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ANALYSIS OF THE EFFECT OF FEEDING COMMERCIAL FERMENTED FEEDS ON THE GROWTH AND SURVIVAL OF NILA FISH (OREOCHROMIS NILOTICUS)

Analisis Pengaruh Pemberian Pakan Komersil Yang Difermentasi Terhadap Pertumbuhan dan Sintasan Ikan Nila (Oreochromis niloticus)

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ABSTRACT

The use of antibiotics can be used to kill harmful microorganisms, but uncontrolled use will have a negative effect on the body's defense system and the balance of important microorganisms and often give rise to more virulent pathogenic strains (Tumbol & Undap, 2016). One of the alternative efforts that can be made to increase the growth of tilapia is by adding probiotics to feed. Therefore, recent developments in cultivation businesses have developed the use of probiotics as a solution to abandon the use of chemicals and antibiotics. Because the use of probiotics in cultivation can maintain microbial balance and control phatogens in the digestive tract (Mansur & Tangko, 2008). Probiotics are living microorganisms that are very beneficial for living creatures, one of which is fish. The microorganisms contained in probiotics are able to help the digestion of food in the bodies of animals and humans so that food containing probiotics will be able to be digested and absorbed by the body properly. This research method is a description method using tables and graphs and the data obtained is analyzed using statistical tests to see real differences. The results of the research show that the addition of probiotics and molasses can have a significant effect on growth where the probiotics are completely absorbed in the feed so that they can improve the performance of the microflora in the digestive tract and help the food digestion process and stimulate increased nutrient absorption to support fish growth, while the treatment of providing probiotics and molasses in Feed did not have a significant effect on tilapia survival. After Tukey's test, it was discovered that there was no significant difference between treatments and tilapia survival during the study.

Keywords: Nila fish (Oreochromis niloticus), Fermentation, Commercial pellet

ABSTRAK

Penggunaan antibiotik dapat dipakai untuk membunuh mikroorganisme yang merugikan, namun penggunaan yang tidak terkontrol akan berpengaruh negatif terhadap sistem pertahanan tubuh dan keseimbangan mikroorganisme yang penting dan sering memunculkan strain patogen yang lebih ganas (Tumbol & Undap, 2016). Upaya alternatif yang dapat dilakukan untuk meningkatkan pertumbuhan ikan nila salah satunya dengan cara penambahan probiotik pada pakan, maka dari itu perkembangan usaha budidaya akhir-akhir ini telah mengembangkan penggunaan probiotik sebagai solusi untuk meninggalkan penggunaan bahan-bahan kimia dan antibiotik. Karena penggunaan probiotik dalam bidang budidaya dapat menjaga keseimbangan mikroba dan mengendalikan patogen dalam saluran pencernaan (Mansur & Tangko, 2008). Probiotik merupakan mikroorganisme hidup yang sangat bermanfaat bagi makhluk hidup, salah satunya untuk ikan. Mikroorganisme yang terkandung pada probiotik mampu membantu pencernaan makanan pada tubuh hewan dan manusia sehingga makanan yang mengandung probiotik akan mampu dicerna dan diserap tubuh dengan baik. Metode penelitian ini adalah metode deskripsi dengan menggunakan tabel dan grafik dan data yang diperoleh dianalisis menggunakan uji statistik untuk melihat beda nyata. Hasil penelitian menunjukkan bahwa dengan penambahan probiotik dan molase dapat berpengaruh signifikan terhadap pertumbuhan dimana probiotik terserap sempurna dalam pakan sehingga mampu meningkatkan kinerja mikroflora dalam saluran pencernaan dan membantu proses pencernaan makanan dan merangsang peningkatan penyerapan nutrisi untuk menunjang pertumbuhan ikan, sedangkan perlakuan pemberian probiotik dan molase dalam pakan tidak berpengaruh signifikan terhadap sintasan ikan nila selanjutnya setelah diuji Tukey, diketahui bahwa tidak terdapat perbedaan yang signifikan antara perlakuan dengan sintasan ikan nila selama penelitian.

Kata kunci: Ikan Nila, Fermentasi, Pakan Pertumbuhan, Sintasan

INTRODUCTION

Tilapia (*Oreochromis niloticus*) in Indonesia is a type of fish that has high economic value and has become a commodity that plays a large role in fisheries production. The increase in value of fish cultivation cannot be separated from the comparative advantages of biology as omnivorous fish which have a wide tolerance for the environment and the practical economic aspects of easy cultivation methods, popular meat taste and relatively affordable prices (Suriawidjaja, 2005). Tilapia fish (*Oreochromis niloticus*) is one of the fishery commodities that is popular with the public to meet their animal protein needs because it has thick flesh and a delicious taste. Tilapia fish is also a potential fish for cultivation because it is able to adapt to environmental conditions with a wide salinity range (Hadi et al., 2009).

One of the obstacles in aquaculture businesses that many farmers complain about is the high price of commercial feed and not significantly encouraging fish growth. Feed as a source of energy for growth is the largest component of production costs, namely 40-89% (Afrianto & Evi, 2005). Feed is a general name used to refer to food that animals, including fish, use or eat for their survival and body growth. Basically, food sources for pet fish come from natural food and artificial food. Because the amount of natural food in the pond is very limited and inadequate, in order for the fish to grow well, it is necessary to provide additional food or artificial food according to the fish's needs.

The use of antibiotics can be used to kill harmful microorganisms, but uncontrolled use will have a negative effect on the body's defense system and the balance of important microorganisms and often give rise to more virulent pathogenic strains (Tumbol & Undap, 2016). Antibiotics can accumulate in the fish's body, causing health problems in humans who consume the fish (Wu *et al*., 2016). One of the alternative efforts that can be made to increase the growth of tilapia is by adding probiotics to feed. Therefore, recent developments in

cultivation businesses have developed the use of probiotics as a solution to abandon the use of chemicals and antibiotics. Because the use of probiotics in cultivation can maintain microbial balance and control pathogens in the digestive tract (Mansur & Tangko, 2017).

Probiotics are living microorganisms that are very beneficial for living creatures, one of which is fish. The microorganisms contained in probiotics are able to help the digestion of food in the bodies of animals and humans so that food containing probiotics will be able to be digested and absorbed by the body properly. Microorganisms in the digestive tract have an important role in increasing digestive power, thereby speeding up the digestive process and fish growth. Apart from that, probiotics can increase the body's immunity from disease attacks. The addition of probiotics to artificial feed can increase the nutritional protein content of feed and maintain the microbial balance of the digestive tract (Rahardjo, 2019).

Based on the problems that have been raised, it is very important to conduct research on the effect of providing commercial feed fermented with probiotics on the growth and survival of tilapia (*Oreochromis niloticus*).

METHOD

This research was carried out at the Rappoa Fish Seed Center (BBI), Bantaeng Regency, South Sulawesi from January to March 2024.

The tools used in this research were 12 containers with a volume of 15 liters, pH meters, DO meters, thermometers, nets, aeration hose rulers, aeration stones, digital scales, buckets and aerators while the materials used were tilapia with weights. average start.

Feeding treatment enriched with probiotic bacteria and molasses

The average weight of female tilapia fish used was 2.5 grams per fish. Feeding twice a day is 5% of body weight. The feed used is commercial feed. In each treatment and replication, 15 tilapia fish seeds were used per container. The container is filled with 15 liters of fresh water (Yaningsih et al., 2018).

This research consisted of three treatments and three repetitions each. Extraction of caramunting leaves dissolved in egg white and then air-dried. A total of 15 animals per treatment with each treatment and replication. Maintenance is carried out for 60 days. A Completely Randomized Design (CRD) with 3 treatments and 3 replications was used at this stage.

Fish Rearing and Data Collection

- ✓ Treatment A: Providing commercial feed without enrichment of probiotic bacteria and molasses
- ✓ Treatment B: 50 ml /kg feed + 100 ml molasses, leave for 30 minutes
- ✓ Treatment C: 30 ml/kg feed + 100 ml molasses, leave for 30 minutes

Enriched feed:
Observation of fish growth is carried out every 7 days during maintenance by weighing the fish.

Test Parameters

The test parameters carried out in this research were Weight Gain (W), Feed Efficiency (EP), Survival (SR), and Specific Growth Rate (SGR).
The growth of fish body weight is measured using the formula:

$$Wm = Wt - Wo$$

Where:
Wm = growth (g)
Wt = final weight (g)
Wo = initial weight (g)

Fish feed efficiency is measured using the formula:

$$EP = \frac{[(Wt + D) - Wo]}{F} x100\%$$

Where:
Wt = average weight of fish at time t (g)
Wo = average weight of fish at the initial time (g)
D = weight of dead fish during rearing (g)
F = amount of feed given (g)

Fish survival was measured using the formula:

$$SR = \frac{Nt}{No} x100\%$$

Where:
SR = Survival (%)
Nt = Number of fish at time t (individuals)
No = Number of fish at the start of the experiment (individuals)

Data analysis

The data obtained was analyzed using statistical tests to see real differences, and analyzed descriptively using tables and graphs.

RESULT AND DISCUSSION

Daily Growth of Tilapia Fish

Growth in fish is influenced by several factors, namely age, feed quality, and environmental quality. It is hoped that the provision of probiotics and prebiotics in tilapia fish feed in this research will be able to support maximum growth in cultivated tilapia fish. Based on the results of daily growth measurements of tilapia (Figure 1), it is known that the highest growth trend was obtained from tilapia in treatment B, namely the provision of 50 ml of probiotic bacteria and molasses in fish feed. Meanwhile, the lowest growth trend was found in treatment A where the fish feed used was not enriched with bacteria and molasses. Maximum growth in treatment B was due to the role of bacteria in helping the food digestion process. Apart from that, giving molasses has a positive influence because molasses acts as a prebiotic or energy source for probiotic bacteria.

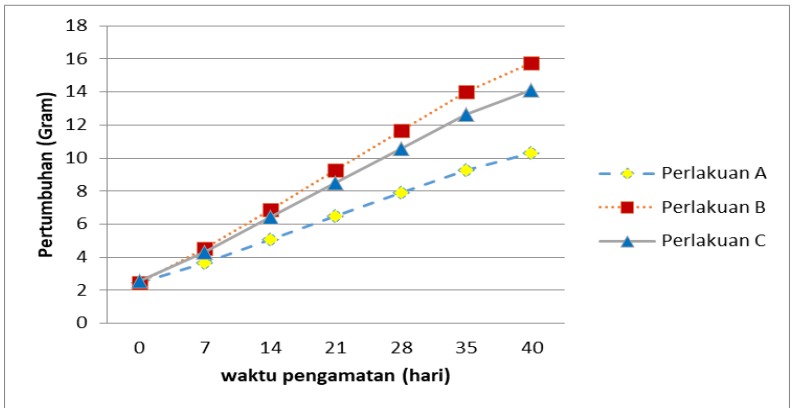

Figure 1. Growth of tilapia fish during the experiment (A: Commercial feed without enrichment with probiotic bacteria and molasses/control; B: 50 ml probiotic bacteria/kg feed + 100 ml molasses, left for 30 minutes; C: 30 ml probiotic bacteria/kg feed + 100 ml molasses, leave for 30 minutes

Absolute Weight Growth

Absolute growth consists of two, namely absolute length growth and absolute weight growth. Growth is a condition where there is an increase in length or weight during the maintenance period. The absolute weight growth of tilapia in this study was in the average range of 103.24 – 182.92 grams (Figure 2). Based on the research results, it was found that the lowest value was in treatment A (control), namely 103.24 grams, while the highest growth value was in treatment B (50 ml probiotic bacteria/kg feed + 100 ml molasses).

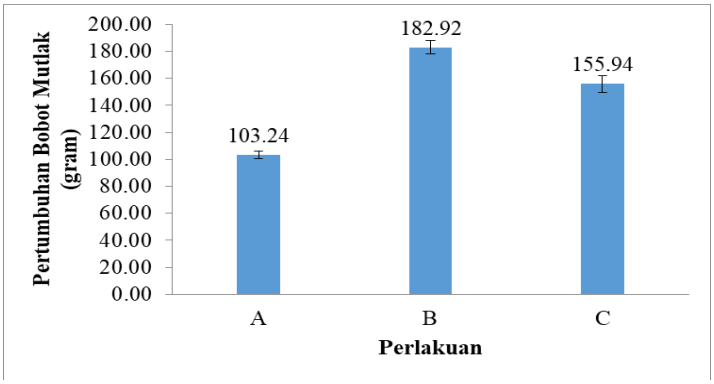

Figure 2. Absolute weight growth of tilapia from each treatment (A: Commercial feed without enrichment with probiotic bacteria and molasses/control; B: 50 ml probiotic bacteria/kg feed + 100 ml molasses, left for 30 minutes; C: 30 ml probiotic bacteria/kg feed + 100 ml molasses, leave for 30 minutes

Apart from that, the absolute weight growth of tilapia can also be seen in Table 1 below.

Table 1. Absolute weight growth (Grams) of tilapia (*Oreochromis niloicus*)

Repetition	Tratment		
	A	B	C
1	106.55	180.89	161.86
2	101.19	188.55	156.49
3	101.97	179.33	149.48
Average	103.24±2.90[a]	182.92±4.93[b]	155.94±6.21[c]

Based on the results of the analysis of variance (ANOVA) test, it was discovered that the treatment of providing probiotics combined with molasses in tilapia feed had a significant effect (P<0.05) on the absolute weight growth of tilapia. Furthermore, after further testing using Tukey analysis, it was discovered that each treatment was significantly different (P<0.05).

Relative Growth

Based on the results in Figure 3, it is known that the highest relative growth came from tilapia in treatment B (49.25gr), and the lowest was found in tilapia in treatment A (36.81gr) as in Figure 3 below.

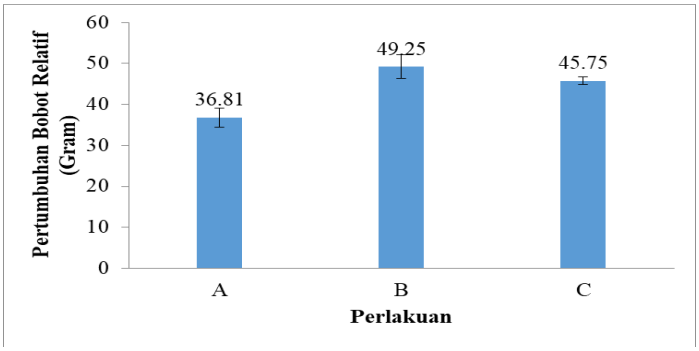

Figure 3. Relative weight growth of tilapia from each treatment (A: Commercial feed without enrichment with probiotic bacteria and molasses; B: 50 ml probiotic bacteria/kg feed + 100 ml molasses, left for 30 minutes; C: 30 ml bacteria probiotics/kg feed + 100 ml molasses, left for 30 minutes

Apart from that, the relative weight growth of tilapia can also be seen in Table 2 below.

Table 2. Relative weight growth (Grams) of tilapia (*Oreochromis niloicus*)

Repetition	Treatment		
	A	B	C
1	35.38	46.54	46.10
2	35.50	48.84	44.66
3	39.55	52.36	46.50
Average	36.81±2.37^{a}	49.25±2.93^{bc}	45.75±0.97^{bc}

Based on the results of the analysis of variance (ANOVA) test, it was discovered that the treatment of providing probiotics combined with molasses in tilapia feed had a significant effect (P<0.05) on the relative weight growth of tilapia. These results show that the addition of probiotics and molasses can be completely absorbed in the feed so that it can improve the performance of the microflora in the digestive tract and help the food digestion process and stimulate increased nutrient absorption to support fish growth. Furthermore, after further testing, using Tukey analysis, it was discovered that each A was significantly different from treatment B and treatment C, but treatment B and treatment C were not significantly different (P<0.05).

Survival

Based on the research results, it was found that the highest tilapia survival came from treatment B, namely 93.33%. The lowest survival was in treatment A and treatment C with the same average value of 91.11% (Figure 4). This shows that there is a positive influence of the amount of probiotics and prebiotics given on the survival of tilapia fish.

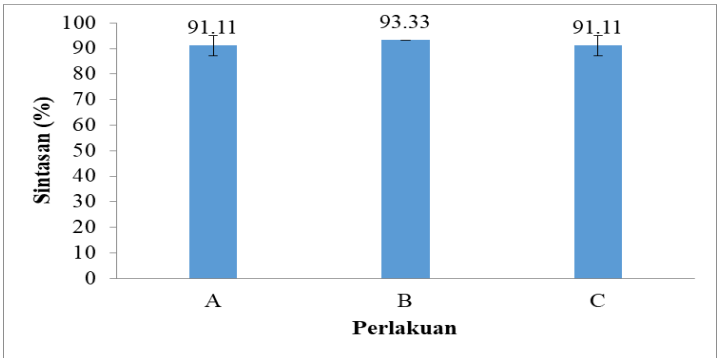

Figure 4. Survival of tilapia from each treatment (A: Commercial feed without enrichment with probiotic bacteria and molasses; B: 50 ml probiotic bacteria/kg feed + 100 ml molasses, left for 30 minutes; C: 30 ml probiotic bacteria/kg kg feed + 100 ml molasses, leave for 30 minutes

The survival value of tilapia can also be seen in Table 3 below.
Table 3. Survival (%) of tilapia (*Oreochromis niloicus*)

Repetition	Treatment		
	A	B	C
1	93.33	93.33	93.33
2	93.33	93.33	93.33
3	86.67	93.33	86.67
Average	91.11±3.85[a]	93.33±0.00[a]	91.11±3.85[a]

Based on the analysis of variance (ANOVA) test in Table 3, it is known that the treatment with probiotics and molasses in the feed did not have a significant effect on tilapia fish survival (P>0.05). Furthermore, after Tukey's test, it was discovered that there was no significant difference between the treatments and fish survival. tilapia during the research.

Feed Efficiency

Based on the results in Figure 5, it is known that the highest feed efficiency was found in treatment B, while the lowest was in treatment A. This shows that feed enrichment using a combination of probotic bacteria and molasses had a positive influence on feed efficiency in tilapia.

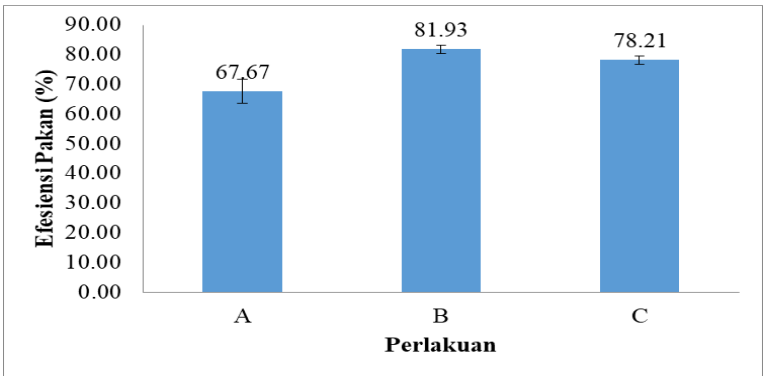

Figure 5. Tilapia feed efficiency from each treatment (A: Commercial feed without enrichment with probiotic bacteria and molasses; B: 50 ml probiotic bacteria/kg feed + 100 ml molasses, left for 30 minutes; C: 30 ml probiotic bacteria /kg feed + 100 ml molasses, leave for 30 minutes

Apart from that, the efficiency of tilapia feed can also be seen in Table 4 below.

Table 4. Feed efficiency (%) of tilapia (*Oreochromis niloicus*)

Repetition	Treatment		
	A	B	C
1	65.50	80.44	78.07
2	65.24	82.12	76.89
3	72.26	83.23	79.68
Average	67.67 ± 3.98^{a}	81.93 ± 1.40^{bc}	78.21 ± 1.40^{bc}

Based on the ANOVA statistical test, it was found that the treatment of bacteria and molasses had a significant effect on feed efficiency ($P<0.05$). Furthermore, after being tested using Tukey analysis, it was discovered that treatment A was significantly different from treatment B and treatment C, but treatment B and treatment C did not differ significantly in their effect on tilapia feed efficiency.

CONCLUSION

The treatment of providing probiotics combined with molasses in tilapia feed had a significant effect on the relative weight growth of tilapia. These results indicate that the addition of probiotics and molasses can be completely absorbed in the feed so that it can improve the performance of the microflora in the digestive tract and help the food digestion process and stimulate increased nutrient absorption to support fish growth, while the treatment of providing probiotics and molasses in the feed has no significant effect on survival. Furthermore, after Tukey's test, it was discovered that there was no significant difference between treatments and tilapia survival during the study.

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