

AquaPro F

Formulated for use in and on feed

AquaPro F is a mixture of selected proprietary strains of different *Bacillus* species including: *Bacillus subtilis*, *B. licheniformis*, *B. pumilus*, *B. megaterium*, *B. polymyxa*. These are combined with the prebiotic mannan oligosaccharide (MOS) with added enzymes (cellulase, amylase, protease and lipase) to aid in the digestion of the feed. The spore load is no less than 2 trillion CFU per kg of product. There are several ways to apply the product.

Top Dressing Feed

Wet Method: For each kg of feed to be used add 1 to 2 grams of AquaPro F to 200 mls of clean water (50 to 100 grams in 5 liters). Let sit with occasional stirring or aeration if available for 8 to 12 hours. Use this material to soak the quantity of feed that the dried material was allocated for. Alternatively, spray on the feed and feed to the shrimp. May be mixed with other materials.

Dry Method: Mix the dried material with a little fish oil or water and coat the feed. When the material is applied in the feed or top dressed on the feed as is, without germinating the bacteria first, the spores pass through the digestive tract and are deposited in the feces. They will germinate and begin the job of further digesting the feed. These bacteria will be re-ingested by the shrimp as they forage and consume detritus in the ponds.



ORAL APPLICATION OF BACILLUS

Oral application of living bacteria to shrimp and fish offers some interesting potential benefits. Unfortunately, most of the numerous publications that claim documented benefits are not reproducible. Most bacteria do not survive the extreme pressures and heat of the feed milling process. A major exception to this are those bacteria that form spores, specifically the *Bacillus* species. These spores are highly heat resistant allowing them to be sold in a dried form with a long shelf life. The spores, in the presence of water, become metabolically active vegetative cells.

Spore forming *Bacillus* species have been shown to benefit shrimp when eaten. The exact mechanism is not clear. Despite widespread speculation the only certain mechanism is that they are involved in the degradation of organic matter. It is a convenient way to add to the load of spores in a pond.

Incorporation into Feed

For optimum performance add 1 to 2 kgs per MT of feed. This is one to two grams of material per kg of feed. The material is fairly heat resistant and given the very high levels of spores, many will survive the milling process colonizing both pond bottoms in feces and recycling through the shrimp.

