



Prevention or Cure: What Should Aqua Farmers Prioritize for Healthy Fisheries?

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Abstract: The fisheries sector, integral to the Indian economy and dubbed the 'Sunrise Sector,' faces significant environmental and health challenges which leads to the use of chemotherapeutics. These treatments, while addressing disease outbreaks, often lead to issues such as toxicity, resistance, and environmental damage. Prophylactic measures, focusing on prevention rather than treatment, offer a cost-effective and eco-friendly alternative. This article explores the balance between prophylactics and therapeutics in aquaculture, advocating for a preventive approach to ensure sustainable and healthy fish farming practices.

Keywords: Aquaculture, Disease prevention, Chemotherapeutics, Prophylaxis, Sustainable farming.

Introduction

The fisheries sector significantly contributes to India's economy, providing national income, food security, and employment. With India ranking as the third-largest fish producer globally, achieving, the sector sustains the livelihoods of approximately 30 million people. However, disease outbreaks pose a major threat to aquaculture, driven by the complex interactions between farmed animals, pathogens, and the environment. Effective disease management is crucial for the sector's sustainability.

Intensification and Disease Outbreaks

increases the risk of disease outbreaks. Factors contributing to this menace include:

- ✓ Increased globalization

- ✓ Intensification of fish farming
- ✓ Introduction of exotic species
- ✓ Interactions between cultured and exotic species
- ✓ Insufficient prevention of harmful organisms' introduction and spread
- ✓ Global warming
- ✓ Lack of clinical facilities for emerging diseases
- ✓ Insufficient prophylactic measures for crucial diseases.

Economic Loss Due to Diseases

Disease outbreaks in aquaculture result in significant economic losses, affecting the livelihoods of fishery communities by reducing income and employment. It's estimated that diseases contribute 10-15% to production costs in Indian aquaculture. For instance, in Andhra Pradesh, an annual loss of 40 million INR was reported due to diseases, accounting for about 10% of the production cost. Similarly, parasitic infestations in carp farms in Mandi, Himachal Pradesh, caused an estimated loss of 67,102 INR (US\$1428) per hectare per year. The import of disease-infected prawn seeds from neighbouring countries crippling the freshwater prawn industry in India.

Therapeutics in Aquaculture

Chemotherapy, while a major method of controlling diseases, poses several issues, including:

- ✓ Triggering toxicity
- ✓ Resistance development
- ✓ Residue persistence in the environment
- ✓ Public health and environmental consequences

Common chemotherapeutics used in aquaculture include Florfenicol, Oxytetracycline, Ormetoprim-sulpha-dimethoxine, hydrogen peroxide, formalin, Chloramine-T, copper sulphate, potassium permanganate, diquat and diflubenzuron. However, these treatments often lead to unabsorbed and un-ingested medicated feed, antibiotic resistance, and potential health risks to farm workers and consumers.

Practical Problems with Chemotherapy

Chemotherapeutic treatments face numerous challenges:

- ✓ Unmetabolized drugs in fish excretions

Additionally, the lack of pharmacokinetics data, standardized protocols, and licensed products complicates effective disease management.

Prophylactic Approach

Prophylactic measures, recommended by the World Health Organization (WHO), offer a proactive alternative to disease management. These include These measures reduce dependence on antimicrobials and other harmful chemicals, supporting sustainable and eco-friendly aquaculture practices.

General Prophylactic Measures

Effective prophylactic strategies encompass better management practices (BMPs) at both hatchery and farm levels. Key measures include:

Practicing Microbial Bioremediation with Probiotics and Prebiotics

Common probiotics in aquaculture include *Bacillus*, *Lactobacillus*, and *Bifidobacterium* species. These organisms, administered via feed or water, Disease outbreaks in aquaculture result in significant economic losses, affecting the livelihoods of fishery communities by reducing income and employment. It's estimated that diseases contribute 10-15% to production costs in Indian aquaculture.

Prebiotics:

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diseases contribute 10-15% to production costs in Indian aquaculture. enhancing the health of the host. Sources include plant-based products, edible mushrooms, and dairy products. Common prebiotics in aquaculture include β -glucan, inulin, arabinoxylan-oligosaccharides (AXOS), mannan-oligosaccharides (MOS), galacto-oligosaccharides (GOS), and fructooligosaccharides (FOS). These

Disease Resistance with Immunostimulants

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Immunization with Vaccines

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Nutritional Interventions with Nutraceuticals

Nutraceuticals, combining "nutrition" and "pharmaceutical," are bioactive compounds from natural sources believed to offer health benefits beyond basic nutrition. Used as growth promoters and immunity boosters, nutraceuticals include nucleotides, enzymes, methyl donors, immunostimulants, chitin, vitamins, amino acids, antioxidants, minerals, organic acids, carotenoids, and phytochemicals. These compounds support defence systems, especially under stress, and enhance overall health.

Conclusion

Disease prevention is crucial for the growth and sustainability of the aquaculture industry. A proactive approach, combining various prophylactic strategies, offers a more effective solution than reactive treatments. Establishing national or regional information exchanges and implementing robust surveillance and diagnostic measures are essential for maintaining healthy aquaculture practices. By prioritizing prevention, aqua farmers can ensure better production, environmental sustainability, and economic viability.

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