

THE USE OF PROBIOTICS AND PREMIXES AS A SOLUTION FOR ANTIBIOTIC FREE FEEDING IN SHRIMP PRODUCTION IN SOUTH EAST ASIA

CHRISTIAN LÜCKSTÄDT

¹ *BIOMIN Deutschland, Gartenstrasse 17, 73119 Zell u. A., Germany*

Recently, growing awareness from consumers and producers of aquaculture species has resulted in demands of responsible and sustainable aquaculture, also in the much debated shrimp production in South East Asia (Feedinfo, 2005). Public opinion and regulation authorities of most shrimp exporting countries focus now on the misuse of antibiotics in aquaculture and public attention has been drawn towards production methods (Lückstädt, 2005).

The mode of action of probiotics in aquaculture can be described by the following steps:

- Production of inhibitory compounds - Probiotic bacteria release chemicals which have a bactericidal or bacteriostatic effect.
- Competition for adhesion sites - Bacteria compete for gut adhesion sites. Adhesion is a prerequisite to colonisation in the intestinal tract. By applying a high number (10^{12}) of beneficial bacteria (probiotics), harmful bacteria (pathogens) are not able to adhere and thus cannot proliferate.
- Improvement of water quality - This is usually associated with *Bacillus* species. In comparison to gram negative, bacteria gram positive strains (e.g. *Bacillus subtilis*) are better converters of organic matter thus producing CO₂. This results in lower levels of residues in the pond, so the BOD (biological oxygen demand) and the COD (chemical oxygen demand) are reduced.
- Enzymatic contribution of digestion - Certain bacterial species (*Bacillus subtilis*) are known to produce and release enzymes (e.g. amylase, protease) that are able to improve the digestive process in shrimp.

Directly fed probiotics are therefore a promising sustainable additive to stimulate shrimp growth and secure a low disease response. In shrimp grow-out, Massam (2005) found directly fed probiotics an effective tool to boost

survival, while Decamp *et al.* (2005) studied the effect of probiotics on one Asian shrimp hatchery. However large scale field trial data from hatcheries are still missing.

During the year 2005 several trials were performed in South Vietnam in a wide number of hatcheries using a probiotic feed additive (containing 3 different strains, i.e. of *Bacillus sp.*, *Enterococcus sp.* and *Lactobacillus sp.*) designed to improve bioavailability in shrimp larvae used from early Zoea to later Post Larvae (PL) stages. The trials were carried out in 56 hatcheries from Nauplii state until PL 12.

Average results from all farms are shown below and based on triplicates in each farm:

Table 1. Survival of shrimp larvae in hatcheries using a probiotic blend (DynaGain®) until PL 12 in *Penaeus monodon*

<i>Hatcheries</i>	<i>Control containing antibiotics</i>	<i>Probiotic blend*</i>
15 hatcheries	50.0%	53.3%
12 hatcheries	45.0%	45.8%
9 hatcheries	55.0%	58.3%
20 hatcheries	50.0%	51.3%

*DynaGain® is a trademark of Mangrove Coast Ltd., Vietnam

Based on these results it could be concluded that the chosen probiotic can be an alternative for an antibiotic-free hatchery operation under the circumstances in Vietnam.