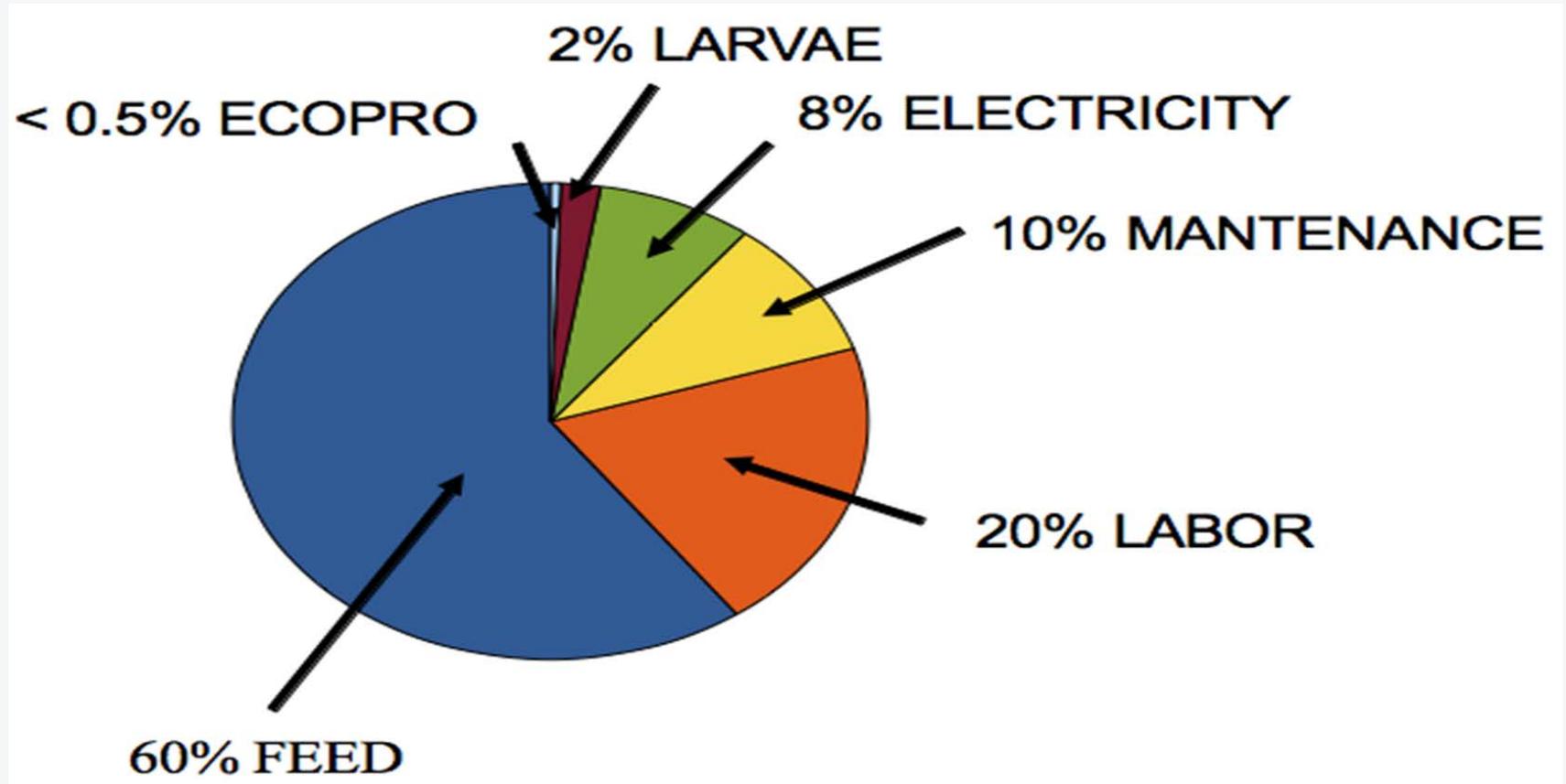
- High water consumption
- High production costs
- Disease



SG Solution

- Add ECOPRO 30 mg/m³/day
- Reduce water change to create **floc**

ZORHEK AQUAFARMS – Florida, USA – Tilapia



Production Costs

ZORHEK AQUAFARMS – Florida, USA – Tilapia

Tilapia Culture

Factor	Control	ECOPRO
FCE	1.45	0.95
SAVINGS IN FOOD		34.48%
HOURS PUMPING/ DAY	24	7
SAVINGS IN WATER		80%
SAVINGS IN ENERGY		25%

Tilapia infected by *Streptococcus* sp.

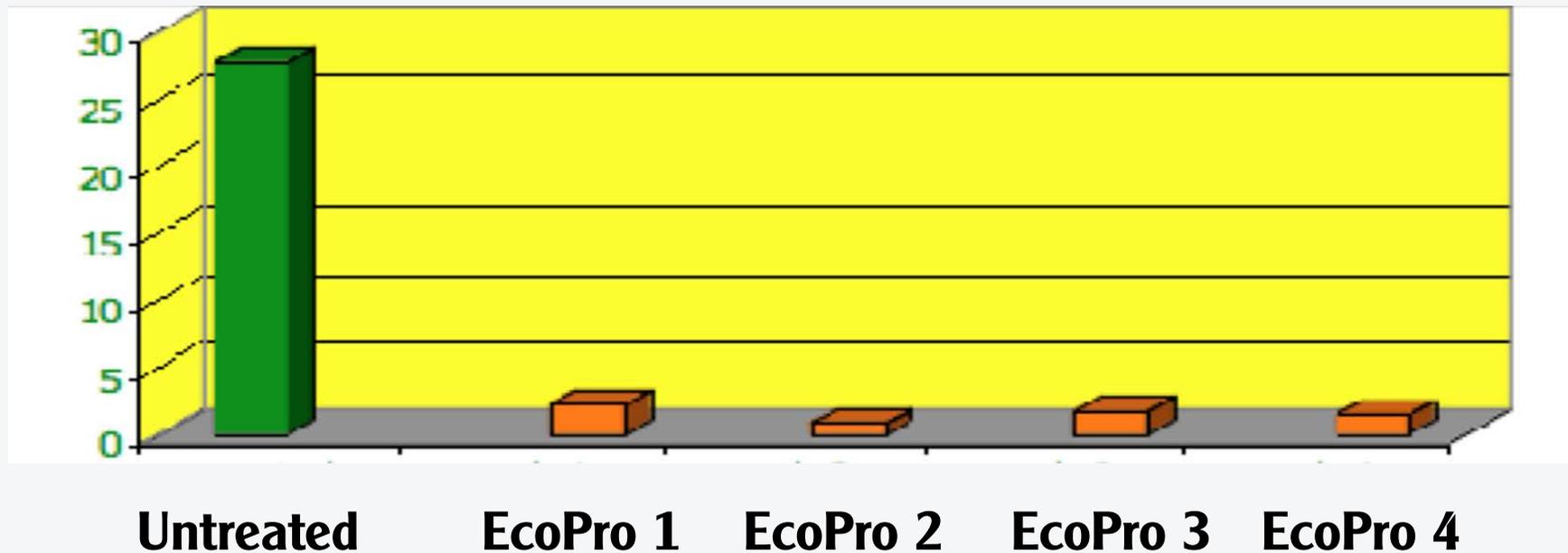


- Control: 23% survival
- ECOPRO/ @ 250 mg/week => 1 week treatment 95% survival

Sturgeon biocontrol with ECOPRO

Percentage of mortality in 1.8 kg fish – 5 independent recirculating systems

- 4075 fish/ system of 8 tanks @ – Duration of trial 180 days
- ECOPRO added at 300 mg/m³/week (dry) or 30 ml/m³/week brewed



Healing of sturgeon wounds by ECOPRO

Day 1



Day 18



How to apply EcoPro?



1. Disinfect water or use tap water directly



2. Dissolve 10g/L or 0.3 oz/qt.



3. Mix well



4. Aeration activation for 18-24 hours



5. After activation, sprinkle it on the pond

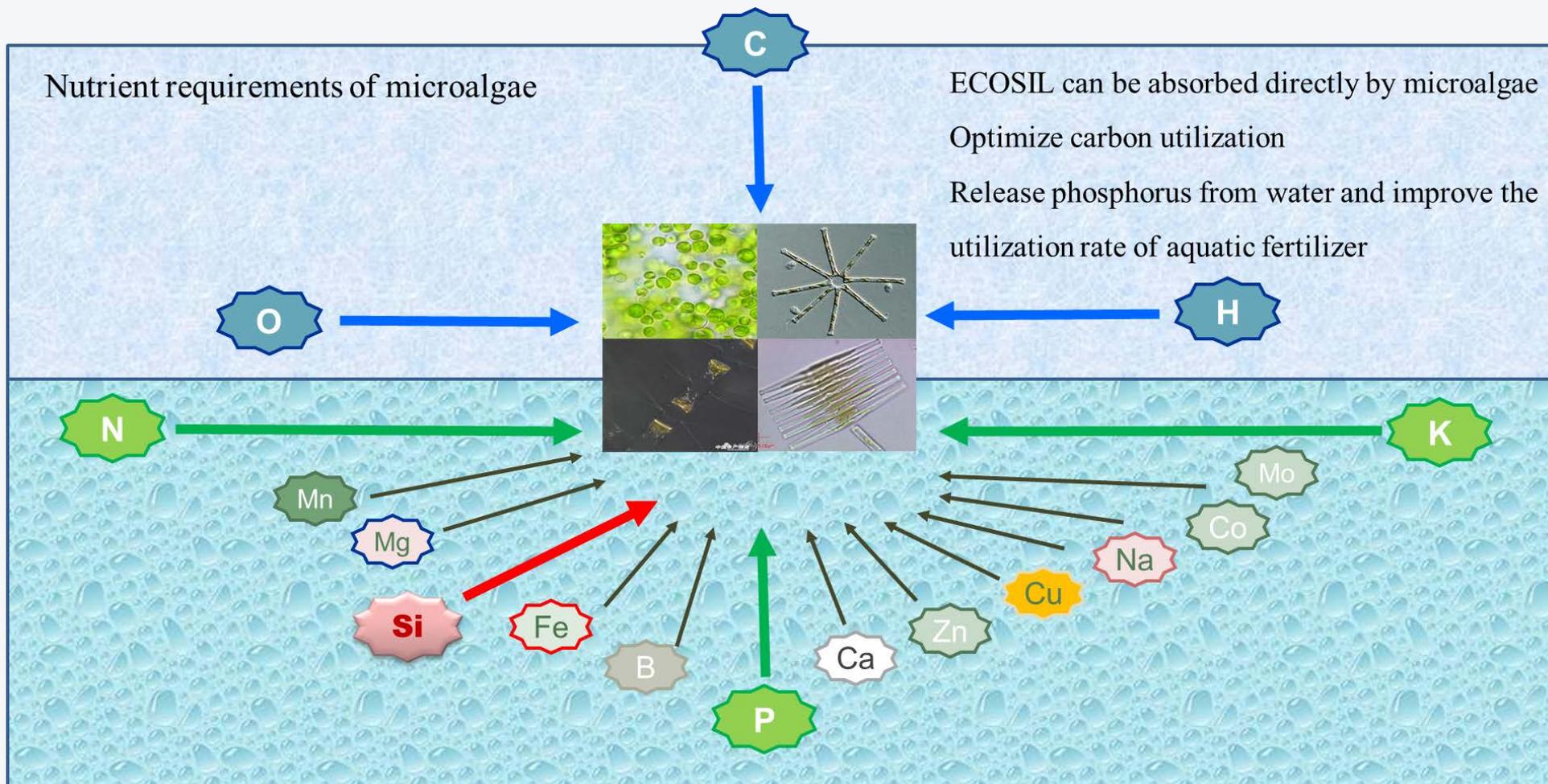
CibuSil

- The only silicide that can be absorbed directly by algal cells
- Improve the aggregate structure of the sediment and really repair the sediment
- Solidify heavy metals to prevent the accumulation of heavy metals in water to the toxicity of farmed animals

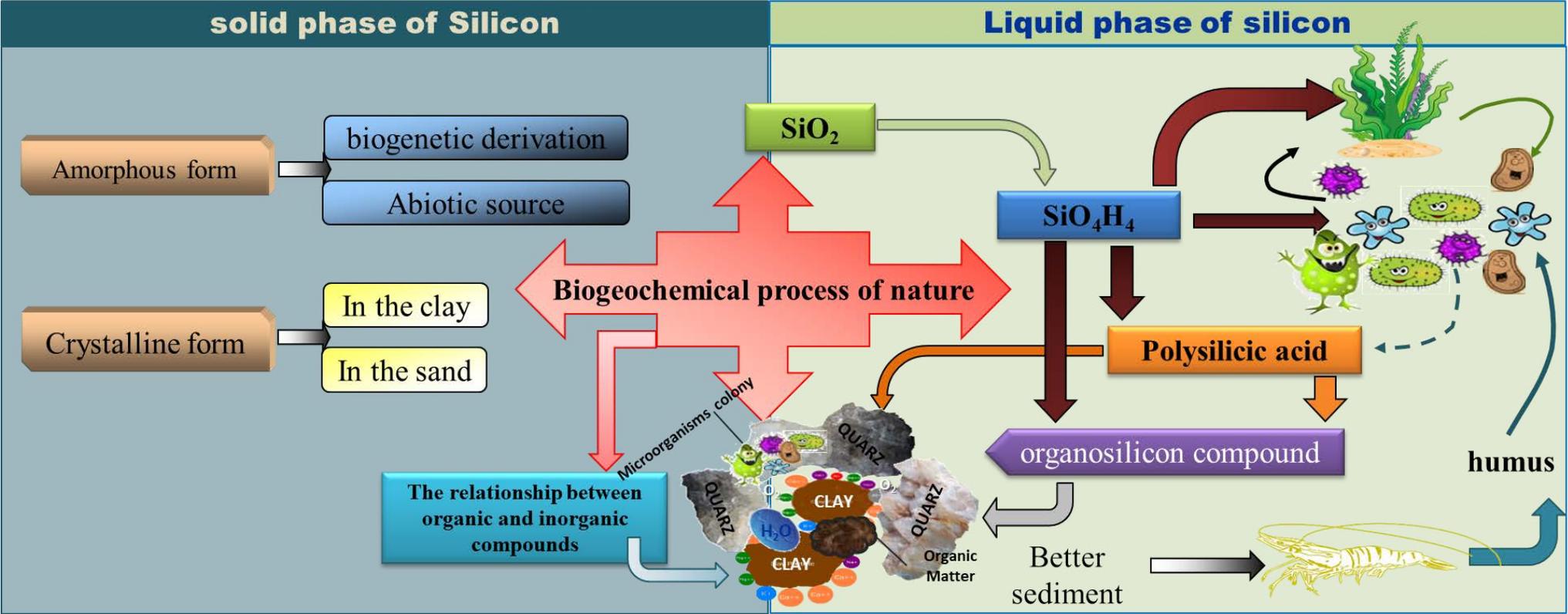
CibuSil: Mechanisms

- Monosilicate acid can be absorbed directly by algal cells through cell walls, promotes algal synthesis of stress proteins and peroxidase, and enhances the ability of algae to adapt to external changes.
- Gram-negative bacteria will produce mucopolysaccharide layer and cause anaerobic biochemical reaction, resulting in the deposition of a large amount of black sludge at the bottom of the pond. Monosilicate acid can destroy the mucopolysaccharide produced by gram-negative bacteria, forming a loose substrate structure suitable for probiotics and improving the dissolved oxygen at the bottom.
- Monosilicic acid, as a highly active soluble silicide, makes the heavy metal ions in water quickly adsorb on the surface of sediment particles and plays the role of solidifying heavy metals. Monosilicic acid reduces the risk of dinoflagellate blooms in Marine ponds by inhibiting the content of Fe ions.

CibuSil: Algae cultivation and algae stabilization



CibuSil: Improve the bottom of the pond



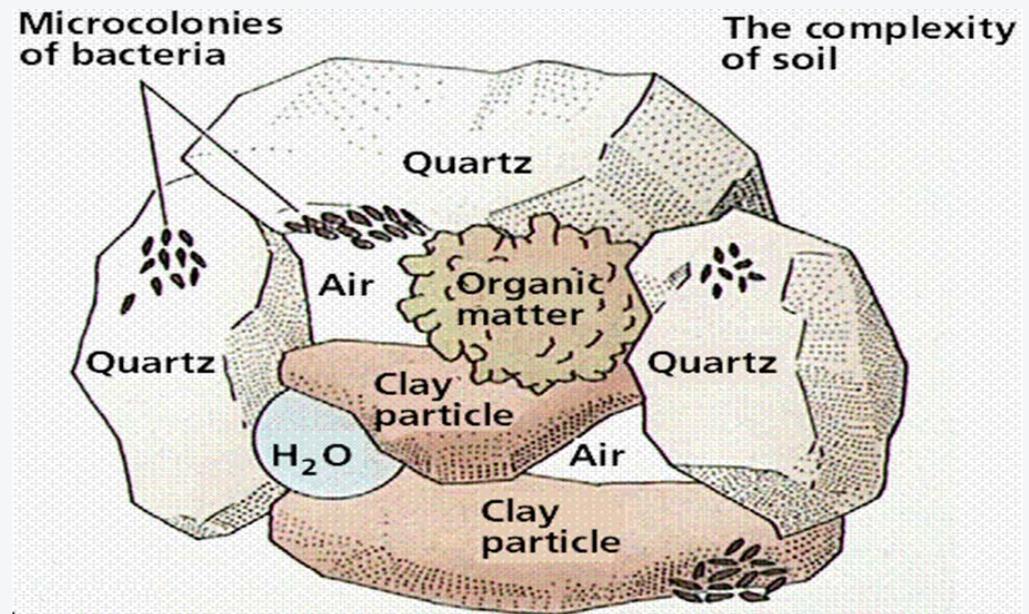
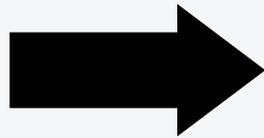
Silicon phase in pond bottom mud

Data: Matichenkov, 2008; Korndörfer, 2000, Graph: J. Rosero 2013.

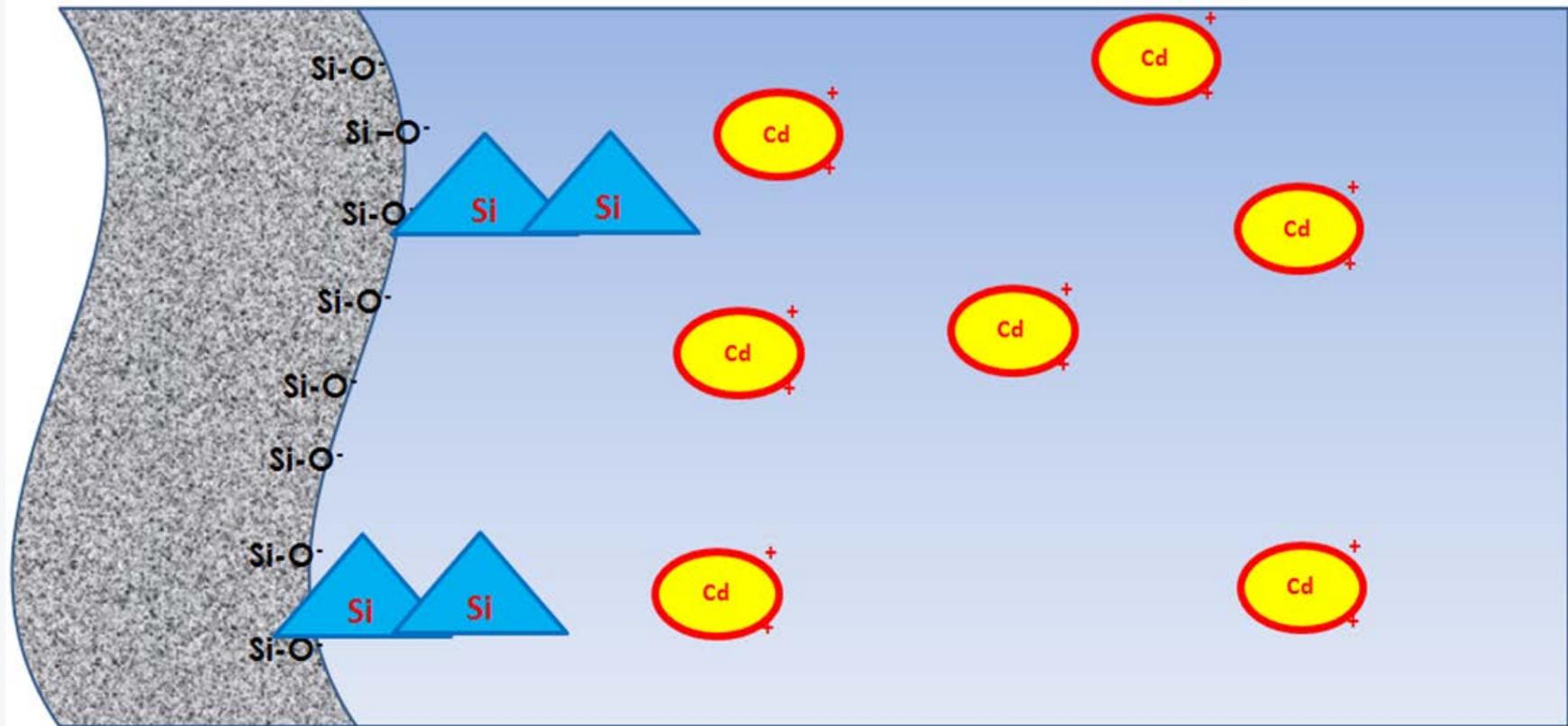
CibuSil: Improve the bottom of the pond

- Monosilicic acid destroys mucopolysaccharide produced by gram-negative bacteria, which creates a physical barrier of oxygen at the bottom of the pool, producing an anaerobic reaction.
- The formation of probiotics for the survival of the substrate structure is really effective bottom modification.

**Gram-negative bacteria
and anaerobic sediments**



CibuSil: Improve the bottom of the pond



Silica will also bind with Cd and improve the bottom of the pond.

CibuSil: In practice

Other benefits of CibuSil application:

- Kill cyanobacteria and not cause water poisoning
- Effect of cyanobacteria treatment lasts long.
- Monosilicic acid can be absorbed directly and used to replenish silicon.
- Silica content is very high. The market basically has no competing products at such high concentration.
- The effect of metal solidification is long-lasting and basically irreversible.
- The effect of potassium persulfate is short.
- No harmful substances will be produced.
- Potassium persulfate will produce sulfide.
- The effect is not as fast as potassium bisulfate.

CibuSil: improve pond bottom quality - California, USA



Before vs After
Treatment



NOTE: CibuSil is used in conjunction with other aquaculture fertilizers as part of a protocol.

CibuSil: How to apply



- Clean up the pond in the early stage: 1 qt./acre
- Aquaculture in the outer pond: 1 pint /acre/month
- Industrial high-density aquaculture: 1 qt./acre/month
- Dilute 100 times in a tank then splash on the surface of the pond



**Thank you for
your attention!**