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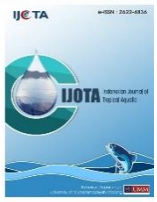

Effectiveness of feed combination from cake and *tubifex* on feed conversion ratio, specific growth rate and survival rate of *Macrobacium rosenbergii*

Ganjar Adhywirawan[1*]

Fisheries Department, Faculty of Agriculture and Animal Science, University of Muhammadiyah Malang, Indonesia.
*ganjar@umm.ac.id

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ABSTRACT

This study aimed to determine the effectiveness of the combination of cake feed and silk worm feed on feed coneration ratio (FCR), Survival, and specific growth rate (SGR) of prawn larvae (Macrobacium rosenbergii). The research was conducted on 8 February - 9 March 2018 at the Fisheries Laboratory of University of Muhammadiyah Malang. In this study used *M. rosenbergii* larvae. This research was conducted by experimental method using randomized block design (RAL) with 5 treatments and 4 replications. P1 100% silk worm and 0% cake feed, P2 25% silk worm and 75% cake form feed, P3 50% silk worm and 50% cake form feed, P4 75% silk worm and 25% cake feed, P5 100 % feed cake form. Feed is given in ad-station for 40 days. Observed data include Feed coneration ratio (FCR), Survival, specific growth rate (SGR), and water quality. The results showed that the combination of cake feed and silk worm feed had a significant effect on the growth rate of Specific (SGR) Fcount 7.58> from F. Table 5% (3.06) 1% (4.89), While no effect For Figures F count 0.90 <of F. Table 5% (3.06) 1% (4.89) and Feed Converation Ratio as F count 2.23 <of F. Table 5% (3.06) 1 % (4.89). Water quality on maintenance media against a reasonable range for shrimp cultivation.

Keywords: Feed convertion ratio (FCR), Survival, specific growth rate (SGR), Feed Cake, Silkworm

1. Introduction

Galah Prawns are freshwater prawns that have a size larger than other types of freshwater prawns. They have a great potential in fisheries sector around the world because they have a high selling value of about 50,000-70,000 per kilogram. In addition, giant prawns have the taste of meat as same as lobster. However, the potential of giant prawns in Indonesia is minimal, while the demand for national scale is high, reaching 10-20 tons/day (Ministry of Marine Affairs and Fisheries, 2012).

Some Factors in the cultivation of prawns need to be considered such as Feed problems, water quality and disease. Feed is a major factor that could support success in cultivation. Good feed will be utilized well by the shrimp, but needs to be considered about age, size and mouth opening of shrimp. Shrimp larvae have a habit of eating plankton or type of small size feed because it has a small mouth opening. Therefore, a combination of feed using silk worms and cake form feed could be a solution. Silk worms have a pretty good nutritional content of protein (57%), fat (13.3%), crude fiber (2.04%), ash (3.6%) and water (87.7%) (Pursetyo *et al*., 2011). The nutrient content of cake feed is protein (38,70%), coarse fat (26,28%), crude fiber (2,36%), ash (5,42%), water content

(61,41%) (Adhywirawan, 2017). Expected Caterpillar and cake feed both to support the growth rate Specific (SGR) and feed conversion and giant prawn stalks.

2. Materials and Methods

2.1. Time and place

This research was conducted on February 8 until March 19, 2018 at Fisheries Laboratory of Agricultural and Animal Husbandry Faculty, University of Muhammadiyah Malang and Laboratory of Nutrition University of Muhammadiyah Malang.

2.2. Material

The tool used in this research is presented in table 1.

Table 1. Tools

Tools	Use
Aquarium 20 pieces	As a media maintenance container (shrimp)
Aerators	Dissolves oxygen into the water
Analytical Scales	Considering the materials to be used
Mixer	To develop shrimp feed ingredients
Chiffon hose	Throw shrimp droppings
PH meter	To measure the level of acidity or base on the media maintenance of prawns stadia postlarva
Thermometer	To measure the temperature on the media maintenance of prawns stadia postlarva
DO meter	Measuring the DO content on the maintenance media of prawns stadia postlarva
Aeration hose	Connect the blower with aeration stone

Table 2. Materials

Material	Description
Shrimp Galah Stadia V	Objects used giant prawn larvae
Freshwater	Media Maintenance of giant prawn larvae
Fish kites	The raw material for cake form feed for giant prawn larvae
Egg	The raw material for cake form feed for giant prawn larvae
Skim Milk	Raw material making cake form gake cake for giant prawn larvae
Wheat flour	The raw material for cake form feed for giant prawn larvae
Vitamin	The raw material for cake form feed for giant prawn larvae
Tubifex Worms	Natural feed of giant prawn larvae

2.3. Experimental design

This study used 5 treatments with 4 replications.
Treatment 1: Provision of worms 100% and feed cake form 0%
Treatment 2: 25% worm feeding and cake form feed 75%

Treatment 3: 50% worm feeding and cake form feed 50%
Treatment 4: 75% worm feeding and cake form feed 25%
Treatment 5: Giving of worms 0% and Feed cake form 100%

2.3.1. Research Plan

The research plan used in the treatment of silk worm feed and cake form feed on giant prawn larvae could be seen in Figure 1.

P1U1	P2U2	P3U3	P4U4	P5U1
P2U3	P3U4	P5U2	P5U3	P1U3
P4U3	P5U1	P2U1	P1U2	P3U1
P3U2	P1U4	P4U2	P2U3	P5U4

Figure 1. Research plan

Description: P1-P5: Treatment 1 to Treatment 5
U1-U4: Deuteronomy 1 through repeat 4

2.4. Data Analysis Method

The data were analyzed by variance or analysis of variance (ANAVA) to determine the effect or not treatment. The smallest real difference test (BNT) was applied to determine optimal treatment at 95% to 99% confidence level comparing the values between treatments resulting from the study is described in a descriptive manner.

2.5. Research procedure

2.5.1. Cake Feed Making

The feed formulation was began by weighing the feed ingredients according to the formulation. The fish flesh was separated from the spines with a small fillet method and weighed 550 grams, after finishing smoothing with blender. Chicken eggs are separated between white and yellow and taken the yolk as much as 322.1 gr. Mix the chicken egg yolk by mixer until it is white and fluffy. Enter the fish kites, skim milk (114.6 gr), wheat flour (12.3 gr) and vitamin C (1 gr) into mixer dough gradually. Enter as much water as needed gradually until the dough is smooth and until homogeneous. Steaming the cake for 30 minutes. Chill the finished cake before it is given to the giant prawn larvae.

2.5.2. Preparation of Giant Shrimp larvae

The prawn larvae were obtained from Brackish Water Cultivation Work Unit (UKBAP) Samas DIY. Before being used for experiments, shrimp larvae are first weaned ie get fed with feed treatment for 5 days. The giant prawns larvae are first weighed and measured in body length. Each container is filled with test shrimp with dense stocking of 40 tails / aquarium.

2.5.3. Treatment Applications

The prawn larvae were acclimated for 30 days and fed at satiatio with a standard dose of 15% from shrimp biomass, with feeding frequency 5 times daily at 06.00, 10.00, 14.00, 18.00 and 22.00 WIB. Un-consumed feed was observed and collected 2 hours post-feeding. It was dried using filter paper and weighed with an analytical scale to find out the amount of feed consumed. Sampling was done every 7 days to adjust feed requirement.

2.6. Primary Parameters

2.6.1. Specific Growth Rate (SGR)

Specific Growth Rate Calculations was calculated using the formula as follows (Takeuchi, 1988):

$$SGR = \frac{LnWt - LnW0}{t} x100\%$$

Information :
SGR: Specific Growth Rate (% / day)
Wt: The biomass weight of the test shrimp at the end of the study (g)
W0: The weight of shrimp biomass test at the start of the study (g)
t: Duration of research

2.6.2. Trajectory

The Calculation of Trajectory used the formula as follows (Mambrasar *et al*, 2015):

$$SR = Nt / N0 \times 100\%$$

Information
Sr = Larva Pass (%)
Nt = Number of live larvae at the end of the experiment
No = Number of live larvae at the beginning of the experiment

2.6.3. Feed Conversion Ratio (FCR)

The calculation of Feed Conversion Ratio (FCR) was calculated by using the formula as follows (Fatagar, 2014):

$$FCR = \frac{F}{[(Bt + Bd) - B0]}$$

Information :
Bt = shrimp biomass at the end of maintenance (kg)
B0 = Shrimp biomass at the beginning of maintenance (kg)
Bd = Shrimp biomass that died during maintenance (kg)
F = the amount of feed given during maintenance (kg)

3. Results and Discussion

3.1. Materials and Proximate Analysis of Cake Feed

One important factor for the manufacture of feed is the nutrient content. It is necessary to calculate the nutritional needs of cake feed to provide a good growth in giant prawns. The protein level to be achieved in the manufacture of cake feed can be seen in table 1 as follows:

Table 3. Cake Feed Formulation

Material	**Protein 55%**	**Gram**
Fish	55,00	550
Skim milk	11,46	114,6
Egg yolk	32,21	322,1
Wheat	1,23	12,3
Vitamin C	0,10	1
Total	100	1000

Source: Effendi, *et al* (2017)

The results of proximate analysis of cake feed ingredients cuould be seen in table 4:

Table 4. Proximate Test of Feed

Name sample	Test the quality of feed shrimp larvae v. Stadia V								
	BB	BK	K water	Ash	Protein	fat	fiber	BETN	GE
cake	99,22	41,47	61,41	5,42	38,70	26,28	2,36	27,24	494,88
Tubifex	-	-	87,7	36	57	13,3	2,04	-	-
Unit	(g)	(g)	(%)	(%)	(%)	(%)	(%)	(%)	(%)

Source: Adhywirawan (2017) *) BETN = 100- (Protein + Crude Fat + Ash + Crude Fiber) **) GE = (4 x% Protein) + (9 x% Fat) + (4 x% BETN) (Marzuqi and Anjusary, 2013), Pursetyo (2011).

3.2. Specific Growth Rate (SGR)

Specific growth rate measurement results (SGR) could be seen in Figure 2.

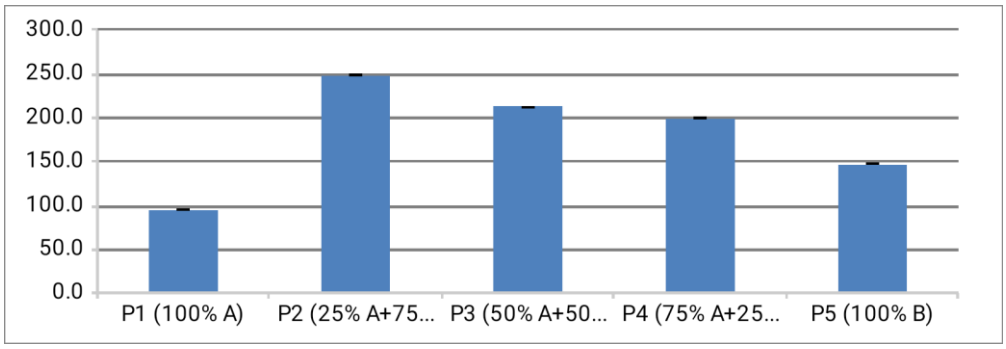

Figure 2. Specific Growth Rate Chart (SGR) Ginger Prawn larvae

Based on Fig. 2, a combination of different feeding gived different results. The highest of SGR was showed by P2 (247), followed by P2 (213), P3 (198), P5 (146) and P1 (94), respectively.

Diversity Sources (SK)	db	JK	KT	F. count	F. Table	
					0,05	0,01
Treatment	4	57890,5	14472,6	7,58**	3,06	4,89
Error	15	28622,9	1908,2			
Total	19	86513,3				

Description: ** (very different)

The results of variance showed revealed that the combination of silk worm and cake showed significant difference on SGR because of F calculate 7,58> F Table 0,05 with level 3,06 and F Table 0,01 with level 4,89. Therefore it was necessary to test the BNT, BNT test results could be seen as follows.

		P1	P5	P4	P3	P2	
Treatmnent	avarage	94,84	146,46	198,81	213,68	247,88	notasi
P1	94,84	0,00	0,00	0,00	0,00	0,00	a
P5	146,46	51,62^{ns}	0,00	0,00	0,00	0,00	b
P4	198,81	103,97**	52,35 ^{ns}	0,00	0,00	0,00	c
P3	213,68	118,84 **	67,22 ^{ns}	14,87 ^{ns}	0,00	0,00	c
P2	247,88	153,04	101,42 **	49,07 ^{ns}	34,20 ^{ns}	0,00	d

Description: ** (very different)

3.3. Trajectory

The synthesis is the number of live larvae after being maintained for some time compared to the number of larvae at the start of maintenance and expressed in percent (Effendi in Pehelerang 2001). The mean value of the cross rate in each treatment could be seen in Figure 3.

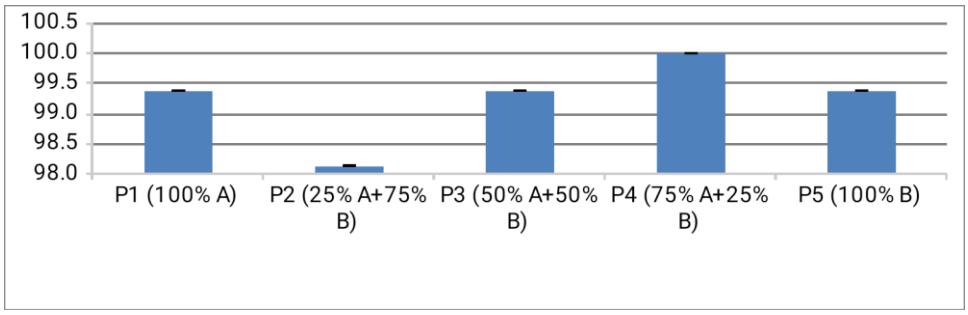

Figure 3. Graph of Ginger Shrimp Larva Pass

Based on fig. 3. showed the highest synthesis value of P4 (100%) treatment with 25% cake feeding treatment and 75% worm feed, followed by P1, P3, and P5 with the same result 99,4% and lowest P2 (98,1% %) with 25% feeding of worms and 75% cake feed.

Diversity Sources (SK)	db	JK	KT	F. count	F. Table	
					0,05	0,01
Treatment	4	7,5	1,9	0,90	3,06	4,89
Error	15	31,3	2,1			
Total	19	38,8				

Description: (ns) is not significantly different

Based on the results of anova test showed that F arithmetic 0.90 <F Table with a level of 3.06 and F Table 0.01 with a level of 4.89. Means accept H0 and reject H1, thus the combination of cake feed and worm feed has no real effect on the cross.

3.4. Feed Converation Ratio (FCR)

Feed conversion is the ratio between the amount of feed given and the amount of shrimp weight obtained. The low the conversion value of feed could be defined the level of efficiency of the use of feed, while high of the feed conversion is defined the level of efficiency of feed. Thus the feed conversion illustrates the level of efficiency of feed utilization achieved. The mean value of conversion value of feed on each treatment could be seen in Figure 4.

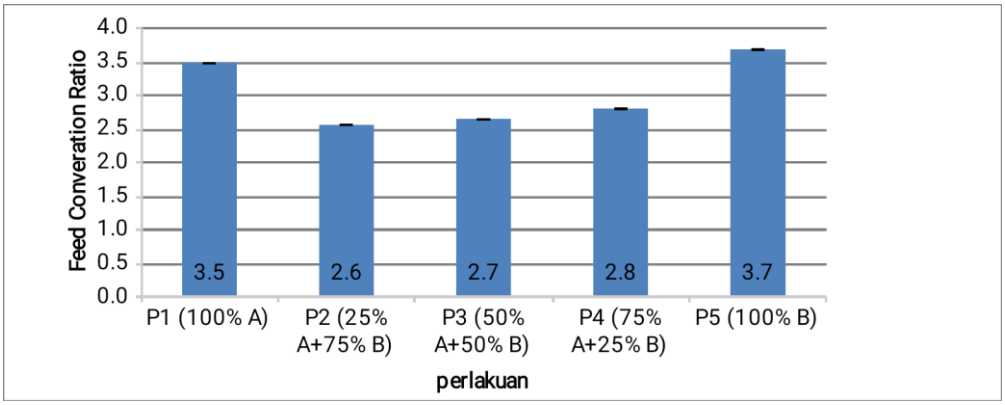

Figure 4. Graph of Feed Converation Ratio (FCR) Gava Prawn Larvae

Feed conversion indicates the rate of feed utilization on shrimp growth. According to Fig. 4, the lowest feed conversion was showed by P2 (2,6), followed by P3 (2,7) and P4 (2,8), while for P1 (3,5) and P5 (3,7) higher yield. According to Mudjiman (2011), feed conversion rate should be from 1.5-8 in range. In our study, the feed is recommendable used in aquaculture because it is within range.

Diversity Sources (SK)	Db	JK	KT	F. count	F. Table	
					0,05	0,01
Treatment	4	4,2	1,0	2,23	3,06	4,89
Error	15	7,1	0,5			
Total	19	11,3				

Description: (ns) is not significantly different

Based on the results of anova test showed that F arithmetic 2.23 <F table with a level of 3.06 and F table 0.01 with a level of 4.89. It is mean H0 accepted and H1 rejected, thus the combination of cake feed and worm feed has no significant effect on Feed Converation Ratio.

4. Conclusions and Suggestion

4.1. Conclusion

The conclusion that can be obtained from this research is

- The results showed that the combination of cake form feed and silk worm feed had a significant effect on the growth rate of Specific (SGR) Fcount 7.58> from F. Table 5% (3.06) 1% (4.89), While no significant effect For F count 0.90 F count = F. Table 5% (3.06) 1% (4.89) and Feed Converation Ratio for F count 2.23 <from F. Table 5% (3.06) 1% (4.89).
- A good combination of feed for growth rate of prawn larvae is P2 treatment (25% natural feed and 75% cake).

4.2. Suggestion

Based on the results of the research, it is recommended to use a combination of 25% silk worm feed and 75% cake feed for larvae prawn larvae utilized to produce the highest Specific Growth Rate (SGR), and for optimum feed conversion.

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