

**DEPARTMENT OF FISHERIES
THUA THIEN HUE PROVINCE**
THE FISHERIES EXTENSION CENTRE OF THUA THIEN HUE PROVINCE
(FEC)

**REPORT ON THE RESULTS OF
HIGH-TIDE CULTURE MODEL OF TIGER SHRIMP USING BIOLOGICAL
PRODUCTS**

Venue: Phu Xuan commune, Phu Vang district, Thua Thien Hue province
Sponsored IMOLA Hue
by:
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Extensionist: Chau Ngoc Phi

Hue, November 2007

Hue, date 2007

**REPORT ON HIGH-TIDE CULTURE MODEL OF TIGER SHRIMP USING
BIOLOGICAL PRODUCTS**

Part 1: BRIEF REPORT

1. *Pilot name:* Poly-culture of tiger shrimp using biological products
2. *Affiliation:* FEC
3. *Project proponent:* Mr. Chau Ngoc Phi
4. *Beneficiary household:* Mr. Phan So, Phu Xuan commune, Phu Vang District, Hue city
5. *Venue:* Phu Xuan commune, Phu Vang district
6. *Objective:*
Use of the bio-products in the tiger shrimp pond to improve the environmental condition
7. *Results based on certain criteria compared with the draft plan:*

NO.	ITEMS	AS REQUIRED IN THE PLAN	ACHIEVEMENT
1.	Area	5,000 m ²	5,000 m ²
2.	Fingerling quantity	75,000 units	80,000 units
3.	Fingerling size	P15	P15
4.	Density	15 units/m ²	15 units /m ²
5.	Culture period	06/2007-10/2007	06/2007-10/2007
6.	Average weight	20g/ unit (50 units/ kg)	Loss caused by the fifth storm

8. Result evaluation:

- The poly-culture pilot of tiger shrimp by using the bio-products has the radically technical, scientific and socio-economic significance. If this is successfully applicable, this will help to resolve the current hiccups facing the farmers in the aquaculture in general and the tiger prawn culture in private such as the contaminated pond pollution, the abuse of many toxic matters in the pond.

The pilot has not brought about the economic efficiency as a result of the influence of the fifth storm on October 5th 2007. The effectiveness of the bio-products use was only demonstrated via the environmental parameters. In collaboration with the project staffs, we have the following reflections:

Over three months of monitoring, the results on some criteria with the following aspects taken into consideration:

+ *Environmental aspects:*

The environmental parameters were quite constant. After the bio-products were used, the environmental condition had been remarkably influenced, in details:

- The water color was constant with the straw-like yellow color and suitable transparency (in the morning: 36-40 cm, afternoon: 33-35 cm).
- pH: constant in the range of 7.8-8.3, except for the period when it rained a lot during 2nd to 5th of August 2007, which reduced the alkalinity and pH and shrimps died scattered. Treatment was applied and the efficacy could be seen; shrimp loss seemed to halter.
- NH₃ during the monitoring period always changed at the low range between 0-0.09 mg/ liter and tended to be gradually lessened except when there were climatic influences.
- We still haven't got the exact information for the H₂S as we do not have the testing equipment. However, as could be observed from the bottom mud quality, no bad smell as the damaged egg could be felt, H₂S was obviously reduced.

+ *Objective:*

At the beginning stage, effectiveness can be concluded on the environmental condition stability and improvement. (Currently, it is impossible to evaluate the economic efficiency given by the model as the fifth storm had caused damage to the culture at the nearly harvest time on October 5th of 2007.

+ *Extension possibility:*

Although the economic efficiency of the pilot model could not be estimated during the culture period, the use of the bio-products in the pond helped to stabilize the environmental condition. As a result, it helped to minimize shocks to shrimps, limit disease risks and avoid many toxic chemicals in current use.

Conclusions and proposals:

- **Conclusion:**

Even though the final results could not be achieved from this pilot as a consequence of the disaster impact, it is possible to make out that the pond with the use of the bio-products was more constant than those without this adoption through the monitoring data over the two months of bio-product use.

They helped to minimize the use of chemicals during the culture period.

Because the investment input was raised, the bio-products were only used in the major shrimp farming crops of intensive and semi-intensive culture.

The pilot was started behind the seasonal calendar and thus influenced the outcomes.

- **Proposals:**

To claim the effectiveness of the bio-product use in the shrimp farming, we propose the FEC and IMOLA to make apt considerations so that the pilot can be further tested in the farming season of 2008.

We also propose the FEC to do more researches on appropriate bio-products for Thua Thien Hue condition so that the farmers possibly apply the technical procedure and widely use the bio-products in the shrimp farming.

If the pilot continues to be piloted, we propose it to be early conducted accordingly with the seasonal calendar released by DOFI.

PART II: OUTCOMES OF THE PILOT MODEL

I. PREFACE:

Thua Thien Hue has a good potential for the aquaculture with its diverse and abundant resources. In particular, since the early 90s of the previous century, the tiger prawn farming has appeared and expanded. Apart from the remarkable success, some local regions due to the economic conditions as well as objective factors leading to the wrong directions in people's investment. On average, the majority of people in Thua Thien Hue province only have 5,000 m² of the water surface used for the shrimp farming. Few families have the storage ponds and pond for use before putting into practice. Therefore, the use of chemicals in the pond, accompanied with the high stocking density and no oxygen supply system that lead to the degradation in the shrimp farming.

The micro-organism technology nowadays is one of the science sectors that develops and has an important role to play in many different fields. To solve the above-mentioned matters, the use of the useful micro-organism to the pond is a good tendency to minimize the use of toxic chemicals in the pond and minimize the growth of many bacteria and harmful virus and simultaneously disintegrate the organic humus, the sediment feed in the pond and eradicate the toxic gas such as NH₃, H₂S, etc. creating the good environment for the pond and making it suitable for the growth and development and minimizing the diseases.

II. SUMMARY:

1. Pilot name: Culture of the tiger prawn using the bio-products.
2. Area: 10,000 m²
3. Density: 15 units/ m², P15
4. Duration: 6/2005-10/2007
5. Venue: Phu Xuan, Phu Vang, Thua Thien Hue
6. Affiliation: FEC
7. Sponsored by: IMOLA Project
8. Project proponent: Mr. Chau Ngoc Phi
9. Household: Mr. Phan So, Phu Xuan commune, Phu Vang district, Thua Thien Hue province

III. DURATION:

1. Progress:
 - + Survey: 25 June 2007 – 1 July 2007
 - + Pond preparation, water supply and treatment: 1 July 2007 – 12 July 2007
 - + Fingerling selection and checking: 12 July 2007 – 14 July 2007
 - + Stocking time and care taking: 14 July – 5 October 2007

2. Implementation process: Farming of tiger shrimps using the bio-products

a. Pond preparation: The pond was dried; the clearance was made; the pond dykes were repaired.

- Lime stocking: pH was checked before the liming; the amount of lime was decided based on the pH of the soil and the bottom characters (lime was applied with large amount in the area where there is a lot of mud and around the pond dykes).

Table identifying the lime amount accordingly with the soil pH

Soil pH	Lime type	Amount
5.2	CaCO ₃	700 kilos/ 5,000 m ²

- Bottom exposing: Thanks to the comfortable weather condition at the time of pond exposing, the pond has been exposed for three day. The pond got dried and showed the bird signs.

In-taking the water into the pond:

After the pond preparation was finished, water was taken through the drainage system with the cloth filtering bags to prevent the predators and discharge to the pond. The supply water to the pond reached 1.0 m.

Predating destroying:

The predators were killed by using the Saponin with the dose of 8 ppm (40 kilos of Saponin/ 5,000 m²).

Treatment of the water color:

The treatment and color producing are mainly made by use of the bio-products with the dose of 5 kilos/ 5,000 m³ of the water; the fan system was used continuously in 24 hours. Three days later, the water became straw-like yellow color with the transparency of 40 cm, pH of 8.0 and alkalinity of 82 mg/ liters; the selection and stocking of fingerlings could be started then.

b. Fingerling selection and stocking:

- Fingerling selection: To have a good fingerling source, the following methodology can be followed:

+ Selecting the fingerlings by sensing:

Shrimps have the healthy signs (with the length size > 13 mm), no abnormal signs.

Shrimps have a bright natural color. It is good to choose the fingerlings with the dark brown color fingerlings.

Shrimps swim close the tank dykes; when the oxygen supply system is removed from the water, shrimps jump strongly high above the water surface.

Shrimps are put into the tank, use the hand to move the water current to a direction, if the shrimps swim the opposite way, shrimps prove to be healthy.

+ Trying to shock the shrimps: by taking 100 shrimps as the samples and putting them into the water condition with the salinity of <5 ‰, with the oxygen providing system during one hour. If the survival rate is over 90 %, the fingerlings are of good quality.

+ After a tank of good fingerlings have been selected by sensing, shrimp samples will be selected to check by using PCR. Shrimps showing the good quality can be selected for stocking.

+ Stocking: The fingerlings are transported using the nylon bags with the dissolved oxygen. By the time all the fingerlings bags are located to the pond, they can be soaked for 30 minutes to balance the temperature. After that, the shrimp bags can be opened to let the water enter and environmental parameters can be balanced by the time of stocking.

To identify the amount of fingerlings to be stocked, one bag will be randomly selected to check again.

The survival rate at the stocking time reaches 100 %.

c. Pond management:

+ Monitoring and use of the bio-products:

The bio-products are used based on the instruction and guidelines of the producers: periodically ten days, using the bio-products with the dose of 0.5 kilo/ 5,000 m³ of water. In addition, during the monitoring process of the environmental parameters, the transparency reduced and the bio-products were supplemented after any water replacement.

Table showing the use of the bio-products

NO.	TIME	WATER LEVEL (M)	AREA (M2)	DOSE (PPM)	QUANTITY	NOTE
1	10/07/2007	1	5,000	0.2	1	Periodical
2	17/07/07	1.2	5,000	0.2	1.2	Periodical
3	27/07/07	1.2	5,000	0.2	1.2	Periodical
4	05/08/07	1.2	5,000		1.8	Required treatment due to 2 nd storm influence
5	12/08/07	1	5,000		1.5	Due to water replacement
6	17/08/07	1	5,000	0.2	1	Periodical
7	02/09/07	1.3	5,000	0.2	1.3	Due to water replacement
8	10/9/07	1.3	5,000	0.2	1.3	Periodical
9	17/9/07	1.3	5,000	0.2	1.3	Periodical
10	25/9/07	1.2	5,000	0.2	1.2	Periodical
11	02/10/07	1.2	5,000	0.2	1.2	Due to water replacement
	total				14	

+ Feed monitoring:

Using the UP food (from Taiwan)

Each day, shrimps are fed 4 times every day at 6 a.m, 10 a.m, 6 p.m and 10 p.m. After the second month, shrimps can be fed according to their weight.

2 % of the feed amount is put into the loop net. Two hours later, dependant on the consumption amount, the feed can be adjusted.

Table demonstrating the growth speed and identifying the feed amount

NO	CHECKING DATE	AVERAGE WEIGHT (G/UNIT)	ESTIMATED SURVIVAL RATE (%)	ESTIMATED PRODUCTIVITY (KG)	% OF THE FEED	FEED QUANTITY / DAY	FEEDING FREQUENCY
1	14/07/07		100	10 vụn		1	2
2	20/07/07		90		7	1.5	2
3	24/07/07	0.5	90	36	7	2.52	4
4	04/08/2007	1	60	72	5	3.6	4
5	09/08/2007	2	60	96	2	1.92	4
6	16/08/2007	3.5	55	154	2.5	3.85	4
7	24/08/2007	5	50	200	3	6	4
8	04/09/2007	6.5	50	260	2.5	6.5	4
9	15/09/2007	7.5	55	330	7	6.6	4
10	23/09/2007	8	50	320	2	6.4	4
11	02/10/2007	9	50	360	2	7.2	4
12	05/10/2007	Loss due to the fifth storm					

+ Water replacement:

The technique of seldom replacing the water was followed; the pollution was not serious at the beginning stage so there was no need to replace the water regularly. The supplementary of the water was only required to ensure the water level of over 1 m.

In the second month of the culture period, because of the severe weather condition, it was necessary to follow the environmental parameters to have the prompt measures and 30 % of the water amount was replaced after heavy rain.

+ Monitoring the water color: The pond's transparency should be 30-40 cm. It was possible to adjust the transparency through the water replacement and use of the bio-products.

+ Monitoring environmental parameters:

Periodically 8-10 days check the environmental parameters including pH, alkalinity, salinity (S ‰), temperature (°C), NH₃, NO₃, PO₄.

Environmental parameters including pH, alkalinity, salinity and water color are constantly monitored and timely adjusted.

Results on the environmental outcomes:

NO.	CHECKING DATE	PH	KH (MG/L)	S (%O)	PO ₄ (MG/L)	NH ₃ (MG/L)	NO ₃ (MG/L)	TRANSPARENCY	WATER COLOR
1	14/07/07	8.0	82	21	0.25	0.003	0	40	Straw yellow
2	20/07/07	7.9	90	23	0	0	0	35	Straw yellow
3	24/07/07	8.0	90	18	0.1	0	0	35	Straw yellow
4	04/08/07	7.2	50	12	0.25	0.003	0	50	Straw yellow
5	09/08/07	8.2	82	20	0	0	0.1	40	Straw yellow
6	16/08/07	8.0	90	19	0	0	0	35	Straw yellow
7	24/08/07	8.2	90	22	0	0	0	35	Straw yellow
8	04/09/07	8.3	92	19	0	0	0	35	Straw yellow
9	15/09/07	8.0	90	19	0	0	0	38	Straw yellow
10	23/09/07	8.0	90	19	0.1	0	0	35	Straw yellow
11	02/10/07	7.5	65	9	0.25	0.0003	0.1	40	Straw yellow

Comments:

Via the monitoring the environmental parameters during the pilot implementation, it is possible to recognize:

- Environmental parameters including pH, alkalinity which always constant at the allowable limit suitable for the development of the tiger prawn (pH ranges from 7.9-8.3; alkalinity of 80-92 mg/ litres), except for the influence of the second (4 August 2007) and the fifth storm (2-5 October 2007) causing huge rain and increase the pH and alkalinity in the pond. In particular, the alkalinity reduced to 50-65 mg/ liters and shrimps died scattered.

Between 5 and 7 August 2007, the alkalinity decreased strongly some shrimps swam towards the pond dykes and died scattered.

- Other parameters including NH_3 , PO_4 , NO_3 were seldom inconstant and did not increase during the farming time. There was only a minor change due to the influence of the second and fifth storms.

- The transparency and water color always retained at the constant level with little change. However; at the same time, in many ponds of some neighboring farmers, the water color was always inconstant and shrimps swam in a massive manner.

From the above-mentioned results, it is possible to confirm that the use of the bio-products into this pilot is able to stabilize the environmental parameters and minimize the use of chemicals for the water treatment during the farming period.

d. Budget for conducting the model:

Pilot budgetary table after three culture months (up to 5 October 2007)

NO	ITEMS	UNIT	QUANTITY	UNIT	IN MONEY (VND)		
					Total	IMOLA support	People's contribution
I	Direct cost				19,484,000	8,800,000	10,684,000
1	Lime for pond preparation	Kilo	1,000	500	500,000		500,000
2	Labor for preparation	Working day	10	40,000	400,000		400,000
3	Chemicals	Kilo	40	8,000	320,000		320,000
4	Fingerling purchase	Unit	80,000	40	3,200,000	1,800,000	1,400,000
5	Feed with the coefficient of 1.4	Kilo	504	16,000	8,064,000	0	8,064,000
6	Bio-products	Kilo	14	50,000	7,000,000	7,000,000	0
II	Indirect cost				6,330,000	6,330,000	0
1	Motorbike gas	Litre	40	12,000	480,000	480,000	0
2	Pilot name boards		1	10,000	100,000	100,000	0
3	Budget for the technical support		5	450,000	2,250,000	2,250,000	0
4	Survey cost		1	500,000	500,000	500,000	0
5	Budget for checking and report writing		12	250,000	3,000,000	3,000,000	0
	Total			25,814,000	15,130,000		10,684,000

The economic efficiency could not be identified due to the loss caused by the influence of fifth storm on 5 October 2007. The pilot household only got an unremarkable amount from the quick harvest.

3. Result evaluation:

The economic evaluation can not be identified due to the loss caused by the impact of the fifth storm on 5 October 2007. The efficacy of the bio-products can be seen only through the environmental parameters including:

Over nearly three months of monitoring, some general remarks can be drawn:

+ *Environmental aspects:*

Environmental parameters were quite constant. After the use of the bio-products, the environment has been impacted. Details are as follows:

- The water color is straw-yellow in color and suitably transparent (36-40 cm in the morning, 33-35 cm in the afternoon).
- pH is suitable in the range of 7.8 – 8.3, except for the period when it rained a lot during 2nd to 5th of August 2007, which reduced the alkalinity and pH and shrimps died scattered.
- NH₃ during the monitoring process always changed at the low level, between 0 – 0.09 mg/ litres and had the gradual tendency, except for the periods under the influence of the continuous rain.
- We still haven't got the exact information for the H₂S as we do not have the testing equipment. However, as could be observed from the bottom mud quality, no bad smell as the damaged egg could be felt so H₂S was obviously reduced.
- *Objective:* at the beginning stage, effectiveness can be concluded on the environmental condition stability and improvement. (Currently, it is impossible to evaluate the economic efficiency given by the model as the fifth storm had caused damage to the culture at the nearly harvest time on October 5th of 2007).

Although the economic efficiency of the pilot model could not be estimated during the culture period, the use of the bio-products in the pond is a must for the tiger prawn farming, contributing to enhancing the efficiency in production, limiting disease risks, improving the environmental condition and avoiding many toxic chemicals in current use.

4. Conclusion and proposal:

- Conclusion:

Although the implementation of the tiger prawn was not successful as expected; however, over the two culture months, it is possible to claim that the periodical use of the bio-products brought about the results on stabilizing the environmental results better than in the ponds without the application of the bio-products and helped minimizing the use of chemicals during the culture period.

The farming of the tiger prawn farming with the use of the bio-products required the complicated technical procedure and high monitoring background as well as the large capital involvement. This model is therefore suitable for the intensive and semi-intensive farming styles.

- Proposals:

To be able to confirm the effectiveness of the application of the bio-products during the shrimp farming, we propose the FEC and IMOLA project to make the appropriate considerations to further testify the model in 2008.

We propose FEC to make further researches on the bio-products to identify the suitable bio-products for the Thua Thien Hue situation so that the farmers can apply the technical procedure and widely adopt the bio-product use in the shrimp culture. The pilot should be conducted early according to the seasonal calendar released by the Fisheries Sector.

Director of FEC

(signed and sealed)

Vo Thi Tuyet Hong

Written by

Signed

Chau Ngoc Phi