

## Case Study Pico Aqua Farm

### Manee Samut Shrimp Farm, Thailand

#### Background

The Manee Samut Shrimp Farm is located in the Ranod district of Songkla Province, Southern Thailand. Independently-owned, Manee Samut employs more than 120 people and sells their shrimp to leading seafood exporters throughout Thailand. With more than 200 ponds on-site, the farmers use various probiotic products for pond preparation and feed supplementation, but results have been unsatisfactory particularly on water quality measures such as ammonia and nitrite. In partnership with PICO ASEAN and local distributor Hydro Bio, the farmers agreed to trial PICO™ Aqua Farm for one growing season lasting 120 days.



#### Objectives

The objective of the trial is to validate the effectiveness of PICO™ Aqua Farm in improving water quality and production in shrimp aquaculture.

#### The Solution

PICO™ Aqua Farm is a powerful blend of probiotics that improves water quality by accelerating the removal of nitrogenous wastes and enhancing natural biological processes. Approved for use in organic food production, PICO™ Aqua Farm helps support optimal animal production in aquaculture systems. Proven applications include algae control, nutrient management, odor control, and feed supplementation (in countries with regulatory approval).

### Implementation Program

The trial maintained two PICO™ treated ponds, each with a corresponding pond for control.

Pond #	Size*	Depth
PICO A15	4.5 rai or 0.72 hectare	1.4 meter
Control D28	same as above	same as above
PICO A26	5.0 rai or 0.80 hectare	1.4 meter
Control™ D9	same as above	same as above

\* A rai is a unit of area, equal to 1,600 square metres (40 m × 40 m), commonly used for measuring land area in Thailand.

Each pond above had a density of 40-50 shrimp per square meter or approximately 500,000 shrimp per pond.

### Dosing Schedule

Per pond, PICO™ Aqua Farm was activated in 200L of water for 12-20 hours according to the following schedule:

Month	Week	PICO gm/wk	Molasses gm/wk	PICO kg/month
1	1-4	300	750	1.2
2	5-8	450	1,125	1.8
3	9-12	900	2,250	3.6
4	13-16	1,100	2,750	4.4
Total In-Feed				11.0
Pond Preparation		6,000		6.0
<b>Grand Total</b>				<b>17.0</b>

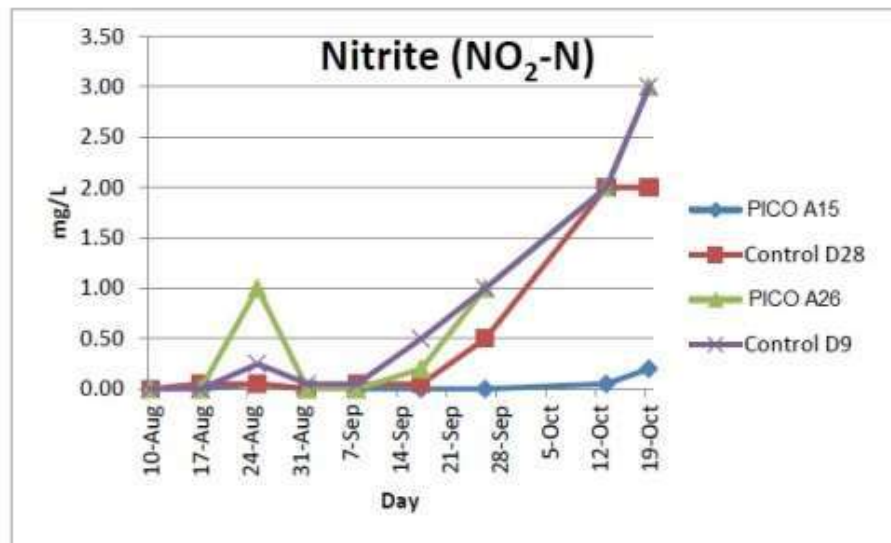
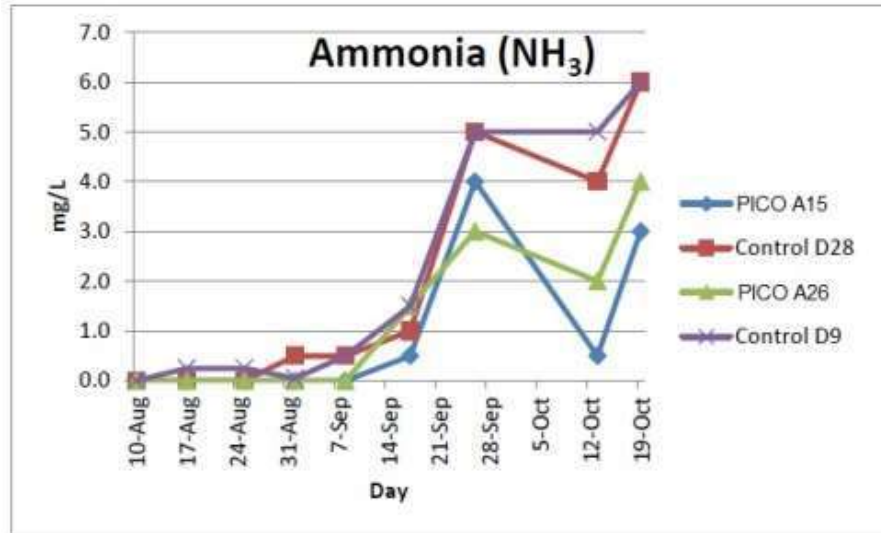
The addition of molasses is a common farmer practice and not required in the PICO™ Aqua Farm protocol.



*Shrimp auto-feed tanks above right*

**Results**

Water quality measurements were taken in the control and PICO™ treated ponds during the first 90 days of the trial. PICO™ ponds showed significantly lower ammonia than their respective control ponds. PICO™ pond A15 also showed significantly lower nitrite compared to control. PICO™ pond A26 was in the same range as control, but both ponds were below the 5 mg/ L set limit for nitrite.



It is important to note that after 94 days, the control ponds had to be harvested earlier than scheduled due to an infection with white spot disease, which damages the gills and skin of fish. None of PICO™ ponds were infected with the disease.



The PICO™ ponds were harvested after 115 days and the results are as follows:

Pond #	Age (days)	Pond Size (ha)	Stocking Density (shrimp/m <sup>2</sup> )	Feed Used (ton)	Biomass [kg/0.16ha (rai)/crop]	ADG (gm per piece)	White Spot?
Control D28	94	0.72	75	8.0	1,044	8.47	Yes
PICO A15	115	0.72	75	14.0	1,778	11.90	No
Control D9	94	0.80	70	8.0	960	9.09	Yes
PICO A26	115	0.80	70	12.0	1,320	11.76	No

Both PICO™ ponds produced significantly larger biomass compared to their respective control ponds. The Average Daily Gain (ADG) per shrimp was also bigger than the controls.

Both PICO™ ponds had higher survival rates than the control ponds, averaging seven percent higher than the controls. It is common practice for the farmers to reduce feed with the incidence of disease, resulting in lower Feed Conversion Ratio (FCR). This practice prevented the PICO™ ponds from achieving a typical lower FCR and resulted in similar FCR ranges (1.7 to 1.8) for control and PICO™ ponds.

To illustrate the economic benefit of using PICO™ Aqua Farm, the farmers compared the final harvest size of the shrimp in all ponds and the results show larger shrimp in the PICO™ ponds compared to control:

Pond #	Age at harvest (days)	Shrimp size (pcs./kg)	Shrimp weight (gm/pc)
Control D28	94	110	9.09
PICO A15	115	83	11.90
Control D9	94	118	8.47
PICO A26	115	85	11.76

### Conclusion

Based on the results of this study, PICO™ Aqua Farm can be used to improve water quality and production in shrimp aquaculture ponds. The PICO™ treated ponds yielded significantly larger biomass and shrimp size as well as higher survival rates compared to their respective control ponds. The PICO™ ponds also had lower ammonia levels than controls, indicating improvement in water quality. It is also interesting that both control ponds were infected by white spot disease, leading to an earlier harvest than normal for the controls. This case study adds to the growing body of evidence to support the effectiveness of PICO™ Aqua Farm in aquaculture production.