

New techniques help intensive shrimp farming return to Ecuador

CASE STUDY



PescaMaris is reviving the lost industry of intensive shrimp farming in Ecuador. Several years ago, white spot disease decimated the entire industry, but now PescaMaris S.A. has started its second year of production and is greatly exceeding performance from years past. Located just outside of Montecristi in the Manabi province of Ecuador, the seven hectare intensive site can equal the production of 150 hectares of traditional open water farms.

“In intensive shrimp farming, the most critical requirement is to maintain the quality of the water which in turn maintains the health of the population” said Ernesto Cardenas, the General Manager of the operation. We have found some unique combinations which allow us to improve our FCR, decrease the cost/kg of our feed and ultimately to increase our total output per hectare.”

One key aspect which PescaMaris credits for the improvement in their operation is the strategic use of Fish Peptide/Nucleotide Isolates in several steps during its production. Ernesto’s creativity goes back many years to when he blended/created shrimp feed formulas while working at [AgriPac Balanfarina](#), one of the largest feed companies in Ecuador. Now with new sources of Peptides+Nucleotides at his disposal, and his own farm to work with, he has found multiple ways to catalyze the growth of the shrimp.



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MANAGING WATER QUALITY: GETTING THE NATURAL PROBIOTIC BACTERIA TO THEIR HIGHEST LEVELS.

Inoculating the ponds with good bacteria is a standard practice in high quality shrimp operations - and it is even more critical for intensive farms. PescaMaris has enhanced this process by adding Bluewave Perfect-Digest FPi (Fish Peptides Isolates) during the bacterial “fermentation” process at the farm. The peptide/nucleotide base is produced at the **Marine Protein S.A.** factory, Manta Ecuador.

Traditional Formula: During the first 10 days of fermentation, sugar molasses is typically used a ratio of 20L per 1L bacteria is mixed with 1,000L of water to create a full batch to be fed into the ponds. With this standard recipe, the molasses is the only food source for the bacteria in the holding tank.

New Formula: By altering the feed for the bacteria to include 10L of FPi Peptide and 10L of molasses, PescaMaris has began utilizing the same technique that many world class pharmaceutical companies do every day....exponentially accelerating the growth of the bacteria with peptides (higher population in fewer days). The increase in population inside the fermentation tank results in more bacteria reaching the water with each application - more bacteria produces more work on the biomass in the water - and ultimately cleaner ponds with healthier shrimp.



Concentrated Bacteria and Fermentation Tank

BETTER, CHEAPER FEEDING: DIY - DO IT YOURSELF (OR AT LEAST 20% OF IT)

Everyone knows that feed is the highest cost component for commercial production and finding a way to reduce feed cost by 10% using peptides is another success at PescaMaris. This process begins by replacing 20% of the expensive manufactured feed (\$28/bag) with a blend of traditional “dry grain silage” (\$8/bag). But in order to bring the grain-silage to shrimp feed quality, it must be top-dressed with the PerfectDigest FPC (\$4/application). This results in a \$12 feed bag vs \$28 from the mfg. The FPC for this application is a combination of fish peptides-nucleotides and fish fats/oils. The mix is allowed to set for about one hour prior to feeding - this allows the FPC to saturate into the grain-silage. The solubility of the Peptide allows for partial release when the feed hits the water serving as an attractant for the shrimp, but it also ensures the shrimp consume all of the low cost grain/silage material”, firstly because they find it, and secondly, because the grain retains a fish taste as a result of the long soak. Top-dressing grain-silage



Left: \$8/bag of grain-silage

Right: In hands are untreated grain-silage, in box is the mix of 80% manufactured feed + 20% silage + peptide top-dressing

with fish peptide has direct implications when considering the use of other “waste grain products” such as Distiller Dried Grains (DDGs) in Aquaculture Feeds. With massive amounts of low cost DDGs available on the market, and a newly designed program to treat with fish peptides - shrimp farmers around the world will be able to benefit from lower feed costs - and improve feed conversion by using these techniques. Gently placing the feed tray/nets and lowering into the pond, rather than just throwing pellets is another example of technique which helps more of the feed to reach the shrimp and not be lost in the water.

KNOW IT FOR SURE: GUARANTEED INCLUSIONS AND PROTEINS WHICH ARE NOT DENATURED.

Making fish peptide additions on the farm, rather than hoping they have been included at the feed mill has some major advantages. For one, the farmer can be assured of exactly how much Peptide is being included in the feed program. Feed mill recipes change - and with the recent high fishmeal prices and sometimes short supply, there has been pressure to reduce its inclusion resulting in lower performing feeds.



Applying liquid peptide to dry feed

Top dressing with the liquid FPi & FPc assures that the peptide has not been denatured during the steam extrusion process at the feed mill. This means the Peptides have maximum bio-activity when they reach the water. In Nature, shrimp eat raw marine components as part of their natural diets - adding the FPi or FPc provides bioactive peptides & nucleotides in a “non-cooked” condition - similar to the way they occur in nature. This format allows for a “lower net inclusion rate” of fish based ingredients, without affecting final performance. Some farmer are concerned that when the peptide leaches from the feed it is lost in the pond - however, what they fail to realize is that the bacteria population in the water quickly consume the peptide and form a floc which in turn the shrimp will feed upon.

SUSTAINABLE PRODUCTION: SMALL FOOT PRINT, RECYCLED WATER, LOWER FISHMEAL FEED CONTENT AND BY-PRODUCT FEED INGREDIENTS ARE THE CORNERSTONES OF THE PROGRAM.

Footprint: As was previously stated, the farm currently operates on only seven hectares, and is producing about 13.5 tons of shrimp per hectare - this compares to 650kg/hectare with open water farms.

Recycle: The ground water has high salinity (which is great for the shrimp) however, there is limited quantities - so PescaMaris incorporates water recycle through a large ‘post pond holding area’. When the ponds are drained, the water has several weeks to recover in the holding area, where it can later be re-used in subsequent ponds. During production cycles they operate at Zero Water Exchange - instead they



maintain >5ppm oxygen level, relying on the bacteria to keep the water clean along with continuous paddle wheel aeration.

Utilization of the liquid fish peptide on site in conjunction with the grain-silage feed, *lowers the total fishmeal content of the diet by about 20%*. Applying some “think globally, act locally” mathematics, this 20% reduction has the ability to make a major impact on the 5MM+ tons of fishmeal used in AquaCulture each year. And the products which PescaMaris has chosen all come from by-product sources, thus further reducing the impact on wild-catch fishmeal.

In summary: farming is a business, and economical success is the final measure of the program - this cycle has shown a great improvement over the last cycle and. FCR has improved from 1.7 in year 2009 down to 1.3 in the current program (yes this number is correct) and currently the ponds receiving the peptide program are two weeks ahead of the neighboring control pond.

Below is a quick summary of other performance from this cycle.

Survival rate: 85%	FCR: 1.25
Harvest Shrimp size: 10g	Yield per hectare: 18,000lbs
Temperature: 23C	Days of Cycle: 84
Feed Cost/kg of shrimp: 0.9 cents	

Historically, intensive farming is up to 30% higher in unit cost of production versus extensive, but today PescaMaris nearing the same unit cost.

The entire peptide feed program has been developed in conjunction with technical support from a local Ecuador distributor Representaciones Acuicolas managed by Jorge Cepeda. The company has spent the last six months testing and analyzing shrimp feed programs with numerous local producers as well as analytical work utilizing peptides for fermentation bacteria.



For more information, please contact [Mark Rottmann](#) or visit www.PerfectDigest.com.
The results of the independent research can be found [here](#)

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