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THE EFFECT OF HERBAL PROBIOTIC FORMULATION WITH MENIRAN LEAVES (*Phyllanthus urinaria*) ON THE GROWTH OF GURAME (*Osphronemus gouramy*)

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Abstract

Gouramy (O. gouramy) is a type of fish consumption that is widely cultivated. The purpose of this study was to determine the effect of giving an herbal probiotic formulation added with meniran leaves (P. urinaria) on the growth factors of gouramy (O. gouramy). This study was conducted based on an experimental design with 5 different treatment doses (0 mg/L, 1 mg/L, 5 mg/L, 10 mg/L, and 15 mg/L) and three replications. The results showed that the higher the dose of herbal probiotics added to meniran leaves the more optimal growth impact. This can be seen from the administration of the highest dose of 15 mg/L which gave an average weight gain of 3.83 gr, a specific growth rate of 3.40%, 100% survival and stable water quality (pH 7, temperature 26-32°C, salinity 3 ppt) compared to the treatment dose. others (0 mg/L, 1 mg/L, 5 mg/L, and 10 mg/L). The conclusion of this study was provision of herbal probiotic formulations added with meniran leaf extract significantly affected to the growth rate of gouramy (O. gouramy).

Keywords: Meniran leaves, Probiotics, *O. gouramy*, *Phyllanthus urinaria*

Introduction

Aquaculture activities are one of the fisheries agribusiness activities that have experienced massive development in recent years (Ariadi et al, 2019). Aquaculture activities utilize various aquatic organisms as mainstay commodities, such as fish, shrimp, shellfish, and seaweed (Muqsith et al, 2019). Aquaculture activities in Indonesia are expected to continue of grow and more technology applications will be used (Ariadi et al, 2019). Thus, this aquaculture activity is one of the productive business activities that have the potential to be developed at massive (Ariadi et al, 2019)..

One of the commodities that was widely used in aquaculture activities was gouramy (*O. gouramy*) (Azrita et al, 2020). Similar to other types of consumption fish commodities, gouramy has many benefits if it was cultivated properly (Nafila et al, 2018). Among the advantages of gouramy culture are that fish seeds were easy to obtain, the cultivation period was not too long, and the selling price was slightly higher than other types of consumption fish commodities. These factors are very beneficial for fish

farmer to make it as the main commodity option for cultivation (Ariadi et al, 2020).

To increase the productivity of aquaculture, in cultivation activities, various technological innovations were added, such as the addition of probiotics and various other herbal ingredients. Probiotics were supplements in the form of live microbial cells and can affect the immune and digestive systems of fish (Arief et al, 2015). One of the herbal plants that provide many benefits for the biological system of animals is the leaves of meniran (*P. urinaria*). The benefits of meniran leaves is for health and facilitate digestion (Geethangil and Ding, 2018). The purpose of this study was to determine effect of giving an herbal probiotic formulation added with meniran leaves (*P. urinaria*) on the growth factors of gouramy (*O. gouramy*).

13 Materials and Methods

6 This research was conducted in October 2021 at the Brackish and Marine Aquaculture Laboratory, Faculty of Fisheries, Pekalongan University. This study used an experimental design with five treatments (control, 1 mg/l, 5 mg/l, 10 mg/l, 15 mg/l) and three repetitions.

The tools used in this research were hand refractometer, pH meter, and Hg thermometer, aquarium pond, analytical scale, aerator stone, and sampling net.

While the ingredients used were gouramy, herbal probiotics containing strains of bacteria *Lactobacillus acidophilus*, *Streptococcus thermophilus* and *Bacillus subtilis* and meniran leaf extract. Application of the application of probiotics is done by spraying and aerating for 30 minutes on the feed. Meanwhile, the amount of feed given was 5% of the weight of the test fish biomass. The test fish were fed twice, namely at 08.00 WIB and 16.00 WIB.

The research parameters observed were fish weight gain, specific growth rate, fish survival rate, and water quality parameters including pH, temperature and water salinity. The absolute weight of the fish was calculated using the formula by Effendi, (1979):

$$Wm = Wt - Wo$$

Where,

Wm : absolute weight growth (gr)

Wt : final average weight (gr)

Wo : initial average weight (gr)

The parameters of the specific growth rate of fish were measured using formula by Effendi (1979), as followed:

$$SGR = \frac{LnWt - LnWo}{T1 - T2} \times 100\%$$

Table 1. Fish Body Weight Gain

Repetition	Treatment (mg/L)					Total
	0	1	5	10	15	
1	2.21	2.55	2.82	3.29	3.83	
2	2.23	2.52	2.83	3.20	3.84	
3	2.19	2.53	2.81	3.24	3.81	4.754
Amount	6.63	7.6	8.46	9.73	11.48	43.90
Average	2.21	2.53	2.82	3.24	3.83	

The aggregative of fish body weight gain can be seen in Figure 1. In the optimal treatment (15 mg/L) the weight gain rate was 3.83 gr. The bacterial community in probiotics was very helpful in increasing the growth rate of fish by improving the fish digestive system (Azrita et al, 2020). The optimal rate of fish body weight gain would had an impact on

3 Where,

SGR = Specific Growth Rate (%)

Wt = final average weight of fish (gr)

Wo = Initial average weight (gr)

T = time duration

For fish survival parameters, calculated using the formula by Effendi, (1979), as follows:

$$\% SR = \frac{Nt}{No} \times 100\%$$

Where,

SR : survival rate (%)

Nt : total number of live fish at the end of this research (fry)

No : number of fish stocked at the beginning of the research (fry)

Results And Discussion

Fish Body Weight

The body weight gain of fish in each treatment had almost the same character. The data on the body weight gain of gouramy during the study can be seen in Table 1. Based on these data, it can be stated that the most optimum treatment of 15 mg/L was proven to has the highest impact on fish body weight gain compared to the other four treatments. This indicated that the more doses of probiotic formula and meniran leaf given the higher the impact of weight gain on fish. This was because the presence of bioactive compounds in meniran leaves and the accumulation of bacterial colonies on probiotics improve the digestive system of fish (Nafila et al, 2018).

increasing other aquaculture productivity indicators such as the value of the feed ratio and feed efficiency (Ariadi et al, 2020). Conditions were very favorable when applied to a larger scale cultivation system.

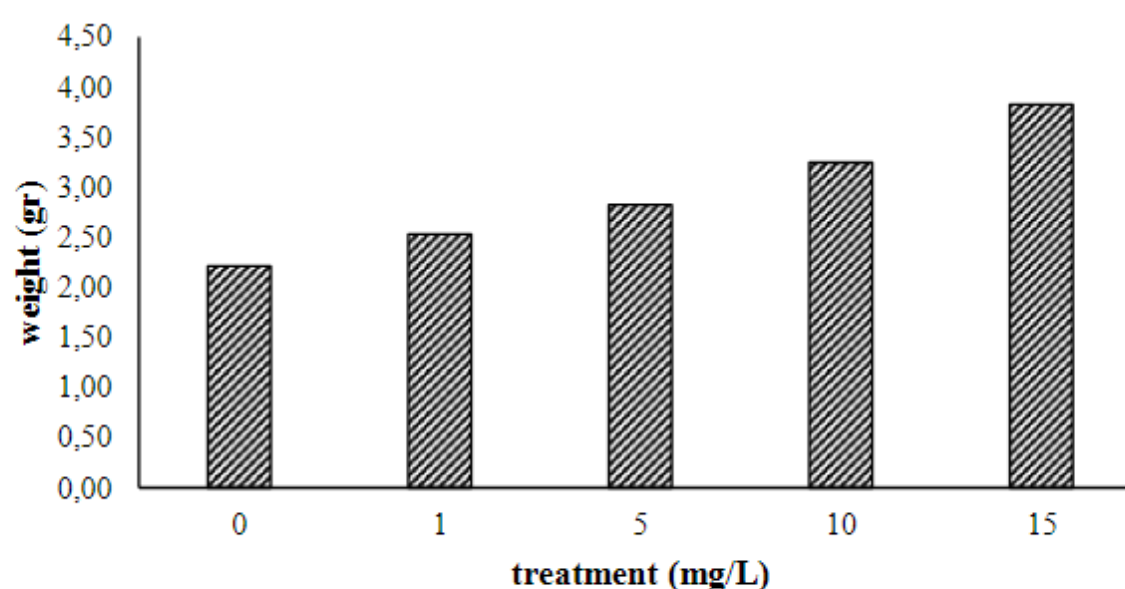


Figure 1. Fish growth chart

10 *Specific Growth Rate*

The specific growth rate of fish has the same flow rhythm as the increase in fish weight. Specific growth rate data can be seen in Table 2. Based on the data in Table 2, it was stated that the higher the dosage of probiotic formulation and meniran leaves given the higher the value of the specific growth rate of

fish obtained. The growth rate of fish or aquatic biota was not only influenced by the food input given is also caused by various factors (Wafi et al, 2021). These factors include nutrition, environmental conditions, stressors, and fish genetic factors (Ariadi et al, 2021).

2 **Table 2. Specific Growth Rate of Fish**

Repetition	Treatment (mg/L)					Total
	0	1	5	10	15	
1	2.35	2.60	2.79	3.06	3.40	
2	2.36	2.59	2.79	3.04	3.41	
3	2.35	2.58	2.78	3.05	3.40	
Amount	7.05	7.77	8.36	9.15	10.21	42.54

Survival Rate

The fish survival rate during research period was quite good, that is, each treatment had an absolute survival value (100%) (Table 3). This condition means that it is quite good for the physiological condition of the fish. The good survival value of fish was due to the good quality of research fish seeds and good

environmental conditions. Gouramy was one type of fish that has a high tolerance level to environmental conditions and aquaculture systems (Budiardi et al, 2011). The absolute survival value can also be caused by good environmental control of aquaculture ecosystems (Ariadi et al, 2020).

Table 3. Survival Rate of Fish

Treatment(mg/L)	Repetition	N ₀	N _t	SR(%)
0	1	5	5	100
	2	5	5	100
	3	5	5	100
1	1	5	5	100
	2	5	5	100

	3	5	5	100
	1	5	5	100
5	2	5	5	100
	3	5	5	100
	1	5	5	100
10	2	5	5	100
	3	5	5	100
	1	5	5	100
15	2	5	5	100
	3	5	5	100

Water Quality

Water quality parameters during the research period has a good range of values for fish farming activities. Water quality parameters during the study period included temperatures ranging from 28-30°C, salinity 3 ppt, and pH 7 (Table 4). These values were in accordance with the standard values for water quality intended for fish farming activities by Ariadi et al, (2020). The optimum temperature would had an impact on the optimal fish

growth rate (Ariadi et al, 2021). Salinity levels would affected the osmoregulation process of fish and physiological responses (Bal et al, 2021). Meanwhile, pH was an important parameter that affects the metabolic system of fish and all physicochemical processes in the waters (Ariadi et al, 2021). Water quality was important ecology parameters in water ponds aquaculture.

Table 4. Water quality parameters

Parameter	Results	Standard	Reference
temperature	28-30°C	26-32°C	Ariadi et al, (2020)
salinity	3‰	3‰	Ariadi et al, (2020)
pH	7.0	7.0	Ariadi et al, (2020)

Treatment with the addition of herbal probiotics added to meniran leaves had an impact on fish body weight gain and the specific growth rate of fish. This condition was due to the content of bioactive compounds in meniran leaves and bacterial colonies in probiotics that have a good impact on the biological and digestive systems of gouramy (Nafila et al,

2018). Fish would be biologically stimulated grew better if there was a booster in their digestive system (Volkoff and Ronnestad, 2020). Optimal fish growth was also caused by suitable water quality parameters and fish biological performance. Water quality parameters were important factors that affect

the condition of aquaculture organisms as well as various other physical and chemical indicators (Ariadi et al, 2020).

4. Conclusions

The provision of herbal probiotic formulations added with meniran leaf extract (*P. urinaria*) significantly affected to the growth rate of gouramy (*O. gouramy*).

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