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Impact Of Probiotic "Probiokorm"On African Catfish (Clarias Gariepinus) Cultivated In Industrial Aquaculture

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Abstract: This article highlights the results of the research carried out in the period from 03.25.2021 to 06.10.2021. Experimental tests were carried out by specialists of the laboratory "New technologies in aquaculture" of the Research Institute of Fishery. According to the signed memorandum between the Research Institute of Fishery and the Institute of Microbiology of the Academy of Sciences of the Republic of Uzbekistan, developed by the specialists of the Institute of Microbiology of the Academy of Sciences of the Republic of Uzbekistan, the biological product "PROBIOKORM" was tested by the specialists of the Research Institute of Fishery on African catfish(Clarias gariepinus).

Keywords: aquaculture, African Clary Catfish, biological product, survival rate, feed rate, probiotic "PROBIOCORM", fish farming, growth rate.

Introduction

At present, the production of fish products is associated with the progress of fish farming in inland waters, as well as breeding products and raising fish by industrial methods. African catfish is one of the most promising aquaculture targets. The biological characteristics of African catfish allow not to spend a lot of energy on environmental parameters in industrial cultivation methods. [8]

The method of industrial fish farming requires careful attention to a number of stress factors in its composition: transportation, fishing, transplanting, stocking density, compound feed, medicines, imported planting material, fish stock and equipment. One of the ways to prevent stress factors is the use of balanced feed. Biologically active substances, including probiotics, are great importance in the balance of the main nutrients of the feed for the cultivation of physiologically complete juvenile fish. [2]

A feature of probiotics is not only an increase in the body's resistance, but also the manifestation of antiallergenic action, and the ability to regulate and stimulate digestion. Many diseases of the gastrointestinal tract occur in a shorter time and in a mild form. Digestion is improved and the absorption of feed is increased, the growth of fish is stimulated. [1,6,8]

To conduct a number of tests in the conditions of Uzbekistan, specialists from the Scientific Research of Fish farming were encouraged by foreign experience in this direction, in particular the success of Russian scientists in the use of probiotics "Subtilis" and "Sporothermin". [1,2]

To achieve this goal, the following tasks were set:

1. To study the growth of catfish when grown on (with a crude protein content of 38.9%) compound feed with probiotic additives.
2. To determine the effectiveness of the use of probiotic additives "PROBIOKORM" in the composition of mixed feed according to fish-breeding indicators of African catfish (yield of fish products, survival rate, efficiency of feed use).

Materials and methods of experimental research.

The research was carried out at the objects of closed circulation water supply of the laboratory "New technologies in aquaculture" of the Research Institute of Fishery. The studies were carried out for 45 days with three repetitions. The experiment used African catfish (Clarias gariepinus) obtained during incubation by employees of the laboratory "New technologies in aquaculture" Research Institute of Fishery. The fish were reared in pools with a volume of 2 m3 (Fig. 1).

Figure 1. Laboratory "New technologies in aquaculture"

The experiment involved 300 catfish in each pool with an average weight of 40-45 grams.

As part of the experiment, African catfish were divided into 2 groups:

Pool A - control group of catfish,

Pool B - dry substance of the biological product "PROBIOKORM" was added to the feed (5% per 1 kg of feed),

The composition of the compound feed in the experiment was prepared according to Table 1.

Table 1 Composition of basic feed for African catfish (Clarias gariepinus)

Ingredient name	Percentage per 1 kg of feed
Fish flour	20
Meat and bone meal	20
Soybean meal	22
Wheat	19
Corn	13,5
Feed yeast	3
Premix	2,5
Total	100
Including	
Crude protein , %	38,9
MJ/kg	12,5

All ingredients were prepared from the domestic market of Uzbekistan. To prepare the compound feed, the required amount of ingredients was added, after thorough mixing, they were removed from the apparatus and brought to a granular state. The size of the pelleted feed was 2.5 mm. The baits were dried for 2 days (Fig. 2), and the experimental fish were given 3% of the total biomass. Feeding was given at 9:00, 12:00, 16:00 and 20:00, divided into 4 portions of the daily diet. The control catch was carried out every 15 days, and the daily ration was adjusted in accordance with the growth of the fish.

Figure 2. Drying process of feedfor African catfish (Clarias gariepinus).

Experimental test results

The water temperature was gradually increased over 5 days, and the fish were adjusted to the pools so that the difference in water temperature was not dramatic and the fish did not get sick. During the entire experiment, no fish mortality was observed in any of the basins. The average water temperature during the study was 23oC∓0.5, and the hydrochemical parameters of the water (table 2) were as follows:

Table2 Hydrochemical parameters of water in experimental pools

Standard value for technological requirements, mg/l.		**8^{30} (30 minutes before feeding)**	**9^{30} (30 minutes after feeding)**
Water temperature t c^0		$23^oC∓0,5$	$23^oC∓0,5$
pH	**7-8**	7.39	7.4
Oxygen	**5.0**	4.6	4.8
Nitrite NO_2	**0,2**	0.02	0.02
Nitrogen NH_4	**1.0**	0.4	0.5
Ammonia NH_3	**0.01-0.07**	0.02	0.02

When feeding fish in all groups during the experiment, there was no negative effect of water on significant hydrochemical parameters. The explanation for this is that the recirculating water supply is operating optimally and the fish are not reared at high densities.

Growth performance and feed utilization parameters were determined as follows:

Weight gain (g):

$$dW = W_2 - W_1 \quad (1)$$

where W_1 (g) – the initial average (for each tank) body weight, W_2 (g) – the average (for each tank) final fish weight;

Relative growth rate(g/day) = weight gain / t, where t – period in days:

$$RGT = W_g/t \quad (2)$$

Specific growth rate (SGR) (% per day):

$$SGR = [(\ln * W_2 - \ln * W_1)/t] * 100 \quad (3)$$

where ln – natural log;

Feed conversion ratio (FCR) = feed intake (g) / wet body weight gain (g);

$$FCR = F_i/WBW_g \quad (4)$$

Data were analyzed by one-way analysis of variance (ANOVA) with “R” statistical software. Statisticalsignificancewasdeterminedat 5% (P<0.05).

The analysis of the growth rates of fish in the experiment is presented in Table 3.

Table 3 Growth rates of African catfish during the experiment

Indicators	Experimental pools	
	A	B
Initial body weight, g	43.2±0.11	41.3±0.11
Final body weight, g	81.7±0.22	88.6±0.55
Average weight gain, g	38.5±0.11	47.3±0.44
Average daily weight gain, g/day	0.84	1.04
Specific growth rate (% / day) (SGR)	1.9	2.5
Feed rate (FCR)	2.8	2.39

Analysis of the research results showed that group B fish had the highest growth rates. The fish in this group weighed 7.1 grams more, respectively, than in pool A. The average daily weight gain was 1.04 g / day, in group A, 0.84 g / day. The highest feed ratio was also observed in fish in basin A, which was 2.8. It is known that in intensive aquaculture, the less feed is spent on raising fish with a live weight of 1 kg, the better.

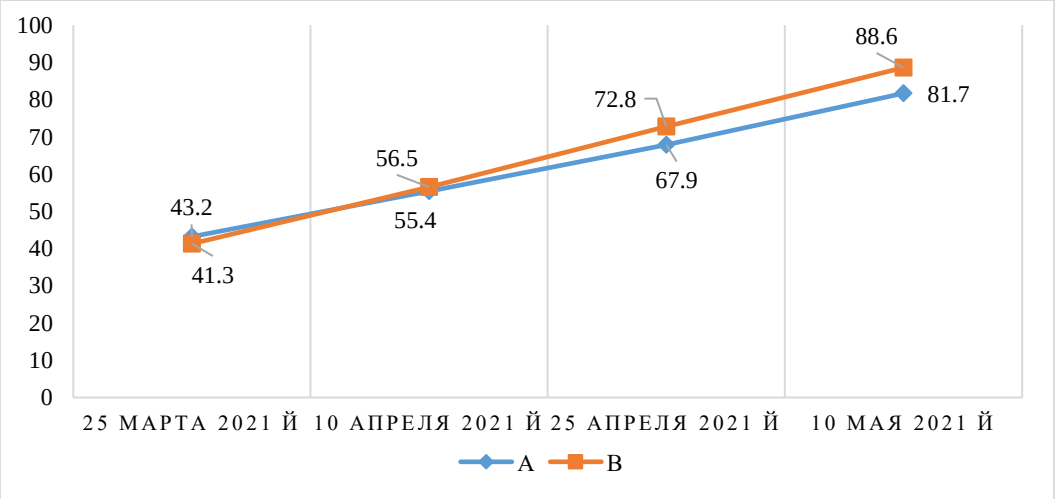

Figure 3. Growth rate of African catfish (year)

In this experiment, this figure was achieved in group B fish. The food for this group of fish was supplemented with PROBIOKORM dry matter, rich in protein, and an enzymatic feed additive based on local microorganisms, which improves digestion and fish productivity. The fish of this group had a positive difference in growth rates compared to the control fish (Fig. 3).

When fish are grown in artificial conditions, especially in RAS, the cost of its feed is more than 50% of the cost of fish products. One way to reduce these costs is to improve the digestibility of feed nutrients. In this experiment, it was clearly and convincingly established that the use of the biological product "PROBIOKORM" contributed to this. Analyzing the main fish-breeding indicator - the yield of fish products from a unit of water area, a direct pattern can be noted: the use of the biological product "PROBIOKORM" in the diet of African catfish accelerates their growth and contributes to a higher yield of fish products. The best fish survival was observed in the second variant B — higher than the others by 15%.

Biological product "PROBIOKORM" has the ability to improve the digestion of poultry and fish, prevent and treat various intestinal diseases. It is a local microorganism-based product, a probiotic, enzymatic and protein-rich food supplement. It also serves to increase the energy value, efficiency, and productivity of feed.

Conclusion

In conclusion, it should be noted that the use of the biological product "PROBIOCORM" in the preparation of high-quality feed for fish has a positive effect, and can also increase the efficiency of feed consumption.

At the same time, it is recommended to conduct a series of studies on the most alternative level of economic efficiency of this additive, depending on the age and type of fish.

Discussions

The use of the probiotic "Subtilis" as an additive in compound feed when growing clarius catfish in the basins of the recirculating water system on compound feed with the addition of this probiotic in an amount of 0.5; 1.5; 3.0 g / kg has a positive effect on the main biochemical parameters of protein and carbohydrate metabolism, which leads to a higher growth rate of fish, especially in the variant with the introduction of probiotic 1.5 g / kg of feed. The use of the probiotic supplement "Subtilis" in the AKF-2P compound feed, especially in the amount of 0.5 g / kg of feed, is economically profitable when growing Clarius catfish. The production profitability in the best case was 135.3%. [1]

The use of the probiotic "Sporothermine" as a food additive has a beneficial effect on the liver of female African Clarius catfish (Clarias gariepinus), reducing vascular congestion and degeneration in hepatocytes. All this indicates that the microbiota of the probiotic "Sporothermin", transforming metabolites, reduces their toxicity, protects liver cells from toxic damage. Intestinal microflora and liver, complexing and complementing each other, form two main systems in the body that carry out detoxification processes. The intestinal normobiota transforms metabolites into non-toxic end products that are not capable of causing toxic damage to the liver and are easily destroyed, then excreted from

the body. Therefore, hepatoenteric regulation can be considered one of the leading homeostatic mechanisms of the body. A decrease in the detoxification function of the intestinal microbiota increases the load on the enzymatic systems of the liver and causes metabolic and structural disorders of this organ. In case of violation of the intestinal normocenosis and an increase in the level of conditionally pathogenic and pathogenic microbiota, a violation of parietal digestion occurs, which leads to the formation of toxic metabolites that cause disturbances in the tissues and cells of the liver. [2]

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