

Using Anodonta Toothless as a Feed Additive on the Example of African Catfish Clarias Gariepinus

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Annotation: The effectiveness of using the meat of the toothless *Anodonta* as a feed additive was studied using the example of juvenile African catfish *Clarias gariepinus*. The difference in the weight gain of African catfish was established when feeding with regular carp feed, feed with the addition of minced meat made from the toothless, and feed consisting of 100% minced meat alone.

Keywords: feed, feeding, African catfish *Clarias gariepinus*, toothless, *Anodonta*.

Fish feeding is one of the important methods of intensifying pond fish farming and the main method of obtaining fish growth in industrial farms. The efficiency of fish feeding primarily depends on the composition and quality of the feed used, feeding techniques, and the quality of water in the reservoir [1].

In fish farming, the cost of feed is from 30 to 50% or even more of the total costs of fish farming, so poor feed and its inefficient use can seriously worsen the overall economic performance of production [1, 2].

The USDA Food Database provides general information on the nutritional value of bivalves [6].

Table 1. Nutritional value of bivalve mollusks.

	Nutritional value of bivalves per 100g of product	
1	Calorie content	86 (kcal)
2	Protein	14.7 (g)
3	Fats	1.0 (g)
4	Carbohydrates	3.6(g)
5	Fiber	0.0 (g0)
6	Water	79.0 (g)

The aim of the experiment was to establish the difference in weight gain of African catfish when fed with regular carp feed, feed with the addition of minced meat made from toothless, and feed consisting of 100% minced meat alone.

MATERIALS AND METHODS

The object of the study was the juvenile African catfish *Clarias gariepinus*, divided into 3 groups. The experiment was conducted in 3 aquariums with a volume of 300 liters each. Each aquarium was filled with 10 African catfish of the same age (60 days). For 50 days, they were fed with feed of different compositions in quantities calculated as a percentage of their weight. The first group of fish (control) was fed with compound feed intended for carp, in experiment No. 1 - feed consisting of 50% compound feed and 50% toothless mince, in experiment No. 2 - feed consisting of 100% toothless mince. The methodology for conducting an experiment with replacing fish meal with silkworm pupa in the feed for juvenile African catfish was taken as a model [7]. The daily feeding rate was 7% of the total weight of the fish in each group. The feeding rate was calculated according to fish farming standards [1,8].

The toothless intended for making mince were collected in the ponds of the Fish Farming Research Institute and were stored during the experiment in a separate aquarium, where the water was changed periodically.

The toothless feed was prepared as follows. Several mollusks were taken out of the aquarium every day, the shells were opened, the muscle part, mainly the “leg” of the mollusk, kept in a weak KMnO₄ solution for 20 minutes for disinfection, and then ground to a mince-like state.

The feed was fed twice a day at certain times: 9:00 and 16:00.

The water was changed weekly, control weighing was performed, and hydrochemical analysis was performed.

Hydrochemical parameters were measured in accordance with standard methods: dissolved oxygen – by the Winkler method; ammonia, ammonium, nitrites – GOST 33045-2014, “Water. Methods for Determining Nitrogen-Containing Substances” [9,10], pH – using a portable pH meter pHscan30.

RESEARCH RESULTS AND DISCUSSION

The experiment lasted 50 days with weekly adjustments to the feeding rate based on the calculated weight gains.

Control group. Average weight 40 g, average length 19 cm.

Experiment №1. Average weight 40 g, average length 19 cm.

Experiment №2. Average weight 60 g, average length 22 cm.

The research showed that:

- in the control group, the fish ate the food reluctantly, over a period of 2 hours;

- in experiment №1, the fish were active during feeding, the minced mollusk was eaten within 30 seconds, and the mixed feed within the next 15-20 minutes;
- in experiment №2, the fish were also very active during feeding, the minced toothless was eaten within 30 seconds.

Over the entire study period, the survival rate of the fish was almost 100 %, with the exception of the control group, in which on the fourth day after the start of the experiment, the loss was 1 specimen.

The daily feeding rate for this group was recalculated for 9 individuals.

It should be noted that, since in experiment №2 the initial average weight of the catfish was 60 g and the total weight was correspondingly greater, compared to the others, where the average weight was 40 g, we calculated not the absolute increase in the total weight, but the relative one. The calculation of the relative increase showed that in the control group it was 83.8%, in experiment №1 - 136%, in experiment №2 - 95.5% (Fig. 1).

The same applies to the length indicator (L): in the control group, the increase in length was 20.5%, in experiment №1 - 31.1%, in experiment №2 - 20.1%.

Thus, the results of the experiment showed that the most productive feed was in experiment №1, consisting of 50% carp feed and 50% shellfish mince. However, although the final result showed a clear advantage of feed №1, a comparison with each previous weighing, expressed as a percentage, showed significant fluctuations and growth was not stable. This can be seen in the following diagrams (Fig. 1, 2).

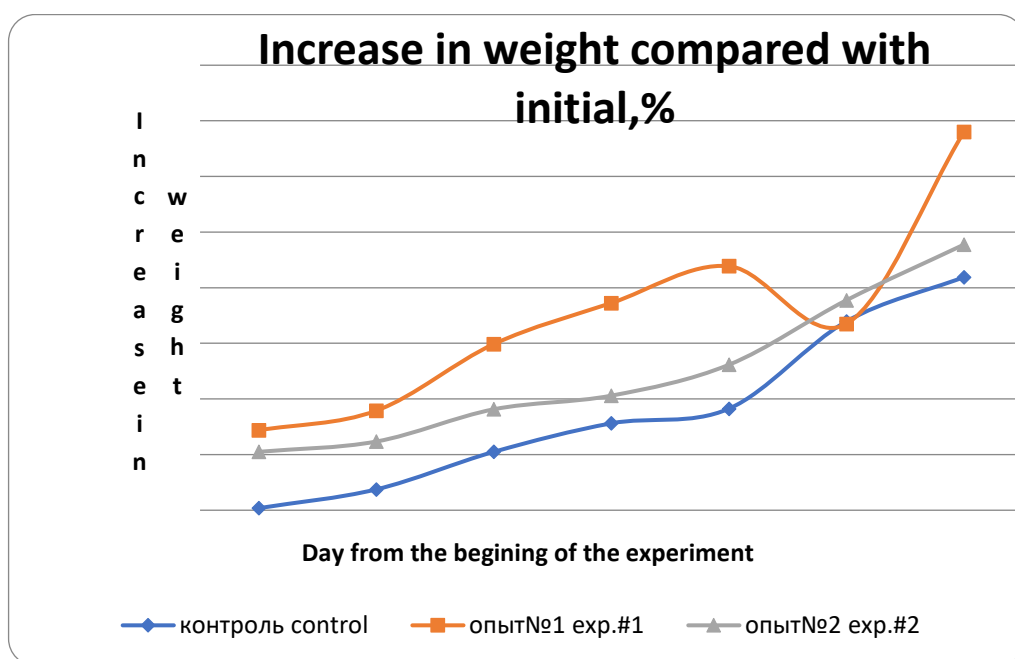


Fig. 1. Increase in % of initial weight.

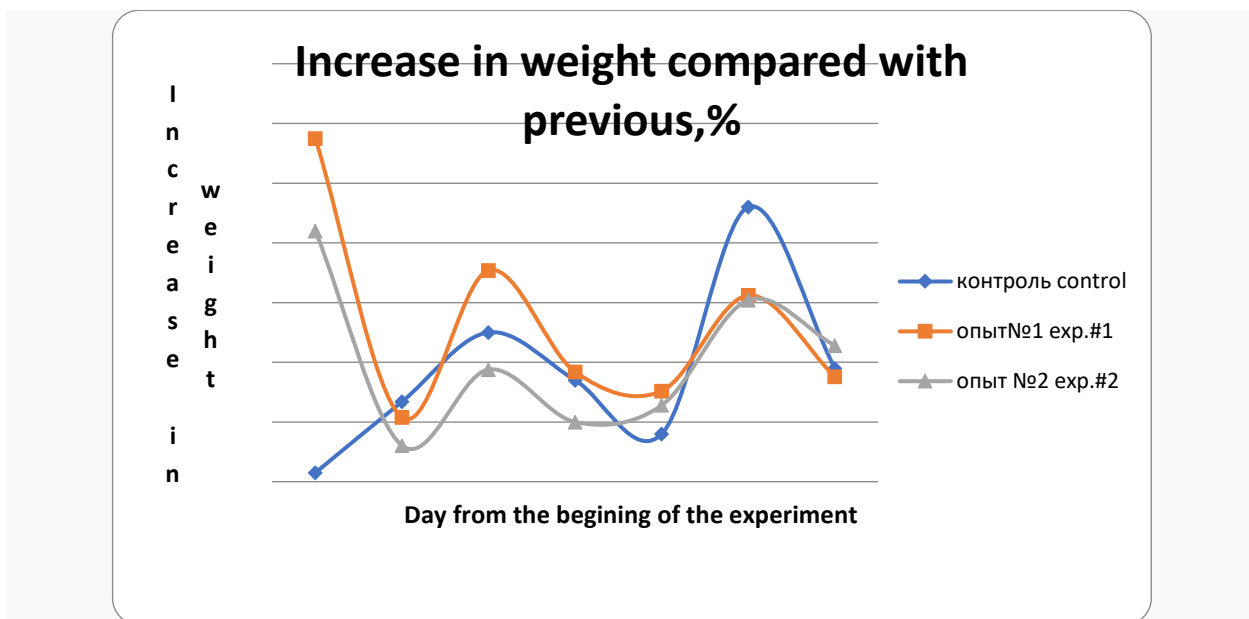


Fig. 2. Weight gain in % from previous weighing.

Thus, the expediency of using toothless in feed for growing African catfish at the age of 60 days was established. The addition of chopped mollusk meat to the feed of African catfish contributes to a weight gain of 52.5% compared to conventional compound feed and by 40.5% compared to pure minced meat, since this feed turned out to be the most balanced in composition

The obtained data will allow us to recommend farmers engaged in the cultivation of African catfish on a small scale to independently make minced meat from toothless, use it as a feed additive, thereby obtaining a weight gain of 52.5% more than when feeding with conventional compound feed.

Further studies will require studies of digestibility, assimilation and physiological and biochemical parameters of the African catfish organism when feeding toothless.

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