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Press Release

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Trials in India were conducted by Royal Bio-Marine in 2013.

What:

PRO4000X tablets contain two strains of Bacillus that have been selected for their innate gene expression resulting in the production of a wide range of enzymes that facilitate their ability to degrade organic material and break ammonia down in aquatic ecosystems. Each tablet contains an average of 64 billion CFU of spores. Unlike conventional products, no activation is required. The tablets are added to ponds or hatchery tanks where they settle to the bottom, slowly dissolve and the bacteria proliferate. They are in direct contact with the pond sediments and large numbers of bacterial spores are delivered into a relatively small area. Targeted delivery to problem areas in ponds and canals ensures a more efficient and less costly approach towards managing accumulated metabolites (organic matter) in production systems. Hatchery trials have shown that the bacteria in our product outcompete vibrios and reduce the overall vibrio load in the environment.

A recent trial in India demonstrated that the use of our PRO4000X tablets allowed a farmer to change the production paradigm and allowed the test farm to close their ponds and increase their yields.

How:

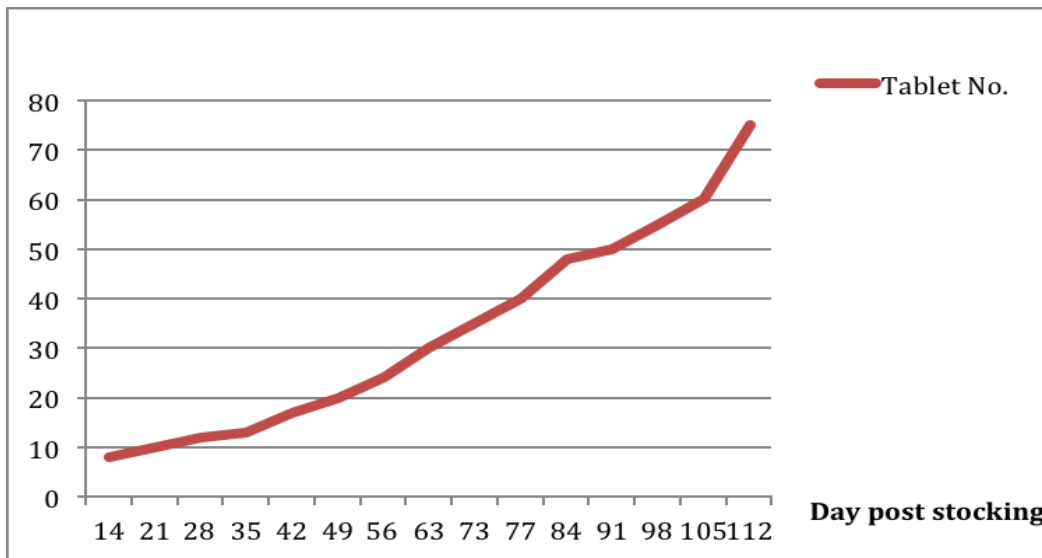
Tablets were applied as in Chart 1. Starting with 8 tablets added to problem areas 14 days post stocking and ending with 75 tablets at day 112 post stocking for a total of 497 tablets per pond per ha per cycle. This is about 8 kgs of tablets total per pond. Tablets were added roughly every 10 days. The actual usage rate typically varies (as it should) and application rates can range from a few kgs to 20 or more kgs per ha per cycle. We strongly encourage our clients to optimize the usage for their specific production parameters. Each environment is different and optimal usage rates should depend on stocking densities, pond design and characteristics, feeding strategies, etc. More tablets are added used as the cycle progresses.

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Chart 1. Tablet application rates per ha per cycle



Results:

Shrimp growth and ammonia levels in the ponds were monitored throughout the production cycle. Table 1 details the pond statistics.

Table 1. Pond statistics for PRO4000X trials (India).

Pond #	Animals per sq m	Area (ha)	Depth (m)	Water Exchange (%)	Cycle (days)	weight grams	MT harvest	% surv	FCRs
1	35	1	1.5	0	115	24.5	>7.7	>90	1.1
2	35	1	1.5	0	115	23.3	>7.3	>90	1.1
3	28	0.9	1.4	0	115	25.9	>6.5	>90	1.2
Control	35	1	1.5	10 to 15	122	15.1	5.3	82	1.7

All four ponds were on the same farm with a common water source, a nearby brackish water creek. All of the shrimp were from the same hatchery and all of the ponds were stocked at the same time. There were distinctive productivity differences between those ponds using the tablets and the control pond. The shrimp grew faster, bigger, used less feed (less mortality) and most important no water exchange was needed in the production ponds.

Chart 2. Growth performance (average body weight versus days of culture)

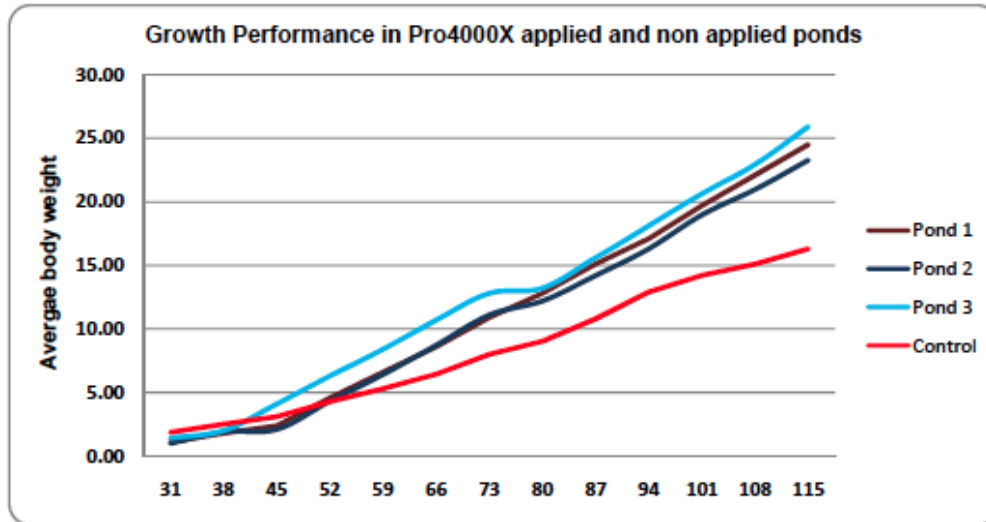


Chart 2 clearly shows that the shrimp in the ponds that were treated with the PRO4000X tablets grew quicker and reached a much higher overall final weight. The yields and final size at harvest are in Table 1 above.

Chart 3. Weekly ammonia levels in control and experimental ponds

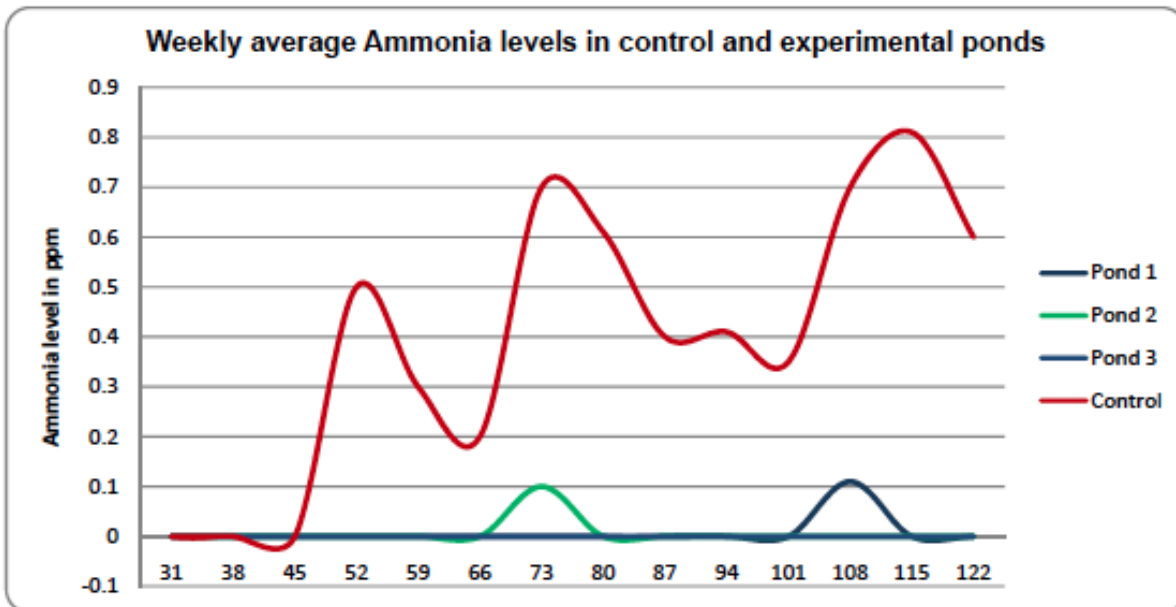


Chart 3 shows the ammonia levels in the ponds throughout the cycle. The control pond experienced high ammonia rates while they experimental ponds did not. The was forced to exchange water in the control pond.

Chart 4. Reduction of TCBS Green vibrio loads over the course of the production cycle.

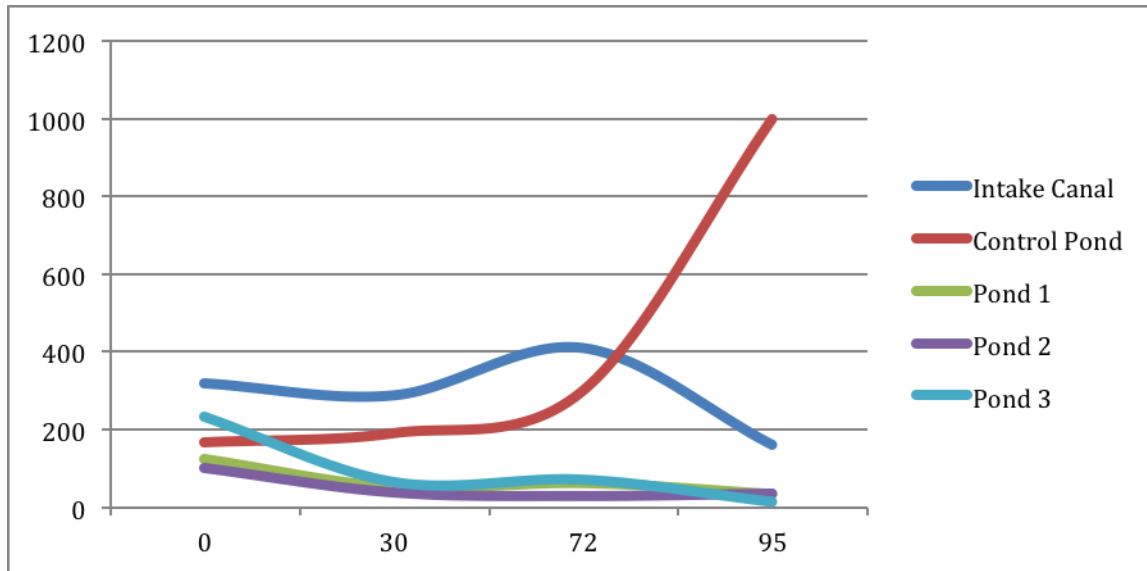


Chart 5. Reduction of TCBS Yellow vibrio loads over the course of the production cycle.

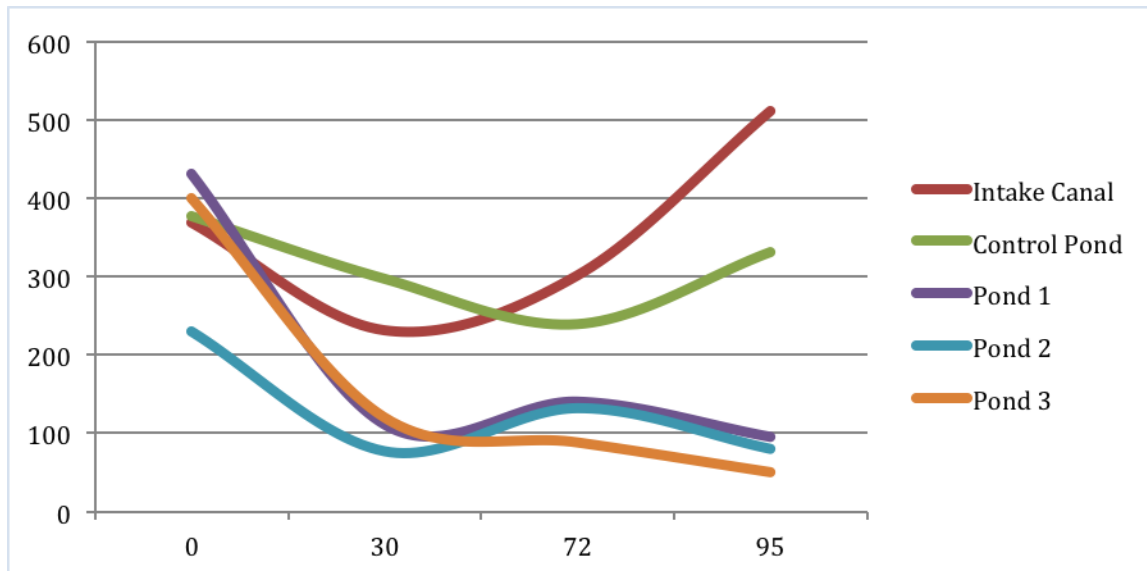


Chart 4 is a graph of the green colonies on TCBS measured at day of culture (DOC) 0, 30, 72 and 95. Levels of TCBS green bacteria in the control pond were similar to that of the three experimental ponds at the start of culture although lower than the levels in the intake canal water. Over the course of the cycle the levels in the three experimental ponds dropped by 65 to 94%. There was a 300% fold increase in the control pond.

Chart 5 is a graph of the yellow colonies on TCBS measured on the same days of culture as in the prior chart. As with the TCBS green bacteria, TCBS yellow loads in the control pond were similar to that of the control pond at the onset of the cycle. Use of PRO4000X dramatically reduced the overall vibrio loads in the experimental ponds while the levels varied in control pond but remained fairly consistent.

Conclusions:

It is clear that the ponds that were treated with the tablets fared much better than the control pond.

- No water exchange was required in the PRO4000X treated ponds (three total)
- Shrimp grew quicker in the PRO4000X treated ponds
- Shrimp consumed less feed in the PRO4000X treated ponds
- There was much less accumulated ammonia in the PRO4000X ponds
- There were higher survivals in PRO4000X treated ponds
- There were higher yields in PRO4000X ponds
- Shrimp were larger in PRO4000X ponds
- Vibrio loads were substantially reduced in ponds treated with PRO4000X.

This set of field trials demonstrated that the bacteria in our tablets were able to create environments in the ponds that allowed the shrimp to flourish. Use of the product paid for itself many times over. Your actual experience with our products will vary. Each pond has its own ecology and this can impact how added bacteria grow. We work with clients individually to optimize the use of our products for their particular ponds.