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Effectiveness of Adding Probiotic Boster Bio Lacto and Turmeric Flour to Feed on Growth Performance of Benih Bileh Fish (*Rasbora* sp.)

Efektifitas Penambahan Probiotik Boster bio Lacto dan Tepung Kunyit pada Pakan Terhadap Performa Pertumbuhan Benih Ikan Bileh (*Rasbora* sp.)

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Abstract

Bileh fish (*Rasbora* sp) is one of the freshwater endemic fish species whose habitat is in rivers and lakes, this fish is much favored by the community, especially in Aceh for consumption needs because it has a savory taste so that the market for this fish increases every month. The high market demand causes the selling price to be high and so far the market demand is mostly taken from natural catches. This study aims to determine the effect of the addition of probiotics boster bio lacto and turmeric flour on the growth of bileh fish seeds (*Rasbora* sp). This study used a completely randomized design (RAB) with four treatments, namely P0 (control) P1 (7 ml probiotics and 10 gr turmeric flour / kg feed), P2 (9 ml probiotics and 10 gr turmeric flour / kg feed) and P3 (11 ml probiotics and 10 gr turmeric flour / kg feed). The results showed that there was no significant effect (P>0.05) on the growth of bileh fish (*Rasbora* sp). The addition of probiotics 9 ml/kg feed is the best dose to produce fish weight gain of 0.13 g, length growth of 1.00 cm, specific growth rate of 1.32%/day, feed conversion ratio of 4.16. However, the best survival rate was found in the addition of probiotics 11 ml/kg feed with a value of 91.7%.

Keywords: Bileh fish*, Probiotics, Growth*

Abstrak

Ikan bileh (*Rasbora* sp) adalah salah satu spesies ikan endemik air tawar yang habitatnya di sungai dan di danau, ikan ini banyak digemari masyarakat khususnya di Aceh untuk kebutuhan konsumsi karena memiliki rasa yang gurih sehingga pasar ikan ini setiap bulannya meningkat. Tingginya permintaan pasar menyebabkan harga jual menjadi tinggi dan selama ini permintaan pasar kebanyakan diambil dari hasil tangkapan alam. Penelitian ini bertujuan untuk mengetahui pengaruh penambahan probiotik boster bio lacto dan tepung kunyit terhadap pertumbuhan benih ikan bileh (*Rasbora* sp). penelitian ini menggunakan Rancangan Acak Lengkap (RAB) dengan empat perlakuan, yaitu P0 (kontrol) P1 (7 ml probiotik dan 10 gr tepung kunyit/kg pakan), P2 (9 ml probiotik dan 10 gr tepung kunyit/kg pakan) dan P3 (11 ml probiotik dan 10 gr tepung kunyit/kg pakan). Hasil penelitian menunjukkan bahwa tidak adanya pengaruh yang nyata (P>0,05) terhadap pertumbuhan ikan bileh (*Rasbora* sp). Penambahan probiotik 9 ml/kg pakan merupakan dosis terbaik untuk menghasilkan pertambahan berat ikan sebesar 0,13 gr, pertumbuhan panjang sebesar 1,00 cm, laju pertumbuhan spesifik sebesar 1,32 %/hari, Rasio konversi pakan sebesar 4,16. Namun pada tingkat kelangsungan hidup terbaik terdapat pada penambahan probiotik 11 ml/kg pakan dengan nilai sebesar 91,7%.

Kata kunci: *Ikan bileh, Probiotik, Pertumbuhan*

1. Introduction

Bileh fish (*Rasbora* sp) is one of the endemic fish species that lives in freshwater and its habitat in rivers and lakes (Zulfadhli, 2015). Bileh fish has a small and flat body (slender), bileh fish is much favored by the public, especially in Aceh Province for consumption needs because it has a savory taste so that the market for this fish increases every month. The high market demand has resulted in the high selling price of bileh fish and so far, the market demand is mostly taken from natural catches. The long-standing catch has caused the number of fish in the wild to decrease. Acehnese people continue to catch fish as a source of daily economic income. To keep the fish population from extinction, it is necessary to reduce fishing activities and make efforts for aquaculture (Zulfadhli and Radhi Fadhillah, 2019). Fish farming is one way to conserve fish and prevent extinction. However, fish production is inseparable from the need for feed needed to carry out cultivation activities. The availability of feed can also affect the results of fisheries production, the more fish cultivated, the greater the feed required.

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Feed is an important element in conducting aquaculture activities that can increase the growth and survival of fish that are kept. According to Fadri *et al.*, (2016), feed can work optimally and can increase weight in fish need a supplement mixed in feed, one way to do this is to add probiotics. There are many types of probiotics marketed and registered with the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia that can be used as supplements, to increase feed digestibility, especially in fish. Commercial probiotics that are sold freely in the market generally contain *Lactobacillus* bacteria. One type of probiotic that contains *Lactobacillus* bacteria is probiotic "Boster Bio Lacto", probiotic Boster Bio Lacto is composed of *Lactobacillus bulgaricus* and *Lactobacillus casei* bacteria. These microbes are fermented microorganisms that when present in feed can improve quality to increase digestibility which in turn can improve fish development.

Immunostimulants are also reported to increase disease resistance in fish and increase fish growth (Belseran and manoppo, 2015). Turmeric is one of the herbal plants that contains natural immunostimulants that can increase growth and increase fish appetite. the largest content in turmeric is curcumin which is 94%. Curcumin can be applied in the field of hydroponics, one of which is by combining it with fish feed because it can facilitate digestion and assimilation of nutrients (Arifin, *et al.,* (2016). According to Mose *et al*., (2019) with the results that have been obtained, the highest specific growth of bileh is in the feed treatment with the addition of turmeric flour 15 g / kg of feed. Based on the description above, it is necessary to conduct research on the provision of probiotics Boster Bio Lacto and turmeric flour in feed to evaluate the growth performance of bileh (*Rasbora* sp).

2. Materials and Methods

2.1 *Tools and Materials*

The tools and materials used in this research are jars, rulers, cameras, stationery, pH meters, DO meters, digital scales, probiotics, turmeric flour, 2 cm Bileh fish seeds, water and commercial feed.

2.2 Research Design

This study used a complete randomized design (CRD) method with 4 treatments with each replicate 3 times. The treatment refers to the research of Sitanggang, *et al,* (2021), consisting of:

Table 1. Treatment design.

code	Treatment
P0	0 ml/kg feed (Control)
P1	7 ml probiotic and 10 g turmeric flour/kg feed.
P2	9 ml probiotic and 10 g turmeric flour/kg feed.
P3	11 ml probiotic and 10 g turmeric flour/kg feed.

Table 2. Proximate composition of test feed.

Nutrient Composition (%)	Treatment			
	P0	P1	P2	P3
Protein	31,14	32,05	32,55	33,94
Carbohydrates	45,07	44,21	47,48	45,57
Fat	3,70	5,65	3,23	4,17
Fiber Content	3,34	3,14	3,32	3,36
Water Content	11,76	10,09	9,63	9,45
Ash Content	5,00	4,86	3,80	3,50

2.3 Container Preparation

The container used was 12 jars, the jars were washed and then filled with water with a volume of 10 liters for each jar. Then the jars were marked in the form of treatment labels and randomized replicates and then aeration was given to each jar. The feed used is commercial feed with the trademark MS Prima Feed size PF 1000. Preparation of feed begins with weighing 1 kg of feed for each treatment. Then the feed is crushed using a blender until smooth. Next, the feed is mixed with turmeric flour as much as 10 gr/kg feed and molded using a feed machine. After drying in the sun to dry, then each dose of probiotics is dissolved using 200 ml/kg feed solvent water. Next, the probiotics were mixed with feed using a sprayer and stirred until evenly distributed and dried for 15-30 minutes, then the feed was weighed as much as 5% of the body weight of the fish in each treatment. The finished feed was tested proximate to determine the nutritional content in the feed. The fish used were juvenile phase bileh fish with a size of 2-3 cm. The juvenile was stocked one week after the preparation of the cultivation container. The stocking density of the seeds used was 20 fish/container (Prayoga, 2022). Before stocking the fish, the weight and length of the fish were measured first to obtain preliminary data. The fish rearing process was carried out for 40 days and fed as much as 5% of the body weight of the fish. The frequency of feeding is twice, namely in the morning at 09:00 WIB and in the afternoon at 15:00 WIB. Sampling is done every 10 days by taking all test fish to determine the survival rate, absolute weight gain and specific growth rate.

2.4 Parameters

2.4.1 Absolute weight growth

The absolute weight gain of the fish was calculated using the formula:

$$B = Bt - Bo$$

Description:
B = average weight growth of individuals (g),
Bt = Final average weight of test fish (g),
Bo = initial average weight of test fish (g).

2.4.2 Specific Growth Rate (SGR)

The specific growth rate is calculated using the following formula:

$$LPS = \frac{Ln\ Bt - Ln\ Bo}{t}\ x\ 100\%$$

Description:
LPS = Specific growth rate,
Ln Bt = Weight of test fish at the end of rearing,
Ln Bo = Weight of test fish at the beginning of rearing,
t = Maintenance time (length of study).

2.4.3 Length Gain

Length gain is calculated with the following formula:

$$P = P1 - Po$$

Description:
P = Individual average length growth (cm),
P1 = Final average length of test fish (cm),
Po = Initial mean length of test fish (cm).

2.4.4 Feed Conversion Ratio

Feed conversion ratio or FCR can be calculated using the following formula:

$$FCR = \frac{F}{(Bt + D) - Bo}$$

Description:
FCR = Feed Conversion Ratio,
F = Total amount of feed (g),
Bt = Total weight of test fish at the end (g),
Bo = Total weight of test fish at baseline (g),
D = weight of fish that died during the study (g).

2.4.5 Survival Rate

Survival rate can be calculated using the following formula:

$$KH = \frac{Nt}{No}x\ 100\%$$

Description:

KH = Survival (%),
Nt = Number of test fish at the end of the study (individuals),
No. = Number of test fish at the beginning of the study (individuals)

3. Results and Discussion

3.1 Absolute Weight Growth

Weight growth of bileh fish during the study is shown in Figure 1.

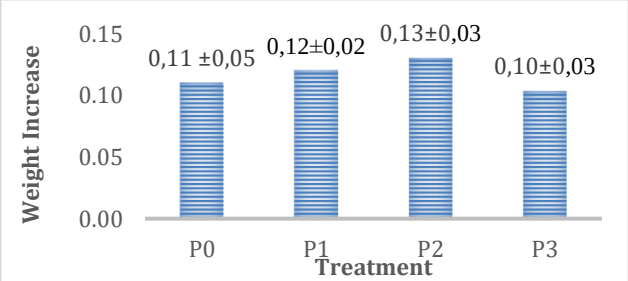

Figure 1. Weight gain of bileh fish (*Rasbora* sp)

In (Figure 1) it can be seen that the increase in the weight of bileh fish with the highest value is found in P2 which is 0.13 g, followed by P1 which is 0.12 g, P0 is 0.11 g and the smallest value is in P3 which is 0.10 g. Based on the results of ANOVA test, the addition of probiotics and turmeric flour in feed does not significantly affect the weight gain of bileh fish (P>0.05). Based on the ANOVA test results, the addition of probiotics and turmeric flour to the feed did not significantly affect the weight gain of bileh fish (P>0.05). Although it did not have a significant effect, the addition of probiotics and turmeric flour in the feed (P1 and P2) was able to show better growth compared to the feed that was not added to the bio lacto booster and turmeric flour (P0). Fish growth occurs due to the addition of probiotics to the feed so that the bacteria in probiotics work to improve the digestive tract of fish. The amount of feed consumed will directly affect fish growth (Kurniawan, *et al*., 2020). Zalukhu, *et al*., (2023), also said that the amount of feed consumed by fish will directly affect fish growth. So that fish growth is also influenced by the energy that enters the fish body. Fish could grow optimally if the nutrients contained in the feed can be absorbed by the body.

3.2 Specific Growth Rate

The specific growth rate of bileh during the study can be seen in Figure 2.

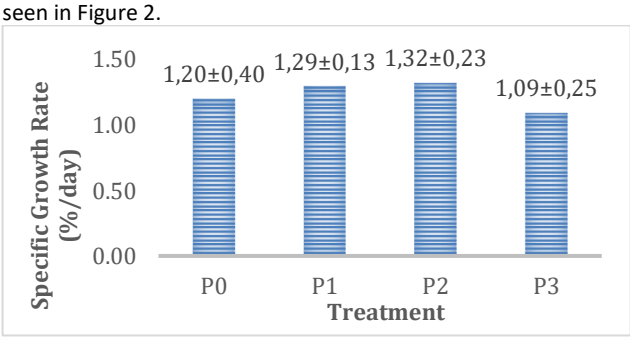

Figure 2. Specific growth rate of billfish (*Rasbora* sp)

Based on the ANOVA test results, the addition of Boster Bio Lacto probiotics and turmeric flour did not significantly affect the specific growth rate of bileh fish (P>0.05). In Figure 2, the largest real growth is found in P2 which is 1.32% and the smallest value is found in P3 which is 1.09%. This is thought to be due to the excess of probiotic bacteria given in the feed will support the occurrence of excessive secondary metabolism and cause death in bacteria to have an impact on reducing feed digestibility by the test fish (Muchlisin, *et al*., 2017).

Shofura *et* al., (2017), said that poor feed quality causes digestibility in fish not optimal, the addition of probiotics in feed can increase the nutritional value of feed. Bacteria contained in probiotics produce various enzymes that help hydrolyze feed into simpler molecules. In addition, microbes that have entered the digestive system will secrete enzymes related to digestion such as protease and amylase. According to Putri *et al*., (2017) curcumin contained in turmeric flour is also able to increase the retention of food substances by stimulating the gallbladder wall to deliver bile to the small intestine so that it can be more developed.

3.3 Absolute Length Gain

The absolute length growth of bileh fish during the study can be seen in Figure 3.

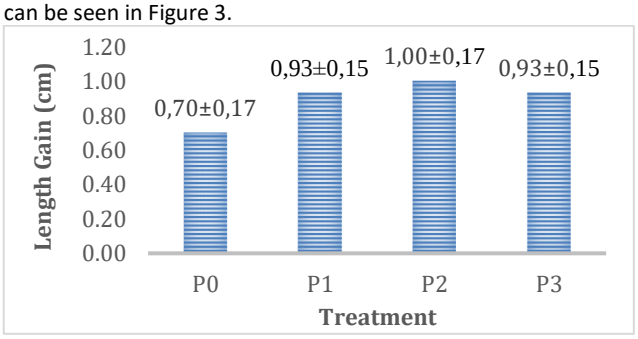

Figure 3. Length gain of bileh fish (*Rasbora* sp)

The results of the research on the length growth of bileh fish showed the best value in the P2 treatment, which is 1.00 cm, while the lowest value in the control treatment P0 is 0.70 cm. ANOVA test results showed that the addition of probiotics and turmeric flour did not significantly affect the length gain of bileh fish (P>0.05). This is believed to be because the microbes that enter the gastrointestinal tract are not comparable to the microscopic organisms currently present in the fish's gastrointestinal tract. Putri *et al*., (2017), stated that with an excessive number of microbes given, it will cause abundance, causing irregularities between microscopic organisms in the digestive system and incoming microorganisms and causing *overgrowth* in supplementation so that bacterial activity is inhibited (Putri *et al*., 2017). This is also in accordance with the opinion of Stimulant (2015), which states that inappropriate doses that are too low or even too high can cause a lack of balance between bacteria that already exist in the digestive tract and bacteria that enter the digestive tract.

3.4 Feed Conversion Ratio

The feed conversion ratio of bileh fish during the study can be seen in Figure 4.

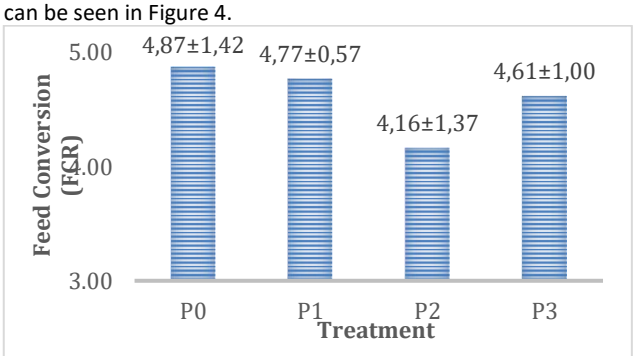

Figure 4. Feed Conversion Ratio of billfish (*Rasbora* sp)

Based on the results of ANOVA statistical tests, the addition of probiotics and turmeric flour to the feed did not produce a significant effect on each treatment (P>0.05). The results of the study of the addition of probiotics and turmeric

flour showed the lowest feed conversion results in the P2 treatment which was 4.16 and the highest feed conversion in the P0 control treatment which amounted to 4.87. In the P2 treatment showed the lowest results compared to the P0, P1 and P3 treatments, the fish were able to consume and utilize feed optimally and then converted into meat. The feed conversion ratio in the study of the addition of probiotic booster bio lacto and turmeric flour to the feed is classified as unfavourable and high, this is thought to be due to influencing factors including feed management and environmental conditions. However, the addition of probiotics and turmeric flour to the feed resulted in a lower feed conversion ratio compared to the control treatment. The lower the feed conversion ratio value indicates that the more efficient the feed and the feed eaten is used well by the fish for growth (Ardita, *et al.*, 2015). Enzymes produced from the fermentation process can improve nutritional value, growth, and increase protein, digestibility and feed nutrition, so that the utilization of feed by the fish body becomes more efficient (Armawati, *et al*., 2015).

3.5 Survival

Survival during the study can be seen in Figure 5.

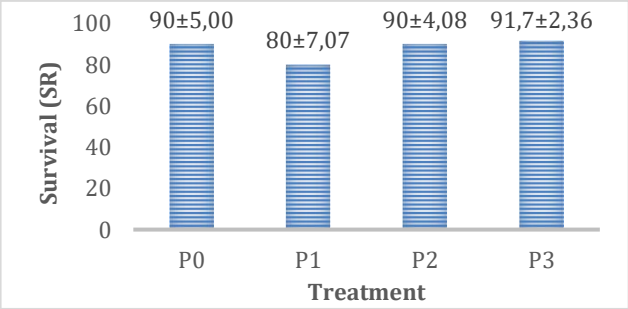

Figure 5. Survival rate of bileh fish (*Rasbora* sp)

Based on Figure 5, the highest survival rate of bileh fish was obtained in the P3 treatment with a dose of 11 ml probiotics and 10 grams of turmeric flour with a value of 91.7%, and the lowest survival rate of bileh fish in the P1 treatment with a dose of 7 ml probiotics and 10 grams of turmeric flour with a survival rate of 80%. Based on the results of ANOVA, it shows that the addition of probiotics and turmeric flour to the feed does not significantly affect the survival of bileh fish (P>0.05). According to Shofura, et al (2017), probiotics contained in feed (changes in aroma, feed texture and moisture) do not affect the physiological state of fish. Fish survival rate is also related to water quality, with ideal water quality parameters, a good survival rate will be obtained, otherwise if the water quality is poor, it will cause health problems in the fish, causing death (Shabrina, *et al*., 2018). In this study, the survival rate of bileh fish was classified as good. Asriyanti, *et al*., (2018) said that death in fish can be caused by two factors, namely, (1) internal factors such as age, the ability of fish to absorb food given the ability of fish to adapt the body to a new environment, and (2) external factors consisting of abiotic conditions, competition between species, population increase, increasing predators and parasites, food shortages and other biological properties related to handling and capture.

3.6 Water quality

During the research, water quality parameters measured include temperature, pH, and dissolved oxygen. Measurement of water quality parameters was carried out once a week in the morning and evening.

Table 3. Average values of temperature, pH and DO in rearing media

Treatment	Water Quality		
	Temperature (°C)	pH	DO (mg/l)
P0	28,17-28,6	8,53-8,6	6,71-6,73
P1	24,73-28,09	5,58-8,6	6,52-7,03
P2	27,9-28,3	8,51-8,6	6,68-7,01
P3	27,9-28,11	8,54-8,61	6,63-6,72

Based on Table 3, measurements of temperature, pH and dissolved oxygen (DO) show that the coverage of water quality during the study of the addition of Bio Lacto probiotics and turmeric flour in the feed completely meets the ideal standards for the growth and survival of bileh fish. In Table 3, the results of temperature measurements in all treatments ranged from 24-28°C. The temperature is estimated to be still adequate for the development of bileh fish. This is confirmed by the statement of Bhatnaga (2019), that the right temperature for fish living in the tropics is 20-30°C.

The acidity (pH) values obtained during the study ranged from 5.6 - 8.6. This shows that the value of acidity (pH) at the time of the study is still considered good and suitable for use in cultivation activities. As stated by Boyd (2020), the ideal pH for cultivation ranges from 6.5-9-0.

Dissolved oxygen should also be considered during the study as it affects fish growth. The quality of dissolved oxygen content obtained during the study was around 6.5-7 mg/L. At this value, fish are still able to survive because it is still within the limits considered normal to help fish survival. According to Boyd and Exhaust in Thesiana and Pamukas (2015), a reasonable dissolved oxygen content for aquaculture is >5 mg/L.

4. Conclusion

The addition of probiotics 9 ml/kg feed is the best dose to produce fish weight gain of 0.13 g, length growth of 1.00 cm, specific growth rate of 1.32%/day, feed conversion ratio of 4.16. However, the best survival rate was found in the addition of probiotics 11 ml/kg feed with a value of 91.7%.

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