

## Status of Aqua-Medicine Used by Fish Farmer in Dhamdha, Durg District, Chhattisgarh

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### Abstract

This study aims to give a review of the present chemical use procedures in Dhamdha's aquaculture industry. Information was gathered and a survey of 41 fish growers was conducted. Using standardized questionnaires, a survey was carried out regarding the usage of chemical products from October 2023 to February 2024. It has been stated that chemical goods used in aquaculture include probiotics, disinfectants, sanitizers, feed additives and compounds for treating water and sediment. The study shows that, compared to other Chhattisgarh aquaculture-producing sectors, the usage of chemical products is still comparatively low, despite the rapid rise of commercial aquaculture in Dhamdha. However, the study found an enormous quantity of chemical substances that are used and that need to regulate and evaluated in terms of their possible effects on Animal health and the environment, as is already the case in the majority of industrialized nations.

**Keywords:** Aqua-medicine, Dhamdha, Fish farmer, Probiotics

### Introduction

Aquahealth is one of the most commonly used medicines in aquaculture, its main function is to clear the bacterial and fungal disease and it also maintains the alkalinity and pH of water. Currently, fish accounts for over 25% of the total animal protein supply for approximately one billion people globally, making it the primary and least expensive source of animal protein (Bondad-Reantaso *et al.*, 2005). Chhattisgarh is the state with the highest water resources in central India; 1.64 lakh hectares of water there are suitable for fish farming. Chhattisgarh is an inland state of India that ranks five in fish seed production and six in fish production in the country. Dhamdha is a block in Durg district of Chhattisgarh state. It is believed that Dhamdha was the stronghold of Gond Kings. Here is their fort. For the security of the fort, about 126 ponds were constructed by these kings. Therefore, Dhamdha is also called the city of ponds. This is a very good example of water conservation. In Dhamdha generally, the pond culture method with Indian Major Carp is prevalent. The aquaculture sector's expansion and advancement have led to a spike in demands for chemical and biological product usage (Faruk *et al.*, 2008). Antibiotics, disinfectants,

fertilizers, pesticides, feed additives and other substances, both synthetic and natural, are currently vital resources for controlling and avoiding bacterial and parasitic illnesses, enhancing water quality, boosting pond productivity and acting as growth promoters (Subasinghe *et al.*, 1996; Bondad-Reantaso *et al.*, 2005; Rico *et al.*, 2013). However, no suitable study or methodical survey has been conducted in Dhamdha to far so as to investigate the utilization of different aqua-medicines, pharmaceuticals and chemicals applied for pisciculture. In order to evaluate the market availability and usage patterns of different aqua-medicines, medications, chemicals, and formulations in India's key aquaculture zones, as well as to comprehend the relationship between drug manufacturers, consultants, and fish farmers, the current survey was conducted.

### Materials and Methods

The survey on chemical use was conducted from October 2023 to February 2024. Interviews with farm owners, managers, assistants, technicians and fish farmers were done as part of a survey that included 41 fish farmers in total (Mishra *et al.*, 2017). Information about the usage of chemicals, including quantity, method and purpose,

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was gathered and compiled. The reported products are classified into five categories: i) Probiotics, ii) Feed additives, iii) Sanitizer, iv) Soil & Water treatment compounds, v) Disinfectants. Further analysis of the data was done with descriptive and tabular statistics.

### Results and Discussion

Different chemical substances were found to be used by the aquaculture farmers surveyed (Table 1). Aquatic animals face several health risks due to the increased demand for fish production and intensive fish culture practices. These risks are mostly brought on by environmental deterioration, stress, and the introduction of infectious agents. In the meantime, wild fish populations are under strain due to overfishing in open-water fisheries. As a result of these effects, a growing number of fish illnesses have emerged and spread, affecting fish productivity and production (Walker and Winton, 2010). Based on their main use, the chemicals that were found were categorized into five groups. Probiotics, which consist of *Bacillus* sp. is used in this region. Probiotics are microbial and yeast supplements that help the body use nutrients more efficiently, aid in digestion and growth, and strengthen the immune system (Verschuere et al., 2000). Spores that have gram positive form most commonly used probiotics in fish farming contain *Bacillus* sp. as one of their main ingredients (Wang et al., 2008). These substances are applied directly to water to enhance its quality and lessen stress on the fish that are being raised. In order to increase feed digestibility and the immunity of cultured species and stop disease outbreaks, some farmers have also combined them with feed as nutritional supplements. Probiotics are used to enhance water quality and the immune status of cultivated species. They are thought to be an environmentally safe substitute for the preventative use of antibiotics (Decamp et al., 2008; Wang et al., 2008). Probiotics are only beneficial and cost-effective when used in conjunction with appropriate farm management practices, as they may compete with bacterial pathogens for resources & prevent pathogen activity (Decamp et al., 2008). It has been

documented that a variety of feed additive goods, including MV24 powder, Hepano mix powder and Arginine powder, are utilized to guarantee the best possible feed quality and to enhance the immunological condition of fishes. Chemical or biological supplements known as growth promoters are added to fish feed to aid in fattening, efficient feed utilization, improved immunity, regulation of the intestinal microbiota and increased fish vitality (Rahman et al., 2014). Nearly all of the farmers who were interviewed treated their soil or water with at least one chemical. The liming compounds (calcium oxide and calcium carbonate) were the most widely utilized treatments for water and soil. Generally, to reduce acidity and raise total alkalinity, liming materials were dissolved in water and spread over pond water and sediments. Zeolite was also utilized by most commercial farms in this study to control infections and remove  $\text{NH}_3$  and  $\text{H}_2\text{S}$  gas, which can be harmful. Most farming organizations also routinely treated fish with fungal illnesses and external parasites by using salt chloride. It has been documented that a variety of disinfectants are used to treat bacterial illness outbreaks and to clean culture facilities and equipment. Formalin, bleaching powder and potassium permanganate were the most often utilized disinfectants. In intensive aquaculture, chlorine is frequently employed as a disease preventive strategy. In addition to regulating the quantity of macrobes and phytoplankton in ponds, it also eliminates tiny crustaceans and other invertebrates that might serve as carriers of the pathogens (Dierberg and Kiattisimkul, 1996). Diverse patterns of use for chemicals, pharmaceuticals and aqua-medicines were noted in Chhattisgarh. These variations were attributed to cultural behaviors that were common in the various regions. In Chhattisgarh, probiotics, antiseptics and sanitizers were used, but marketing and usage of antibiotics were not observed (Mishra et al., 2017). Marketing and use of antibiotics could not be observed in Chhattisgarh, although use of antiseptics/ sanitizers and probiotics were showed (Figure 1).

Table 1: Chemical products used in aquaculture practices in Dhamdha, Durg district Chhattisgarh

Sl. No.	Chemical products	Trade name	Purpose
1.	Probiotics	Biomrine, V5 powder, Eco Marine	<ul style="list-style-type: none"> <li>• Pond preparation, kill unwanted microorganisms, increase essential nutrients in the soil.</li> <li>• To balance the pond of aquatic animals, digest organic wastes and convert them into micronutrients.</li> </ul>
2.	Feed additives	MV24 powder, Hepano mix powder, Arginine powder	<ul style="list-style-type: none"> <li>• To improve live function &amp; improve FCR.</li> <li>• Increase immunity &amp; weight, improves appetite &amp; FCR of fishes.</li> </ul>
3.	Sanitizer	Toximar powder, Sokrena WS	<ul style="list-style-type: none"> <li>• To eliminate the disease-spreading agents by penetrating the biofilm at the bottom of the pond.</li> </ul>
4.	Chemicals employed for keeping up of water quality and pond preparation	Lime, Zeolite, Microlance powder, Watermin powder, $\text{O}_2$ max tablet	<ul style="list-style-type: none"> <li>• Increases the availability of minerals in water and soil.</li> <li>• To maintain the pH of water.</li> <li>• To deliver oxygen.</li> </ul>
5.	Disinfectants	Potassium permanganate, Bleaching powder, Fomalin	<ul style="list-style-type: none"> <li>• Control of bacteria, fungal, algal and purifies the water.</li> </ul>

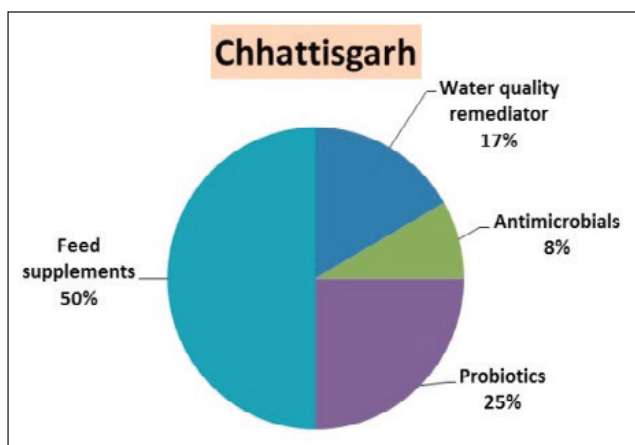


Figure 1: Farmer-used drugs, chemicals or formulations in particular Chhattisgarh regions (Mishra *et al.*, 2017)

### Conclusion

Aquaculture pharmaceuticals play an important role in building the ponds, management of soil and water, enhancement of fish production, feed formulation, control of reproduction and encouragement of the growth. When used appropriately, chemicals can be a valuable tool for managing diseases in aquaculture; however, when used carelessly, they can seriously harm both the environment and human health. This study found that Dhamdha uses a large variety of chemical compounds for aquaculture. Small and marginal farmers make up the majority of aquaculture farmers, with a few exceptions. When using semi-intensive and a little extended culturing techniques, such as those used in Pangas, Tilapia or Indian major carp cultivation, minimal chemical requirements are observed. According to the survey, the majority of farmers lacked adequate understanding about chemicals and relied on fish consultants or local feed and chemical providers for help when using aqua medicines. All of that might have a detrimental effect on humans, fish and the ecosystem. Therefore, scientists, researchers and policy officials must collaborate to address the problem of drug usage in aquaculture to lessen its detrimental effects. As stocking densities rise and water quality deteriorates, recently discovered probiotics might offer a suitable substitute for the growing usage of antibacterial agents in aquaculture. It is important to note that most farmers surveyed utilized antimicrobial products without taking the proper handling measures. This underscores the need for further training and education regarding occupational health hazards and risks to human health.

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