Applications Research of Microbial Ecological Preparation in Sea Cucumber Culture

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Abstract. At present, micro ecological preparation is widely applied in aquaculture with good effect. The application of micro ecological preparation in sea cucumber culture can effectively improve the economic benefits. The micro ecological preparation can play the role of inhibiting harmful bacteria, purifying water quality and saving culture cost in the process of sea cucumber culture. We should select appropriate bacteria, guarantee stable environment and use with long-term in the applications of microbial ecological preparation in sea cucumber culture to obtain good effects.

1. Introduction
Micro ecological preparation refers to the preparation of a growth promoting substance which is beneficial to the host and beneficial to the host or probiotics, using the principle of microecology, and is prepared by special process. At present, probiotics have been used in feed, agriculture, medicine, health care, food and other fields. Lactobacillus plantarum and Bacillus subtilis are widely used in feed industry, and lactic acid bacteria, Bifidobacterium, Enterococcus and yeast are widely used in food. In recent years, microbial preparations have gradually taken the place of traditional additives in poultry and livestock breeding industry. In the future, probiotics as a pollution-free preparation which follows the natural cycle of ecological environment will be a development trend of the additive industry. Aquatic probiotics in fish and shrimp farming is widely used, the feeding effect has been affirmed, and the current application in sea cucumber culture is relatively small. The sea cucumber high density breeding environment, residual bait rot, biological metabolites and biological debris deposition, harmful algae and bacteria multiply, resulting in physical and chemical environment of aquaculture water and deterioration of the ecological environment directly endanger sea cucumber growth and development and the quality of the products. The use of probiotics can not only reduce the water organic pollution, water purification, can also inhibit or kill the pathogenic microorganisms; as a feed additive, can also add nutrients, improve sea cucumber gastrointestinal beneficial bacteria to achieve the purpose of ecological control[1]. The particularity of marine environment makes it possible for marine microorganisms to be used in aquaculture environment. From the sea cucumber culture environment, we screened the microorganisms with high purification efficiency and enhanced the immunity of sea cucumber, and applied it to aquaculture. It can well adapt to the characteristics of aquatic animals and their growth environment, and the development of probiotics has pointed out a new direction for aquaculture industry.
2. Functions of Microbial Ecological Preparation in Sea Cucumber Culture

2.1 Inhibit Harmful Bacteria.

The sea cucumber pond and pond of sea cucumber seedling has the characteristics of high density, so that there is many biological residues, feed and residual harmful substances such as algae breeding environment, resulting in many sea cucumber breeding environments for the breeding of bacteria, sea cucumber growth brings unfavorable effects [2]. Excessive reproduction of the bacterial flora can cause diseases such as sea cucumber, rotten stomach disease, rotten edge disease, and so on. The sea cucumber is prone to rot, ulceration and other diseases, especially in the seedling stage of sea cucumber, and even to the failure of seedling culture. This requires the suppression of harmful bacteria in the breeding environment, and micro ecological agents in this regard will undoubtedly have good results. When the cell containing probiotic probiotics in breeding in the breeding pool in growth to become the predominant bacteria in the water, you can reduce or exclude harmful bacteria, which play a role to prevent bacteria poisoning.

At present, the application of probiotics shows that photosynthetic bacteria and marine Rotorua can effectively reduce and inhibit the occurrence of sea cucumber canker. In addition, the bacteria can lyse and kill harmful bacteria in the water body, control the ammonia nitrogen, sulfide and other substances in the water, thus inhibiting the growth of harmful bacteria [1]. To improve the effect on mitten crab and dark tail puffer pond environment. Lactic acid bacteria can effectively adjust the aquatic animal intestinal flora balance by nutrition competition, competition or attachment sites produce antibiotics, bacteriocin etc. kill or inhibit pathogen toxin, enhance the anti-infection ability, regulating intestinal mucosal immune activity, improve the survival rate of disease in animal suffering when. Lactic acid bacteria can inhibit the growth of a variety of fish pathogenic bacteria, feed fish to contain Lactobacillus bait, can improve their immunity.

2.2 Purify Water Quality.

Aquatic probiotics, sea cucumber is the use of animal beneficial microorganisms in vivo or in aquaculture water or promoting probiotics through special processing technology which can be used in water, micro ecological control, water purification, can produce biological effect and ecological effect. The sea cucumber in the growth process for the water environment have higher requirements, this is because the water environment will lead to poor quality of cucumber skin, intestinal symptoms appear vomiting. Especially the lack of sufficient natural bait algae in some sea cucumber aquaculture ponds, sediment density difference, the new pond, extremely prone to sea cucumber diseases, and application of micro ecological preparation can effectively improve the situation. This is because the beneficial microorganism containing probiotics with ammonization, nitrogen fixation, nitrification, denitrification and nitrogen fixation, and sulfide oxidation in the process of metabolism, the sea cucumber growth in water containing toxic substances is decomposed into carbon dioxide, nitrate and sulfate etc., so as to ensure the stability of equilibrium in water environment, sea cucumber biological consumption of oxygen and dissolved oxygen index, water quality improvement [2]. In addition, probiotics can also promote the reproduction of algal organisms to supplement food for sea cucumbers. To put water in lactic acid bacteria can not only promote food organisms multiply, growth, and decomposition of fish bait, feces and organic matters in water, improve water environment, inhibit harmful bacteria in water regulation of algae growth and reproduction, phase equilibrium, the control of harmful bacteria and algae. It can effectively reduce nitrite content in water and reduce ammonia nitrogen in water, and avoid the shortcomings of destroying and polluting water quality and high incidence. Improve the ecological environment in water, purify the water quality, and promote the healthy growth of fish and shrimp species. As a water quality regulator for aquaculture water, lactic acid bacteria can effectively solve the problems such as serious consumption, high incidence and low yield.

2.3 Save Culture Cost.
humidity, acidity, mechanical friction and extrusion under the condition of room temperature and
The stability of probiotics mainly refers to the specific environment of tolerance, such as temperature,
3.2 Guarantee Stable Environment.
prepare products with good effect still needs to be studied thoroughly and extensively tested.
paid to the regulation of storage temperature in the application of probiotics. Microbial ecological agents
strains have different requirements for water temperature environment. Therefore, attention should be
microbial activity, such as unsaturated fatty acid has an antagonistic effect of probiotics. Different
storage time; air microorganisms can direct contamination of probiotics; ultraviolet radiation has a
protein content and amino acid composition are more abundant and complete, the protease and amylase
rate of sea cucumbers. In addition, the Bacillus contained in the microbial preparations can produce
digestive enzymes such as lipase, amylase, lipase and so on, which promote the digestion and absorption
of nutrients by sea cucumber. Therefore, probiotics can effectively save aquaculture costs. Lactic acid
bacteria secrete lactic acid and produce a variety of digestive enzymes that help fish digest and absorb
and promote growth. Low content of nitrite in the water, maintaining the growth and breeding of
nitrifying bacteria: convert nitrite into nitrate, reduced the content of nitrite in water, reduce or even
completely relieve the toxicity of nitrite on Breeding of sea cucumber, to eliminate chronic death, restore
vitality, strengthen the emergency response capacity, increase appetite, growth speed, maintenance the
growth and breeding. Photosynthetic bacteria are a kind of bacteria with high nutrition and high
nutritional value. Using photosynthetic bacteria as an open bait, the survival rate of sea cucumber can be
greatly increased[3]. The lactic acid bacteria agent can increase and improve the beneficial active
ingredient in the feed, increase the appetite of the sea cucumber, improve the conversion rate of feed
nutrients, reduce the feed coefficient, accelerate the growth rate, and reduce the cultivation cost.

3. Key Points of Applications of Microbial Ecological Preparation in Sea Cucumber Culture

3.1 Select Appropriate Bacteria.
We can make sea cucumber microbial preparations of bacteria, photosynthetic bacteria, nitrifying
bacteria, denitrifying bacteria, bacillus, yeast, phage, vibrio, alkaline, bacillus, and so on. Selection of
bacteria should be based on the purpose of the use of different, select the appropriate strains. As for the
stability of the water quality, prevent water aging, maintain water quality, can be used with lactic acid
bacteria, photosynthetic bacteria, bacteria yeasts, actinomycetes, bacillus and nitrifying bacteria in sea
cucumber. The high incidence of the disease, probiotics to improve the immunity of sea cucumber can be
selected with bacillus cereus, bacillus subtilis such as; sea cucumber breeding pool in sea cucumber
skin, swollen mouth, skateboarding, stiff disease, can choose probiotics containing phage. The use of
probiotics should consider the objects and purposes of their actions. The species of animals are different,
and the requirements of bacteria are also different. Aquatic animal carnivorous fish in the digestive tract
of dominant bacteria of intestinal bacteria, micrococcus, pseudomonas, lactic acid bacteria, vibrio, and
herbivorous fish in the digestive tract, and lactobacillus acidophilus. The role and effect of different
species are different, such as compound to choose bacillus and light and bacteria in water purification;
yeast can help digestion, when aquatic animal stress or after drug treatment should be chosen based on
the preparations for the yeast, can choose high temperature resistant bacillus granulation[4]. The
confirmed microbial agents are few, and new strains and composite microbial agents are needed.
Probiotics have reasonable collocation, optimization is the key to manufacture composite products
where the agents[5]. Because microbial species have complex synergistic and antagonistic effects, how to
prepare products with good effect still needs to be studied thoroughly and extensively tested.

3.2 Guarantee Stable Environment.
The stability of probiotics mainly refers to the specific environment of tolerance, such as temperature,
humidity, acidity, mechanical friction and extrusion under the condition of room temperature and
storage time; air microorganisms can direct contamination of probiotics; ultraviolet radiation has a
certain effect on killing microbial cells; some nutrients and probiotics mixed, will significantly affect the
microbial activity, such as unsaturated fatty acid has an antagonistic effect of probiotics. Different
strains have different requirements for water temperature environment. Therefore, attention should be
paid to the regulation of storage temperature in the application of probiotics. Microbial ecological agents
belong to live bacteria preparations, if the preservation methods and storage conditions are improper, they can cause bacterial inactivation, so it must be preserved according to the corresponding requirements.

Temperature is an important factor affecting the survival rate of probiotics. When the temperature is over, the chemicals and enzymes in the cell react more quickly, causing irreversible inactivation of proteins, nucleic acids and other cell components in the body. Therefore, microecological preparations are generally refrigerated in the environment of temperature to avoid inactivation or denaturation of enzymes and other cell components in cells, and affect the viability of bacteria. A variety of environmental factors may have a certain impact on micro ecological agents, we should minimize the adverse effects, select the appropriate water environment. Different strains are also affected by environmental factors. The effect of photosynthetic bacteria was not obvious in rainy and rainy days. The effect of bacillus preparation was not obvious in the water bodies with high nitrite. The water body is not conducive to the growth of nitrifying bacteria, and the light has a certain inhibitory effect on the growth and reproduction of nitrobacteria. Therefore, before the use of probiotics, water environmental factors should be measured, to select the appropriate micro ecological agents, and through the improvement measures to achieve the most ideal results.

3.3 Use with Long-Term.
The beneficial microorganism has the special functions of purifying and regulating the environment of the aquaculture water, rapidly decomposing harmful substances, preventing disease and controlling disease, repairing the intestinal tract of the sea cucumber, and enhancing the immunity and the disease resistance. However, the effect is relatively slow. Therefore, in aquaculture, it is necessary to continue the use of these microorganisms to maximize the regulation of these microorganisms and improve the ecological environment of aquaculture, to achieve the best use effect. Microecological preparations can be used in the whole growth process of animals, but their effects are different in different periods. Different culture stages use different doses. The intestinal tract of newborn animals is basically sterile, and the microecological balance in vivo has not been completely established, and the ability to resist disease is weak. At this point, the introduction of probiotics, can quickly enter the body, occupy the attachment point. The best effect on animal growth period, intestinal function begins to deteriorate, probiotics can rise to supplement and perfect the beneficial intestinal flora, ensure health after application of antibiotics. Antibiotics often reduce gastrointestinal bacteria quantity, probiotics can help restore the bacteria number in the transport, transformation, mutation and breeding feed weather harsh environmental stress conditions as soon as possible.

The micro ecological balance of aquatic animals is destroyed, and the use of probiotics is advantageous to the formation of dominant species\(^6\). Increased activity of harmful organisms such as Escherichia coli in the intestines of aquatic animals can lead to the conversion of proteins into ammonia, amines, and other harmful substances. Probiotics can significantly reduce the number of harmful bacteria such as Escherichia coli and Salmonella in the intestines, thereby reducing the excessive growth of ammonia and other spoilage substances and reducing fecal odor. The beneficial microorganisms are excreted into the aquatic environment by aquatic animals, and can utilize the excessive organic substance in the water environment to synthesize bacterial substances, and the aquatic environment can be purified for a long time.

4. Conclusion
By adjusting the microbial community composition and distribution of the sea cucumber aquaculture environment system, the micro ecological preparation inhibits the excessive proliferation of harmful organisms or accelerates the degradation of excess organic matter in aquaculture environment. It can purify the water polluted by the chemicals and antibiotics for a long time and enhance the nutritive function of sea cucumber. Therefore, the micro ecological preparation will become an important direction of bait additives of the sea cucumber.
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