Global Scientific JOURNALS

GSJ: Volume 10, Issue 7, July 2022, Online: ISSN 2320-9186
www.globalscientificjournal.com

UTILIZATION OF COMMON PLECO MEAL AS FEED FOR PANGAS CATFISH (*PANGASIUS* SP)

Yuli Andriani[1*)] and Rusky I. Pratama[1)]

[1)] *Staff at Fisheries Department, Faculty of Fisheries and Marine Sciences, University of Padjadjaran*
[*)] *E-mail: yuliyusep@yahoo.com*

KeyWords
common pleco, fish meal, performance, growth, pangas catfish

ABSTRACT

One of the components of fish feed that has a high price is fish meal, hence efforts are needed to find alternative substitutes from surrounding natural sources so that the feed price becomes more economical. The purpose of this study was to evaluate the use of common pleco fish meal in artificial feeds on the growth and survival of pangas catfish (*Pangasius* sp.) as an alternative to providing protein sources in fish feed. The study was conducted using a completely randomized design (CRD), consisting of 5 (five) treatments and each repeated 3 (three) times. The treatment given was the addition of 0, 5, 10, 15, and 20% artificial fish meal in artificial feed. Parameters observed at the end of the study included digestibility, growth rate, and water quality. The results showed that the addition of common pleco meal could be used up to 20% in the feed. The highest relative growth of catfish is 1.88%, digestibility is 60.75%, and the water quality is still within the safe tolerance limits for fish farming. Based on observations, the use of common pleco meal up to a level of 20% in feed does not harm the survival of pangas catfish, thus it can be used as an alternative fish meal in fish feed.

1. INTRODUCTION

The source of animal protein that is commonly used as one of the ingredients for feed is fish meal. Fish meal is not only used in the field of fisheries, but also in the livestock sector, hence that the use of fish meal is increasingly faced with supply and price constraints. In an effort to meet protein in feed, it is necessary to seek alternative feed ingredients with relatively the same nutritional value to reduce the use of fish meal in feed. One of the ingredients that can be used as a source of animal protein in feed is common pleco (*Hypostomus plecostomus*) fish meal.

Common pleco is one of the non-economical fish that is abundant in the waters of West Java-Indonesia, thus it can be processed and used as fish meal. Fish meal is a potential source of animal protein to be developed as a substitute for fish meal. Based on the results of the proximate analysis, it is known that the protein value of common pleco meal ranges from 56.51-65.45%. The results of this analysis indicate that the fish meal of common pleco can be used as a source of animal protein for feed because the crude protein content is close to that of commercial fish meal (47.85-55.57%).

Research on the use of common pleco fish meal as a supplement in feed has never been done, hence it is necessary to do a study first, consequently it can be known to what extent the effect of adding common pleco fish meal as a protein source on fish growth, one of which is in pangas catfish (*Pangasius* sp.) which is one of the important aquaculture commodities in Indonesia.

2. MATERIALS AND METHOD

This research lasted for 4 months, at the Aquaculture Laboratory Hatchery, Faculty of Fisheries and Marine Sciences, Padjadjaran University, while the proximate analysis of feed and test feed ingredients, the manufacture of broom fish meal was carried out by the Animal Feed Chemistry Laboratory, Faculty of Animal Husbandry, Padjadjaran University.

Materials and instruments used in this study include: Pangas catfish (*Pangasius* sp.) size 10 ± 0.5 grams per fish obtained from the

Jangari Cianjur area as many as 250 fish; common pleco fish meal, obtained by collecting common pleco fish from public waters and then processed into meal; the test feed was in the form of pellets and contain protein content of 35% with the percentage addition of common pleco meal and the average energy content was 2840 kcal EB/kg.

The experiment was conducted using a completely randomized design (CRD), consisting of 5 (five) treatments and each repeated 3 (three) times, namely:

Treatment A: Feed with the addition of 0% common pleco protein fish meal
Treatment B: Feed with the addition of 5% common pleco protein fish meal
Treatment C: Feed with the addition of 10% common pleco protein fish meal
Treatment D: Feed with the addition of 15% common pleco protein fish meal
Treatment E: Feed with the addition of 20% common pleco protein fish meal

Feed is given with a frequency of three times a day, namely at 8:00 AM, 12:00 PM and 16:00 PM. Fish weighing is done once a week. Furthermore, adjustments are made for the amount at the next feeding. Observational parameters to be collected and analyzed include:

1) Feed Digestibility [1], [2]

$$\text{Consumption of dry matter feed (g/day)} = (\text{Output dry matter of feces (g/day)})/\text{Indigestion} \times 100\%$$

2) Relative Growth

$$PM = [Wt - Wo\,]/t \times 100\%$$

Where:
PM = relative growth (%)
Wt = fish weight at the end of the study (g)
Wo = weight of fish at the beginning of the study (g)

3) Water Quality

Water quality measurements (pH, temperature, dissolved oxygen and ammonia) were carried out 3 times during the study period, specifically at the beginning, middle and end of the study.

Data analysis was carried out by analyzing the effect of each treatment with statistical analysis of the ANOVA test and continued with Duncan's test to determine the difference between each treatment.

3. RESULTS AND DISCUSSION

Feed Digestibility

The average digestibility of common pleco fish meal by pangas catfish in each treatment during the study is presented in Table 1.

Table 1. Common pleco fish meal average digestibility

Treatments	Digestibility (%)*
A	67.70 a
B	60.75 a
C	60.20 a
D	53.94 a
E	54.37 a

*Values with different letters in the same column are very significantly different (P<0.05)

The highest digestibility of common pleco meal by pangas catfish was found in feed without the addition of common pleco meal (67.70%), then tended to decrease with each higher addition of common pleco meal which was 60.75 %, 60.20%, 53.94% and 54.37%, consecutively. The addition of common pleco fish meal in catfish feed generally has an effect on feed digestibility. The highest digestibility of catfish is found in feed without the addition of common pleco meal. This indicates that there is a limiting factor in fish meal in its use as a protein feed ingredient in fish feed. This limitation may arise from various physiological and morphological characteristics of common pleco, hence that the quality when used as fish feed ingredients is not excellent. Judging from the body structure of the common pleco fish which has very hard bones and scales, it can be assumed that it has high calcium and chitin content, which in turn will reduce digestibility.

The low digestibility of feed containing common pleco meal, especially in high addition amounts, is thought to be influenced by the crude fiber content of the feed, especially the lignin content. The lignin content in each ration was as follows: 6.89%, 8.49%, 9.83% and 9.92%. [3] stated that lignin is part of the ration that is not useful as a food substance, even has a detrimental effect because it will reduce the absorption of food substances. In this regard, it is known that between animal species, including fish, differ in their ability to digest lignin, so that digestibility becomes unstable in different animal species. This is due to the diverse population of microflora in animal species, both in number and composition. Of the 148 species from estuaries and 1 species of freshwater fish

(*Ictalurus punctatus*), cellulose enzymes were not found in either the stomach or anterior intestine. It is suspected that cellulose is not produced by microorganisms present in the intestines of fish.

[4] suggested that the function of fiber in the ration would stimulate peristaltic movements in the intestine, hence that with the higher fiber content in the ration, the contact between the ration and the intestinal wall was shorter, which in turn would reduce the digestibility value of the ration. The optimum crude fiber content in the ration is 3-5%, fish growth will be affected when the crude fiber content reaches 8%, while it will suppress growth when it reaches 14-20% [3]. The effect of lignin on fish digestibility will change depending on the species and age of the fish, because the larger the fish size, the more microflora in the digestive tract and the composition will vary. The results of [5] study showed that lignin as much as 9.92% reduced the ration consumption of fresh water pomfret fish size of 200 g.

Relative Growth

Data on changes in weight of catfish are presented in Table 2. The highest growth rate of catfish was found in the addition of 10% (1.88 grams) of common pleco meal, and the lowest was at 0% addition of 1.62 grams.

Table 2. Duncan Test Results Effect of Treatment on Relative Growth of Catfish (%)

Treatment	Relative Growth (%)	Significance*
A	1,62	a
B	1,83	a
C	1,88	a
D	1,80	a
E	1,77	a

*Values with different letters in the same column are very significantly different (P<0.05)

The results showed that the absolute growth of catfish increased in line with the addition of common pleco meal to a certain extent and then the growth decreased at a higher level of addition. The use of 20% common pleco meal in the ration significantly reduced fish growth compared to 0%, 5%, 10% and 15%. The decrease in the growth rate of fish was in line with the increase in the content of common pleco meal in the ration. This is related to the dry matter digestibility of the ration which decreases with the use of common pleco meal with a higher percentage. The lower the digestibility value of the ration will result in lower availability of energy, amino acids and fats, and will further decrease the growth rate. Rations that have low digestibility will cause food substances that should be utilized by the body to come out with feces.

The composition of amino acids, especially essential amino acids from the ration will also affect the growth of fish. According to [6], suitable feed for growth is feed that has an amino acid pattern that is almost the same as the amino acid pattern of the fish body. When viewed from the comparison of the amino acid composition of fish meal and common pleco meal, common pleco meal has complete amino acids but the value and amount is lower than commercial fish meal.

The amino acid with the lowest percentage in common pleco meal was methionine (0.08%), relatively lower than commercial fish meal (1.57%). This resulted in the availability of methionine decreasing in line with the increase in the content of common pleco meal in the ration. Methionine is an essential amino acid containing sulfur which has an important role in fish growth. The process of absorption of amino acids into the cell wall is activated by methionine as a precursor, thereby accelerating the absorption of other amino acids [7]. Methionine deficiency in the diet also affects the balance of amino acids in the diet.

Water Quality

Another influential factor in this research is the condition of the fish rearing media. In this study, temperature, density and water quality were sought to support the maximum survival rate. The experimental fish were kept in a room that had a controlled and relatively stable temperature, low density, aeration, siphoning and periodic water changes. Thus the survival rate obtained in this study greatly describes the effect of treatment on experimental fish. The results of the measurement of several water quality parameters during the study can be seen in (Table 3).

Table 3. Water quality during the study

Water Quality Parameters	**Treatment**				
	A	**B**	**C**	**D**	**E**
Temperature (^{0}C)	26.5 - 29	26.0-28.5	26.0-28.5	26.0-28.5	26.0-28.5
Dissolved oxygen (mg/L)	6.00 – 7.0	6.20 – 7.0	6.30 – 7.20	5.5 – 7.0	5.25 – 6.9
pH	6.5-6.9	6.5-6.8	6.7-6.9	6.6-6.9	6.7-6.9
Alkalinity (mg/l) $CaCO_3$(eq)	12.5-19.5	12.9-19.5	12.7-16.0	13.4-19.0	14.0-20
Ammonia (mg/l)	0.05-0.17	0.05-0.16	0.06-0.17	0.07-0.18	0.05-0.10

Table 3 shows that the range of water quality values for fish rearing media during the study was still within the appropriate range to support fish growth. The survival rate obtained in this study was higher when compared to the survival rate in [8] study. This may

be due to differences in the source and amount of protein, as well as the size of the fish used.

Conclusion

The addition of common pleco meal up to 20% in the feed did not have a negative effect on the digestibility and growth of pangas catfish. The relative growth yield was 1.88%, digestibility was 60.75%, and the water quality was still within the safe tolerance limits for fish farming.

References

[1] Ranjhan, SK. 1980. Animal Nutrition in Tropics, 2nd Revised Edition. New Delhi. Vicas Publishing House PVT. Ltd.
[2] Schneider, BH and Flatt, WP. 1973. The Evaluation of Feeds Through Digestibility Experiment. New York. The University of Georgia Press.
[3] NRC. 1983. Nutrient Requirement of Warmwater Fishes. National Academy Science. Washington D.C. 102 p.
[4] Halver, JE. 1989. Fish Nutrition. Second Edition. New York. Academic Press, Inc. 789 p.
[5] Haetami, K. 2004. Evaluation of the Digestibility of Azola Meal in the Ration of Freshwater Pomfret (*Colossoma macropomum*, Cuvier 1818). [Article]. Faculty of Agriculture. Padjadjaran University.
[6] Shigueno, K. 1975. Shrimp Culture In Japan. Tokyo: Association for International Technical Promotion. 153 p.
[7] Scott, ML, Neisheim, MC, and Young RJ. 1982. Nutrition of The Chickens. 2nd Ed. Ithaca, New York. M.L. Scott and Assoc.
[8] Rachmawati, D. 1996. The Effect of Using Earthworm Meal (*Lumbricus rubellus*) as a Source of Animal Protein in Artificial Feeds on the Growth of Carp (*Osphronemus gouramy* Lac.) Seeds. [Master Thesis]. Bogor Agricultural Institute. Postgraduate Program.