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The study of aloe vera powder effect as feed additive on the performance of broiler

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Abstract. Prolonged use of antibiotic growth promoter (AGP) in poultry ration has resulted in residual effect on poultry products. Therefore, the demand for natural substances that have antibiotic properties to replace AGP is increasing nowadays. Aloe vera (*Aloe barbadensis* Miller) is a nutritious plant and has various biological active compounds that reported have a beneficial effect on broiler chicken. The objective of the research was to determine the best level of dietary Aloe vera supplementation on the performance of broiler chicken. A total of 80 day-old broiler chicks (Cobb) were divided into four treatment groups with four replicates (5 chicks each). All chicks were raised for 42 days in the 16 pen (100 x 100 x 50 cm) equipped with rice hulls as bedding material, a feeder and a drinker. Chickens in the control group were fed with basal feed and for the next three group, chickens were fed with basal feed supplemented with Aloe vera for 0.75, 0.1, and 0.125%, respectively. In general, although there were no significant differences of all performance parameters among treatments found during experiment, chicken from supplemented group have a tendency to consume more feed, grew faster and higher feed efficiency compared to the control group. It seems that, increasing the level of Aloe vera flour in the ration is needed to improve the performance of broilers reared under tropical conditions.

1. Introduction

A raising concern about healthy animal food as well as human health, a broader range of policy and research is dedicated to restrict or replace the antibiotic growth promoters (AGPs) used in animal feed. Besides the well known additives i.e., probiotic, prebiotics, enzymes, and organic acid, herbs is a new class of additives to poultry feed that have a multiple beneficial properties either to the poultry or indirectly to humans as a main population who consumed the product from these poultry [1,2].

Indonesia, South Sulawesi in particular, is well known for its plenty resources of different kind of herbs that can be used as natural feed additives for poultry. Aloe vera (*Aloe barbadensis* Miller) is reported in some studies have a multiple positive effect on broiler chicken [3-5]. The major compound of Aloe vera i.e., anthraquinones, saccharides, vitamins, enzymes, and low-molecular-weight compounds was reported to be responsible for its anti-inflammatory, anti-viral, and antioxidant properties [5,6]. Hamman [7] reported that many benefit of Aloe vera are attributable to



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polysaccharides, acemannan in particular, which compose the most part of the dry matter of Aloe vera gel. Acemannan was reported has immunomodulatory, anti-microbial, and anti-tumor effects in animals [5]. In addition, Lin et al [8] reported that acemannan treatment increased the *lactobacillus* count and reduced the *E. coli* count in the intestine of broilers.

The use of the local variety of Aloe vera in broiler feed is assumed to be beneficial in order to enhance the broiler performance in the tropical humid region of South Sulawesi. The aim of this experiment was to further enhance of our knowledge and to examine the effect of dietary Aloe vera leaves flour addition on the broiler performance.

2. Materials and method

The Aloe vera plant used in this study was obtained from local farmer (Bulukumba Regency). The harvested Aloe vera leaves were selected from the oldest leaves which grew out at the bottom of the plant. Having been harvested, the leaves were washed and cut into smaller pieces and dried in the freeze-drying machine (-40°C) for 48 hours. The dried leaves then grinded and the flour yielded from this process was weighed.

A total of 80 one-day-old broiler chicks (Cobb) were divided into four treatment groups with four replicates (5 chicks each) based on a completely randomized design. All chicks were raised for 42 days in the 16 pen (100 x 100 x 50 cm) equipped with rice hulls as bedding material, a feeder and a drinker. Chickens in the control group were fed with basal feed and for the next three group, chickens were fed with basal feed supplemented with Aloe vera for 0.75, 0.1, and 0.125%, respectively. Feed and water were provided ad libitum to the birds throughout the experimental period. All chicken were exposed to continuous lighting from electric bulb at the night and natural sunlight at the day time.

The performance parameters i.e., feed consumption, weight gain, and feed conversion ratio (FCR) were measured weekly during the experiment period. At the end of the experiment, all chickens were weighed individually and expressed as final body weight. Performance index is the expression of the body weight achievement and feed used in certain of rearing time and calculated as follows: liveability \times average daily gain/feed conversion ratio \times 10 [9]. The data obtained in this study were analyzed according to general linear model procedure. The significance of all treatment effect was tested using multiple range Duncan test [10].

3. Results and discussion

Data on broiler performance parameters are presented in table 1. Treatment of Aloe vera flour during the experiment failed to gain the optimum growth of the broilers as its genetic potential. The supplementation of Aloe vera leaves flour in the ration showed a similar effect on the feed consumption, weight gain, FCR, and performance index of broiler maintained for 42 days.

Table 1. The effect of the dietary supplementation of Aloe vera on the broiler performance.

Parameters	Treatment			
	P0	P1	P2	P3
Feed consumption (g/bird)	2519.87 \pm 107.52	2866.27 \pm 152.12	2760.6 \pm 871.34	2808.4 \pm 235.18
Weight gain (g/bird/d)	21.07 \pm 4.52	27.11 \pm 3.08	22.13 \pm 1.98	26.14 \pm 4.26
Final bodyweight (g/bird)	925 \pm 190.79	1175 \pm 128.9	965 \pm 83.86	1135 \pm 179.9
FCR	2.94 \pm 0.06	2.54 \pm 0.39	2.49 \pm 1.03	2.6 \pm 0.43
Performance index	80.04 \pm 137.32	113.65 \pm 92.51	102.92 \pm 34.86	107.42 \pm 30.17

P0: Control, P1: Ration with 0.75% Aloe vera flour; P2: Ration with 0.1% aloe vera flour; P3: Ration with 0.125% aloe vera flour.

Although the value of feed consumption among treatment groups did not showed a significant different during treatment, there were a tendency that the value of feed consumption was slightly

higher in the three treatments compared to the control group. Other studies reported that broiler feed consumption was increased after fed Aloe vera gel [11, 12]. On the other hand, Sinurat et al. [4] reported a decrease in feed consumption of broilers fed Aloe vera gel extract. The differences in these reports indicate that the response of broilers to the use of aloe vera depends on the type of ingredients used (leaves, gels, extracts, active ingredients) as well as their levels in rations or drinking water.

The growth rate of the broiler in this study, indicated by weight gain and final body weight parameters, was slower compared to the standard of modern broilers which reported could reach 2 kg less than 35 days of rearing period [13]. The slower growth rate in this study was assumed to be affected by the use of low quality of other local feed ingredients in the ration caused the imbalance of nutrients consumed by the chicken. The similar condition was also reported by a study [14] that a poor growth rate of broiler was experienced during the experiment of using Aloe vera in broiler feed. In other study, an experiment for comparing the effect of Aloe vera and commercial AGP resulted in better growth performance of AGP group compared to the group fed Aloe vera up the 2.5% in the ration [11]. Although the growth rate was reported slower compared to the other treatment, Darabighane [11] asserted of another beneficial effect of Aloe vera on the broiler i.e., heavier dressing percentage compared to the control group.

The supplementation of Aloe vera in this study also indicated that there were no significant effect on the feed efficiency of the broilers. This was indicated by the similar value of the feed conversion ration during the experiment period. The average value of these parameter also poorer than standar value if modern broilers. However, a trend of FCR value improvement was indicated in the Aloe vera groups. A similar study by Shokrane et al. [12] reported that the improvement of the gut was attributable of Aloe vera treatment and related to more balanced population of microbiota in chicken's gut.

The production index of this study as overall performance indices was poorer than what expected for the use of Aloe vera in the broiler maintenance system. As depicted in the table 1, the production index value was lower than previous report [9]. Moreover, Sasaki et al [9] the higher production index value is categorized as good performance, and on contrary, the lower production index lower is categorized to have poor performance. Comparing the production index value among reports is difficult due to the differences of the rearing condition, breed, or slaughter age. However, the lower value reported in this study was closely correlated to the poor growth rate of broiler during the experiment.

4. Conclusion

The dietary supplementation of the Aloe vera leaves flour did not improve the broiler chicken, however, the poorer growth rate also could not be attributed to the aloe vera level used in this experiment. It seems that, increasing the level of Aloe vera flour in the ration is needed to improve the performance of broilers reared under tropical conditions.

References

- [1] Hardy B 2002 The issue of antibiotic use in the livestock industry: what have we learned? *Anim. Biotechnol.* **13** 129–147
- [2] Verstegen M W, and Williams B A 2002 Alternatives to the use of antibiotics as growth promoters for monogastric animals *Anim. Biotechnol.* **13** 113–127
- [3] Purwadaria T, Togatorop M H, Sinurat A P, Rosida J, Sitompul S, Hamid H dan Pasaribu T 2001 Identifikasi zat aktif beberapa tanaman (lidah buaya, mimba dan bangkudu) yang potensial JITV **2** 42-48
- [4] Sinurat A P, Purwadaria T, Togatorop M H, Pasaribu T, Bintang I A K, Sitompul S dan Rosida J 2002 Respon ayam pedaging terhadap penambahan bioaktif lidah buaya dalam ransum: pengaruh berbagai bentuk dan dosis bioaktif lidah buaya terhadap performans ayam pedaging JITV **7** 69-75

- [5] Choi S, Chung M H 2003 A review on the relationship between *Aloe vera* components and their biologic effects *Semin. Integr. Med.* **1** 53-62
- [6] Boudreau M D, Beland F A 2006 An evaluation of the biological and toxicological properties of *Aloe barbadensis* (Miller) *J. Environ. Sci. Heal. C.* **24** 103-154
- [7] Hamman J H 2008 Composition and applications of *Aloe vera* leaf gel *Molecules.* **13** 1599-1616
- [8] Lin J 2005 Effects of gel, polysaccharide and acemannan from *Aloe vera* on broiler gut flora, microvilli density, immune function and growth performance *Chinese J. Vet. Sci.* **25** 668-671
- [9] Sasaki Y, Uemura R, Sekiguchi S, Takahashi T, Fujii Y and Sueyoshi M 2014 An analysis of factors affecting production performance in broiler flocks on Japanese commercial farms *Br. Poult. Sci.* **55** 737-44
- [10] Steel R G D and Torrie J H 1960 *Principles and Procedures of Statistics* (New York: McGraw-Hill Book Company, Inc.)
- [11] Darabighane B, Zarei A, Shahneh A Z and Mahdavi A 2011 Effect of different levels of aloe vera gel as an alternative to antibiotic on performance and ileum morphology in broilers *Ital. J. Anim. Sci.* **10** 189-194
- [12] Shokraneh M, Ghalamkari G, Toghyani M, and Landy N 2016 Influence of drinking water containing *Aloe vera* (*Aloe barbadensis* Miller) gel on growth performance, intestinal microflora, and humoral immune responses of broilers *Veterinary World* **9** 1197-1203
- [13] Cobb-vantress 2018 Broiler management guide (Cobb-vantress.com) Accessed April 2020
- [14] Mahela C and Moorty M 2008 Production performance of broilers fed with *Aloe vera* and curcuma longa turmeric *Int. J. Poult. Sci.* **7** 852-856