



WATER TREATMENT LINE FOR USE IN FISH HATCHERIES

Water quality management has been proven to be one of the most important factors during the early larval rearing in fish hatcheries. As the pioneer in water quality management, we are proud to offer two advanced products for the stabilization of the microbiota & microflora in larval fish tanks.

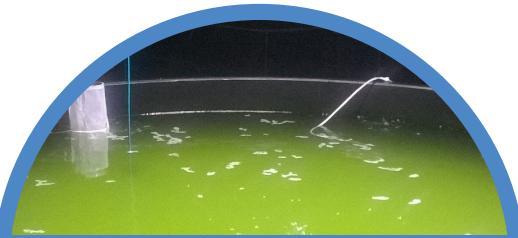
Sanolife® MIC-F



Microbial water treatment for fish larvae



Sanolife® GWS



Dry Green Water Substitution for fish larvae



MICROBIAL WATER TREATMENT



- Optimizes water quality parameters
- Improves the rearing environment

Most fish hatcheries have problems with **microbial control**, one of the main factors for early mortalities and low overall performance. Few tools are available for farmers to create an optimal microbiological environment.

Sanolife MIC-F is one of the most advanced tools targeting the colonization of the fish tanks starting from the early larval rearing. Together with optimal feeds, feeding regimes and correct zootechnical management, the practice of applying probiotics for microbial tank management has been proven to be an integral part of the production of high quality fry, which is necessary to improve the overall performance and robustness during pre-on-growing and grow-out.

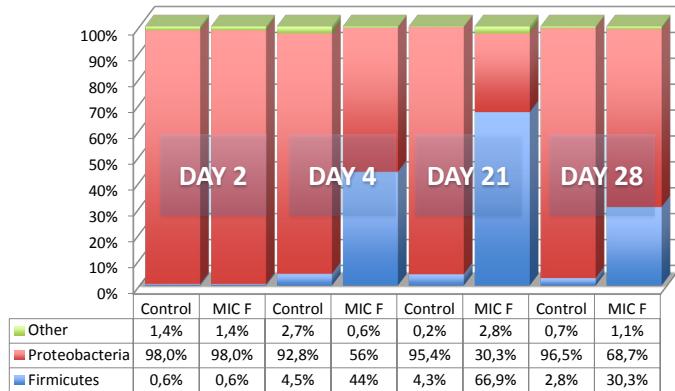
The powder contains a total of 1×10^{10} viable spores per gram (*Bacillus subtilis*, *B. licheniformis* and *B. pumilus*). This mixture of microrganisms supports the animal:

- 1- in the colonization of the digestive tract by providing benign (good) bacteria that compete with pathogenic and opportunistic (bad) bacteria.
- 2- by significantly improving the quality of the culture water.



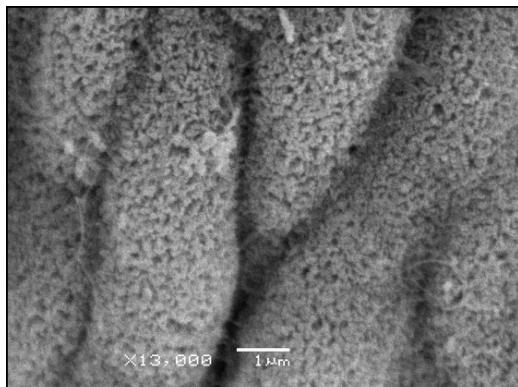
PRODUCT PERFORMANCE

Percentage of *Bacillus* vs *Vibrio* in seabream larvae.



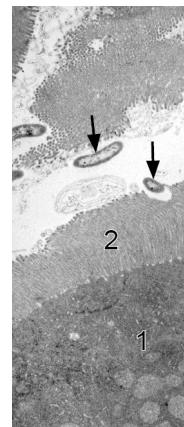
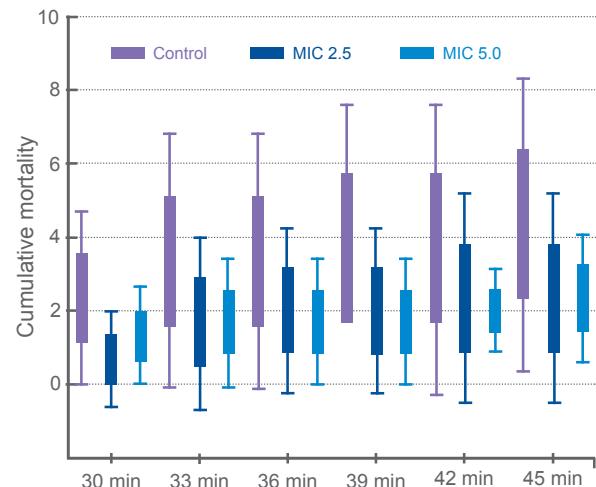
Colonizing the larvae and their gut from the early larval stages is very important to avoid pathogens and other opportunistic bacteria.

Applying Sanolife MIC-F in the larval fish tank will result in the colonization of larvae by beneficial bacteria that belong to the phylum Firmicutes to which the *Bacillus sp* belongs to.



Pictured:
Midgut of
seabass larva.

Cumulative mortality per treatment upon triplicate osmotic stress test at 30 dp



When the gut is not colonised by "useful" bacteria others more dangerous can do it.

The arrows show *Vibrio* present in the midgut lumen in close contact with apical microvilli of 5 dph seabass larva.

INSTRUCTIONS FOR USE

Direct application in the larval rearing tank

Apply a daily dose of up to 5 g of Sanolife MIC-F per m³ water.

Preparation: using a bucket, take a bit of water from the tank. Mix it with the recommended amount of powder and distribute the mixture evenly into the tank. When the daily water exchange rate exceeds 250%, please consult your INVE Aquaculture representative for advice on dosage. The first application should be done just before the fish larvae open their mouth - min application until 30 dph.

THREE PROBIOTIC STRAINS FOR AN OPTIMAL SYNERGETIC ACTION

B. subtilis, *B. licheniformis* and *B. pumilus* have all been granted "Qualified Presumption of Safety" status by the European Food Safety Authority(EFSA). It is part of the authoritative list of microorganisms with a documented history of safe use in food & feed.

Bacillus subtilis

What are they?

Also known as hay or grass bacillus, they are rod-shaped, Gram-positive bacteria that are naturally found in the soil and the gastrointestinal tract of both ruminants and humans. Their optimal growth conditions are in the mesophilic temperature range (15°C to 35°C) and under a wide range of salinities (from 0 to 60).

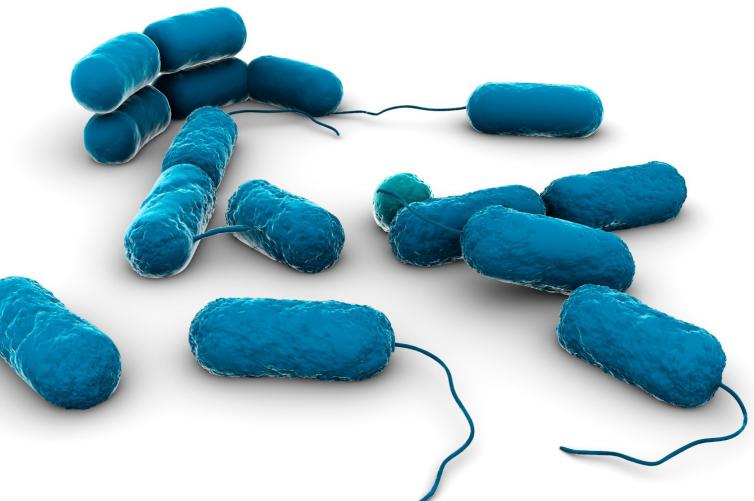
Bacillus subtilis bacteria use their flagella for a swarming motility. This motility occurs on surfaces, for example on agar plates, rather than in liquids. While before it was thought they were strictly aerobic, recent studies show that they also grow in anaerobic conditions, making them facultative aerobes.

What do they do?

They produce a large variety of enzymes such as lipase amylase, protease, cellulase etc, which helps breaking down uneaten feed.

Did you know?

B. subtilis is considered to be the best studied Gram-positive bacterium and is actively used in our everyday life, for example to produce natural enzymes in washing powders. It produces a lot of interesting metabolites, including antimicrobial peptides such as subtilin which helps inhibit certain kinds of bacteria and /or reduces the proliferation of opportunistic fast growers such as *Vibrio*.



Bacillus licheniformis

What are they?

Gram-positive, spore-forming bacteria widely distributed as saprophytic organisms in the environment. They are also naturally found in the water environment (soil and vegetation). They prefer to grow at temperatures around 30°C but also grow at temperatures >50°C and under a wide range of salinities (from 0 to 60). *B. licheniformis* form endospores and are arranged in singles or chains.

What do they do?

B. licheniformis produce a variety of extracellular enzymes which are associated with the cycling of nutrients in nature. The strains we use produce a particularly high number of enzymes. Additionally the strains in MIC-F also perform denitrification, converting nitrate into nitrogen gas under anaerobic conditions.

Did you know?

In 2012, scientists isolated an enzyme in *Bacillus licheniformis* that has proven to be an unexpected tooth decay fighter as it has the ability to cut through a layer of bacteria - and also plaque.

Bacillus pumilus

What are they?

Spore-forming bacteria that are rod-shaped, Gram-positive, and aerobic. They are very suitable for use in aquaculture hatcheries as they grow under a wide range of salinities - from 0 to 60.

What do they do?

Bacillus pumilus produce a variety of enzymes which help digesting the proteins in the body of the animal. Spores of *Bacillus pumilus* in animal feed thus help to convert the complex nutritious animal feed to easily digestible, less complex food and significantly influence animal performance in livestock production systems. Also, as a spore forming bacteria it can resist high temperatures usually encountered during the manufacturing process of animal feeds.

Bacillus pumilus has antifungal & antimicrobial activity. It produces antimicrobial peptides like bacteriocin which helps inhibiting certain kinds of bacteria. The strains we use for MIC-F are the best at inhibiting pathogens.

GREEN WATER SUBSTITUTE



- Improves water quality
- Substitutes live algae in green water culture

For a lot of hatcheries, the availability of live algae is a bottleneck for increasing their production. Sanolife GWS, an off-the-shelf available product, gradually replaces the use of these live algae. It considerably reduces the work load and allows increased larval output at lower costs, as it gradually eliminates the production cost of the phytoplankton unit.

Applying this product will offer the same results as using live algae, and can even increase performance because of improved water quality and microbial flora.

GREEN WATER TECHNIQUE

Sanocare GWS partially or gradually substitutes the use of live algae by 50% to 100% of the daily algae needs, depending on the age of the fish larvae.

1. Use approximately 5 to 15 g/m³ of fish culture water.
Adapt according to local conditions (light intensity, water exchange rate and required transparency depth).

2. Divide the quantity over different rations throughout the day.
Considering GWS is a dry product, it could behave differently from live algae. Special attention needs to be paid to siphoning practices and an adequate use of surface skimmers.

Days of culture	% substitution of live algae	Daily water exchange (%)	Sanolife GWS g/m ³ /day
2 to 12	50	100	5
13 to 18	75	100	7.5
19 to 22	100	100 to 150	10
23 to 30	100	150 to 200	10



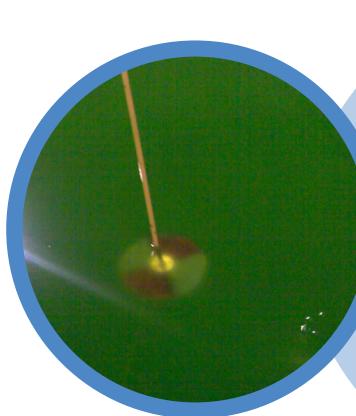
INSTRUCTIONS FOR USE

Direct application in the larval rearing tank

A good preparation will help reach the product's maximum potential.

Please follow these steps carefully.

1. Blend the product in fresh water for 5 to 15 minutes at maximum 20 g/l using a blender.
2. Store the suspension in the fridge for a period of minimum 6 hours prior to the application.
3. Just before applying the suspension in the tank, blend it again for 30 seconds.



TIP:

An easy method to measure the presence of algae in a larval rearing tank is the secchi disc. You can make this tool by painting using a CD disk. Once the desired turbidity is marked on the plastic rod just add GWS dispersed in water, then after 30 minutes measure the effect.



For more information, please contact your local INVE Aquaculture Service Center or take a minute to visit our website: www.inveaquaculture.com

To the best of our knowledge, the technical data in this technical card is accurate and reliable as of the date of publication. We do not assume any liability for the accuracy and completeness of the above information. Please inspect and test our products in order to satisfy yourself as to the suitability of the products to their particular purpose.

