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An Overview of the Importance of Probiotics in Aquaculture

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ABSTRACT

It is important to note that the use of medication for every infection in aquaculture can reduce growth rate and consumer acceptability because of bioaccumulation and magnification, the use of probiotics as live microbes may serve as dietary supplements to improve the host. Development of probiotics in aquaculture will reduce the list of antimicrobial drugs which were prophylactic alone and which possess potential hazards to man who consume them. Probiotics was used to reduce mortality in fingerlings of some important fish. Probiotics is cost effective and useful despite the fact that its usefulness has not been proved in fishes unlike land animals.

Key words: Bioaccumulation, microbes, prophylactic, fingerlings, hazard

INTRODUCTION

The term probiotic means life, it was derived from two Greek words “pro” and “bios” (Gismondo *et al.*, 1999). Probiotics are live microbes that can be used to improve the host intestinal microbial balance and growth performance. Development of probiotics in aquaculture will reduce the use of antimicrobial drugs which were prophylactic alone and whose over dependence in recent time poses potential hazards to man who consume them (Salminen *et al.*, 1999). One of the main success stories in aquaculture is the huge turnout of products, annually it is estimated that over 40% of aquatic product are from aqua cultural activities valued at seventy eight billion U.S. Dollars (FAO, 2007). This number is expected to increase as time goes on as a result of overfishing of the world’s waters and increasing demand for aquatic food. A major drawback to production capacity of aquaculture is disease outbreak and pollution. This has led to the used and misused of drugs, chemicals and additives which have raised concern over food safety regulations. The need for sustainable approaches to control these setbacks has made a whole lot of options available amongst which are the use of immunostimulants and probiotics. The health benefits of probiotics was questioned years ago, regardless of which argument represents the true situation, alternatives are being sought after and probiotics is one field that commands attention because it has been proven to be effective and still developing (Moriarty *et al.*, 2005). This study intend to state the importance of using natural substances in treating some infection that otherwise chemicals would have been use in curing and to show that not all infection require the use of chemicals.

Origin of probiotics: Probiotics is a child of necessity the first trial was conducted in Japan. Spores of *Bacillus toyoi* were used to reduce mortality of elves (fingerlings) of the Japanese fish (*Anguilla japonica*) through feed supplements. These soil bacteria were chosen because its strains were efficient in land animals and knowledge about the gastrointestinal micro biota in fish were

scarce. Strains isolated from the aquatic environment were tested on fish but few products have passed from the laboratory to the market. Thus commercial application of probiotics in fish culture is not well developed compare to the mollusk especially shrimp (Moriarty *et al.*, 2005).

Probiotics in aquaculture: Probiotics can be defined as a live microbial feed supplement which beneficially affects the host animal by improving its intestinal balance (Markridis *et al.*, 2005). They are live feed additives but some of their effects can be reproduced with dead cells or cell wall components particularly those involving the immune response (Gatesoupe, 1999). Probiotics as live micro organisms, benefits the host (aquatic organism) by improving feed or enhancing its nutritional value (Moriarty, 1996). Feed is known to be a major factor in aquaculture, especially in food fish production. The use of live microbial organism such as probiotics, offers a way in improving the nutritional value and growth of food fish (Irianto and Austin, 2002). The concept of probiotics activity arises from the knowledge that antagonism against pathogens is a result of active modulation of the Gastrointestinal Tract (GIT) which provides nutritional benefits (Vaughan *et al.*, 2002).

Benefits of probiotics in aquaculture:

- It is cost effective that is performance of the product is less than the price of the product (Li *et al.*, 2006)
- Growth performance of species fed with probiotics feed is high compared with those fed with ordinary diets (McIntosh *et al.*, 2000)
- Probiotics reduces the amount of feed necessary for animal growth resulting in reduction of production cost and consequent feed conversion ratio/utilization (Ouwehand *et al.*, 2002)
- Protein digestibility increase when animals are fed with probiotics improved diet (Fooks *et al.*, 1999)

Factors that determine benefit from probiotic products:

- Types of species cultured (Freshwater, brackish water and marine fish)
- The culture stage of the species larvae, juvenile or brood stock
- The rearing system employed (flow-through or recirculation tank, ponds or cages) (Li *et al.*, 2006)

Constraints of probiotics in aquaculture:

- Inability of strains to be produced in commercial quantities and consequent demonstration on a large scale
- Difficulty in proving performance at the farm level
- Inability of companies to conduct extensive research on how to make product specifically for aquaculture purposes

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