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The Effects of Functional Feed Additive Probiotic and Phytogeticin Rations on The Performance of Local Ducks

M Daud, M A Yaman and Zulfan

Animal Husbandry, Faculty of Agriculture, Syiah Kuala University, Banda Aceh, Indonesia

E-mail: daewood@unsyiah.ac.id

Abstract. The research aims to study the use of functional feed additive probiotic and phytogeticin in rations on the performance of local duck. The study used 80 heads local duck 8-16 weeks old grower phase. The study was conducted by experimental method, using a completely randomized design with 4 treatments of rations and 4 replications (5 ducks/pen). The with 4 treatment rations: R1 (basal diet /control), R2 (basal diet+ phytogeticin 0.4%); R3 (basal diet + probiotic 10^8 CFU); R4 (basal diet + phytogeticin 0.4% + probiotic 10^8 CFU). The observed variables were: feed consumption, body weight gain, final body weight, feed conversion, and mortality. Data was analyzed by using one-way analysis of variance then continued with Duncan test. The results showed that the use of functional feed additive probiotic and phytogeticin gave a positive response to the performance of local duck grower phase. The use of functional feed additive probiotic and phytogeticin in ration significantly affect ($P < 0,05$) feed consumption, body weight gain, final body weight and ration conversion, but no significant affect on ration mortality. It was concluded that the use of functional feed additive phytogeticin and probiotic could serve as a source of feed additive in local duck ration and able to increase performance of local duck.

Keywords: phytogeticin, probiotic, feed additive, performances, local ducks

1. Introduction

One of the ways to improve livestock performances and production is through utilization of feed additive in rations. Feed additives that are very commonly used are antibiotics or better known as Antibiotic Growth Promoter (AGP) which serves to help fight pathogenic bacteria and consequently can increase livestock production. Antimicrobials, especially antibiotics in livestock are used as therapy, prevention of disease, and are also used as a growth promoter [1]. Scientifically, the use of AGP is considered successful and is able to improve the FCR value. However, the WHO has banned the use of AGP in livestock because it can adversely affect human health. Likewise, FAO, said that the use of antibiotics is a threat to humans, because microbes that should be able to be eradicated with antibiotics do not.



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The European Union has banned the use of antibiotics as a growth promoter since 2006 [2]. But in Indonesia, the new AGP ban will come into force since January 1, 2018, The use of antibiotic growth promoter (AGP) in feed has been banned by the Indonesian government. Therefore, the search for alternative AGP continues to be carried out. The addition of phytochemical and probiotic is one of the potential alternatives because it has the same ability as AGP.

Phytochemicals are the result of secondary metabolites of plants that contain nutritionally valuable, non-nutritive, or anti-nutritive compounds [3;4]. Some phytochemical active components include essential oils, flavonoids, saponins, and tannins. While probiotics are a group of living microbes that are beneficial and are used to influence landlords through the improvement of microorganisms in the digestive tract [5]. The most widely used probiotic microorganisms are *Lactobacillus* and *Bifidobacteria* strains [6]. Feed additives used in this study were probiotics sourced from lactic acid bacteria (*L. casei* *Rhamnosus*) and phytochemical derived from ciplukan plant extraction. The research aims to study the use of functional feed additive probiotic and phytochemical in rations on the performance of local duck.

2. Methodology

The research material used 80 heads female local duck 8-16 weeks old grower phase. Ration used in this experiment consisted of probiotic, phytochemical, corn, rice bran, coconut meal, soybean meal, sago, fish meal, coconut oil, premix, NaCl, and DCP.

The study was conducted by experimental method, using a completely randomized design (CRD) with 4 treatments of rations and 4 replications (5 ducks/pen). The experiment used completely randomized design with 4 treatment rations: R1 (basal diet /control), R2 (basal diet + phytochemical 0.4%); R3 (basal diet + probiotic 10^8 CFU); and R4 (basal diet + phytochemical 0.4% + probiotic 10^8 CFU).

Table 1. Composition and nutrients content of the treatment rations

Feed Ingredients	Treatment Rations			
	R1	R2	R3	R4
	%.....			
Corn	40	40	40	40
Rice bran	17	17	17	17
Coconut meal	10	10	10	10
Soybean meal	12.5	12.5	12.5	12.5
Sago	10	10	10	10
Fish meal	7.5	7.5	7.5	7.5
Coconut oil	1.5	1.5	1.5	1.5
Premix	0.5	0.5	0.5	0.5
NaCl	0.5	0.5	0.5	0.5
DCP	0.5	0.5	0.5	0.5
Total	100	100	100	100
Calculated nutrients content:				
Metabolizable energy (Kcal/kg)	2707	2707	2707	2707
Crude protein (%)	19.19	19.19	19.19	19.19
Crude fiber (%)	5.97	5.97	5.97	5.97
Crude fat (%)	3.27	3.27	3.27	3.27
Ca (%)	1.27	1.27	1.27	1.27
P (%)	0.81	0.81	0.81	0.81
Meth (%)	0.35	0.35	0.35	0.35
Cys (%)	0.24	0.24	0.24	0.24
Lys (%)	0.97	0.97	0.97	0.97

Note: R1 (basal diet /control); R2 (basal diet + phytochemical 0.4%); R3 (basal diet + probiotic 10^8 CFU); R4 (basal diet + phytochemical 0.4% + probiotic 10^8 CFU).

Treatment Rations

The ration used during the research was basal ration without antibiotics. All treatment rations use the same feed ingredients, only differing in the use of phytogetic and probiotics. Treatment rations is formulated according to the grower phase duck requirements: It contained 19 % crude protein and 2700 kkal/kg metabolizable energy (Table 1).

Experimental Procedure

This study used heads local duck 8 weeks of old and reared until 16 weeks of old in the litter cagessystem. The experiment lasted 8 weeks and during that time, feed and water were offered ad libitum. Feed consumption and body weight gain were determined weekly. Final body weight, feed conversion, and mortality of local duck were determined at the end of feeding trial.

Research Variables and Data Analysis

The observed variables were: feed consumption, body weight gain, final body weight, feed conversion, and mortality of local duck. Data was analyzed by using one-way analysis of variance then continued with Duncan's Multiple Range Test [7].

3. Result and Discussion

Rations Consumption

The average consumption of local ducks ration during the study were 994-1064 grams per head per weeks (Table 2). The lowest feed intake was obtained from treatment R1 (control) and the highest feed intake was found in treatment R4 (basal diet containing phytogetic and probiotic). The data of local ducks performance obtained in this study are presented in Table 2.

Table 2. The performances of local ducks (8 - 16 weeks)

Parameters	Treatment			
	R1	R2	R3	R4
Ration consumption (g/h/w)	994±15.9 ^a	1,050±14.7 ^{ab}	1,036±17.8 ^{ab}	1,064±18.7 ^b
Body weight gain (g/h/w)	76.09±1.34 ^a	83.86±1.38 ^b	81.69±1.60 ^b	79.59±1.29 ^b
Final body weight (g/h)	1,408.7±21.2 ^a	1,470.8±27.4 ^b	1,453.5±18.1 ^b	1,436.7±40.9 ^b
Feed conversion ratio	5.6±0.45 ^a	5.7±0.76 ^a	5.7±0.57 ^a	5.9±0.59 ^b
Mortality (%)	0	0	0	0

Note: Different superscript in the same line means significantly different ($P < 0.05$); R1 (basal diet /control); R2 (basal diet + phytogetic 0.4%); R3 (basal diet + probiotic 10^8 CFU); R4 (basal diet + phytogetic 0.4% + probiotic 10^8 CFU).

The results showed that the use of phytogetic and probiotic in ration significantly affect ($P < 0.05$) ration consumption of local duck. An improvement of ration consumption was found in the local ducks feed phytogetic and probiotic (R4), it was significantly higher ($P < 0.05$) in compare to control ration (R1). The giving probiotic from local microbial have significant effect on ration consumption [8]. Ration consumption in livestock can be influenced by various factors, one of the main factors according to was the quality of feed including the nutrient content contained in the feed [9]. Found that ration consumption was also strongly influenced by the palatability of the rations, types, and composition of feed ingredients used in duck ration formulation [10]. In addition, the palatability of the ration is also influenced by the of the ration itself (11). Feed consumption influenced by various factors, including the nutrient content in the feed and the level of energy content in the ration (12). Phytogetic is reported to have the ability to increase ration palatability, improve intestinal function, and absorption nutrients [13].

Body Weight Gain

The average body weight gain of local ducks (8-16 weeks) during the study ranged from 76,09-83,86 g/head/weeks (Table 2). The results of statistical analysis showed that the use of phytogetic and probiotic in local duck ration gave significant affect ($P < 0,05$) on weight gain. This result suggested

that the use of phytogetic and probiotic in the dietary as feed additive source increased the weight gain of local duck. The increasing of livestock weight was strongly influenced by the consumption of rations [14]. Several research reports show that the use of phytogetic and probiotic is proven to increase growth performance, and improve feed conversion [15;16].

Final Body Weight

The results showed that the final body weight of local ducks ranged from 1408,7– 1470,8 g/head (Table 2). Rations containing phytogetic and probiotic had a significant affect ($P < 0.05$) on final body weight of local ducks at 8-16 weeks. The highest final weight was found in R2 treatment 1470,8 g/head and the lowest final weight was found in treatment R1 1408,7 g/head. It can be seen that the use of 0,4% phytogetic increased duck's body weight relatively higher than other treatments, ($P < 0.05$). The use of phytogetic and probiotic feed additives in rations can have a positive impact on improving the performance of local duck. The use of phytogetic feed supplements in feed can improve performance, and improve the safety and quality of the meat produced [17].

Feed Conversion Ratio (FCR)

Feed conversion ratio (FCR) one of the variables used to see the ability of livestock to convert feed into meat products. Research results showed that the use of phytogetic and probiotic in ration local duck for grower stage during 8-16 weeks had significant affect ($P < 0.05$) on ration conversion (Table 2). The highest FCR was found in R4 treatment 5,9 and the lowest FCR was found in treatment R1 5,6. The lower the value of the FCR, the lower amount of feed needed to increase a unit of body weight [18]. This finding suggested that the use of phytogetic and probiotic in the grower local duck ration produced a similar FCR to the control feed. This finding suggested that the formulated local diet containing phytogetic and probiotic is able to provide the level of palatability, quantity and balance of nutrients and it is effective in promote growth of the ducks and improves feed to body weight conversion of the rations. The smaller the feed conversion rate, the more efficient the use of ration by livestock [19].

The value of feed conversion depends on the quality of feeds given to the animal. The higher the nutrient conceived the better the conversion of the resulting feed. This happens because with a good feed the livestock consumed less feed to produce the same body weight in compare to less good one. High growth reflected the efficiency of ration consumption and it can be seen from decreasing ration conversion rate [20]. Several research reports show that the use of phytogetic is proven to improve feed conversion, improve carcass quality, improve safety of food products from livestock, and reduce stress response [21;22].

Mortality

The results showed that the use of phytogetic and probiotic in ration did not affect mortality of local duck grower phase. This suggests that the use of phytogetic and probiotic may be one of the sources of feed additive source in local duck ration as well as good and regular maintenance management. Provision of ration and regular water supply greatly affects the immune system of ducks. Cage hygiene also greatly affects the mortality of ducks, where dirty cages easily led to disease infection that caused death of the ducks. Good maintenance management can control and prevent disease on ducks and inhibit the occurrence of infection so mortality rate in ducks were minimized [23]. Giving probiotic supplementary feed can have a positive effect on livestock immunity. Colonization of probiotic bacteria added to feed helps in the act of immunizing livestock in preventing colonization of pathogenic bacteria that contaminate feed [24]. Phytogetics is beneficial in improving the performance of poultry and increasing immune activity, and has the potential to be anti-inflammatory [3]. Supplementation of feed with thymol and carvacrol increased broiler immune response [25].

4. Conclusion

It was concluded that the use of functional feed additive phyto-genic and probiotic could serve as a source of feed additive in local duck ration and able to increase performance of local duck grower phase.

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