

Probiotics in Aquaculture

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Abstract

During last years the aquaculture production is growing thanks to its intensification (i.e.: growth promoters, use of antibiotics, and several other additives); obviously these practices create stressful conditions that cause problems related to diseases and deterioration of environmental conditions often occur and result in serious economic losses. The control of diseases using antibiotics has been questioned by acquisition of antibiotic resistance with a massive diffusion in the environment; so the use of probiotics (environmentally friendly) is an interesting alternative. Probiotics are used for: alternative measures to control the fish diseases, to promote health and finally formulate balanced diets for a better growth.

Keywords: Aquaculture ; Marine fish; Probiotics

Introduction

In 2010, global production of farmed food fish was 59.9 million tones [1]. Over the years, aquaculture sector has undergone a sea change in order to meet the increasing demand. The production is maximized through intensification with addition of commercial diets, growth promoters, antibiotics, and several other additives; all these practices create stressful conditions that cause problems related to diseases and deterioration of environmental conditions often occur and result in serious economic losses [2].

The prevention and the control of diseases have led during recent decades to a substantial increase in the use of veterinary medicines. Probiotics are originally defined as the organisms and substances which contribute to the intestinal microbial balance [3]. The term probiotic means promoter of life infact help, in a natural way, to improve the overall health status of the host organism [4]. Probiotics open a new era in health management strategy for fish/shellfish gaining increasing scientific and commercial interest. The obvious potential advantages of such approaches are that they promote specific microbes in the intestine for restoring the intestinal microbial balance and exerting numerous beneficial effects in host Oliva-Teles 2012 [5].

Probiotics are live microorganisms which when administered in adequate amounts confer a health benefits on host. They are used for aquaculture practices include: *Lactobacillus*, *Lactococcus*, *Leuconostoc*, *Enterococcus*, *Carnobacterium*, *Shewanella*, *Bacillus*, *Aeromonas*, *Vibrio*, *Enterobacter*, *Pseudomonas*, *Clostridium*, and *Saccharomyces* species. The involvement of probiotics in nutrition, disease resistance and other beneficial activities in fish has proven [6]. Among the numerous health benefits attributed to probiotics, modulation of immune system is one of the most commonly purported benefits of the probiotics and their potency to stimulate the systemic and local immunity under in vitro and in vivo conditions is noteworthy. For this reason there is a close link between the welfare and the use of probiotics. Recently the probiotics are used as alternative measures to control the fish diseases; infact they inhibit pathogenic microorganisms and have been used therapeutically to treat a variety of gastrointestinal and even systemic disorders. Probiotics transiently colonize the bowel and except when used to treat an acute disorder, must be regularly consumed to maintain benefit. Use of microbial probiotics to promote health maintenance and disease prevention and control is now widely accepted as the new ecofriendly alternative measures for sustainable aquaculture [7]. Probiotics are also known to play an important role in developing innate immunity among the fishes, and hence help them to fight against any pathogenic bacterias as well as against environmental stressors [8].

Conclusions

The current global food crisis and increasing production costs has

put pressure on governments and the international community to ensure sufficient food supply for a growing population. Thus, aquaculture is presented as a way to meet the growing demand for fresh water food. Improving aquaculture practices will become an important alternative to overexploitation and modification of aquatic ecosystems caused by capture fisheries. The use of probiotics can potentiate the benefits of this activity because it offers viable alternatives for the generation of a higher-quality livestock product in terms of size, production time, and health. It is necessary to conduct studies relating to probiotics resistance to antibiotics, and the chances of transmission of genetic elements to other microorganisms in the fish Gastro Intestinal Tract (GIT), and thus to humans when consuming the aquaculture product. And on the other hand, there is a need to strengthen studies of microbial ecology in aquaculture systems, correlating microbial communities with animal growth and its relationship to the water quality.

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