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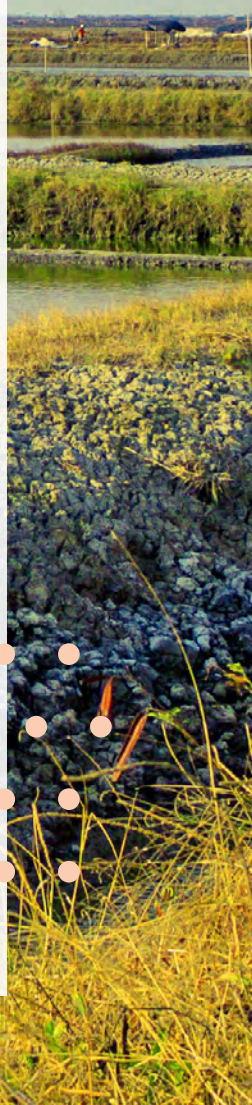
AQUACULTURE
CUSTOMER STORY \ DECEMBER 2022
ANDHRA PRADESH, INDIA

Reducing pollution while increasing yield

at an earthen pond shrimp farm, in Andhra Pradesh, India



AQUA-Cal+™

Case Study Snapshot

Background

This farm is currently facing several challenges, including frequent disease outbreaks, deteriorating water quality, and unsatisfactory farming results. To address these issues, we have recommended implementing the AQUA-Cal+ standard protocol, which focuses on improving water quality, reducing stress on the shrimp, and ultimately enhancing yield.

CHALLENGES

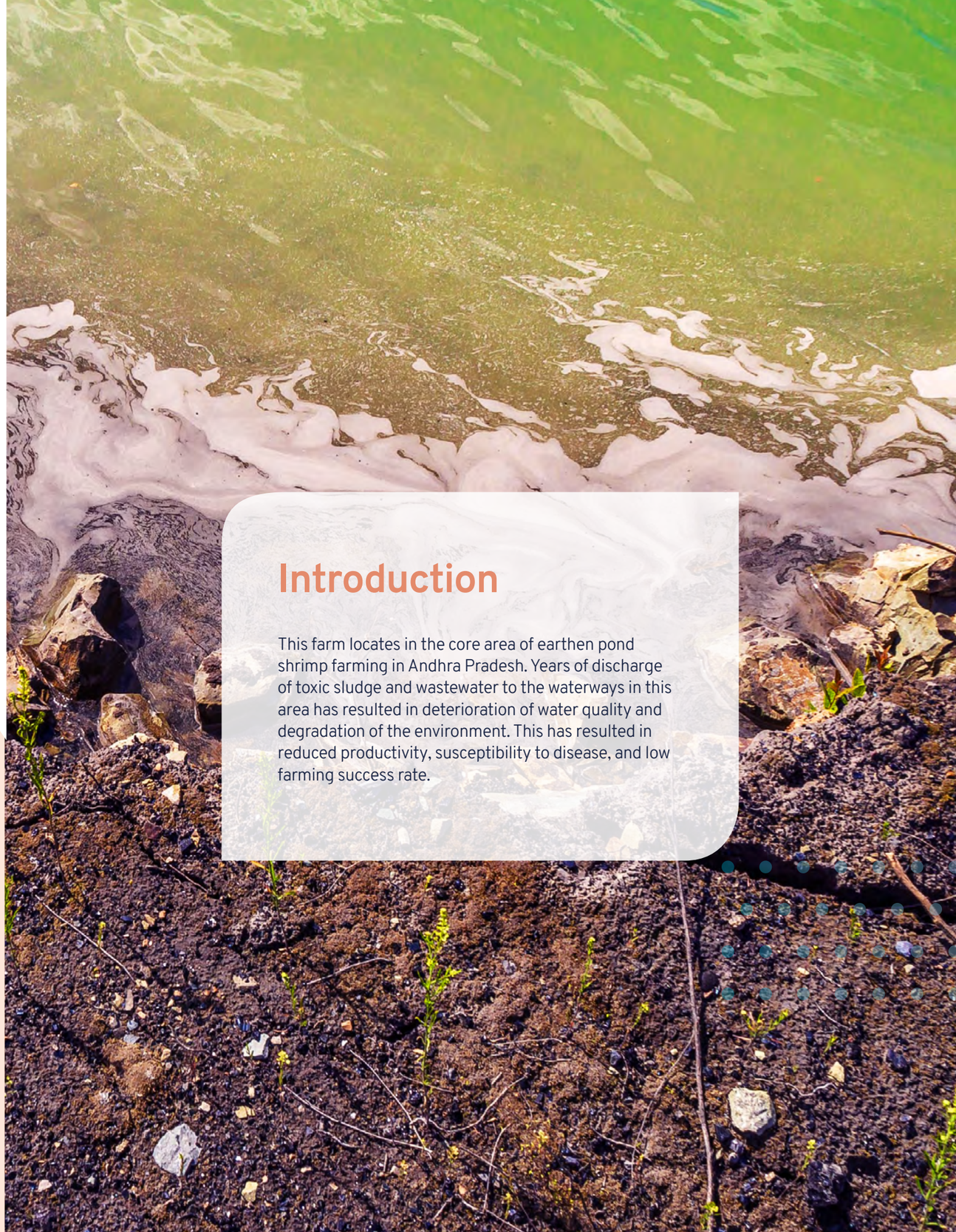
- Poor water quality
- Low harvest weight
- Low farming success rate

SOLUTION

AQUA-Cal+ is a water and sludge conditioner, developed by Calix, that safely addresses disease and pollution, delivering improved feed performance and yield.

BENEFITS

- Increased water quality
- Increased harvest weight
- Reduced FCR



Introduction

This farm locates in the core area of earthen pond shrimp farming in Andhra Pradesh. Years of discharge of toxic sludge and wastewater to the waterways in this area has resulted in deterioration of water quality and degradation of the environment. This has resulted in reduced productivity, susceptibility to disease, and low farming success rate.

The Solution

AQUA-Cal+, making aquaculture more sustainable

AQUA-Cal+ has already begun to transform prawn and shrimp farming, as well as fin fish farming. It improves water condition, reduces stress on the animals and helps lead to increased harvest weight and survival rates, whilst protecting the environment.

Multiple benefits in a single solution:

Improved water quality

- AQUA-Cal+ works as a water and pond bottom conditioner; clarifying the water, controlling pH and releasing alkalinity as required to aid in the digestion of organic matter.

Less stress on prawn and shrimp

- With stabilised conditions in the pond, stress is reduced. When stress is reduced and water condition is improved, both fish and prawns become healthier and more productive.

Sludge volume reduced

- As AQUA-Cal+ neutralises the pond bottom sludge and accelerates its breakdown, pond bottom septicity is prevented. AQUA-Cal+ helps release organic material for the growth of phytoplankton (natural food for shrimp), while binding the toxic contaminants. Subsequently, the smell of the sludge is greatly reduced, with less toxic compounds in the water.

Iron suppression

- Conditioning with AQUA-Cal+ removes the iron by flocculation from the water, significantly reducing turbidity and toxicity. The stocking of the pond after the water is conditioned reduces the subsequent mortality of the post-larvae.

Higher revenue – yield at harvest up to 20%

- Results from trials on both Pacific White Shrimp and Tiger Prawns show that AQUA-Cal+ has a superior performance to probiotics in controlling ammonia, nitrite and pond bottom sludge.
- The data consistently shows AQUA-Cal+ stabilises alkalinity; suppresses extreme changes in pH; provides ingestible essential magnesium and calcium; reduces turbidity, improves light penetration; improves phytoplankton productivity; reduces toxic metals in the system; reduces ammonia and nitrite.

EARTHEN POND PROTOCOL

https://calix.global/wp-content/uploads/2021/11/NEW-EARTHEN-POND-PROTOCOL_rebranded_v3.pdf

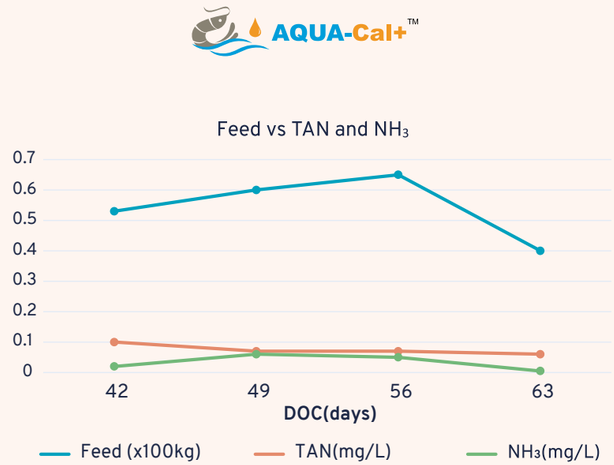
Observations

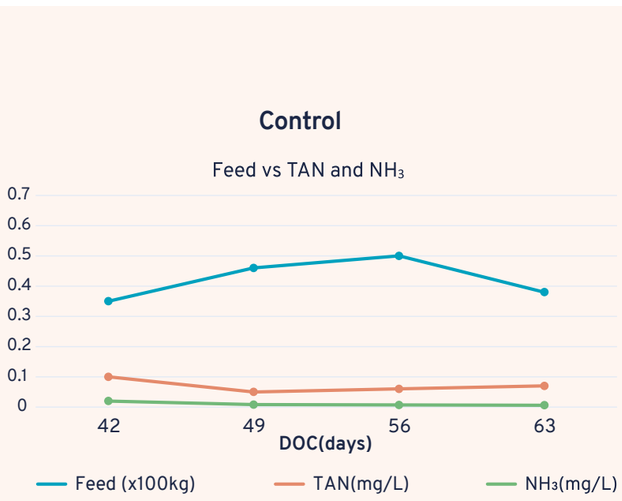
Pond	Pond Size (Ha)	Stocking Density (pcs/m^2)	DOC (Days)	ABW (g)	Survival Rate (%)	Total Feed (Kg)	Total Harvest Weight (Kg)	FCR
Control	0.64	28	70	12.8	85	2834	1974	1.43
AQUA-Cal+	0.80	25	73	**15.8**	79	3286	**2527**	**1.30**

The historical performance of the Trial pond has been notably poor. We suspect that significant mortality took place prior to the implementation of AQUA-Cal+ at DOC 27, resulting in a lower survival rate in the Trial pond in comparison to the Control pond.

TAN and NH_3 suppression using AQUA-Cal+

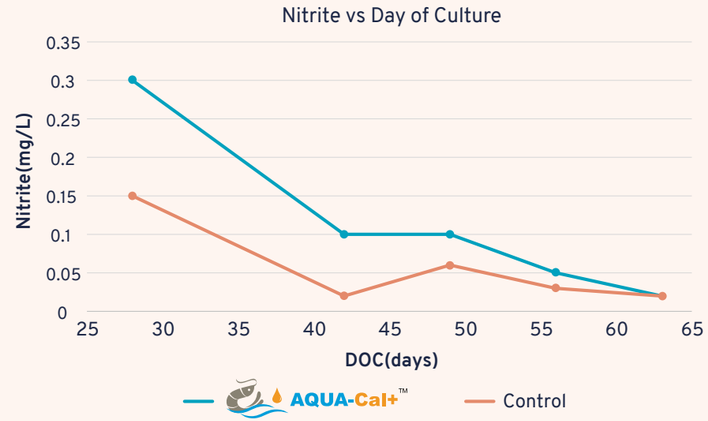
Despite a higher feeding volume in the AQUA-Cal+ pond, the levels of TAN and NH_3 were effectively suppressed to levels comparable to those of the control pond, which had a lower feeding volume.





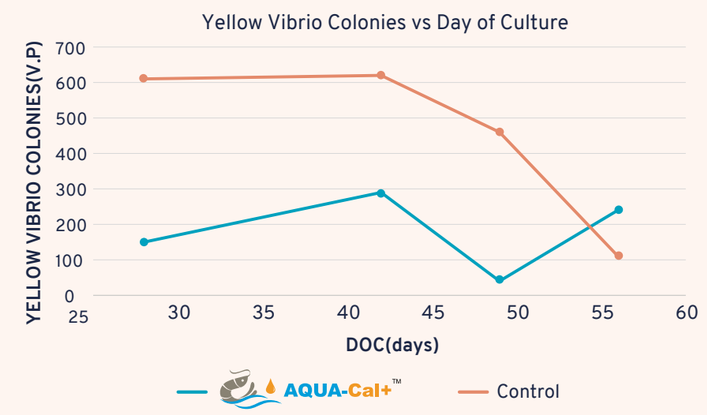
Lower nitrite using AQUA-Cal+

As depicted in the graph, it is evident that the AQUA-Cal+ pond exhibited higher nitrite levels initially when compared to the control pond. However, with the consistent application of AQUA-Cal+ during the culture period, the levels of TAN and NH_3 were significantly reduced. This, in turn, curbed the source of nitrification from TAN and NH_3, ultimately leading to a decrease in nitrite levels.



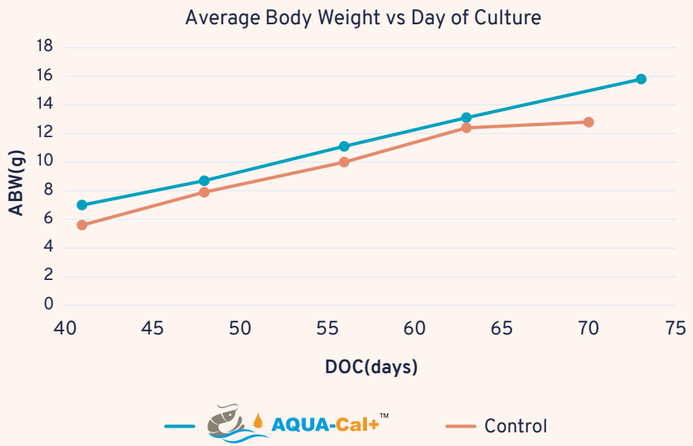
Lower yellow vibrio colonies using AQUA-Cal+

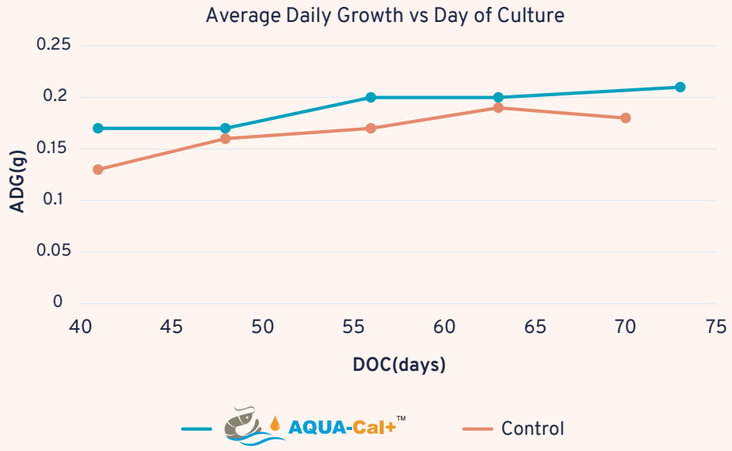
As AQUA-Cal+ aids in the digestion of organic matter present in the pond bottom, it leads to a shift in bacterial populations. This change results in the creation of a more conducive environment for shrimp growth.



Better average body weight and average daily growth with AQUA-Cal+

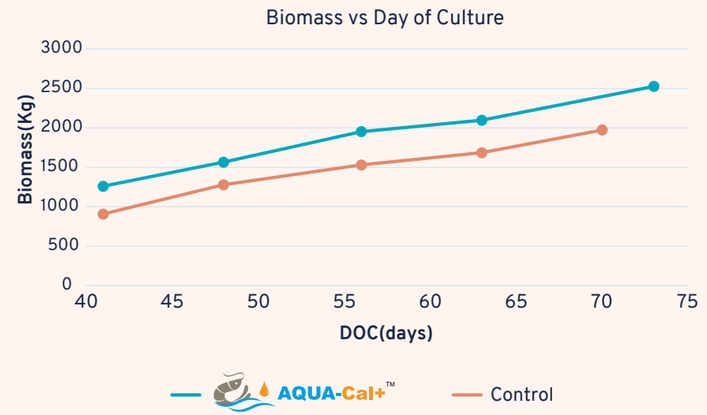
The implementation of the AQUA-Cal+ standard protocol has resulted in significant improvements in water quality and reduced stress levels in the shrimp. This has ultimately led to higher Average Daily Growth and Average Body Weight in the AQUA-Cal+ pond when compared to the control pond. The improved water quality, which is achieved by controlling levels of TAN, NH_3, nitrite, and nitrate, along with reducing stress levels, has created an optimal environment for the shrimp to thrive and grow. As a result, the shrimp in the AQUA-Cal+ pond have been able to achieve better growth rates and overall health, leading to higher body weights on average.

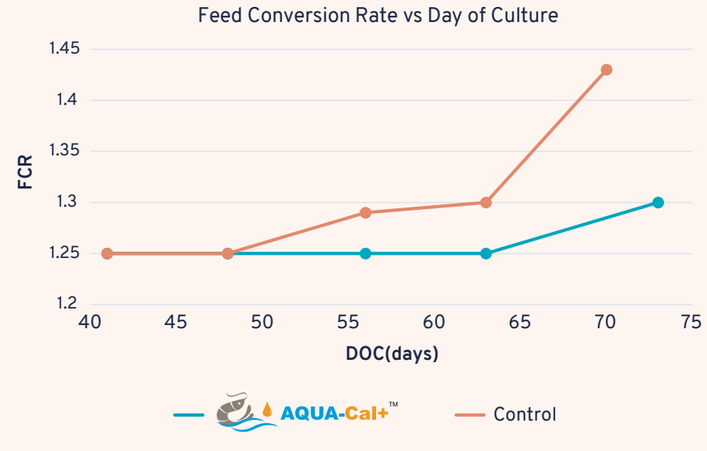




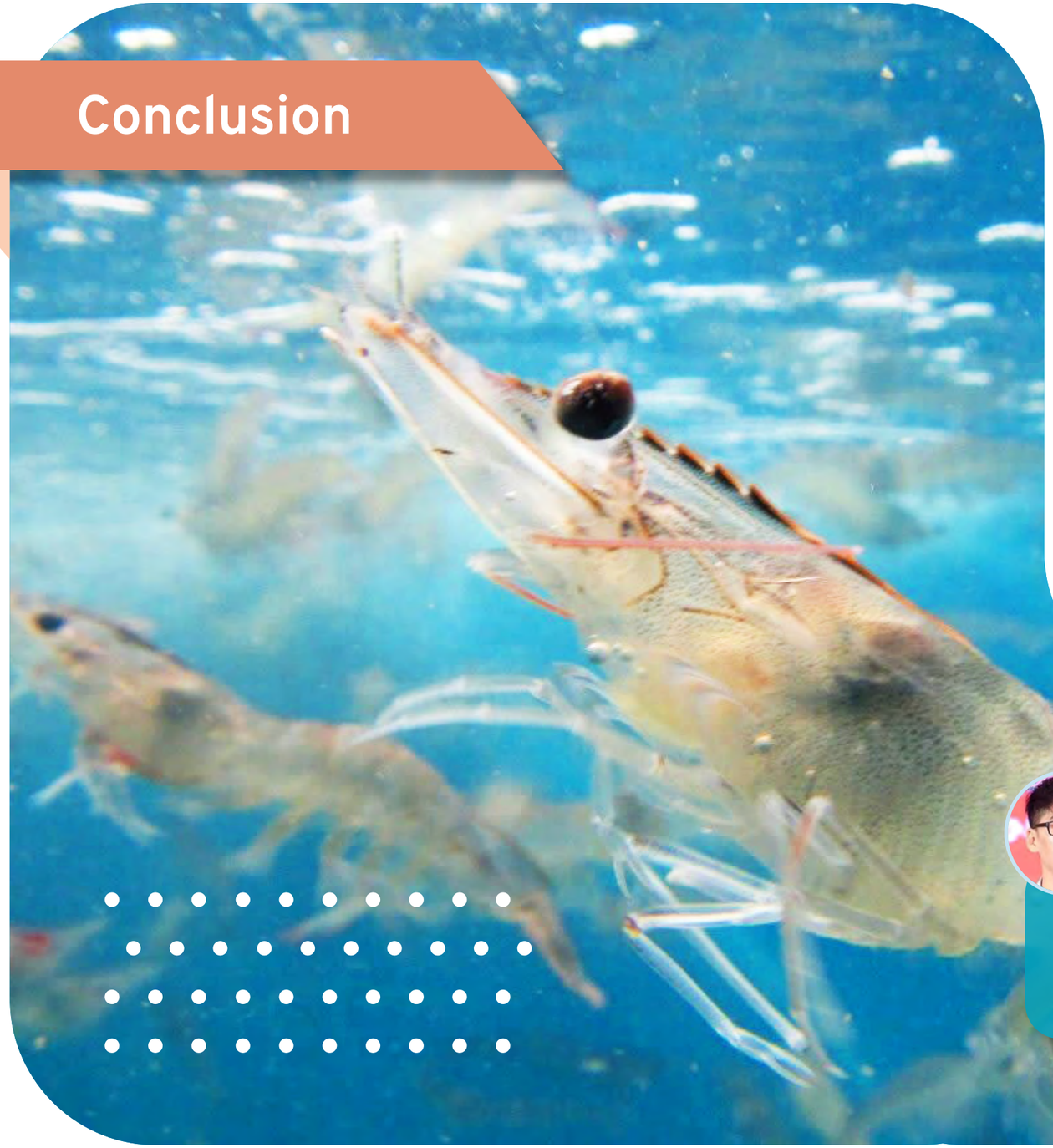
Better FCR and higher Biomass using AQUA-Cal+

The use of AQUA-Cal+ has contributed to improved water quality in the pond, leading to healthier shrimp and less stress. This is reflected in the lower FCR observed in the AQUA-Cal+ pond as compared to the control pond. A lower FCR indicates that shrimp in the AQUA-Cal+ pond are converting feed into biomass more efficiently, resulting in better growth rates and healthier shrimp. These observations are further supported by the biomass graph, which illustrates the improved growth and overall health of the shrimp in the AQUA-Cal+ pond. Hence, it can be concluded that AQUA-Cal+ has positively impacted the growth and overall health of the shrimp in the pond, contributing to a more efficient and sustainable farming operation.





Conclusion



This farm, like many in the area, was suffering from poor water quality and reduced yields. This is a recurring pattern throughout Asia and can be traced back to the common practice of sludge discharge directly into waterways.

We can clearly see the benefits of using AQUA-Cal+ in a earthen pond.

- Better average body weight and average daily growth
- Better suppression of ammonia and nitrite
- Both DOC and FCR were improved
- Lower yellow vibrio colonies using AQUA-Cal+

Wilson Lum
Applications Engineer Aquaculture

AQUA-Cal+ is a great alternative and a more sustainable approach to shrimp culture. Guided by our expertise and protocols, we help farmers reduce pollution while increasing their yield and revenue.

A more sustainable industry means aquaculture and shrimp farming can become a more efficient way of growing food and feed the protein needs of a growing human population.

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