



A Guide for

Good Aquaculture Practices in Shrimp Farming



SALEM MICROBES PRIVATE LIMITED

www.salemmicrobes.com






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SALEM MICROBES PRIVATE LIMITED

CEO's Message

Dear Farmers and Channel Partners,

It is indeed a pleasure to wish you a Healthy and Prosperous year ahead.

We all have grown with Indian Aquaculture is no doubt but we have not sustained our profits is the reality. Growth singularly can never help a business succeed without sustained profit and this needs environmental care in aquaculture business.

Salem Microbes Team is highly committed to be "a partner in progress throughout the life cycle of shrimp and fish culture" by virtue of its quality products, farm advisory services and Lab support services.

As a tradition of this company "to innovate and deliver", we have been in fore front of aquaculture to try, succeed and sometimes fail in bringing new products and services which are "bench marks" not only in India also in countries where we are present. By this way we always stay ahead of the competition in providing the best of both worlds as technology and cost effectiveness.

As technology leaders in innovative probiotic and their delivery systems, we are in the process of bringing in the best of technologies available in manufacturing and services to fulfill the customers desire of "farming with profits."

Let us all make this year a memorable one.

Dr. D.Ramesh Kumar
Chief Executive Officer

FARMING WITH PROFITS





SALEM MICROBES PRIVATE LIMITED

Vision

To excel as a trusted, socially responsible and customer driven organization providing maximum value to all stake holders "with goodness of science"

Mission

To Manufacture quality products at competitive cost and deliver effective services through technology and team work

Values and Practices

- Ethical Practices
- Professional and Transparent Management
- Customer Focus and Accountability
- Commitment to society, Safety and Environment
- Adaptability to "Change"
- Innovation and Creativity
- Emphasis on human resources development



ABOUT US

Increased environmental regulation, demand for eco-friendly inputs in food production industry to protect consumer health, minimal discharge of waste into the environment are the fundamentals upon which we in SALEM MICROBES PRIVATE LIMITED work. Established in 1999, we with a vision to exploit the goodness of science have identified "Natural Microbes" as a means to serve the community. With an unambiguously vital role played by Microbes in sustaining the environ, we have developed alternative eco-friendly strategies with their help. Our strength lies in commitment towards delivering quality hi-tech products from the point of raw materials selection to finished product to assist our customers in fulfilling their purpose. SALEM MICORBES PRIVATE LIMITED helps varied industries facing the production and sustainability problem by its innovation and expertise.

AQUACULTURE
FISHERY
ORNAMENTAL FISH
CETP & BIOREMEDIATION
SOLID WASTE COMPOSTING


SALEM MICROBES PRIVATE LIMITED is engaged in manufacturing and marketing of Feed Supplements, Feed additives, Concentrates and Microbial Cultures for the Aquaculture, Fishery, Poultry, Animal husbandry and Ornamental Fish Industry. We also specialize in customized Bio-remediation products for Environmental treatment for various types of industries. Our state of art production facilities for various products meets the ever changing demand of the buyers. Apart from our own brands, we supply customized products for all the relevant industries to support their outsourcing. We are always working towards to bring in new technologies and practices to improve the profitability of our customers.

EXPERTISE

Hi Farmers, I am Laboo. I am the Ikon of Profit for Farmers. I derive my name from the word LAAB, means Gain. It aligns well with SALEM MICROBES mission of “**Farming with Profits**”.

First I want to wish you all a Profitable farming in Seasons to Come.

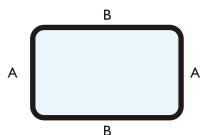
In this Booklet, I will help you to revisit the updated Best Shrimp Farming Practices and give you an overview of the Prevention and treatment methodologies to follow, both in general context and by using our SALEM MICROBES interventional Health products. As a Normal practice in Shrimp farming industry, conditions may vary from farm to farm and adaptations to the proposed solutions are recommended.

I have taken lot of care in giving you information, still if you feel something has to be corrected, please feel free to communicate with me thru, laboo@salemicrobes.com or  9344837525.





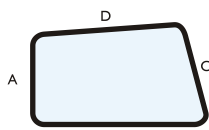
Pond Volume



Perfect Rectangle Ponds:

Side A (meters), Side B (meters), Pond Depth Z (meters)

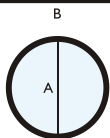
$$\text{Volume (m}^3\text{)} = A \times B \times Z$$



Irregular sided Ponds:

Side A (meters), Side B (meters), Side C (meters), Side D (meters),
Pond Depth: Z (meters)

$$\text{Volume (m}^3\text{)} = (A + C) \times 0.5 \times B \times Z$$



Circular Ponds:

Diameter (A) (meters), Pond Depth: Z (meters)

$$\text{Volume (m}^3\text{)} = 3.14 \times (A/2)^2 \times Z$$

Disinfection of Pond

Total Volume of Water (m³) - A

Active Chlorine Percentage (%) - B

Desired Chlorine Concentration (ppm) - C

$$\text{Bleaching Powder required} = \frac{A \times C}{B \times 10} \text{ kg}$$

Aeration Capacity

ABW in grams = A

Total Seed Stocked = B

Expected Survival (%) = C

$$\text{Total Biomass (D) in kgs} = \frac{A \times B \times C}{1000}$$

$$\text{Total Aeration required (HP)} = D/400$$

Biomass Calculation

Number of PL's stocked - A

Area of the pond (m²) - B

Water Depth (m) - C

Cast net Factor - 1.4

No. of pieces caught/ netting - D nos.

ABW (grams) - E

$$\text{Answer (1) - Total Biomass} = \frac{B \times D \times E}{1.4 \times C \times 1000} \text{ kgs}$$

$$\text{Answer (2) - Survival} = \frac{B \times D}{1.4 \times C \times 1000} \%$$

Feeding Calculation

ABW in grams - A

Total Shrimps stocked in the pond (nos) - B

Approximate Survival % - C

Feeding frequency times - D

Percentage of feed (E): (From Feeding Chart)

$$\text{Total Biomass (kg) (F)} = \frac{A \times B \times C}{1000}$$

Total feed required (kg) (G) =

Total Biomass (F) × Percentage of Feed (E)

$$\left. \begin{array}{l} \text{Quantity of} \\ \text{Feed per} \\ \text{Feeding (H) (kg)} \end{array} \right\} = \frac{\text{Total feed required per day (G)}}{\text{Feeding Frequency (D)}}$$

BIOSECURITY AND DISINFECTION

Protect me from enemies



Disease outbreaks in shrimp culture is considered as the highest level of threat. Based on the previous history of last few years since development of shrimp culture, mass disease outbreak has caused havoc throughout the shrimp producing regions. Apart from ensuring Pathogen-free status as SPF seeds, farmer should give equal attention to horizontal transmission of diseases from pond to pond, farm to farm and village to village.

This is done by following precautionary measures, through proper coordination among farmer's association regarding judicious use of water resources, seed stocking density, periodic treatment and disposal of sludge, drainage after harvest, closure and disposal of crop due to viral diseases etc...

IMPORTANT POINTS TO REMEMBER

- ◆ SPF Post Larvae
- ◆ Personal hygiene and facilities of farm workers.
- ◆ Reservoir and Water treatment system
- ◆ Birds Scare kites
- ◆ Minimal or Zero water exchange system
- ◆ Correct stocking density based on available infrastructure
- ◆ Crab and Dog fence
- ◆ Vehicle movement and disinfection
- ◆ Controlled movement of workers, within farm and from Outside farm
- ◆ Disinfection of equipment and nets after every use
- ◆ Control movement of Outsiders not related to that farm

Biosecurity Adaptations



POND PREPARATION

Why is Pond Preparation necessary?

To provide me a clean rearing environment and optimal conditions for my growth and survival.

Poor pond preparation can result in deterioration of the soils during the crop, with release of nutrients and toxic compounds to the water column, creating stress for the shrimp and environment.

Good pond preparation is also a proactive measure for disease management strategy.

FOLLOW
ME



DO NOT MISS THESE STEPS..

After the harvest, Completely drain and clean the pond without water and other aquatic animals.

Strengthen the pond and restore the Sluice gate ,inlet and outlet in good condition, to increase the water holding capacity of the pond.

Completely remove the deposited organic waste and black soil in pond area and plough if necessary.

Sundry the pond bottom until it cracks, to remove moisture, kill algal spores, benthic algal mats, and other aquatic organisms. Till the dry pond and compact to reduce turbidity and seepage.

Do pH check and apply Lime (kgs per hactre) as follows.

| pH | Agrilime CaCO_3 (x 1) | Dolomite $\text{CaMg}(\text{CO}_3)_2$ (x1/1.09) | Burnt Lime (CaO) (x1/1.79) | Hydrated Lime $(\text{Ca}(\text{OH})_2)$ (x1/1.35) |
|-----|-----------------------------------|---|-------------------------------|---|
| 5.5 | 750 | 682 | 419 | 556 |
| 6.0 | 500 | 455 | 279 | 370 |
| 6.5 | 250 | 227 | 140 | 185 |
| 6.8 | 100 | 91 | 56 | 74 |

Do proper layout of aerators to achieve maximum aeration without damaging the walls and bottom.



Pond Drying



Soil P³ Testing



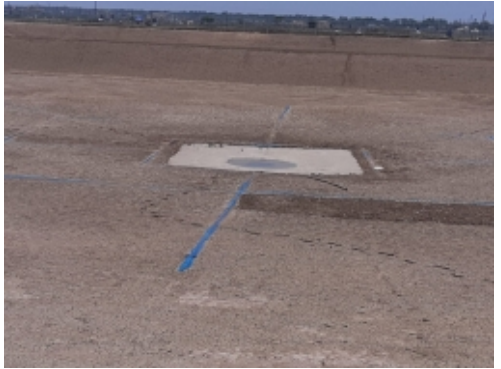
Liming



Ploughing



Pond Compacting



Central Drainage System



Water Filtration

Steps to follow...

WATER CULTURE

- Day-1** Fill water up to 1.2M average water depth, Leave for 2 days to settle.
- Day-3** Add Bleaching 30ppm at night time when pH is low and Prepare Fermented Juice
Fermented Juice is made by mixing (1) 30 Kg Rice Bran, (2) 15 Kg jaggery/molasses, and (3) 250 g yeast in 200 Litres drum containing Clean Non-Chlorinated or De-Chlorinated Water and kept for 48 hrs. A periodic mixing or mechanical aeration is recommended for better oxygen supply).
- Day-4** Dolomite 100 Kg/pond at Noon Time and Run Aerator.
- Day-5** Add Fermented Juice 1st dose at Noon Time 100L to pond. Spread the Fermented juice evenly in Pond. To makeup a fresh 200 Litre Fermented juice, Add 100L water, 5 Kg Jaggery/molasses and 100 g yeast to the balance 100 Litre Fermented juice remaining. Aerate for the next 24 hrs.
- Day-6** Add 100 Litres of Fermented Juice as 2nd dose at Noon time to the pond. Repeat Day 5 Make up procedure to make once again 200 Litre Fermented Juice.
- Day-7** Add all the 200 Litre Fermented Juice as 3rd dose to the pond.
- Day-8** Apply VIRZON AQUA (Pond Water Sanitizer) 1-2 Kg /pond ,and simultaneously start preparing the Fermented Juice again for 200 Litre volume.
- Day-9** Apply Dolomite 50 Kg/pond and Growup (Pond Minerals) 10 Kg /pond.
- Day-10** Apply TOXBEAT 1 Kg (Soil Probiotic), RIDER 20 Kg (Zeolite) and Fermented Juice 100Litre (1st dose) & make up Fermented Juice to 200 Litre.
- Day-11** BACCHECK 1 Kg / BUG BEAT 1 Kg (Water Probiotic) and Fermented Juice 100 Litre (2nd dose) & make up Fermented Juice to 200 Litre.
- Day-12** Growup 10 Kg (Pond Minerals) and Fermented Juice 200 Litre (3rd dose).
- Day-13** EDTA 5 Kg /pond at evening time.
- Day-14** Add SeedOne Growout 200 g / pond (SEED STOCKING PROBIOTIC), minimum 4 to 8 hrs before stocking of seed.

Note: Apply Fermented Juice during algal problems, pond preparation, low bloom,

IMPROPER POND PREPARATION



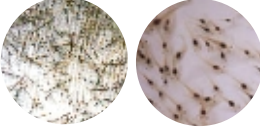
Over Bloom Pond



Benthic Algae due to Low Bloom

SEED STOCKING MANAGEMENT

I deserve
a Good Start



- Buy seed only from a CAA registered hatchery with proper documents.
- Request for salinity of PL tank to be adjusted with Salinity of Stocking pond.
- Prepare good and Stable Plankton bloom, before stocking.
- Transport and Stock seed only in cool hours as between 7 pm and 7am.

Standards for PL selection

| Parameter | Standard | Method of Analysis |
|------------------------|---------------------------|----------------------------|
| WSSV | Absent | Nested PCR / Real Time PCR |
| AHPND/EHP | Absent | Nested PCR / Real Time PCR |
| Stress test - Salinity | More than 90% | 50% Salinity drop for 1 hr |
| - Formalin | More than 90% | 100 ppm formalin for 1 hr |
| Muscle to Gut ratio | 4:1 | Microscopy |
| Hepatopancreas | Full with oil globules | Microscopy |
| Gut | Full & without Gregarines | Microscopy |
| Necrosis | Absent | Microscopy |
| Fouling | Absent | Microscopy |
| Dorsal Rostral Spines | More than 4 | Microscopy |
| Total Length | More than 12mm | Physical Observation |
| Size variation | Less than 5% | Physical Observation |



WATER QUALITY MANAGEMENT

Water is my best friend,
Keep him healthy



Water Quality is vital for a successful crop. Water quality and quantity determines the success or failure of an aquaculture operation. The water should be treated to remove all the suspended solids, dissolved nutrients and bacterial and viral pathogens. Maintenance of good water quality is essential for both survival and optimum growth of Shrimps. While locating the farm site, careful study should be made on the source of water, quantity of water available during the different seasons and the quality of water. All instructions and precautions should be followed strictly to get best out of your farm.

Some Key Points to follow are,

- Maintain Pond to Reservoir in 3:1 ratio
- Pump water with proper mesh filtration (20, 40, 60 and 80 mesh in stages)
- Do Sedimentation and Chlorination sufficiently.
- Establish optimum bloom.
- Provide sufficient aeration to maintain the required dissolved oxygen level and to keep the water in circulation.
- Follow all biosecurity measures to keep the carriers away from pond.
- Use Probiotics for managing the water quality

The water parameters that should be monitored routinely in ponds during culture period are Temperature, pH, Salinity, dissolved oxygen and transparency.

- The pH should be in optimum level of 7.5 to 8.5 and should not vary more than 0.5 in a day.
- Variations in salinity not exceeding 5 ppt in a day will help in reducing stress on the shrimp.
- The optimum range of transparency is 25-35 cm. Transparency can be measured using secchi disc
- The un-ionized form of ammonia nitrogen should be less than 0.1 ppm.
- Any detectable concentration of hydrogen sulphide is considered undesirable.

General water quality parameters

Water Parameters

Optimal Range

| | |
|---------------------------------------|-------------|
| Dissolved Oxygen | >5 ppm |
| Temperature | 28–31 °C |
| pH | 7.5–8.5 |
| Transparency (Secchi disc) | 35–45 cm |
| Salinity | 10–25 ppt |
| Total Alkalinity as CaCO ₃ | 100-160 ppm |

Water Parameters

Optimal Range

| | |
|---|-----------|
| Total Hardness as CaCO ₃ | >2000 ppm |
| Calcium/Magnesium Ions Ratio | 1:3 |
| Total Ammonia (NH ₄ ⁺) | < 1.0 ppm |
| Unionized Ammonia (NH ₃) | < 0.1 ppm |
| Nitrite | < 0.2 ppm |
| Hydrogen Sulphide (H ₂ S) | < 0.1 ppm |

Feed me
Intelligently



Feed management is one of the most important aspects of successful shrimp production as the feed accounts for 50 to 60% of the Operation cost. Feed management strategies should therefore be aimed at optimizing feed inputs, reducing the Feed Conversion Ratio (FCR) and reducing the negative impact of excess feeding on pond bottom and water quality.

Where and How to feed ?

Shrimp tends to eat in places that are cleaned by paddlewheel aerator. Thus, provide feed for shrimp where it is clean; avoid feeding in dirty places or near edges of the pond. Depending on different situations, as low / high temperature, low DO, rainfall, molting, disease conditions etc., can increase or decrease the amount of feed for a day accordingly. If Autofeeder is installed, verify the storage and adjust the timings according to check tray observation.

How to adjust the amount of feed ?

The use of feeding tray (Check tray) is very important to check the amount of feed, which reflects the feeding possibility, health, and survival rates of shrimp, as well as conditions at the bottom of the pond. Feeding tray is usually a net with a square or round steel frame with edges' height not more than 5 cms. The area of a feeding tray is usually from 0.4 to 0.6 M². Feeding tray should be placed close to the bottom of the pond, where it is clean and 2 M away from the slope of the pond bund, aerator, sluice gate and pond corners. Depending on the area and density, 4 to 6 feeding trays can be placed in a pond.

| Tray Observation and Feed adjustment : | |
|---|--|
| Check Tray observation | Changes to make in the next feeding time |
| If shrimp eats all the feed | Increase 5% of the amount of feed in the next feeding time |
| If the feed leftover is 10% | Keep the same amount of feed |
| If the feed leftover is around 11 - 25% | Reduce 10% of the amount of feed in the next feeding time |
| If the feed leftover is around 26 - 50% | Reduce 30% of the amount of feed in the next feeding time |
| If the feed leftover is more than 50% | Stop feeding next time |

The amount of feed and periods of checking time:

| Days of Culture | The amount of feed in Check tray | Checking period (hrs) |
|-----------------|----------------------------------|-----------------------|
| 21 – 60 | 10gm/1kg feed | 2.5 – 2.0 |
| 61 – 90 | 15gm/1kg feed | 2.0 – 1.5 |
| >90 | 20gm/1kg feed | 1.5 – 1.0 |

Note: On days when weather changes, such as severe rainy or sunny days, feed only 70-80% of the amount of required feed for shrimp. Observe shrimp's molting to reduce the amount of feed intake, and increase after the molting process finish.

Gut Examination

| Gut contents Colour | Suspected Feed | Suspected Gut Contents | Do treatment |
|-----------------------|---|---|---|
| Dark brown or Black | Benthic detritus or sediment | Under feeding or inadequate feeding frequency | Increase feeding and frequency |
| Pink or Red | Cannibalized body parts by feeding dead shrimps | Death (Mortality) and Disease in pond | Check for Disease and Dead shrimps and do treatment |
| Green | Benthic algae | Under feeding | Increase feeding |
| White or Pale | Manufactured feed or natural food | Gut infections | Reduce feeding and do treatment |
| Light to Golden brown | Manufactured feed | Normal condition | Good. Follow regular chart. |

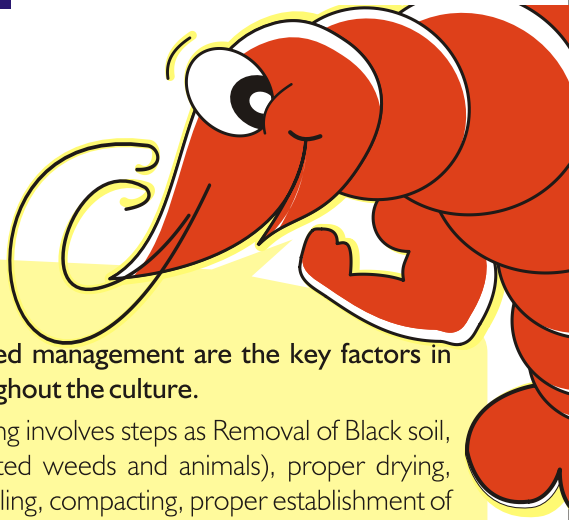
Do's and Don'ts:

- Don't use feed more than 90 days old. Follow First IN, First OUT system.
- Don't use ANTIBIOTICS for any reason, as your whole crop will be rejected by the buyer.
- Keep feed bags safely, away from direct sunlight or moisture.
- Check the Pond bottom regularly to identify Black soil areas and avoid feeding there.
- Check Ammonia and Nitrite periodically to identify pollution.



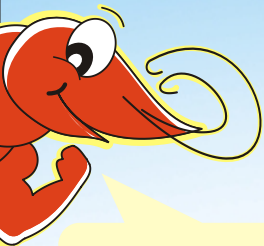
POND BOTTOM MANAGEMENT

Maintain my floor
clean & tidy



Proper Pond preparation and Feed management are the key factors in ensuring good pond bottom throughout the culture.

- Pond preparation before stocking involves steps as Removal of Black soil, other aquatic animals, (unwanted weeds and animals), proper drying, correcting the pH with liming, tilling, compacting, proper establishment of diatom to avoid development of benthic algae etc.,
- Stocking the pond should be based on the carrying capacity of the pond, previous disease history, age of the pond, reservoir and water source, Water Column height, no. of aerators available, power and generator capacity, proper drainage facilities like central drain and sludge pump,
- Overstocking with free seeds should be avoided, as sometimes more than expected survival will become unmanageable and will challenge the capacity of the pond. In such conditions, Partial harvest is recommended to manage such situations.
- Proper Schedule of Feeding as per chart.
- Use of Auto-feeders, if possible.
- Regular check tray monitoring and adjusting feed accordingly.
- Regular chain dragging or manual removal of dead and benthic algae.
- Periodic checking of Black spots (sites of uneaten feed and waste in Sides and center).
- Removal of Sludge by Central drainage/Shrimp toilets. DO not dispose it directly into the creek. Maintain a sludge, (ETP - Effluent Treatment Pond) Pond to store, settle and treat it. Dispose it only at the end of the culture. This avoids introducing a Bundle of your Problems/disease back into the Common creek, on which all your neighbor farmers depend including you. Be Socially Responsible.
- Proper Use of Water and Soil Probiotics to degrade Organic matter.
- Proper positioning of Aerators to direct the settlement of waste as Uneaten feed, dead algae, fecal matter, to center of the pond.



WHITE GUT / WHITE FECAL SYNDROME (WFS)

Today's worst problem for me
Help me to defend it

White Fecal Syndrome (WFS) is highly prevalent in today's Aquaculture. WFS is characterised by Pale White Fecal Strings floating over the pond water surface. At the onset of WFS, shrimp tend to eat less, become dark in colour, soft, grows very slow, becomes weak and start dying.

During the progressive stages of WFS, it makes the shrimp have been vulnerable to opportunistic pathogen leading to bacterial and viral diseases. WFS does not all of a sudden result in mass mortality, but results in heavy economic loss due to slow growth, size variation and high FCR.

Few preventive and treatment strategies are practiced in different parts of the world to minimise the effect. When these strategies does not yield results or if the disease repeats, its advised to Harvest the pond, as recovery rates of these ponds are very less.

Symptoms of WFS

WFS generally occur within one to two months of culture and shows following signs as,

- Reduced feed intake
- Hepatopancreas turns Pale white
- White feces inside the gut and check trays
- Dark coloration of body and gills
- White strings of feces float all over the Water surface
- Loose shell in shrimp

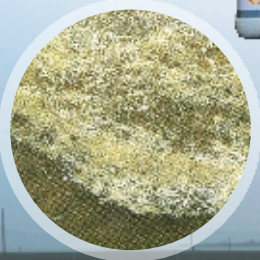
Double Track Program for WFS condition

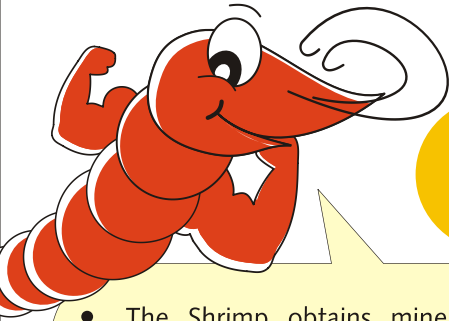
The combined use of INTAKE, Organic acid enhancer and PREVENT WFS, a probiotic supplement gives a better result due to their synergistic actions, providing needful support for the shrimps to manage or overcome the stress of the infection.

- Establishes well balanced intestinal microflora
- Competitively excludes the pathogens
- Prevents white gut infection
- Avoids white fecal formation
- Improves Feed Intake



- Synergistic combination of Organic acids, Essential oils, Antioxidants and Prebiotics
- Works on double targets as on the feed and GI Tract
- Improves the secretion of Digestive enzymes
- Assures complete absorption of feed nutrients
- Boosts immune system





Make me stronger, I fetch you more

- The Shrimp obtains minerals from pond water and feed, Dietary supplementation of selected minerals could facilitate better survival and growth, even in Low saline environment.
- Minerals are important not only as growth improver it is rather much more important as a nutrient for increasing survival of the young shrimps.
- In Low Saline water, the ionic composition is more important than salinity with regard to its effect on shrimp survival and growth
- The ratios of key ions, such as Na:K or K:Mg, could also potentially influence growth and survival of shrimps reared in low saline environments.
- During Monsoon, supplementing minerals will help in balancing the minerals lost/reduced due to addition of large amount of water.
- Normal development of Algal bloom is compromised in High density ponds, due to lack of adequate minerals catering both the Shrimp and Algal population. In such condition, supplementation of Macro and Micro minerals helps in overcoming this shortage and to get desired Bloom development, Shell development and Molting.



Body Cramp & Bend



Loose Shell



White Muscle

AMMONIA & NITRITE MANAGEMENT

Don't suffocate me,
avoid toxic gases





Ammonia is the major toxic component produced continuously by shrimps during culture. It can also accumulate in the water due to the decomposition of organic matter as excess feed, faeces, dead shrimp and dead algae. Of all the water quality parameters which affect shrimp, ammonia is the most important after oxygen. In water, Ammonia present in two forms, Ionized (NH_4^+) and un-ionized (NH_3) which together are called the Total Ammonia Nitrogen (TAN). In these two, un-ionized (NH_3) ammonia is very dangerous.

The Overall Shrimp survival, health and growth is hampered by high level of ammonia and nitrite. Regular conversion of Ammonia to Nitrite and then to harmless Nitrate is done by the Nitrifying bacteria present in the pond. But when this rate of conversion is slower than the ammonia production, it leads to buildup of Ammonia and nitrite in ponds.

Ammonia and Nitrite build-up in ponds can be controlled by adopting combined strategies as,

- (1) Better Feed management
- (2) Proper Algal bloom maintenance
- (3) Regular Pond bottom maintenance
- (4) Favourable Water quality parameters.

Relative toxicity of Ammonia, Nitrite & Nitrate

| Condition | Ammonia (ppm) | Nitrite (ppm) | Nitrate (ppm) |
|---|---------------|---------------|-------------------|
| Happy  | 0.0 | 0.0 | 0.0 |
| Sad  | 0.5 | 2.0 | 25 |
| Sick  | 1.0 | 3.0 | 50 |
| Dead  | >1.0 | >3.0 | Varies by Species |

Useful APPS for farmers in



MPEDA
MPEDA



CIBA Shrimpapp
ICAR-CIBA



INDAQUA
ICAR-CIFA



TreatMyFish
ICAR-CIFA



Fish Disease Advise
ICAR-CIFRI



mJhinga for Shrimp
ICAR-CIFE



Chingri
ICAR CIBA



Krishi Kisan
MeitY, Govt. of India



Kisan Suvidha
Mobile Seva

Give me Safe
and Healthy food
I don't like Antibiotics

There is a great concern of increasing Antibiotic resistance of pathogens, in the human food chain. To comply with the International Regulatory Challenge of Non Antibiotic Usage and focus on Best Aquaculture Practices (BAP) and Aquaculture Stewardship Council (ASC), utmost precaution has to be taken in choosing the farm inputs.

Feed supplements are nutritional substances of various compositions as Gut Probiotics, Vitamin and Minerals, Organic acids, Immuno-stimulants, Ammonia binders etc...

As the stages of culture grows, there is depletion of natural nutrition present in the environment, as it is consumed by the shrimps but there is no addition of fresh water for Biosecurity reasons.

Many demanding conditions arises which necessitates the use of feed supplements from external sources to help or improve a particular function in shrimp system.

Conditions and purpose of different feed supplement

| Stage of Culture | Conditions / Purpose | Action/Effect | Supplements to be added |
|------------------|--|---|------------------------------------|
| Seed Stocking | To Propagate and increase probiotics population in the gut | Increases Survival | Stocking Probiotics |
| Upto 30 DOC | To increase immunity | Increase Disease resistance | Immuno-stimulants |
| After 30 DOC | To improve feed intake | Improves digestibility by producing feed digesting enzymes | Feed Probiotics |
| | To improve nutrient absorption | Increase absorption capacity of Gut | Organic acids |
| | To improve shell quality and body weight | Provides sufficient Macro and Micro minerals for Proper shell development | Minerals, Vitamins and Aminoacids. |



OXYGEN MANAGEMENT

DO

Perfect my Aeration
more is my growth



The amount of oxygen dissolved in the pond water is vital to the shrimp's health. However, in the culture pond, dissolved oxygen is mainly consumed by pond sediment (50-70%) and plankton (20-45%). Only a small portion of dissolved oxygen is consumed by the shrimp (5%).

Adequate level of Dissolved Oxygen (DO) can be ensured in water column by 3 methods.

1. By installing different types of Aerators,
2. By controlling plankton density to an optimum level,
3. By minimizing the unwanted organic substances which consume oxygen, such as uneaten feed waste, fecal matter, dead benthic algae, black soil etc.

Aerators:

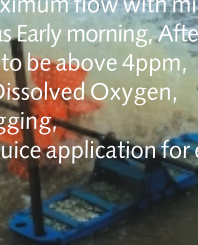
Aerators play a critical role in Pond Oxygenation in Semi-intensive and Intensive culture systems. They primarily maintain adequate oxygen levels and facilitate gaseous exchange. Use of aerators also mix the pond water column well to prevent stratification. The suspended wastes as dead algae, fecal matter, silt also settle in the center of the pond due to water currents.

Factors/Incidents affecting Dissolved Oxygen:

- High phytoplankton bloom increases Oxygen demand
- Cloudy weather results in less photosynthesis
- Sudden Bloom crash results in less photosynthesis
- Usage of Disinfectant, Algicides kills Algae and increases Oxygen demand inside the pond
- Bad Bottom soil increases the Oxygen demand
- High DOC with insufficient aerators/power failure increases Oxygen demand
- High Temperature increases Oxygen demand
- High Salinity increases Oxygen demand
- Deeper the Pond, lesser will be the Oxygen levels

Key Points to remember :

- Decide and fix sufficient aerators @ min 1 HP / 400 kg biomass,
- Properly position the aerators to achieve maximum flow with minimum energy,
- Check DO levels of Pond water 4 times a day as Early morning, Afternoon, Evening and Late night,
- Always ensure minimum Dissolved Oxygen to be above 4ppm,
- Water exchange is the last option to adjust Dissolved Oxygen,
- Stop aeration during feeding and Chain dragging,
- Use aerators during Liming and Fermented Juice application for even distribution





*Certified as Antibiotic-free Aquaculture inputs by,
Coastal Aquaculture Authority,
Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying,
Government of India*



| S. NO. | PRODUCT NAME | CAA NUMBER |
|--------|------------------|-----------------------|
| 1 | BAC CHECK | CAA/F16/PRO/00171 |
| 2 | TOXBEAT | CAA/F16 /PRO/00172 |
| 3 | SEED ONE GROWOUT | CAA/F16/PRO/00173 |
| 4 | BUGBEAT | CAA/F16/PRO/00174 |
| 5 | PREVENT - WFS | CAA/F16/FA/00175 |
| 6 | ECO BEAT TABS | CAA/F16/PRO/00176 |
| 7 | INTAKE | CAA/F16/FA/00177 |
| 8 | B-YUKA 30 | CAA/F16/FA/00178 |
| 9 | YUKA | CAA/F16/PRO/00179 |
| 10 | MACRO PS | CAA/F16/PRO/00180 |
| 11 | GUT ACT PREMIUM | CAA/F16/PRO/00181 |
| 12 | O GEN TABS | CAA/F16/CHEM/00182 |
| 13 | GROW UP | CAA/F16/FA/00183 |
| 14 | SEED ONE | CAA/F16/PRO/00184 |
| 15 | RESTORE | CAA/F16/PRO/00185 |
| 16 | NH CONTROL | CAA/F16/PRO/00186 |
| 17 | ACUABIOTIQ | CAA/JUN 18/FA/01821 |
| 18 | AQUA ONE | CAA/JUN 18/FA/01822 |
| 19 | AQUA ONE 2.0 | CAA/JUN 18/FA/01823 |
| 20 | STEP UP | CAA/JUN 18/FA/01824 |
| 21 | ESY BIND | CAA/JUN 18/FA/01833 |
| 22 | MACRO M | CAA/JUN 18/FA/01834 |
| 23 | SALMIN | CAA/JUN 18/FA/01835 |
| 24 | BAC CHECK 2.0 | CAA/JUN 18/PRO/01815 |
| 25 | Bio-OD | CAA/JUN 18/PRO/01816 |
| 26 | RESCUE | CAA/JUN 18/PRO/01817 |
| 27 | MI-POND | CAA/JUN 18/PRO/01818 |
| 28 | AMMICON | CAA/JUN 18/PRO/01819 |
| 29 | AMEX | CAA/JUN 18/PRO/01820 |
| 30 | O GEN POWDER | CAA/JUN 18/CHEM/01826 |
| 31 | VIRZON AQUA | CAA/JUN 18/CHEM/01827 |
| 32 | ASTRA | CAA/JUN 18/CHEM/01828 |
| 33 | RAKSHA | CAA/JUN 18/CHEM/01829 |
| 34 | SAL DE FLO | CAA/JUN 18/CHEM/01830 |
| 35 | TRUDINE-20 | CAA/JUN 18/CHEM/01831 |
| 36 | RIDER | CAA/JUN 18/CHEM/01832 |
| 37 | IMMUTRON | CAA/JUN 18/IMMU/01825 |
| 38 | ENCON | CAA/JAN19/PRO/03129 |

INPUTS & SERVICES

Field Advisory Services and Farm Input Supplies to ensure Better culture practices that meet the requirement of biosecurity, sustainability and maximum production. We follow Antibiotic-free farming protocols.

Farming with Quality Inputs



Registered with Government authority in MALAYSIA, BANGALADESH & VIETNAM

SHRIMP HATCHERY

SEEDONE, AMMICON, AQUAKING

Probiotics for,
Enhancing Survival,
Maintaining Favourable
Microbial Population,
Continuously
reducing/removing
Ammonia and Nitrite and
Organic Pollutants.



SHRIMP NURSERY

SEEDONE, ENCON

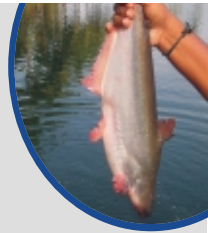
Probiotics for
Enhancing Survival,
Developing Good Biofloc,
Maintaining Favourable
Microbial Population,
Continuously reducing
Ammonia and Nitrite and
Organic Pollutants



SHRIMP GROWOUT

SEEDONE GROWOUT,
BACCHECK, BUGBEAT,
BIO OD, TOXBEAT, YUKA,
B YUCCA 30, RESCUE,
MACRO PS, BLUE BOLT,
ECO BEAT TABS, GUTACT
PREMIUM, INTAKE,
PREVENT WFS, GROWUP,
MACRO M, OGEN,
VIRZON AQUA, ASTRA,
RAKSHA, BUILDUP

Probiotics for Enhancing Seed
Survival,
Probiotic for Vibrio Control,
Non-Antibiotic Growth
Promoters,
Feed Enhancers,
Ammonia and Nitrite Reducers,
H₂S and Black soil removers,
Preventing white Fecal
Syndrome,
Minerals to Improve Muscle
Weight, Shell Quality and
Promote regular molting,
Sanitizers and Disinfectants.



FISH CULTURE

RESTORE,
NH CONTROL,
SALMIN, ASTRA,
RAKSHA, VIRZON
AQUA, RIDER, OGEN

Feed Supplements to
Improve Digestion,
Nutrients to Strengthen
animal,
Mineral Supplements to
Promote Plankton Quality
inturn Natural Feeding,
Sanitizers and Disinfectants.



LABORATORY SERVICES

We provide essential backend support on Water, Soil quality and Animal diseases diagnosis. This helps farmer and the field technicians to diagnose and control diseases, improve Production, ensure Profitability, Quality and food safety to the end consumer.



NETWORK OF 6 LABS
Authorised Service provider of
NFDB AQUAONE CENTER



SOIL ANALYSIS

pH, Total Organic Carbon(%)
Total Nitrogen, Available Phosphorus.

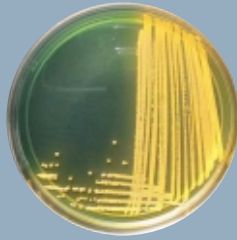
**Farming with
Realtime
Information**

WATER QUALITY ANALYSIS

Routine Water parameters such as pH, Salinity, Alkalinity (Carbonate & Bicarbonate), Hardness (Calcium & Magnesium), Total Ammonia – TAN, Un-ionized Ammonia NH₃ / Nitrite NO₂

DISEASE DIAGNOSIS

Gross examination for aquatic animal's health assessment and clinical sign of diseases.



MICROBIOLOGY

Isolation and characterization of primary pathogens in Shrimps and Fishes, Pond water and sediment in grow – out ponds. Routine direct culture, identification and total count of *Vibrio parahaemolyticus* that is mainly responsible for EMS/AHPND

VIROLOGY

POCKIT™ Nucleic Acid Analyzer is a powerful point-of-need PCR detection tool that combines advanced insulated isothermal polymerase chain reaction (iiPCR) technology. It offers an effective solution for disease surveillance like Early Mortality Syndrome / Acute Hepatopancreatic necrosis disease (EMS/AHPND), Enterocytozoon hepatopenaei (EHP), White spot Syndrome virus (WSSV)



PERFORMANCE EVALUATION, TECHNOLOGY TRANSFER AND INTERNATIONAL COOPERATION

Evaluation of Performance of Animals and Products at the field level according to Set Standards. Feasibility study to adopt New technologies and Production Practices.



CONSULTING AND TRAINING

Consulting on biosecurity and shrimp disease prevention. Organization/support for seminars, technical training courses for farmers. Aquatic disease diagnosis training for field/farm technicians.

First Time in India

TRACEABILITY PROGRAM

This Program is to Integrate the data generated by the farm and the laboratory. This help to create a comprehensive record of a farm / pond produce.

*Farming with
Traceable Records*

INTEGRATION OF LABORATORY, SERVICE AND FARM RECORD

With our Network of Lab, get the advantage of Lab results integration with their farm data in Chronological order.

FARM CERTIFICATION ADVISORY

Guidance for Farm Registration and Market driven Farm Certifications to comply with International standards.

TRACING OF FARM PRODUCE UPTO CONSUMER

First of Its kind in INDIA, a Unique Traceability support program integrating all the relevant data from the stakeholders to establish TRACEABILITY CHAIN.

