

ROLE OF PHYTOBIOTICS IN AQUACULTURE

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¹Ramagiri Mahesh Kumar*, ¹M. Rajeshwar Naik, ¹Shiva Krishna Kota and
²Gora Shiva Prasad

¹KVK, Bellampalli, Telangana, India

²Research Scholar, Faculty of Fishery Sciences, Kolkata, West Bengal, India

Email: mkcharan013@gmail.com

Phytobiotics can be regarded as plant-derived products added to feed in order to enhance performance in aquatic species. Mostly leaves, roots, tubers or fruits of herbs, spices and other plants can be used as pytobiotics. They are generally used to enhance better growth performance in shrimp and fish culture.

Aquaculture is the major contributor towards fish supply as production from marine capture fisheries is almost stagnant over recent years. Now a day's intensification of aquaculture in terms of increasing stocking density, excess feed utilization caused to lead stress in aquatic organisms, which ultimately lead to suppressing the immunity and growth of the organisms. Till now, chemotherapy is the major option for the prevention and treatment of aquatic diseases. However, a chemical drug has several showed negative impacts on the environment as well as a human in several pieces of literature. Antibiotics and their residues have a negative role in the aquatic system because most of the bacterial strains are developing drug resistance in the environment. Hence, in recent years, attention is given towards eco-friendly and sustainable methods of aquaculture disease management practices.

So to overcome the above problem, stimulation of the non-specific immune system is a superior choice available for enhancing the immunity as well as growth performance of cultured organisms. Bioactive compounds are rich in phytobiotics, which can act as immune stimulants. Moreover, they are a new frontier area of aquaculture, and there is an underlying need to obtain a clear and direct dose-dependent stimulatory effect on the immune system, physiology of the organism and growth.

Functions

- 1) Increase the activity of phagocytic cells and increase their bactericidal activities.

- 2) It triggers natural killer cells, complement activity, proliferate lymphocytes, lysozyme and antibody responses of fish and shrimp.
- 3) Mainly it shows a positive effect on aquatic organisms

Phytobiotics as therapeutics in aquaculture

- 1) Alternative to chemical drugs it shows better disease management and eco friendly to nature.
- 2) Majorly plant origin is mostly using in aquaculture to activate appetite, antiviral, antibacterial and anti-parasitic agent in aquaculture.
- 3) Bioactive compounds such as phenols, sulphur, terpenoids, alkaloids, flavonoids, and saponins are present in plant origin, which are commonly used as phytobiotics.
- 4) Several kinds of literature have been reported to assess the effect of dietary algal derivatives; herb and plant extract on fish health.
- 5) However, there is still a lacuna between the method of herbal extract preparation in a different method, administration route and their long-term effects on fish physiology. Recently increased consumer preferences on organic food products over recent years underlined the possibilities of phytobiotics in aquaculture.

Table 1: List of herbs can be used as therapeutics in aquaculture

SL. No.	Herbs (Scientific Name)	Common Name	Properties
1	Allium sativum	Garlic	Antibacterial, Antiparasitic.
2	Zingiber officinalis	Ginger	Antistress, Growth promoter, Antibacterial
3	Ocimum sanctum	Tulsi	Appetite stimulation, Growth promoter, Antibacterial,
4	Aloevera	Aloe	Antibacterial
5	Azadirachta indica	Neem	Antibacterial, Antifungal, Antiparasitic
6	Piper longum	Long pepper	Growth promoter, Antiparasitic

Potential of phytobiotics in aquaculture

Plants extracts have been used to have a variety of properties such as like anti-stress, growth promotion, appetite stimulation, immune system enhancement, bloodstock

maturation, aphrodisiac and antipathogenic due to the presence of various bioactive substances such as alkaloids, terpenoids, tannins, saponins, glycosides, flavonoids, phenolics, steroids and essential oils.

Moreover, phytotherapies are cost-effectiveness, environment friendly and more eco-friendly than synthetic molecules and are less likely to elicit drug resistance, because of more diversified compounds presences in plant extracts then chemicals drugs.

Conclusion

Various parts of herbs, the extraction method and the concentration of the extracts can show possible influence on the health, growth and reproductive ability of the cultured organisms. There is less risk in preparation of the plant extract, concentration and administration of herbal extracts, previous studies have noted the multiple activities and potential application of herbal extracts in aquaculture. In another study, the intraperitoneal injection has been showing to be the most efficient way of administration. Furthermore, it is much expensive and can also activate stress responses in fish. Finally, administration through oral route seems to be the most suitable way in aquaculture practices. Furthermore, It is evident that the application of herbal extract is favourable in different aspects of aquaculture, including disease prevention, treatment and stimulating the growth performance in fish and shrimp species. However, it is important to conduct various research in vitro and in vivo experiments to have clear knowledge. Furthermore, the dose-dependent action against different pathogens, physiological functions and different bioactive compounds and their mode of action and possible residual action is also needed to be understood.

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