

EcoPro

CROP MANAGEMENT TOOL & PRODUCTION AID

Guaranteed by ECOMICROBIALS INC.

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Composition

Contains naturally occurring microorganisms listed by AFFCO for use in animal feeds.

Please request incubation instructions for application.

Storage

Avoid moisture and direct sun exposure.

Net Weight: 2 lbs (907grams)

Manufacture Date:

Expiration Date:

SAMPLE

Distributed by SG Crop Solutions

Web: www.sgcropsolutions.com

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EcoMicrobials™



ECOPRO Tech Sheet

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.

ECOPRO works at temperatures of 18 to 45 °C (65 to 113°F). ECOPRO COLD works at temperatures of 3 to 25 °C.

ECOPRO has been listed by the Organic Materials Review Institute (OMRI) since 2012 for use in certified organic food production. Our production facility is registered under the FDA for food grade production of ECOPRO (FDA-FCE No. 30134).

ECOPRO works through diverse mechanisms:

- Breaks down particulate organic matter by releasing exoenzymes
- Breaks down mucopolysaccharides, produced by Gram negative bacteria, that form a physical barrier to oxygen and lead to anaerobic sediments
- Absorbs dissolved organic matter more efficiently than Gram negative bacteria
- Absorbs ammonia and nitrites
- Reduces populations of deleterious bacteria by competition for nutrients and by production of active metabolites
- Enhances production of digestive enzymes (amylase, lipase, trypsin) in the digestive system of the cultured animals, leading to improve feed and protein conversion efficiencies that reduce feeding costs and increase growth and overhaul production
- Reduces or eliminates water exchange requirements saving energy and reducing risk of bringing unwanted microbes into the system

Application procedure

In order to obtain the benefits from probiotic strains we require both: the appropriate strains of bacteria, and the number of cells to carry out the activity. In order to get the numbers of cells to efficiently carry out the cleaning process at low cost we need to multiply the cells of ECOPRO.

Procedure to incubate ECOPRO

Wash a plastic tub and lid with dish soap, rinse well, fill recipient with water, add commercial liquid bleach (table presented below for determination of volume of sodium hypochlorite at different commercial concentrations needed per liter of water) or calcium hypochlorite in powder to get a final chlorine concentration of 10 ppm and leave for one hour. If you have an air pump, place the air-stone hooked to the pump in the water and turn it on during the disinfection process. Filter the air (0.2 microns) if you have the equipment.

| Concentration of sodium hypochlorite | 5.00% | 6.00% | 7.00% | 8.00% |
|---|-------|-------|-------|-------|
| ml of sodium hypochlorite to get 1 liter of water @ 10 ppm Chlorine | 0.42 | 0.35 | 0.3 | 0.26 |

After the disinfection process dissolve ECOPRO in the water at a rate of 10 grams per liter, leave the air pump on, place the lid and leave incubating for 18 to 24 hours at 25 to 35°C (77 to 95°F). At the end of the incubation period the number of bacteria should have multiplied between 500 and 3000 times, depending on the water quality, temperature and rate of aeration (amount of air and bubble size).

After the incubation process, pour the content of the tub directly into the water of the rearing tank or pond. If a paddle wheel aerator is used, we recommend to add the product in front of the created current to facilitate spread the product throughout the rearing system. Add the product after adding water to the system. The dose rate and frequency of application depend on the stocking density and water quality.

Dose rates of ECOPRO

The dose rates of ECOPRO depend on several factors

Planting density: Follow the tables below. A range of concentrations is given in these tables with the low rates for good environmental conditions and the high rates for adverse conditions.

Food quality: a bad quality feed usually has more fiber and because of poor nutritional balance, the target organisms consume more and excrete more due to poor assimilation efficiency. The highest the amount of fiber and feces the largest is the amount of probiotic required to degrade this organic matter. We recommend the use of high quality feeds to improve feed conversion efficiency, reduce the amount of feed used, and reduce the environmental impact.

Water quality: Waters with high organic matter content in particulate or dissolved form will require highest doses of probiotics for their depuration. Waters with pesticide residues or antibiotics will need larger doses of probiotics. Waters with higher levels of heavy metals or unbalanced minerals will require larger doses of probiotics. The production of foam in the presence of aeration indicates a large content of dissolved organic matter in the water. Under these conditions a larger dose of probiotics is recommended to reduce the amount of foam. We recommend to reduce the water exchange as these changes affect the ecological balance of the system, and stress the target organisms affecting the feed conversion efficiency. Additions of water without treatment is one of the main sources of pathogens into culture systems. If a water change has to be done we recommend to treat the water before adding it to the system, or apply probiotic just after water addition.

Sediment quality: The recommended low dose rates are for systems with clean bottoms, without accumulated organic matter. Larger doses of probiotics are needed in case of accumulated sediments rich in organic matter in order to degrade these organics and incorporate them into the trophic web of the culture system.

Temperature: We recommend to use ECOPRO COLD for water with temperature ranges between 37.4 and 77°F (3 and 25°C), and ECOPRO for waters with temperatures between 65 and 113°F (18 and 45°C).

Dose rates

The doses are presented in ml of product incubated at a rate of 10 gr. of ECOPRO per liter of water, according to the preparation instructions.

In order to determine the dry weight of ECOPRO needed, 1 ml of brewed product corresponds to 10 mg of dry ECOPRO before the incubation procedure.

Dosage rates for ECOPRO COLD should be increased by 10 to 20% due to the low temperatures at which this product is used.

Shrimp

Larval cycle

| Stage of development | Dose of ECOPRO (ml/m ³ /day) |
|----------------------|---|
| Zoea 1 | 2 |
| Zoea 2 | 3 |
| Zoea 3 | 4 |

Grow-out ponds

Doses are in ml per cubic meter per week. Divide this number by the number of applications per week to determine volume per application.

| | < 20 PL/m ² | | 20-50 PL/m ² | | 50-100 PL/m ² | | 100-200 PL/m ² | |
|--------------------------|------------------------|------|-------------------------|------|--------------------------|------|---------------------------|------|
| Week | Low | High | Low | High | Low | High | Low | High |
| 1 - 2 | 2 | 3 | 7 | 10 | 10 | 14 | 14 | 20 |
| 3 - 4 | 2.5 | 3.8 | 8 | 12 | 12 | 18 | 18 | 26 |
| 5 - 6 | 3 | 4.6 | 9 | 14 | 14 | 22 | 22 | 32 |
| 7 - 8 | 3.5 | 5.4 | 10 | 16 | 16 | 26 | 26 | 38 |
| 9 - 10 | 4.5 | 6.2 | 12 | 18 | 18 | 30 | 30 | 44 |
| 11 - 12 | 5.5 | 7 | 14 | 20 | 20 | 34 | 34 | 50 |
| ml/m ³ /cycle | 42 | 60 | 120 | 180 | 180 | 288 | 288 | 420 |

Doses are presented in milliliters per cubic meter per week. Divide this number by the number of applications per week to determine the volume per application.

| | 200-300 PL/m ² | | 300-400 PL/m ² | | 400-500 PL/m ² | | > 500 PL/m ² | |
|--------------------------|---------------------------|------|---------------------------|------|---------------------------|------|-------------------------|------|
| Week | Low | High | Low | High | Low | High | Low | High |
| 1 - 2 | 20 | 28 | 30 | 40 | 40 | 60 | 60 | 86 |
| 3 - 4 | 26 | 36 | 38 | 53 | 53 | 78 | 78 | 112 |
| 5 - 6 | 32 | 44 | 46 | 65 | 65 | 96 | 96 | 136 |
| 7 - 8 | 38 | 52 | 54 | 77 | 77 | 114 | 114 | 162 |
| 9 - 10 | 44 | 60 | 66 | 92 | 92 | 132 | 132 | 190 |
| 11 - 12 | 50 | 68 | 78 | 105 | 105 | 150 | 150 | 220 |
| ml/m ³ /cycle | 420 | 576 | 624 | 854 | 854 | 1260 | 1260 | 1812 |

In order to reduce pathogens concentrations, such as *Vibrio* in seawater or *Streptococcus iniae* in freshwater, it is necessary to increase the dose rate of ECOPRO (double or triple the dose according to the concentrations of the pathogen in the culture water). Apply ECOPRO daily until reducing pathogen concentrations, then go back to the doses used previously.

Treatments

| Condition | ml/m ³ /day |
|-----------|------------------------|
| Chock | 30 to 50 |
| Disease | 50 to 120 |

Fish

Earth ponds

Loading density at harvest 1.5 to 2 kg/m³

| Week | ml/m ³ /week |
|----------|-------------------------|
| 1 to 5 | 3 |
| 6 to 10 | 4 |
| 11 to 15 | 5 |
| 16 to 21 | 6 |

Tanks with liners

| DOSE | ml/m ³ /week |
|----------|-------------------------|
| Hatchery | 7 to 21 |

| Prior to planting | 2 to 20 ml/m ³ |
|-----------------------------|---------------------------|
| Fish biomass/m ³ | ml/m ³ /week |
| 100 to 300 gr. | 5 to 20 |
| 300 to 500 gr. | 6 to 30 |
| 500 gr. to 1 kg | 8 to 40 |
| 1 to 2 kg | 10 to 50 |
| 2 to 3 kg | 15 to 60 |
| 3 to 4 kg | 20 to 70 |
| 4 to 6 kg | 25 to 80 |
| 6 to 8 kg | 30 to 90 |
| 8 to 10 kg | 35 to 100 |
| < 15 kg | 40 to 120 |
| < 20 kg | 50 to 150 |

Culture with biofloc

Dose used for final densities of 4 to 8 kg of fish biomass/m³ and fishes of 500 grams.

For other densities please extrapolate dose rates linearly, e.g. 20 ml/m³/day for 20 kg of fish biomass.

| Month | ml/m ³ /day |
|--------|------------------------|
| 1 | 3 to 5 |
| 2 | 4 to 6 |
| 3 | 5 to 7 |
| 4 | 6 to 8 |
| 5 | 7 to 9 |
| 6 to 8 | 8 to 10 |

Treatments

| Condition | ml/m ³ /day |
|-----------|------------------------|
| Chock | 30 a 50 |
| Disease | 50 a 150 |

Recommendations

Do not skip the brewing process and add the probiotic directly to the production system. The rich nutrient formula might feed deleterious microbes that might be present in large concentrations in the production system.

Use all the product that has been incubated. Do not store left over product. Do not attempt to add nutrients and continue multiplying the cells as changes in the proportion of cells and in species composition (contamination) will lead to ineffective and sometimes deleterious brews that may cause mortality in your production system.

Store ECOPRO in airtight container in a dry place, avoiding exposure to the sun and extreme temperatures.

ECOPRO

Crop Management Tool & Production Aid



Material Safety Data Sheet

Last revision: 6-2020

1. Product and Company Identification

| | |
|------------------------------|--|
| Product Name: | EcoPro |
| Manufacturer | EcoMicrobials LLC |
| | 7003 N. Waterway Dr. Unit 214. Miami, FL 33155 |
| Information telephone Number | 305 298 2036 |
| Emergency telephone Number | 305 298 2036 |

2. Hazards Identification

Effects in health

| | |
|------------|--|
| Skin | May cause slight skin irritation |
| Eyes | May cause slight irritation |
| Ingestion | may cause gastrointestinal irritation, nausea, vomiting and diarrhea |
| Inhalation | May cause irritation of respiratory tract |

| | |
|--|-------------------------------|
| <u>Potential Environmental Effects</u> | No adverse ecological effects |
|--|-------------------------------|

3. Composition

Spores of naturally occurring beneficial microorganisms, not genetically altered of the genus *Bacillus*, *Paenibacillus*, *Geobacillus*, *Pseudomonas*, and *Tricoderma*.

4. First Aid Measures

| | |
|------------|---|
| Skin | Wash with water and soap. If irritation persists consult a physician. |
| Eyes | Wash eyes with water. If irritation persists consult a physician. |
| Ingestion | Do not induce vomit. Consult a physician. |
| Inhalation | Expose the patient to fresh air. In case of difficulty to breath consult a physician. |

5. Fire-Fighting Measures

| | |
|---|---|
| Flammable Properties | Slightly flammable according to HMIS criteria |
| Suitable Extinguishing Media | Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide |
| Unsuitable Extinguishing Media | None |
| Hazardous Combustion Products | None |
| Specific Hazards Arising from the Chemical | May cause allergic respiratory reaction |
| Protective Equipment and Precautions for Firefighters | Self-contained breathing apparatus and standard turnout apparel |

6. Accidental Release Measures

| | |
|---------------------------|--|
| Personal Precautions | For personal protection see section 8 |
| Environmental Precautions | Spilled preparation should be removed immediately to avoid formation of dust from dried preparation. Take up by mechanical means preferably by a vacuum cleaner equipped with high efficiency filter. Flush remainder carefully with plenty of water. Avoid splashing with high pressure washing (avoid formation of aerosols). Ensure sufficient ventilation. Wash contaminated clothing. |

7. Handling and Storage

| | |
|---------------------|--|
| Handling | Avoid formation of dust and aerosols. Ensure adequate ventilation |
| Storage | Keep tightly closed in a dry and cool place. |
| Temperature | Keep in a dry, cool and well ventilated place. |
| Storage Conditions | In unbroken packaging – dry and protected from the sun. The product has been formulated for optimal stability. |
| Conditions to avoid | Avoid temperatures above 45°C. Avoid freezing temperatures. Avoid moisture. Avoid strong acids, alkali compounds and oxidizing agents. |

8. Exposure Controls/ Personal Protection

| | |
|---------------------------------|--|
| Occupational Exposure Controls | Ensure adequate ventilation, especially in confined areas. Maintain good conditions of industrial hygiene. Some processes may require enclosures, local exhaust ventilation, or other engineering controls to control airborne levels. |
| Personal Protective Equipment | In case of insufficient ventilation wear suitable respiratory equipment that meets HEPA/P100 specifications. Eye protection, wear glasses with side-shields. Skin protection, Long sleeved clothing. Hand protection, Protective gloves |
| Environmental Exposure Controls | Local authorities should be advised if significant spillages cannot be contained. |

9. Physical and Chemical Properties

| | |
|----------------------|---|
| Physical State | Dry powder |
| Odor | Earthy |
| Boiling Point/Range | No information available |
| Melting Point/Range | No information available |
| Flash Point | No information available |
| Flammability | Slightly flammable |
| Explosive Properties | No information available |
| Oxidizing Properties | No information available |
| Vapor Pressure | No information available |
| Solubility | Soluble |
| Specific gravity | 0.8 |
| pH | 7 while suspended in water at 10% concentration |

10. Stability and Reactivity

| | |
|------------------------------------|--|
| Chemical stability | Stable under recommended storage conditions |
| Conditions to avoid | Excessive temperatures below freezing or above 45°C. |
| Materials to avoid | None |
| Hazardous decomposition products | None |
| Possibility of hazardous reactions | None |

11. Toxicological Information

Acute toxicity

| | |
|--|----------------|
| Ingestion, LD50 Rat Oral (mg/kg) | Not determined |
| Inhalation, LC50 Rat inhalation (mg/L/4hr) | Not determined |
| Skin, LD50 Rat Dermal (mg/kg) | Not determined |
| Eye irritation | Not determined |

Chronic Toxicity

| | |
|-----------------|--|
| Sensitization | According to our experience and to the information provided to us, the product does not have any harmful effects if it is used and handled as specified. |
| Carcinogenicity | The ingredients are not found in listings of carcinogenic compounds. |

12. Ecological Information

Ecotoxicology

This product is not expected to pose an environmental hazard. No toxicity data is available specifically for soil organisms, plants and animals.

| | |
|---------------------------|---|
| Environmental Effects | The data available do not support any environmental hazard. |
| Persistence/Degradability | The organic components of the product are biodegradable. |
| Bioaccumulative Potential | Not available |
| Other adverse effects | No known effect |

13. Disposal Considerations

| | |
|------------------------|---|
| Waste Disposal Method | Dispose of contents/container in accordance with local regulations. |
| Contaminated Packaging | Dispose of wastes in an approved disposal facility. |

14. Transport Information

| | |
|--------------------------------------|---------------------|
| Transport Regulations | Not dangerous goods |
| IMDG; IMO; RID; ADR; ICAO; IATA; DOT | Not regulated |

15. Regulatory Information

International Inventories

Complies with TSCA, CHINA, AICS

USA Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Re-authorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and 40 CFR Part 372.

SARA 311/312 Hazardous Categorization

| | |
|-----------------------------------|----|
| Acute Health Hazard | No |
| Chronic Health Hazard | No |
| Fire Hazard | No |
| Sudden Release of Pressure Hazard | No |
| Reactive Hazard | No |

USA, State Regulations

| | |
|---------------------------|--|
| California Proposition 65 | This product in its present state does not contain any Proposition 65 chemicals. |
|---------------------------|--|

How to apply EcoPro?



1. Use disinfected water or tap water directly



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



3. Mix well



4. Aeration activation for 18-24 hours

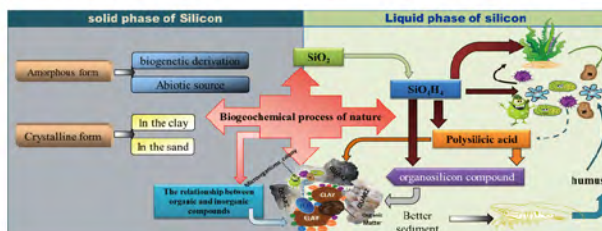
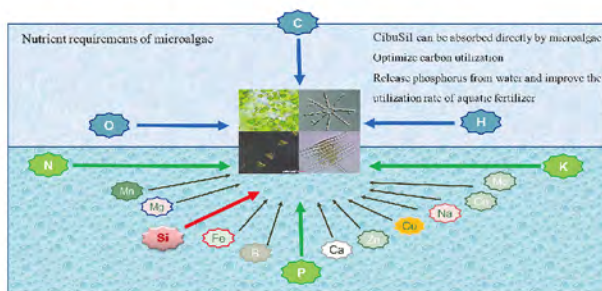


5. After activation, sprinkle it into the pond



CibuSil

- 💧 The only silicide that can be absorbed directly by algae cells.
- 💧 Improve the structure and repair the pond sediment
- 💧 Breakdown heavy metal, reduce water toxicity, increase available nutrient



Further DGGE electrophoresis results and field trials have confirmed the ability of CibuSil to increase microbial diversity and allow pond organisms to reach ecological balance, which ultimately lead to higher production.



REGENERATIVE AQUACULTURE



Our Goal



With a green and healthy aquaculture, we can reduce:

- 💧 Water and soil pollution
- 💧 Climate anomalies
- 💧 Diseases

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."



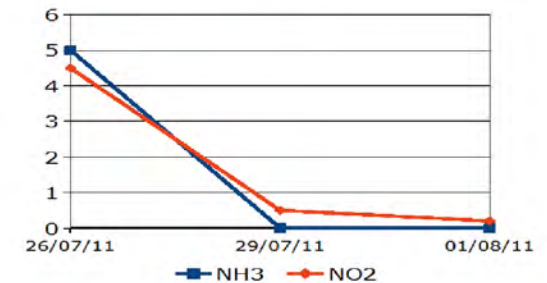
EcoPro: Mechanisms Summary

- 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



- Degrades organic matter and mucopolysaccharide layer produced at the bottom of ponds
- Produces natural antibiotics and reduces stress by cleaning the water
- Produces polysaccharide that protect fish and help them heal wound

EcoPro



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 |

Conventional culture system



EcoPro culture system

