THE EFFECT COMBINATION OF COMMERCIAL FEED WITH *Azolla microphylla* ON FEED CONVERSION RATIO AND FEED EFFICIENCY OF TILAPIA FISH (*Oreochromis niloticus*)

Irza Aghnafairuz Dzulkarnain[1*], Lailatul Lutfiyah[1], Nina Nurmalia Dewi[1]

[1]*Faculty of Fisheries and Marine, Airlangga University*
*Email: irza.aghnafairuz@gmail.com

Abstract

Tilapia (Oreochromis niloticus) is one of the prospective freshwater fish producers to be developed in Indonesia. Tilapia is one of the freshwater fish commodities that has received great attention from the fisheries because it is easy to breed, grows fast, and is tolerant to unfavorable environments. One of the problems of tilapia fish farmers is the high feed cost. The factor that affects the growth of fish is the nutritional content in the feed. To increase the growth of tilapia, quality feed is needed. One effort that can be done to increase the growth of tilapia is by combining commercial feed with A.microphylla. This study used a completely randomized design (CRD) with 4 treatments, each treatment was repeated 5 times, with a treatment design P0 (100% pelleted feed), P1 (75% pelleted feed with 25% A.microphylla), P2 (50% pellet with 50% A.microphylla, P3 (25% pellet feed with 75% A.microphylla). The variables observed were Feed Conversion Ratio (FCR) and feed efficiency. The results of statistical analysis showed that the combination of feed resulted in significantly different Feed Conversion Ratio and feed efficiency ($p < 0.05$). Tilapia fish Feed Conversion Ratio with a higher increase in treatment P3 (2.1405) and a lower decrease in P0 (1.2296). Tilapia feed efficiency with a higher increase in treatment P0 (81%) and a lower decrease in P3 (43%). Values for the range of water quality vi parameters obtained were temperature 27.5 – 30.5 °C, pH 6.5-7.9, DO 4 - 5 mg/l, and ammonia 0 mg/l.

Keywords: *Azolla microphylla*, *Oreochromis niloticus*, feed efficiency, feed conversion ratio

Introduction

Tilapia (Oreochromis niloticus) is one of the prospective freshwater fish producers to be developed in Indonesia. Tilapia is one of the freshwater fish commodities that has received great attention from the fisheries business, because it is easy to breed, grows fast, and is tolerant of unfavorable environments. fish growth rate (Halija, 2019). One of the problems faced by tilapia farmers is the high cost of feed. According to Perius (2011), feed is the largest component (50-70%) of production costs. Therefore, the right feed ingredients are needed so that production costs decrease as the quality of feed increases. A.microphylla is a water fern that can grow and develop quickly and is in symbiosis with Cyanobacteria which can fix nitrogen in the air. With this symbiotic ability, A.microphylla biomass has good nutritional quality, especially nitrogen and its compounds such as protein. In addition, the growth rate of 2 A.microphylla is also very fast, that is, it can multiply within a time range of 2-10 days depending on environmental conditions and nutrient availability (S.B Katole et al, 2017).

The feed conversion ratio is an index of total feed utilization for growth or the number of grams of feed needed by fish to produce 1 gram of fresh fish weight (Restianti, 2016). The feed conversion ratio is one of the parameters that can be used as a measure of the efficiency of feed use in aquaculture. The lower the Feed Conversion Ratio (FCR), the more efficient use of feed, conversely, the higher the FCR, the more wasteful use of feed in increasing the weight of cultivated fish. Feed efficiency is the inverse of the feed conversion ratio, the higher the value of feed efficiency, the less amount of feed needed to produce one kilogram of meat. Kosim et al (2016) stated that an increase in the value of feed efficiency indicates that the feed

consumed is of good quality so that it can be used efficiently. According to Basak et al (2002), A.microphylla has a protein content of 25.78%. According to Fatkhummubin (2019), tilapia can grow faster only with feed containing 20 – 25% protein.

According to Sari (2009), the feed given was weighed and fish mortality during the study was weighed and counted to calculate feed efficiency every day. The higher the value of feed efficiency, the better the response of fish to the feed, which is shown by the fast growth of fish (Susilo et al., 2005). Saopiadi et al (2012) added the main factor that determines the high or low efficiency of feed utilization is the nutritional value of the feed given. The smaller the level of feed efficiency, the lower the quality of the feed.

Based on this background, it is necessary to research the effect of the combination of commercial feed with A.microphylla on the feed conversion ratio and feed efficiency of tilapia to prove whether it can increase the value of feed efficiency and reduce the feed conversion ratio in tilapia (*Oreochromis niloticus*).

Methods

This research used experimental research. The independent variables in this study were commercial feed without the addition of A. microphylla as a control and a combination of commercial feed with A. microphylla. The dependent variable in this study is the feed conversion ratio and efficiency of tilapia. Control variables in this study were tilapia weighing 10 grams, pond size, water volume, and water quality parameters.

Results and Discussion

Table 1. Feed Conversion Ratio of Tilapia

Treatment	Feed Conversion Ratio ± SD
P0	1,23± 0,06[a]
P1	1,58± 0,18[b]
P2	1,70± 0,12[c]
P3	2,14± 0,48[d]

Based on table 1, Tilapia feed conversion ratio in each treatment, among others P0 (1,23± 0,06[a]), P1 (1,58± 0,18[b]) P2 (1,70± 0,12[c]) P3 (2,14± 0,48[d]). Ratio value Feed conversion with a higher increase was found in treatment P3 (2.14 ± 0.48[d]), while the lowest feed conversion ratio was found in treatment P0 (1.23 ± 0.06[a]).

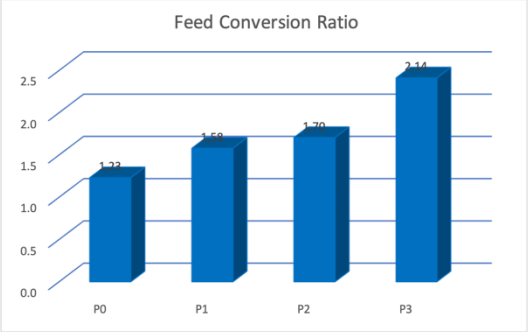

Figure 1. Feed Conversion Ratio of Tilapia

The results of statistical analysis showed that the combination of A.microphylla and pellets resulted in significantly different feed efficiency ($p < 0.05$). The results of the ANOVA test showed ($p < 0.05$) so Duncan's further test was carried out to find out the best results. Judging from the results of Duncan's advanced test and the graph above, the control treatment with 100% pellet feed showed the highest feed efficiency value and the combination treatment with 75% A.microphylla feed and 25% pellets showed the lowest feed efficiency value.

Table 2. Water Quality during the experiment period

Parameter	Treatment			
	P0	P1	P2	P3
Temperature (°C)	26,9 – 30,1	27,5-30,3	27-30	27,3-30,5
pH	6,3-8	6,6-7,8	6,5-7,9	6,5-7,7
DO (mg/l)	3,5-5	3,8-4,7	3,9-4,5	3,7-4,7
Amonia (mg/l)	0	0	0	0

The water quality in tilapia ponds for 28 days showed a temperature range from P0 – P3, namely 26.9 – 30.5°C. for the range of pH content in tilapia ponds from P0 – P3, namely 6.3 – 8, the dissolved oxygen (DO) content in tilapia ponds from P0 – P3 has a range of 3.9 – 5 mg/l and for the ammonia content in fish

ponds tilapia from P0 – P3 has a yield of 0 mg/l.

Conclusion

Based on the research conducted and statistical analysis, it can be concluded that:

1. The combination of commercial feed and A.microphylla with different concentrations of the feed conversion ratio showed a significant difference ($p<0.05$). The control treatment of 100% pellets (P0) showed the best feed conversion ratio value of the other treatments and the treatment was still relatively normal, namely the combined treatment of 75% pellets and 25% A.microphylla (P1).

2. The combination of commercial feed and A.microphylla with different concentrations on feed efficiency showed a significant difference ($p<0.05$). The control treatment of 100% pellets (P0) showed the highest feed efficiency value of the other treatments. and the treatment that was still included in the normal category was the combination treatment of 75% pellets and 25% A.microphylla (P1).

References

Basak B, Pramanik AH, Rahman MS, Tarafdar SU, & Roy BC. 2002. A.microphylla pinnata as a Feed Ingredient in Broiler Ration. International Journal of Poultry Science. 1 (1): 29-34.

Fatkhummubin, S., Jumadi, R., & Luthfiyah, S. (2019). Uji Pengaruh Tepung Azolla (Anabaena Azollae) Dengan Takaran Yang Berbeda Pada Pakan Terhadap Pertumbuhan Dan Kelangsungan Hidup Ikan Nila Srikandi (*Oreochromis niloticus*). Jurnal Perikanan Pantura (JPP), 2(2), 87.

Halija, Halija. 2019. Analisis Performa Pertumbuhan Dan Kelangsungan Hidup Ikan nila Salin (*Oreochromis niloticus*) Yang Diberi Suplementasi Temulawak (*Curcuma xanthorriza*) Pada Pakan. Journal Of Aquaculture And Enviroment. Vol. 1(2).

Iskandar, R., dan E. Elrifadah. 2015. Pertumbuhan dan Efisiensi Pakan Ikan nila (*Oreochromis niloticus*) yang diberi Pakan Buatan Berbasis

Katole SB, LendeSRand PatilSS. (2017). A Review on Potential Livestock Feed: A.microphylla. Livestock Research International, 05(01):01–09.

Kosim, M., D. Rachmawati dan Samidjan, I. 2016. Pengaruh Penambahan Enzim Fitase dalam Pakan Buatan terhadap Laju Pertumbuhan Relatif, Efisiensi Pemanfaatan Pakan dan Kelulushidupan Lele Sangkuriang (*Clarias gariepinus*). Journal of Aquaculture Management and Technology, 5(2): 2634.

Pascual, S. 2009. Nutrition and feeding of fish. Van nostrand Reinhold, p.11-91, New York.

Perius Y. 2011. Nutrisi http://yulfiperius.files.wordpress.com/ 2011/07/1 pendahuluan.pdf. [Diakses 22 Desember 2021]

Restianti, Anggi. 2016. Pengaruh Dosis Fitase Dalam Pakan Buatan Terhadap Pertumbuhan Dan Efisiensi Pemanfaatan Pakan Benih Nila Larasati (Oreochromis niloticus). Journal of Aquaculture Management and Technology. 5(2):35-43.

Saopiadi. 2012. Frekuensi Pemberian Pakan Optimum Menjelang Panen Ikan nila (Oreochromis niloticus). Jurnal Perikanan Unram. Program Studi Budidaya Perairan. Universitas Mataram.

Sari, W. P. 2009. Pemberian Pakan Dengan Energi Yang Berbeda Terhadap Pertumbuhan Benih Ikan Kerapu Tikus. Jurnal Ilmiah dan Perikanan dan Kelautan. 1(2).

Susilo, U., A. Haryono dan B. Hariyadi. 2005. Evaluasi Efisiensi Pakan dan Efisiensi Protein pada Ikan Karper Rumput (Ctenopharyngodon idella Val.) yang Diberi Pakan dengan Kadar Karbohidrat dan Energi yang Berbeda. Ichthyos, 4(2):87-92.