

## Uses of artificial-chemical in fish pond in Dhamdha, Durg, Chhattisgarh

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### Abstract

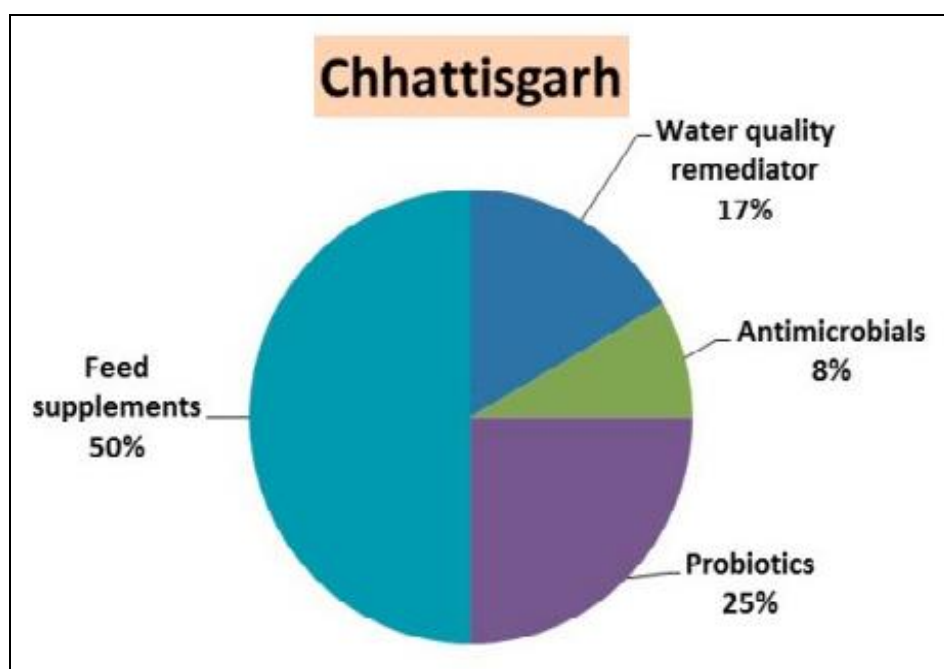
This study aims to give a review of the present chemical use procedures in Dhamdha's aquaculture industry. Information was gathered and a survey of 41 fish growers was conducted. Using standardized questionnaires, a survey was carried out regarding the usage of chemical products from October 2023 to 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:** Dhamdha, Aqua-chemical, pisciculture, Chhattisgarh

### Introduction

Pisciculture is a process of growing fish and selling it or using its products for domestic or commercial use. Pisciculture provides us fish for food, income, and sources of protein. 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<sup>[1]</sup>. Chhattisgarh is the state with the highest water resources in central India; 1.64 lakh hectares of water there are suitable for fish farming. In the state of Chhattisgarh, fishing is acknowledged as a significant industry with the potential to be both an entrepreneurial venture and a source of revenue<sup>[2]</sup>. Chhattisgarh is an inland state of India that ranks five in fish

seed production and six in fish production in the country. A total number of 1133 ponds are situated in the dhamdha block. It is a historical, religious, and culturally rich kingdom belonging to the Gondwana dynasty. Which is renowned for having a distinct identity. Another name for it is "Talabo Ki Nagari" Or "City of Ponds"<sup>[3]</sup>. Marketing and use of antibiotics could not be observed in Chhattisgarh, although use of antiseptics/ sanitizers and probiotics were showed (Figure 1). 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.



**Fig 1:** Farmer-used drugs, chemicals, or formulations in particular Chhattisgarh regions<sup>[4, 1]</sup>

## 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 [4]. Information about the usage of chemicals, including quantity, method and purpose, was gathered and compiled. The reported products are classified into four categories: i) Soil & Water treatment compounds ii) Probiotics, iii) Feed additives, iv) Sanitizer, The data were further analyzed using tabular and descriptive 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 [5].

The carp culture at the study site contained O<sub>2</sub> max and O<sub>2</sub> marine tablet. In aquaculture, maintaining optimum DO concentration (3-6 ppm) in the culture ponds is most important in cloudy weather, post-monsoon and during winter season, as many cases of fish-kills are recorded due to this single factor. O<sub>2</sub> MAX, Oxycal and Oxy-Gen were used for DO maintenance [5]. Oxymax was commonly used to remove hardness and toxic gases in fish culture ponds [6].

**Table 1:** List of Aqua-chemicals used by fish farmers in Dhamdha, Durg, Chattisgarh

S.N.	Trade name	Purpose	Doses applied	Mode of application
<b>A. Water and soil treatment compounds</b>				
1.	O <sub>2</sub> max tablet	Starts delivering oxygen immediately and reduces stress	In case of low oxygen level: 1 kg. Per hectare.	Spread over the pond
2.	Watermin powder	Regular use of Watermin helps prevent mineral deficiency symptoms in shrimp, Increases the availability of minerals in water and soil, performs osmoregulation process, Improves the process of sloughing off, Helpful in plankton development.	20 kg/ha	Spread over the pond
3.	Microlance powder	Improve the soil quality of pond, reduces harmful gases, helps to eliminate organic matter, helps in speed up the nitrogen cycle	Fish- 1kg/ ha every month for two months	Spray over the pond
<b>B. Probiotics</b>				
1.	Bio marine	For pond preparation, kill unwanted microorganism, increase essential nutrients in the soil	8 lit/200 lit water	Spray this mixture thoroughly in the pond
2.	Eco marine	To balance the pond of aquatic animals, digest organic wastes and convert them into micronutrients, eliminate sludge and odor, reduce toxic gases such as ammonia, hydrogen sulfide and nitrite	40 tablets/ one-meter-deep pond of 1 hectare	At an interval of fifteen days in a pond of one hectare area of 2 meter deep
3.	Pro marine powder	To increase digestion and increase weight, help in preventing white stool and intestinal problems, to increase weight, to maintain nutritional quality of fish and prawn	2-5 g/ 1kg feed (fish) 5-10 g/ 1 kg feed (prawn)	Mixing with fish feed
4.	V 5 powder	For Water and soil management, maintain primary productivity of pond, maintain pH, alkalinity, increase amount of dissolve oxygen	1 kg/ 20 liters of water	Sprinkle it at different places of pond
<b>C. Feed additives</b>				
1.	Nutrisigma	Faster growth & improve FCR, Improved immunity & reduced mortality	10gm/kg of feed 20kg per acre of pond	Mixing with feed
2.	NutriGel-P-FS	Growth promotion, Higher efficiency in FCR & To prevent stress and disease	20-30 ml/ kg of pellet feed	Mixing with feed
3.	AscoSol-C	Disease resistance, Rapid growth, High survival & moulting	0.5 to 2 gm/kg of feed	Mixing with feed
4.	Gut Plus	Activate gut function, absorption & assimilation of nutrients	5gm/ kg of pellet feed	Mixing with feed
<b>D. Sanitiser</b>				
1.	Toximar powder	To increase amount of oxygen by absorbing poisonous gases, deodorize, maintain better water quality, increase availability of oxygen	10-20kg/ acre	Spread over the pond
2.	Sokrena WS	To eliminate the disease spreading agents by penetrating the bio film at the bottom of the pond, Increase the number of white blood cells through non- specific immunostimulant and also improve the ability to fight diseases.	Fish 2-4 liters/ acre	Sprinkle in different parts of the pond.

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 [7]. Five distinct active components (Biomarine, ecomarine, pro marine powder, and V5 powder) were discovered in these piscicultures. Probiotics, calcium, and vitamin C are augmented by probiotics and magnesium. Table 1 presents the information. The effects of *Bacillus subtilis* and

*Rhodococcus* sp., two probiotic bacteria, have been investigated recently on the gut microbiota of *Oreochromis niloticus* [8]. 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 [9, 10]. 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<sup>[9]</sup>.

It has been documented that a variety of feed additive goods, including Mv24 powder, Hepao 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<sup>[11]</sup>. Micro-elements or trace minerals, such chromium, cobalt, copper, iodine, iron, manganese, molybdenum, selenium, and zinc, are needed in minute amounts and are involved in a wide range of metabolic activities. Each trace mineral component plays a unique role in the immunity of cultured organisms; however, Zn, Mn, Cu, and Se are the essential trace metals that have been linked to enhanced immunity or functions that support immunity<sup>[12, 13]</sup>. It has been documented that feeding fish with dietary Cu improves their immune systems and growth performance<sup>[14, 15, 16]</sup>. Zinc is a vital element that stimulates growth and is important for multiple cellular processes, including as cell division, cofactor reproduction, immunity, and defense against free radicals.

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 NH<sub>3</sub> and H<sub>2</sub>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<sup>[17]</sup>. 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<sup>[4]</sup>.

## 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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