

Effects of chromium-yeast contained feed on growth rate of silver pompano (*Trachinotus blochii*)

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Abstract

Silver pompano (*Trachinotus blochii*) is one of the high economic fisheries commodities that are easily cultivated and easy to sell. One obstacle in aquaculture is the high cost of feed. Chromium and yeast have the potential to improve the performance of digestive enzymes and increase the activity of insulin function. P. this research aims to find out the effect of usage chromium-yeast as feed additives to the growth rate of enlargement of star Silver pompano (*Trachinotus blochii*). The raw materials used are Silver pompano, chromium, yeast, and commercial feed. This research design uses a Completely Randomized Design (CRD) with four chromium dose treatments-yeast different with three repetitions. Data analyzed with ANOVA and Duncan test with confidence level 95%. The results showed that the concentration of chromium-yeast addition in feed can increase growth and feed utilization efficiency to an increase in the average daily growth rate which is significantly different, the efficiency of feed utilization and life sustainability that no different real. Addition of chromium-yeast feed with a concentration of 3.20 ppm can produce a daily growth rate of 0.32 grams / day, 85% utilization of feed efficiency and survival (97%) is the best.

Keywords: chromium, yeast, *Trachinotus blochii*, metabolisme carbohydrate

1. Introduction

Silver pompano (*Trachinotus blochii*) is one of the marine commodities cultivated in Indonesia. Pomfret is one of the marine aquaculture commodities that has high economic value. Currently, this fish has a selling price of around Rp. 70,000 per kg. The maintenance of this fish is relatively fast compared to other marine fish commodities, is easy to maintain, and can be sold in a dead condition making it easier to harvest [1]. This fish has a high Survival Rate, but it needs to be given artificial feed, it can't just be fed trash fish, so the cost of feed becomes high, this is a problem for the bizarre fish cultivation business. Costs incurred for feed in fish farming reached 60% of the total production cost [2]. Silver pompano is a carnivorous fish, so farmers often provide pellets with high protein around 40% and low carbohydrate around 10%, whereas the digestibility of fish is quite low. This is due to insulin activity as a hormone associated with fish carbohydrate metabolism is low.

Chromium mineral (Cr) is an essential trace element whose existence is needed in very small concentrations. Chromium has a major role in the interaction between insulin and cell receptors present together as a complex compound called glucose tolerance factor (GTF) which can increase the activity of insulin function. Increased insulin activity will increase the mobilization of glucose in the blood to target cells for immediate use as energy [3].

The Provision of Cr in organic form will have a positive effect because it is more easily absorbed [4]. Chromium provides different biological responses to feed efficiency and the average daily growth rate of an individual. Increased insulin activity will increase the mobilization of glucose in the blood to target cells for immediate use as energy [3]. Chromium indirectly through the action of insulin can also

stimulate glycogenesis, lipogenesis, transport, and uptake of amino acids by cells through increased sensitivity of insulin receptors [5, 6, 7]. The aim of this study is to determine the optimal dose for increasing growth using organic chromium as a feed additive in utilizing carbohydrates in feeds on the growth rate in the enlargement of Silver pompano (*Trachinotus blochii*).

2. Materials and Method

The tools used in this research such as floating net cage (KJA) as a place for raising fish; pH Meter as a pH gauge for waters; DO Meter as a gauge of water oxygen solubility; Mercury thermometer as a gauge of water temperature; Drain as a tool for taking fish; Scales as a gauge of weight; Basin as a temporary container for fish; Ruler as a gauge of the length of the fish's body; Plastic wrap as the base there is the manufacture of test materials; Pressure Cooker as a place for sterilization; Refractometer as a measure of salinity; Documentation tools as tools for document research; Stationery as a tool for recording research. The materials used in this research such as Silver pompano (*Trachinotus blochii*), Chromium, Yeast, Tapioca Flour, Feeds.

This research design uses a Completely Randomized Design (CRD) with four different chromium dosage treatments and each treatment is carried out three times. The treatments used are as follows:

1. Feed without the addition of 0.0 ppm chromium-yeast (control);
2. Feeds with the addition of chromium-yeast 1.47 ppm;
3. Feeds with the addition of chromium-yeast 3.20 ppm;
4. Feeds with the addition of chromium-yeast 4.59 ppm.

The research was carried out for 42 days by giving food once a day at 16.00 WIB. The results obtained were analyzed for diversity by using the ANOVA table and to find out the effect between treatments was done by Duncan's test with a confidence level of 95%.

The test feed is a commercial pellet mixed with chromium-yeast using a binder. Organic Cr production is carried out by incorporating Cr into fungi (yeast) through the fermentation process. The basic substrate used is tapioca flour. Tapioca flour as much as 100gr mixed with 1L of water with stirring to form a gel, then mixed with inorganic Cr. The mixture is then sterilized using a pressure cooker for 20 minutes at 121°C, 15 psi. After chilling, the substrate is flattened on a plastic tray and added yeast. The top of the plastic tray is wrapped in plastic wrap, and arranged in a rack. Incubation is carried out for 5 days at room temperature, then the product is dried using an oven at 50°C. Then the product is mashed to fine-grained and ready to be mixed in commercial pellets.

2.1 Container Preparation

Maintenance is carried out on floating cages with a size of 3 × 3 × 3 meters. The floating net cage is cleaned before being used to eradicate pests and parasites on the maintenance media by rubbing and drying with 20 stockings per net.

2.2 Fish Preparation

The fish used in study were 10-12 cm of Silver pompano juvenil weighing 5-8 grams from floating net cages in Universitas Padjadjaran, Pangandaran. They are acclimatized before being used for five days. This is done as an adjustment to the new environment. Acclimatized fish began to be given commercial pellet feeds to get used to it at the time of research.

2.3 Implementation

Feeding with chromium-yeast mixed is given according to each treatment. Feeding is carried out as much as once a day at 16:00 WIB according to the treatment during the research carried out. Giving the amount of feed is carried out by as much as 3% of body weight.

The weighing of the test fish was carried out at the beginning of the research before the test fish was put into the floating net cage to determine the initial weight of the fish test, then carried out sampling every 7 days. Weighing the test fish is done by weighing the weight by weighing the media used to hold the fish, recording the weight of the media, then calibrating the scales, and inserting some test fish, then getting the value of the weight of the fish. Water quality measurements include temperature, pH, dissolved oxygen (DO), and salinity once every 7 days.

2.4 Observation Parameters

The following are observational parameters in the research titled Effect of Addition of Chromium-Yeast to Silver pompano (*Trachinotus blochii*) Against ADG, Feed Utilization Efficiency, Survival rates, chromium content in meat and water quality. The effect of each treatment data was tested using Analysis of Variance (ANOVA). If there are differences between treatments, further tests are performed using Duncan's multiple range test with a confidence level of 95% [18].

3. Results and Discussion

3.1 ADG

Based on observations of maintenance on an enlargement of Silver pompano for 42 days by adding different chromium-yeasts to the feed resulting in the addition of a variety of average weight. The average weight of individual Silver pompano increases in each treatment increases with increasing maintenance time. The addition of weights of Silver pompano fed with chromium-yeast levels differed in each treatment indicates that the feed can be utilized and eaten by binfang Silver pompano. An increase in the average weight of Silver pompano can be seen in Figure 1.

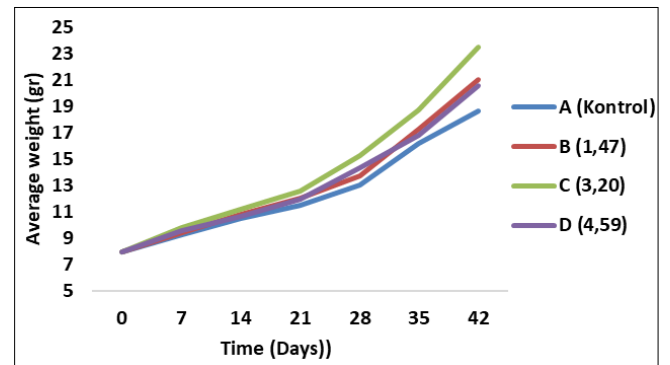


Fig 1: The Average Weight Increase of Silver pompano

The average weight gain of Silver Pompano increases with time of maintenance, meaning that the feed can be exploited and utilized by the Silver Pompano in the enlargement phase. The longer the maintenance time, the better Silver pompano in adapting to the environment and the feed provided. The average weight of Silver pompano at the start of maintenance ranges from 7.7 to 8 grams, whereas after maintenance for 42 days the average weight of Silver pompano is 19-23 grams. Based on Figure 1, it can be seen that the treatment C by giving 3.20 ppm chromium-yeast showed the highest results of the average weight of Silver pompano that is 23.5 grams.

Table 1: Average Daily Growth (gr / day) Silver pompano

Treatment	Chromium-yeast concentration (ppm)	Average Daily Growth (gr / day)
A	0	0.25 ^a
B	1.47	.31 ^a
C	3.20	.37 ^b
D	4.59	0.30 ^a

The results of the average weight gain of the Silver pump are continued by calculating the daily average growth rate. Growth rates of each treatment were, A (Control, 0 ppm Chromium-yeast) 0.25 gram / day, B (1.47 ppm Chromium-yeast) 0.31 gram / day, C (3.20 ppm Chromium-yeast) 0.37 gram / day and D (4.59 ppm Chromium-yeast) 0.30 gram / day. The results of the average daily growth rate were continued by using analysis of variance (ANOVA) because it showed the average daily growth rate of the addition of different chromium-yeast concentrations gave significantly different results and was continued using Duncan's multiple range test with a confidence level of 95%, it turns out that treatment C shows the results of the highest average daily growth rate and states that results are significantly different

from controls,

The treatment of chromium-yeast showed better results than the average daily growth rate compared to controls. The presence of chromium in the body can form complex compounds called glucose tolerance factor (GTF), which are compounds that can stimulate insulin activity and carry lots of glucose into cells [9]. States that an increase in insulin in the blood accelerates the introduction of blood glucose into cells so that a decrease in blood glucose levels occurs more quickly [10]. The process is related to increased insulin activity in the presence of chromium [11]. This indicated that blood glucose can be immediately utilized by cells as a source of metabolic energy. The added value of biomass of baung fish that consumed chromium-containing feed was higher than without chromium (control). The addition of chromium-yeast in the feed up to 3.20 ppm significantly increased the retention value of protein feed from 30.28% to 44.32% compared to other treatments, namely the administration of chromium-yeast with concentrations of 1.47 and 4.59 ppm. The administration of 3.20 ppm chromium-yeast can increase the value of the highest daily growth rate and feed efficiency [12]. Whereas the gourami fish which is herbivorous fish with the addition of chromium-yeast in the feed as much as 1.5 ppm significantly increases the growth rate and feed efficiency highest compared to other treatments namely 3.0 and 4.5 ppm [10]. 20 ppm significantly increased the retention value of protein feeds from 30.28% to 44.32% compared to other treatments, namely giving chromium-yeast with concentrations of 1.47 and 4.59 ppm. The administration of 3.20 ppm chromium-yeast can increase the value of the highest daily growth rate and feed efficiency [12]. Whereas the gourami fish which is herbivorous fish with the addition of chromium-yeast in the feed as much as 1.5 ppm significantly increases the growth rate and feed efficiency highest compared to other treatments namely 3.0 and 4.5 ppm [10]. 20 ppm significantly increased the retention value of protein feed from 30.28% to 44.32% compared to other treatments, namely giving chromium-yeast with concentrations of 1.47 and 4.59 ppm. The administration of 3.20 ppm chromium-yeast can increase the value of the highest daily growth rate and feed efficiency [12].

3.2 Efficiency of Feed Utilization

The results of the efficient use of feed-in feeding Silver pompano showed mixed results. Efficiency of feed utilization of each treatment namely, A (Control, 0 ppm Chromium-yeast) 68%, B (1.47 ppm Chromium-yeast) 69%, C (3.20 ppm Chromium-yeast) 74% and D (4.59 ppm Chromium-yeast) 68%. The results of the calculation of the efficiency of feed utilization were continued using analysis of variance (ANOVA) because it showed different efficiency of feed utilization by giving significantly different results and continued using Duncan's multiple range test with a confidence level of 95%. Based on the results of Duncan's multiple range test treatment C shows the results of the highest average daily growth rate and states the results are significantly different from the control. The highest efficiency of feed utilization and average daily growth rate was shown by treatment C by giving chromium-yeast as much as 3.20 ppm. The value of feeding efficiency is directly proportional to the growth produced, meaning that growth will change in line with changes in feeding efficiency if the amount of feed given does not change [13].

The greater the value of the efficiency of feeding, the better the fish utilizes the feed provided that the greater the bodyweight of the fish is produced. The efficiency value of feed utilization by giving chromium-yeast as much as 3.20 ppm shows a value of 74%, this shows that as much as 74% of feed that can be eaten and utilized by fish while the remainder is wasted and fecal feed.

Table 2: Efficiency of Feed Utilization

Treatment	Chromium-yeast concentration (ppm)	Efficiency of Feed Utilization (%)
A	0.00	67 ^a
B	1.47	69 ^a
C	3.20	74 ^b
D	4.59	67 ^a

3.3 Survival Rate

Observations on maintenance of Silver pompano for 42 days showed that treatments A (control) and C (3.20 ppm chromium-yeast) stated the results of the survival rate of 97% each. Whereas in treatment B (1.49 ppm chromium-yeast) the results showed a survival rate of 93% and in treatment D (4.59 ppm chromium-yeast) stated the results of a survival rate of 95%.

Table 3: Survival Rate of Silver pompano

Treatment	Chromium-yeast concentration (ppm)	Survival Rate (%)
A	0.00	97 ^a
B	1.47	93 ^a
C	3.20	97 ^a
D	4.59	95 ^a

Survival of Silver pompano is not affected by the presence of organic chromium, considering that this fish is relatively strong to pressure. This presumably because Silver pompano has good diseases resistance, easy to maintain and also support from the aquatic environment.

4. Conclusion

The results showed that the concentration of chromium-yeast addition in feed can increase growth and feed utilization efficiency. The addition of chromium-yeast feed with a concentration of 3.20 ppm can produce a daily growth rate of 0.37 grams / day, the efficiency of feed utilization of 74% and survival (97%) is the best.

5. References

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