Growth Performance of Male Mojosari-Alabio Crossbred Ducks Fed Diets Containing Green Algae (*Ulva fasciata delile*) in Tropical Area

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ABSTRACT

This study was aimed to investigate the effectiveness of feeding local ducks with green algae (*Ulva fasciata delile*) as alternative feed additive to maximize the growth performance in tropical area. Forty eight male day old ducks of Mojosari-Alabio Crossbred ducks were allocated to four dietary treatments, with three replications with four ducks per replicate pen. The ducks were given one of four experimental diets: basal diet without additive supplementation (UF-0; control) or control diets with *Ulva fasciata delile* (UF) supplementation with the levels of 10 g/kg (UF-1), 20 g/kg (UF-2), or 30 g/kg (UF-3), in tropical-opened poultry house. The diets and drinking water were provided *ad libitum* for 8 weeks rearing period. Variables observed in current study were: feed consumption, body weight gain, feed conversion ratio (FCR), slaughter weight, and income over feed and duck cost. The obtained data were statistically analysed using Oneway ANOVA. Duncan's new Multiple Range Test was subsequently used to separate data with significant difference. Results showed that 30 g/kg GA supplementation increased ($P<0.05$) body weight gain and slaughter weight, reduced feed conversion ratio ($P<0.05$), improved income over feed and duck cost ($P<0.05$), without affecting feed consumption. These results suggest that green algae might be potential to be used as an alternative feed additive to maximize growth performance of male local Mojosari-Alabio Crossbred ducks in tropical area.

Keywords: Mojosari-Alabio crosbred ducks, Green algae, Growth performance, Tropical area

INTRODUCTION

Mojosari-Alabio (MA) crossbred duck has long been known to have high potency as a good quality animal protein source for human, through meat and egg productions. The soft and tasty meat has made duck meat and eggs to become two of the favourite menu in Indonesian cuisines. The reasonable price and market-availability have also made people attracted to choose this commodity. However, the real genetic potency of MA crosbred duck nowadays can not be achieved due to the poor quality of nutrient and low level of rearing management. Occasionally, good quality of feedstuffs is not given to the duck making it low in growth performance (Ketaren and Prasetyo, 2002). Therefore, local alternatives of feedstuffs that readily in supply, good in nutritive values, less cost, and less competitive with human consumption are needed to be explored. One alternative that might be studied is sea weed, emphasize on green algae.

Gieskes *et al.* (1988) reported that green algae are abundant in some area of coral reefs in Indonesia. The nutrient content and bio-active compounds make the green algae is potencial to be used as nutrient booster for duck. Green algae contains bio-active compounds that have capability as antibacterial, anti fungal, anti viral agents (Chapman and Chapman, 1980), as well as a good micro-nutrient sources for poulty. The antioxidant properties of bio-

active substances in green algae are required to reduce oxidative stress (Shiu and Lee, 2005). There is no available study to investigate the growth performance responses of MA crosbred due to the addition of conventional diets with *Ulva fasciata delile* in tropical area.

MATERIALS AND METHODS

Birds, houshing, and experimental design. A total number of 48 one-day old male Mojosari-Alabio (MA) crossbred ducks (59±3 g) were used in this study. The birds were divided into 4 dietary treatments in a randomized complete block design. The birds were given one of the treatments: a commercial standard basal diet without green algae supplementation (UF-0; control), basal diets supplemented with *Ulva fasciata delile* with the levels of 10, 20, and 30 g/kg (UF1, UF-2, UF-3), respectively (Table 1). Every treatment was relicated three times, with four ducks in each replicate pen. The basal commercial diet used in current study was BROILER 1 which contained 21.0 % crude protein. The *Ulva fasciata delile* was collected from local beaches that located on the south area of Special Province of Yogyakarta. Feed and drinking water were served for *ad libitum* consumption for 8 weeks.

Ducks were housed in raised floor pens equipped with a round feeder and bell drinkers. The pens were housed in an opened poultry site that fascilitated with ventilation and light regulator.

Table 1. Diets composition (g/kg, as-fed basis) and calculated nutrient content of the diets used in the study

	Dietary treatments			
	UF – 0	UF – 10	UF – 20	UF – 30
Diets composition, g/kg				
Commercial feed BR-1	970.0	970.0	970.0	970.0
Ulva fasciata delile	0	10.0	20.0	30.0
Filler	30.0	20.0	10.0	0
Total	1000.0	1000.0	1000.0	1000.0
Calculated nutrients content, g/kg				
Crude protein	204.1	204.5	204.9	206.2
Crude fibre	44.2	45.3	46.2	47.1
Calcium	10.1	10.2	10.2	10.3
Phosphorus	8.2	8.2	8.3	8.4

Note: UF-0=commercial basal diet (control) without *Ulva fasciata delile* (UF) supplementation, UF-1=control+10 g/kg UF, UF-2=control+20 g/kg UF, UF-3=control+30 g/kg UF.

Sampling procedures and statistics. Body weight and feed intake data were taken on d 56 for calculation of body weight gain (BWG), feed conversion ratio (FCR), and income over feed duck cost (IOFDC). Variables data that observed were: feed consumption, BWG, FCR, slaughter weight, and IOFDC. The obtained data were statistically analysed using Oneway ANOVA. Duncan's new Multiple Range Test was subsequently used to separate mean with significant difference. All statements of significant difference were based on probability of less than 5%.

RESULTS AND DISCUSSION

Results in Table 2 showed that supplementation of *Ulva fasciata delile* (UF) at the level of 10-30 g/kg did not affect the amount of feed that consumed by the ducks. Feeding ducks with 30 g/kg UF did not influence daily feed consumption. However, UF supplementation at the rate of 20 g/kg resulting in higher average of daily weight gain (P<0.05). Average of body weight gain of the birds increased 6.10% when compared to that of birds in control group. Results also showed that feed conversion ratio of the ducks fed 20 g/kg UF was lower than that of in control group (P<0.05). Birds in UF-20 group were 7.62% more efficient in converting nutrients when compared to that of birds in control group.

Furthermore, results based on the calculations in Table 3. showed that the value of income over feed cost of the ducks (IOFDC) in control group was IDR 3,300. UF supplementation with the levels of 10, 20, and 30 g/kg increased the IOFDC values to IDR 4,100; 4,100; and 4,300, respectively.

Table 2. Feed consumption, average daily gain, of 56 days old ducks

	Dietary treatments			
	UF – 0	UF – 10	UF – 20	UF – 30
Feed intake, g	5070.11	4830.12	4997.44	4800.02
Average daily gain, g	1493.09[b]	1495.98[b]	1584.13[a]	1552.38[ab]
Feed conversion ratio	3.39[a]	3.22[ab]	3.15[b]	3.09[b]
Slaughter weight, g	1556.27[b]	1554.20[b]	1644.01[a]	1611.06[ab]

[1]Means represent 3 pens of 4 ducks in each pen; 2UF-0 = Control diet; UF-10 = diet with 10 g/kg green algae; UF-20 = diet with 20 g/kg green algae; UF-30 = diet with 30 g/kg green algae. [abc]Different superscripts on the same row show significant different (P<0.05).

Table 3. Feed cost, revenue generating, and IOFDC of 56 days old ducks

Treatment	Repl.	Feed consumption (kg/bird)	Feed cost (IDR/kg)	Total feed cost (IDR/bird)	Average body weight (kg/bird)	Revenue (IDR/bird)	IOFDC (IDR/bird)
UF-1	1	4.66	3,215	14,900	1.54	21,000	4,600
	2	4.86	3,215	15,600	1.59	21,000	3,900
	3	4.96	3,215	15,900	1.54	21,000	3,800
Average				15,400		21,000	4,100
UF-2	1	5.13	3,230	16,400	1.67	22,000	4,000
	2	5.11	3,230	16,400	1.67	22,000	4,000
	3	4.74	3,230	15,100	1.59	21,000	4,200
Average				15,900		21,600	4,100
UF-3	1	4.76	3,245	15,200	1.56	21,000	4,100
	2	4.98	3,245	15,900	1.65	22,000	4,400
	3	4.66	3,245	14,900	1.61	22,000	4,400
Average				15,300		21,600	4,300
UF-0	1	4.82	3,200	15,300	1.55	21,000	4,100
	2	5.26	3,200	16,600	1.58	21,000	2,700
	3	5.10	3,200	16,300	1.54	21,000	3,200
Average				16,000		21,000	3,300

[1]IOFDC = Income Over Feed Duck Cost. UF-0 = Control diet; UF-10 = diet with 10 g/kg green algae (GA); UF-20 = diet with 20 g/kg GA; UF-30 = diet with 30 g/kg GA.

Results this study might showed beneficial evidences that *Ulva fasciata delile has* good potencies as feed additive or feedstuff for Mojosari-Alabio duck. Improvement of body weight gain of the duck fed diets might be attributed to the antimicrobial properties of the bio-active substance in UF. Studies by Mtolera and Semesi (1996) showed that green algae contains antimicrobial agent that inhibited the growth and colonization of pathogenic microbes, including 3 bacteria: *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli* (EC), and a yeast, *Candida albicans*. Antibacterial activity of green algae against pathogenic microbes was also shown to reduce the growth and population of 3 gram positive (*Staphylococcus aureus*, *Micrococcus luteus*, and *Enterococcus faecalis*) and 3 Gram negative (*Escherichia coli*, *Enterobacter aerogenes*, and *E. coli* O157:H7) *in vitro* (Taskin *et al.*, 2007). Prashantkumar (2006) has also shown that green algae have antimicrobials properties against some pathogenic microbes. In more recent study, Chanda *et al.* (2010) showed that green algae have good potency as antimicrobials agent to combat pathogenic microbes.

Green algae have the ability to inhibit the growth and colonization of pathogenic microbes in the intestine of duck, which might reduce the productions of microbial metabolites (toxins). Reduction of toxins production might reduce the over production of mucous barrier in the survace of small intestine, that might fascilitate better growth of absorptive intestinal micro-villi, and resulted in more micro-nutrient absorption that beneficial for growth of the host duck. Reduction of the intestinal pathogenic microbes might also important in the effort to reduce the competition for available nutrients and to reduce local intestinal physical problems (Thomke and Elwinger, 1998; Apajalahti *et al.*, 2004). These might be the mechanism of action on how diet supplementation with *Ulfa fasciata delile* resulted in faster growth rate, lower FCR, and higher slaughter weight in the MA crossbred duck.

CONCLUSIONS

It might be concluded that dietary supplementations with *Ulva fasciata delile* with the level of 20 g/kg in increased body weight gain and slaughter weight, reduced feed conversion ratio, without affecting feed consumtion of 8 weeks male Mojosari-Alabio crossbred duck. Supplementation with the rate of 30 g/kg resulted in the higher income over feed duck cost than the other levels of supplementation.

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