



RESEARCH PAPER

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Levels of *Aloe vera* decoction as additive in the drinking water of broilers

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Abstract

The growth performance of broilers as affected by *Aloe vera* decoction as an additive in the drinking water was found comparable to commercial antibiotic + electrolytes in terms of final weight, gain in weight, feed consumption, feed conversion ratio, dressing percentage, and water consumption as well as profit above feed, medicine, and cost of broilers. Levels of *Aloe vera* decoction at 5 ml to 10 ml in the drinking water can substitute commercial antibiotics.

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Introduction

Poultry nutritionists continue to look for alternatives to AGP and antioxidants. Antibiotic growth promoter (AGP) in poultry has been banned by the European Union and has drawn the concerns of researchers toward the use of natural substances like herbs as additives to animal and poultry feeds (Joao, 2018). They have beneficial properties like anti-oxidant, anti-fungal, anticoccidial, and immune-modulatory effects. These herbs like *Aloe vera*, cinnamon, garlic, tulsi, pepper, etc. are considered safe, cost-effective, and environmentally friendly with no side effects that enhance the performance of birds, maintain health improve feed utilization, and are environment-friendly.

Phytogenic and herbal products have increased attention as natural additives and have been accepted by consumers as natural additives (Wang *et al.*, 2024).

Natural feed additives used in animals like *Aloe vera* can improve performance and productivity by maintaining the beneficial microflora in the gut of animals and these natural products become of great importance as growth-promoting agents that can replace antibiotics (Placha *et al.*, 2022).

Based on qualitative analysis, *Aloe vera* gel contains alkaloids, saponins, carbohydrates, phenolics, diterpenes, triterpenes, and flavonoids which have a significant effect on the growth and feed intake of animals. Saponins observed to kill protozoans to impair the protein digestion and uptake of vitamins and minerals in the gut and act as hypoglycemic agents (Das *et al.*, 2016).

Aloe vera as an alternative to antibiotics in broilers showed higher body weight, feed intake, largest villus height, and the greatest villus height to crypt depth ratio as compared to a control group (Babak *et al.*, 2014). Moreover, many studies have been carried out on using additives including herbs, as alternatives to antibiotics for the performance of poultry products (Shroha *et al.*, 2019). The antimicrobial properties of

herbs can improve the intestinal microflora population and enhance health in birds' digestive systems through reduction in some disease-making bacteria (Mohammadi *et al.*, 2014).

Aloe vera (*Aloe barbadensis* Miller) is a perennial succulent belonging to the Liliaceae family and is called the healing plant or the silent healer (Choi *et al.*, 2003). *Aloe vera*, as an additive, has great potential for improving the growth performance of broilers, carcass characteristics, haemato-biochemical parameters, intestinal health, immune system response, and cost of production. It can also be used in controlling coccidiosis. *Aloe vera* can be added to broiler feeds or in drinking water in the form of powder, gel, extract (ethanolic or aqueous), polysaccharide extracted from gel), dosage, genetics of broilers, ingredients of diet, and farm management.

Therefore, more studies are required to determine effective dosage and form of use (Quaye *et al.*, 2023).

Materials and methods

One- hundred sixty head day-old broiler chicks were distributed at random in five treatments replicated four times following the Randomized Complete Block Design. The treatments are as follows:

- T₀ – Commercial antibiotic + electrolytes
- T₁ – 2.5 ml *Aloe vera* decoction/li of water
- T₂ – 5 ml *Aloe vera* decoction/li of water
- T₃ – 7.5 ml *Aloe vera* decoction/li of water
- T₄ – 10 ml *Aloe vera* decoction/li of water

Preparation of decoction

Aloe vera was planted at the Poultry project of DMMMSU-NLUC, Bacnotan, La Union, Philippines where the research was conducted. It was harvested at 10-12 months after planting and 3-4 leaves were taken per plant. *Aloe vera* was gathered, cleaned, and washed. Decoction was made by boiling ½ kilogram fresh *Aloe vera* leaves per liter of water then simmered for 30 minutes in low fire. After boiling, the *Aloe vera* decoction was strained and stocked in a clean container. *Aloe*

vera decoction was added to plain water following the levels specific in each treatment and served as drinking water from brooding to 35 days. The control group was provided with electrolytes containing niacinamide, magnesium chloride, potassium chloride, sodium acetate, sodium chloride, and glucose for 35 days.

Preparation of experimental cages and management practices

The cages were cleaned with soap and water and then disinfected to prevent the growth and multiplication of disease-causing microorganisms. Cages were left for seven days to eliminate the odor. The cages were installed with electric bulbs as a source of heat during the two weeks of brooding period. The sides of the cages were covered with clean empty sacks to maintain the proper temperature and to prevent the birds from exposure to draft while the floors were placed with rice hull as beddings which were changed every other day. Strict hygiene and sanitation were properly imposed and observed throughout the experiment.

Data gathered

1. Initial weight (kg): This was taken by weighing the birds at day old before placing them in their respective cages.
2. Final weight (kg): This was taken by weighing the bird at 35 days old.
3. Gain in weight (kg): This was taken by subtracting the initial weight of birds from the final weight.
4. Feed Consumption (kg): This was obtained by summing up the daily feed intake of broilers from a day old to 35 days old.
5. Water Consumption (li): This was taken by summing up the total amount of water consumed from brooding to 35 days of age.
6. Dressing Percentage (%): This was obtained by dividing the dressed weight by the birds' live weight, multiplied by 100.
7. Feed Conversion Ratio: This was computed by dividing the total amount of feed consumed by the total gain in weight.

8. Profit above feed, supplement, and stock cost (P): This was taken by subtracting the cost of feed, medicine, and stock cost from the sale value of birds at the end of the study.

Data analysis

The data gathered were analyzed using the Analysis of Variance in Randomized Complete Block Design, and differences among treatment means were further tested using the Tukeys's Honest Significant Difference (HSD) Test.

Results and discussion

Growth performance of broilers

Table 1 presents the final weight of broilers as affected by *Aloe vera* decoction in the drinking water. The final weight per bird ranges from 1.44 to 1.50 kg. The analysis of variance disclosed no significant result. The addition of *Aloe vera* decoction in the drinking water did not affect the performance of broilers in terms of final weight. The result of the present study is similar to the findings of Mehala and Moorthy (2008) in their study on the production performance of broilers fed with *Aloe vera* and turmeric that no significant differences in the final weight of broilers.

The data on broilers' gain in weight range from 1.40 to 1.45 kg (Table 1). Analysis of variance disclosed no significant difference. Darabighane *et al.* (2011) stated that supplementation of *Aloe vera* at a rate of 2% in broilers' diet was found comparable in terms of gain in weight. Similarly, Rafeeq *et al.* (2017) found that the effect of herbal additives on broilers' body weight is insignificant.

Feed consumption

The feed consumption of broilers is presented in Table 2. The feed consumption of experimental birds ranged from 2.56 to 2.70 kg. Herbs act as feed additives, have great potential to improve productive performance, immune response, and intestinal health with health-beneficial compounds, also help in the reduction of methane and ammonia emissions and have great potential in poultry nutrition (Kuralkar *et al.*, 2021). However, in the present study, the feed

consumption of broilers as affected by *Aloe vera* decoction was found comparable. The result might vary depending on the dosage, ingredients of the diet,

genetics of broilers, and aspect of applications (Babak and Nahashon, 2014). The analysis of variance revealed no significant difference.

Table 1. Final weight and gain in weight of broilers as affected by *Aloe vera* decoction as a supplement in the drinking water

Treatment	Final weight (kg)	Gain in weight (kg)
Commercial antibiotic + electrolytes	1.47	1.43
2.5ml <i>Aloe vera</i> decoction/li water	1.44	1.40
5ml <i>Aloe vera</i> decoction/li water	1.46	1.42
7.5ml <i>Aloe vera</i> decoction/li water	1.49	1.45
10ml <i>Aloe vera</i> decoction/li water	1.50	1.45
Significance	ns	ns
cv	6.19%	6.32%

Table 2. Feed consumption and feed conversion ratio of broilers as affected by *Aloe vera* decoction as a supplement in the drinking water

Treatment	Feed consumption (kg)	Feed conversion ratio
Commercial antibiotic + electrolytes	2.70	1.89
2.5ml <i>Aloe vera</i> decoction/li water	2.56	1.85
5ml <i>Aloe vera</i> decoction/li water	2.63	1.87
7.5ml <i>Aloe vera</i> decoction/li water	2.62	1.81
10ml <i>Aloe vera</i> decoction/li water	2.64	1.81
Significance	ns	ns
cv	3.75%	7.49%

Table 3. Water consumption and dressing percentage as affected by *Aloe vera* decoction in the drinking water of broilers

Treatment	Water consumption (li)	Dressing percentage (%)
Commercial antibiotic + electrolytes	1.68	73.96
2.5ml <i>Aloe vera</i> decoction/li water	1.62	75.08
5ml <i>Aloe vera</i> decoction/li water	1.64	75.92
7.5ml <i>Aloe vera</i> decoction/li water	1.68	75.70
10ml <i>Aloe vera</i> decoction/li water	1.70	76.01
Significance	ns	ns
cv	4.70%	2.49%

Feed conversion ratio

The feed conversion ratio per bird ranged from 1.81 to 1.89 (Table 2). The higher the feed consumed by birds the higher the final weight, the better gain in weight, and the lower FCE, however, in the present study the analysis of variance was found comparable in terms of feed conversion ratio. The result of the present study is in line with the findings of Muhammad *et al.* (2014) and Motawae (2017) that no significant differences were observed in broilers given an antibiotic and 2% *Aloe vera* gel in terms of feed conversion ratio. Similarly, Bernard *et al.* (2016) and Christaki *et al.* (2010), cited that no significant differences were found in the feed conversion efficiency of broilers as affected by *Aloe vera*.

Water consumption

The water consumption of broilers as affected by *Aloe vera* decoction ranged from 1.62 to 1.70 li of water (Table 3). The analysis of variance revealed insignificant results. The inclusion of *Aloe vera* decoction in the drinking water did not affect the water intake of broilers. Odo *et al.* (2010) reported that the inclusion of 0%, 5%, and 10% *Aloe vera* on the growth performance of birds did not affect water consumption.

Dressing percentage

The dressing percentage per bird as affected by *Aloe vera* decoction ranged from 73.96 to 76.01% (Table 3). Analysis of variance revealed insignificant results.

The result of the present study is similar to the findings of Ojewola and Ewa (2005) and Singh *et al.* (2017) that no significant differences were found in the dressing percentage given *Aloe vera* on broiler chickens.

Table 4. Profit above feed, medicine, and stock costs as affected by *Aloe vera* decoction in the drinking water of broilers

Treatment	Profit (₹)
Commercial antibiotic + electrolytes	28.72
2.5ml <i>Aloe vera</i> decoction/li water	28.00
5ml <i>Aloe vera</i> decoction/li water	29.46
7.5ml <i>Aloe vera</i> decoction/li water	29.14
10ml <i>Aloe vera</i> decoction/li water	28.93
Significance	ns
cv	6.81%

Profit above feed, medicine, and stock costs

Data on profit above feed, medicine, and stock cost of broilers ranged from P28 to 29.46 (Table 4). The analysis of variance found insignificant results. The result of the present study did not affect the profit above feed, medicine, and stock costs as affected by different levels of *Aloe vera* decoction in the drinking water of broilers.

Conclusion

The growth performance of broilers as affected by *Aloe vera* decoction as an additive in the drinking water was found comparable to commercial antibiotic + electrolytes in terms of final weight, gain in weight, feed consumption, feed conversion ratio, dressing percentage, and water consumption as well as profit above feed, medicine, and cost of broilers.

Recommendation

Levels of *Aloe vera* decoction at 5 to 10 ml can be used as an additive in the drinking water of broilers as a substitute for commercial antibiotics.

References

Babak D, Nahashon SN. 2014. A review on effects of *Aloe vera* as a feed additive in broiler chicken diets. *Annals of Animal Science* **14**(3), 491–500.

Bernard N, Mohammed A, Edwards A, Bridgemohan P. 2016. Effect of *Aloe barbadense* leaf and gel aqueous extracts during the starter and finishing phases of broiler production. *International Journal of Poultry Science* **15**(1), 15.

Choi S, Chung MH. 2003. A review on the relationship between *Aloe vera* components and their biologic effects. *Seminars in Integrative Medicine* **1**(1), 53–62.

Christaki EV, Florou-Paneri PC. 2010. *Aloe vera*: A plant for many uses. *Journal of Food, Agriculture and Environment* **8**(2), 245–249.

Darabighane B, Zarei A, Shahneh A, Mahdavi A. 2011. Effects of different levels of *Aloe vera* gel as an alternative to antibiotic on performance and ileum morphology in broilers. *Italian Journal of Animal Science* **10**, 198–194.

Das KK, Razzaghi-Asl N, Tikare SN, Di Santo R, Costi R, Messori A, Saso L. 2016. Hypoglycemic activity of curcumin synthetic analogues in alloxan-induced diabetic rats. *Journal of Enzyme Inhibition and Medicinal Chemistry* **31**(1), 99–105.

Joao S. 2018. The evaluation of phytogetic feed additive as an alternative to antimicrobial growth promoter in broiler feeds. Doctoral dissertation, Stellenbosch: Stellenbosch University.

Kuralkar P, Kuralkar SV. 2021. Role of herbal products in animal production—An updated review. *Journal of Ethnopharmacology* **278**, 114246.

Mehala C, Moorthy M. 2008. Production performance of broilers fed with *Aloe vera* and *Curcuma longa* (turmeric). *International Journal of Poultry Science* **7**(9).

Mohammadi Z, Ghazanfari S, Moradi MA. 2014. Effect of supplementing clove essential oil to the diet on microflora population, intestinal morphology, blood parameters and performance of broilers. *European Poultry Science/Archiv für Geflügelkunde* **78**.

Motawae O. 2017. *Aloe vera* extract in poultry. *Aloe vera-Acemannan*.

Muhammad JAK, Khan SH, Naz S, Gilani SS, Shafi JA, Hassan F, Hassan M, Anwar M. 2014. Effect of dietary supplementation of *Aloe vera* leaves on growth performance and immunity of Fayoumi chicks. Poultry Research Institute Murree Road, Shasabad, Rawalpindi, Pakistan. *Pakistan Journal of Nutrition* **13**(4), 191–195.

Odo BI, Ekenyem BU, Nwamo AC. 2010. Effects of *Aloe vera* as leaf protein concentrate on growth performance of cockerels. *International Journal of Poultry Science*.

Ojewola GS, Ewa UE. 2005. Response of growing broilers to varying dietary plant protein. *International Poultry Science* **4**(10), 765–771.

Quaye B, Opoku O, Benante V, Adjei-Mensah B, Amankrah MA, Ampadu B, Atuahene CC. 2023. Influence of *Aloe vera* (*Aloe barbadensis* M.) as an alternative to antibiotics on the growth performance, carcass characteristics, and haemato-biochemical indices of broiler chickens. *Veterinary Medicine and Science* **9**(3), 1234–1240.

Shroha A, Bidhan DS, Yadav DC, Rohila H. 2019. Ajwain as a non-antibiotic growth promoter in the broiler industry: A review. *Pharma Innov* **8**, 518–524.

Singh H, Kumar J, Ali N, Kumar R. 2017. Effect of supplementation of *Aloe vera* on growth performance in broiler chicks. *ResearchGate*.

Wang J, Deng L, Chen M, Che Y, Li L, Zhu L, Feng T. 2024. Phytogetic feed additives as natural antibiotic alternatives in animal health and production: A review of the literature of the last decade. *Animal Nutrition*.