

Original Research Article

Study on Effects of Aloe Vera (*Aloe Barbadensis* Miller) Supplementation on Growth Performance and Carcass Traits of Broiler

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Abstract: The experiment was conducted at Bismillah poultry farm in Peipur Village, Zakigong Upazila, Sylhet district, using 90-day-old chicks of the "Lohman strain" commercial broilers. The objective was to investigate the impact of Aloe vera supplementation on various aspects of broiler performance, including growth, feed conversion ratio, carcass yield, and physicochemical properties of the meat. Ninety chicks were allocated and randomly assigned to four treatment groups and a control group, with each group replicated three times and consisting of six broilers per replication. Aloe vera gel was incorporated into the diets at four different concentrations: 0.1% in T1, 0.2% in T2, 0.3% in T3, and 0.4% in T4. The control group (T0) was not administered any Aloe vera supplementation. The results of the experiment showed that broilers in the T4 group, which received 0.4% Aloe vera gel in their diets, exhibited a significant increase in feed consumption compared to the other groups ($p < 0.05$). These birds also demonstrated significantly higher body weight gain ($p < 0.05$) than the other groups. Additionally, the T4 group had a significantly lower feed conversion ratio ($p < 0.05$) compared to the other groups. Based on these findings, it can be concluded that the application of Aloe vera gel enhances broiler production. The Aloe vera-induced treatments (T1, T2, T3, and T4) resulted in greater body weight gain and improved feed conversion ratio compared to the control group. Therefore, it is recommended to use Aloe vera gel to enhance the meat production performance and improve the carcass of the broiler.

Keywords: Broiler, Aloe vera, growth performance, Carcass characteristics.

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INTRODUCTION

The poultry industry holds a crucial position in Bangladesh, providing employment opportunities and serving as an affordable source of protein for the nation. Chickens are important for both resource-limited communities and commercial farmers. Poultry meat holds a prominent position in the food industry due to its widespread consumption and remarkable versatility. It constitutes a significant portion, approximately 37%, of the total meat production in Bangladesh. Broilers are widely recognized for their outstanding ability to efficiently convert feed into poultry meat within a relatively short period, typically around 35 days. These specialized breeds of chickens have been selectively bred and genetically optimized to exhibit rapid growth and efficient feed utilization. This rapid turnover allows for multiple production cycles, typically 5-6 cycles per

year, resulting in quick returns on investment. Globally, the consumption of chicken meat has been consistently increasing over the years, leading to a substantial growth of 20-30% in production within the past decade [1]. The increase in chicken consumption can be attributed to its affordability and high protein content, which has led to a growing demand for chicken meat. Chicken is widely accepted in most religions and cultures, making it a favorable choice for consumption without any religious or cultural restrictions. Furthermore, there is an increasing concern among meat consumers regarding the quality of the meat they consume. Consequently, it is important to understand how medicinal plants impact the quality of meat. The use of antibiotics has come under scrutiny due to concerns about bacterial resistance. Different types of antibiotics can be used in poultry diets based on their specific requirements. However, the search for

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alternatives in animal feeding arises from the need to find substitutes for antibiotics as growth promoters [2]. This natural supplementation approach offered potential benefits in terms of improved growth, meat yield, and overall carcass quality of poultry. The demand for medicinal plants is on the rise in several countries due to their beneficial attributes for poultry production. Aloe Vera is among the plants that have gained recognition for its nutritional, botanical, and veterinary applications as shown in Fig 1. It has also expanded in popularity in commercial sectors leading to the development of various products due to its antimicrobial and laxative properties [3]. Moreover, Aloe vera, known for its beneficial properties, including antimicrobial, antioxidant, and immunomodulatory effects, has gained attention as a potential natural supplement in animal feed (Amber *et al.*, 2021). From this perspective, the inclusion of Aloe Vera in chicken drinking water can be utilized to enhance both intestinal health and growth performance as a combined effect [4]. Moreover, quality-conscious meat consumers are growing more concerned about the meat they consume,

particularly regarding qualities such as tenderness, juiciness, marbling, color, and flavor. Aloe Vera has been documented to have potential in treating and managing chicken diseases and parasites. However, the specific duration or period of its use in such cases is not explicitly mentioned [5]. Therefore, there is a need to collect up-to-date data regarding the utilization of aloe vera and its impact on the livelihoods of commercial farmers. Furthermore, certain researchers have demonstrated the effectiveness of aloe vera as an antimicrobial agent and in combating helminthes [6]. Aloe vera supplementation in broilers decreased mortality and reduced feed costs by 6.2 to 13.5% (Islam *et al.*, 2019). Even, Aloe Vera Supplementation in drinking water at 20 ml/liter could successfully replace antibiotics in Turkey (Bolu *et al.*, 2013). Nevertheless, the effects of aloe vera on the growth performance and meat quality of chickens have not been adequately established. Thus, this study aims to investigate the effects of supplementing Aloe vera (*Aloe barbadensis* miller) on broiler chickens' growth performance and carcass characteristics.

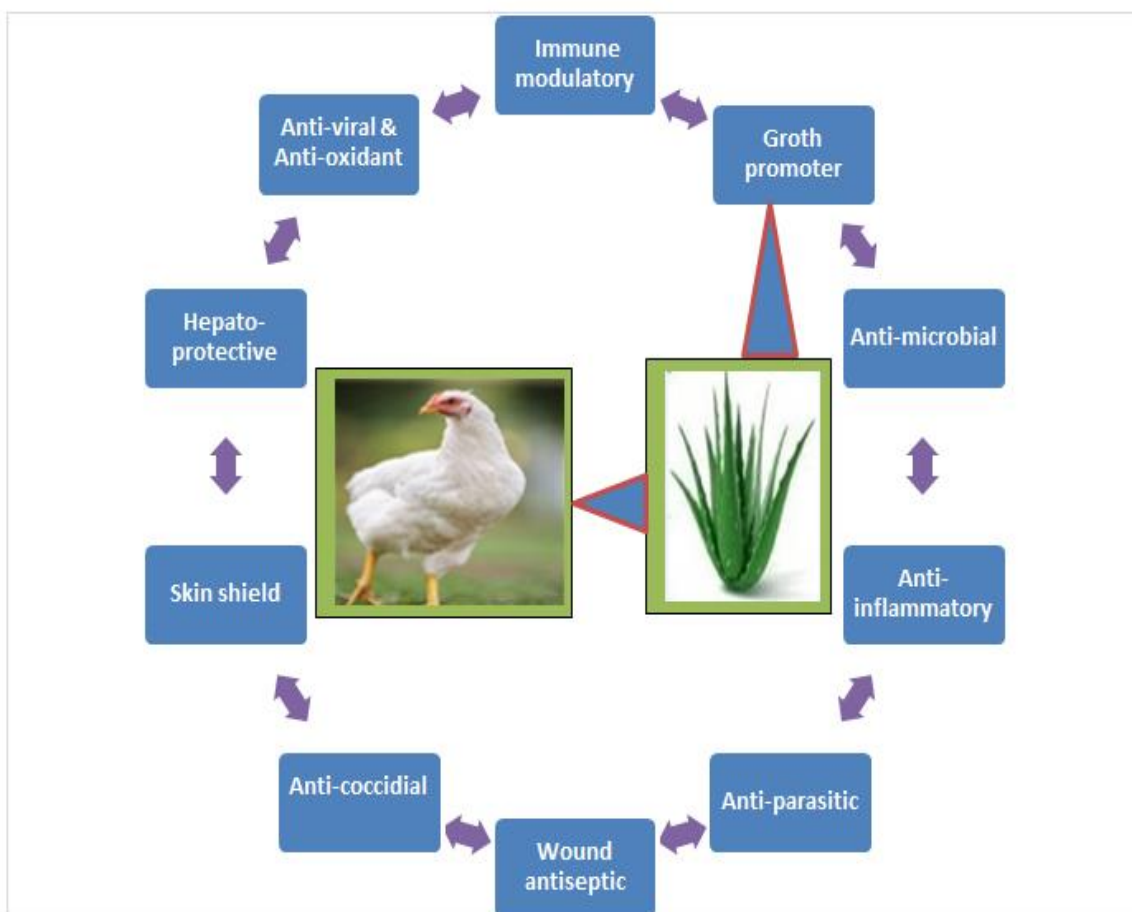


Figure 1: Aloe vera is classified as a 'Nature tonic' since it has a variety of constituents that have beneficial functions on both animals and humans

MATERIALS AND METHODS

The experiment was conducted at Bismillah poultry farm in Peipur Village, ZakigongUpazila,

Sylhet district, using 90-day-old "Lohman strain" commercial broiler chicks (n=90). The broilers were reared on a littered floor for a period of five weeks. The primary aim of the research was to evaluate the effects

of supplementing Aloe vera on various factors, including the growth performance, feed conversion ratio, carcass yield, and physicochemical properties of broiler meat. A total of 90 broiler chickens were randomly assigned to four treatment groups and a control group. Each treatment group and control group had three replications, with six broilers per replication. Aloe vera gel was added to the diets at different concentrations for each treatment group: 0.1% for T1, 0.2% for T2, 0.3% for T3, and 0.4% for T4. The control group (T0) did not receive any Aloe vera gel supplementation.

Collection and preparation of Aloe vera

A total of 23cm (9 inches) long Aloe vera leaves were purchased from the local market and washed with fresh water. One leaf was used on the first day, and the remaining leaves were saved for later use. The thinnest and pointed section of the leaf was removed and discarded using a sharp knife, as extracting gel from this part would be time-consuming. The base of the leaf was cut off, and any yellow ooze, known as aloe latex, was carefully cleaned off as it contains laxative properties that could potentially disrupt the digestive system. The edges of the leaf were also trimmed off to ensure the thorough removal of any unwanted portions. The Aloe vera leaf was placed flat on a cutting board to extract the gel, and the peel was gently removed. To minimize gel loss, an incision was made along the spine of the leaf. The knife was then inserted between the cut leaf and the thick, transparent gel in the center. The top layer of the gel was flipped to the bottom, and the process was repeated to extract the gel effectively. The leftover gel was stored in an airtight container and refrigerated for later use in the broiler feeds. In the control group, the broilers were fed a basal diet without any additives.

Collection of experimental broiler chicks

A total of 90 Lohman meat-type day-old chicks (DOC) were obtained from Kazi Agro Complex Limited, Sylhet. The chicks underwent a thorough examination to ensure they were free from any deformities and had a uniform size. Special care was taken to maintain consistent weights among the chicks. For the experiment, eighteen chicks were randomly allocated to five treatment groups, with each group consisting of three replicates.

Management of experimental birds

Prior to the experiment, the poultry house was thoroughly cleaned and disinfected using a combination of bleaching powder, tap water, and n-alkyl dimethyl benzyl ammonium chloride (Timsen TM) solution. This step is essential in maintaining effective broiler house management to prevent the accumulation and spread of disease agents within the poultry shed. The broiler birds were housed in a well-ventilated shed with absorbent bedding on the floor. A specially designed electric brooder with a chick guard was used to provide a

suitable environment for chick brooding. Throughout the study, the birds were given access to commercial feed and clean water without any restrictions to fulfill their nutritional requirements. The feeding schedule included three meals per day, and watering was carried out twice daily in the morning and evening. The amount of feed consumed was determined by measuring the quantity provided and calculating the remaining residue after a 24-hour period. In addition, strict medication protocols and biosecurity measures were meticulously implemented to ensure the health and well-being of the birds.

Data collection and Calculation

Feed conversion ratio (FCR)

The FCR was calculated as the total feed consumption divided by weight gain in each replication.

$$FCR = \text{FeedIntake (KG)} / \text{WeightGain (KG)}$$

Live weight gain

The average body weight gain of each replication was calculated by deducting the initial body weight from the final body weight of the birds.

$$\text{Bodyweightgain} = \text{FinalWeight} - \text{InitialWeight}$$

Dressing percentage

The dressing yield was determined by subtracting the weight of blood, feathers, head, shank, and digestive system from the bird's live weight. The giblet, which includes the liver, heart, gizzard, and neck, was considered separately. The dressing percentage of the bird was calculated using the following formula:

$$DP = \text{DressingYi (gm)} / \text{LiveWeigh (gm)} \times 100$$

Dressing yield= breast, thigh, drumstick, back, wing, giblet, abdominal fat weight (g)

Statistical analysis

All the data obtained during the study were collected, tabulated, and analyzed in alignment with the research objectives. Preliminary data calculations were performed using the Excel program. The collected data were then subjected to statistical analysis using the Statistical Package for Social Sciences (SPSS) software, specifically version 16.0. To assess the differences between means, a one-way analysis of variance (ANOVA) was conducted. Subsequently, Duncan's multiple comparison tests were employed to determine significant variations between the means. The significance level was set at $P < 0.05$, indicating that differences with less than 5% probability were considered statistically significant.

RESULTS AND DISCUSSION

Weekly Feed consumption (WFC) rate of broiler

The total feed consumed by different treated groups and control groups has been showed in Table 4. The results indicate that the T4 group had the highest

feed consumption, with an average of 1263.23g ± 8.45. On the other hand, the T0 group had the lowest feed consumption, with an average of 1200.30g ± 4.52. The T2, T1, and T3 groups consumed 1223.83g ± 2.10, 1225.20g ± 8.74, and 1250.84g ± 3.18, respectively, during the fifth week of the study. The analysis of the total feed consumption revealed significant differences (P > 0.05) between the treatment groups and the control group. These findings partially supported the research conducted by previous researchers [6], who also

supplemented broiler drinking water with Aloe Vera and observed an increase in average feed intake. Mansoub (2011) reported a notable increase in the digestibility and absorption of amino acids when incorporating Aloe vera plants into bird feed. The study also highlighted that the inclusion of Aloe vera supplements improved the secretion of pancreatic and digestive enzymes, leading to enhanced nutrient absorption.

Table 1: Effects of aloe vera on feed consumption (g/bird) of broiler at different weeks (n=18, Mean ± SE)

Treatments	1st week FC	2 nd week FC	3 rd week FC	4 th week FC	5 th week FC
T ₀	178.70 ^c ±.263	396.29 ^b ±8.74	778.80 ^c ±3.38	1002.80 ^c ±6.23	1200.30 ^c ±4.52
T ₁	180.30 ^b ±.745	376.85 ^c ±2.10	738.82 ^c ±4.98	1009.46 ^a ±8.21	1225.20 ^b ±8.7
T ₂	180.39 ^b ±.463	384.20 ^b ±4.58	790.43 ^b ±4.80	1004.30 ^b ±4.54	1223.83±2.10
T ₃	184.45 ^a ±.920	410.80 ^a ±3.18	792.49 ^b ±4.49	1007.83 ^a ±2.43	1250.84 ^b ±3.2
T ₄	185.41 ^a ±3.32	431.33 ^a ±8.45	802.33 ^a ±11.7	1011.20 ^a ±19.8	1263.23 ^a ±8.4
Mean±SE	181.85±3.18	399.89±6.45	780.57±6.87	1007.12±4.17	1232.64±6.45

Here, SE= Standard Error, T0 = Control group with basal diets, T1=0.1% aloe vera gel mixed with diets, T2= 0.2% Aloevera gel mixed with water, T3 = 0.3% Aloe vera gel mixed with diets, T4 = 0.4% Aloe vera mixed with diets. The mean with different superscripts is significantly different (P<0.05). The mean within the same superscripts doesn't differ (P>0.05) significantly. Means significance at a 5% level of significance (P<0.05).

Effects of Aloe vera on water consumption of broiler (ml/bird)

Water intake by different treatment groups in 35 days of the rearing period of birds in the different aloe vera concentration levels was shown in Table 5. During the first week water intake by the T4 group is

high and the T1 group is low. Water intake is comparatively higher in T1, T3, T4, T4 group in 2nd, 3rd 4th and 5th week respectively. The result is similar to the previous researcher's no significant difference (P> 0.05) in water intake using aloe vera in groups [12].

Table 2: Effects of aloe vera on water intake of broiler shown below (n=18, Mean ± SE)

Treatments	1st week	2nd week	3rd week	4th week	5th week
T ₀	530±0.78	1014±31.50	1300±63.50	2230±52.90	3060±23.37
T ₁	528±1.53	1021±20.47	1247±53.97	2190.76±53.47	3151.7±33.30
T ₂	531± 0.58	1017±23.50	1330±39.30	2100±50.30	3090.47±30.4
T ₃	528± 0.88	986.67±23.47	1340±57.03	2200.37±87.19	3235±52.19
T ₄	531.44±.38	981.67±33.83	1262±36.52	2246±25	3390±32
Mean±SE	529.68±0.83	1004.06±26.55	1295.80±50.06	2193.27±53.77	3185.43±34.25

Effects of Aloe Vera on body weight gain

The effects of aloe vera on the growth performance of the broiler in all the treatments group are presented in Table 6. The average body weight gain (in grams) observed in different weeks for each treatment group is as follows: T0 - 157.28 ± 2.28g, T1 - 361.79 ± 3.79g, T2 - 548.73 ± 10.31g, T3 - 728.936 ± 11.22g, and T4 - 804.58 ± 12.22g. The body weight gain from the first week to the fifth week ranged from 157.28 ± 2.28g to 804.58 ± 12.22g. Among all the groups, the T4 group exhibited the highest average body weight gain of 812.28 ± 19.72g, while the T2 group, treated with 0.2% aloe vera gel, had the lowest average body weight gain of 798.72 ± 23.65g. Supplementing broiler chicks with aloe vera at concentrations of 108, 109, and 1010cfuAloevera/kg resulted in a similar body weight gain compared to the supplemented (treatment) group, which recorded a body weight gain of 2230 ± 17.40g, in contrast to the non-

supplemented (control) group. These results suggest that the addition of aloe vera to the broiler diet positively influenced body weight gain, with the T4 group demonstrating the highest growth performance.^[7]Supplemented Aloe vera (T2 0.05%, 0.05% Aloe vera, and Bio-moss 0.1%) in broiler chicks increase the body weight gain supplemented in (treatment) group 2274 ±18.6g in comparison to non-supplemented group (control) [8]. These findings are consistent with previous studies where broilers were supplemented with aloe vera in their drinking water, and similar results were observed regarding the increase in final body weight [6, 9]. According to the studies conducted by Bernard *et al.*, (2016), Darabighane *et al.*, (2011), and Nalge *et al.*, (2017), the addition of Aloe vera gel extract in drinking water is more beneficial in improving broiler performance compared to the treated with antibiotic growth promoters (virginiamycin). This improvement was observed without any detrimental

effects on the overall health of the birds. Although other studies have shown that the addition of 0.5% garlic to the diet of broilers has a positive effect on their growth [10]. However, the study reported that feeding garlic powder at higher levels of 1.5%, 3%, and 4.5% did not significantly impact the birds' performance. The present findings of our study align with the results obtained by

Mehala and Moorthy in 2008 who investigated the effects of combining Aloe vera and Curcuma longa (turmeric) at different levels on weight gain. Their findings indicated that varying the levels of Aloe vera and Curcuma longa (combining) did not result in a significant difference in the body weights gain [11].

Table 3: Effects of aloe vera on body weight gain (BWG) (g/bird) of broiler at different weeks (n=18, Mean ± SE)

Treatments	1 st week BWG	2 nd week BWG	3 rd week BWG	4 th week BWG	5 th week BWG
T ₀	152.90±6.42	352.75±3.61	502.82±30.47	750.62±8.71	800.9 ^b ±20.71
T ₁	151.88±5.81	355.40±10.16	533.52±25.83	690.98±23.65	800.23 ^b ±10.35
T ₂	154.30±2.21	357.78±8.66	570.73±5.14	698.99±9.35	798.72 ^c ±23.65
T ₃	160.55±5.24	370.80±6.55	565.33±12.45	751.37±20.71	810.78 ^a ±8.71
T ₄	166.75±1.63	372.23±10.88	571.23±19.84	752.72±19.71	812.28 ^a ±19.72
Mean±SE	157.28±2.28	361.79±3.79	548.73±10.31	728.93±11.22	804.58±12.22

Effects of aloe vera on a feed Conversion ratio of Broiler

The feed conversion ratio (FCR) of broilers in different treatment groups is presented in Table 7. In the first week, there were no significant differences (P>0.05) in FCR among the treated groups and the control group. However, in the second and third weeks, the control group (T₀) had higher FCR values compared to the other groups. In the fourth week, the control group had a lower FCR than the other groups, while the T₄ treatment group had a higher FCR. In the fifth week, the control group had the highest FCR, while the T₄ treatment group had the lowest FCR. The outcomes of this study align with the similar findings of Islam *et al.*, (2003), as they observed notable enhancements in feed conversion rate (FCR) when incorporating different amounts of Aloe vera gel and powder into broiler feed. Notably, the T₄ group, which was supplemented with 0.4% aloe vera gel in their feed, showed the lowest and best FCR. Based on previous research, Aloe vera used a water concentration of 1-3% and achieved a certain

FCR percentage, while the current study used a lower water concentration of 0.1-0.4% but obtained a more or less similar FCR percentage [12]. The study's results suggest that using a lower water concentration of 0.1-0.4% still resulted in a favorable FCR percentage. This could indicate that Aloe vera plants in this study were efficient in utilizing water and converting feed into desirable outcomes. Moreover, Aloe vera is believed to possess antibacterial, anticoccidial, and immunomodulatory properties that contribute to improved intestinal health and performance in animals (Islam *et al.*, 1988). These properties may result in increased nutrient absorption and ultimately lead to lower feed conversion ratios (FCR). It is worth mentioning that the results of the first week are contradictory to a previous study [13], where broilers were fed with a combination of aloe vera powder (0.1% and 0.2%) and Curcuma longa powder (0.1% and 0.2%) have reported no significant differences in FCR for the first week of treatment.

Table 4: Effects of aloe vera on a feed Conversion ratio of broiler meat (n=18, Mean ± SE)

Treatments	1 st week BWG	2 nd week BWG	3 rd week BWG	4 th week BWG	5 th week BWG	Mean±SE
T ₀	1.20±0.03	1.16 ^a ±0.02	1.56±0.08	1.35 ^c ±0.06	1.52±0.02	1.36 ^a ±0.04
T ₁	1.19±0.01	1.13 ^b ±0.01	1.36±0.04	1.48 ^a ±0.05	1.42±0.04	1.32 ^b ±0.03
T ₂	1.15±0.04	1.04 ^c ±0.02	1.30±0.01	1.43 ^b ±0.06	1.43±0.02	1.27 ^c ±0.03
T ₃	1.11±0.01	1.03 ^c ±0.03	1.40±0.03	1.45 ^a ±0.03	1.41±0.01	1.28 ^c ±0.02
T ₄	1.10±0.03	1.10 ^b ±0.04	1.28±0.09	1.40 ^b ±0.02	1.37±0.04	1.25 ^c ±0.04
Mean±SE	1.15±0.02	1.09±0.02	1.38±0.05	1.42±0.04	1.43±0.03	1.3±0.03

Effects of aloe vera on carcass parameter of broiler:

The effects of aloe vera on carcass characteristics of broiler chickens, including eviscerated weight percentage, giblet percentage, breast meat percentage, drumstick percentage, and edible percentage, were examined and presented in Table 8. Among the different treatment groups, T₄ exhibited a higher eviscerated weight percentage of 59.00%±0.58 compared to the other groups. On the other hand, the T₀ treatment group, which received basal diets, had the lowest eviscerated weight percentage of 55.37%±0.33.

The highest giblet percentage of 8% was observed in the T₁ group, which was treated with 0.1% aloe vera gel mixed with the diets, while the lowest giblet percentage of 7% was found in the T₄ group treated with 0.4% aloe vera gel mixed with the diets. The T₂ group, treated with 0.2% aloe vera gel, showed the highest breast meat percentage, whereas the T₁ group, treated with 0.1% aloe vera gel mixed in the diets, exhibited the lowest breast meat percentage. The drumstick percentage ranged from 13% to 16%, with the highest value observed in the T₂ group and the

lowest in the T1 group. The edible portion of the birds was significantly higher ($P < 0.05$) in the T3 group, with a percentage of $67.0058\% \pm 0.$, compared to the T0, T1, T2, and T4 groups. The T0 group had an edible portion percentage of 63.00%, the T1 group had $64.00\% \pm 0.58$, the T2 group had $65.67\% \pm 0.33$, and the T4 group had $65.67\% \pm 0.67$. The numerical findings of the present study contradict the results reported by Islam *et al.*, (2003), who observed an increase in carcass yield and

no impact on breast weight when supplementing broiler diets with Aloe Vera gel and powder. These findings compared with previous research, where other researchers have reported increased dressing percentages when different levels of aloe gel were supplemented in drinking water. The present findings demonstrate a higher degree of similarity to the current results, which enhances the effectiveness and reliability of our data.

Table 5: Effects of aloe vera on carcass parameter of broiler (n=18, Mean \pm SE)

Treatments	*Eviscerated weight %	*Giblet %	**Breast meat %	**Drumstick %	*Edible %
T ₀	55.37 ^c \pm 0.33	7.9 ^a	42.57 ^b \pm 0.37	15.00 ^b	63.00 ^c
T ₁	56.34 ^b \pm 0.58	8.0 ^a	40.67 ^c \pm 0.85	15.33 ^a \pm 0.33	64.00 ^c \pm 0.58
T ₂	57.33 ^b \pm 0.58	7.44 ^c \pm 0.334	43.50 ^a \pm 0.33	13.00 ^c \pm 0.58	65.67 ^b \pm 0.33
T ₃	58.00 ^a \pm 0.68	7.50 ^b	43.00 ^a	16.00 ^a	66.00 ^a \pm 0.58
T ₄	59.00 ^a \pm 0.58	7.00 ^b	42.57 ^b \pm 0.33	14.00 ^b \pm 0.33	65.67 ^b \pm 0.67
Mean \pm SE	57.208 \pm 0.55	7.568 \pm 0.067	42.462 \pm .376	14.666 \pm .41	64.868 \pm 0.376

SUMMARY AND CONCLUSION

The experiment showed no significant differences ($P > 0.05$) in average water intake between the treated and the control groups. However, the T4 group consumed a higher amount of feed, while the T0 group consumed a lower amount. The total feed consumption differed significantly ($P > 0.05$) between the treatment and control groups. During the first week, the T4 group had higher water intake, while the T1 group had lower water intake compared to the other groups. From the second to the fifth week, water intake was comparatively higher in the T1, T2, T3, and T4 groups. Statistically significant differences ($P < 0.05$) were observed in body weight, feed consumption, body weight gain (BWG), and feed conversion ratio (FCR) of the birds treated with Aloe vera gel. The T4 treatment group, which received 0.4% aloe vera gel in the diets, showed higher average body weight gain, while the T2 treatment group, which served as the control group with 0.2% Aloe vera gel in drinking water, had lower average body weight gain. The highest average feed conversion ratio (FCR) of $1.36a \pm 0.04g$ was found in the T0 control group, which received basal diets, while the lowest average was observed in the T4 treatment group, which received 0.4% Aloe vera gel in the diets. Moreover, Aloe vera can achieve a similar or higher FCR percentage with a lower water concentration range. In terms of carcass characteristics, T4 had a higher eviscerated percentage compared to the other treatment groups, while the T0 group had the lowest percentage among the groups receiving basal diets. The T1 group, treated with 0.1% aloe vera gel mixed with diets, had the highest giblet percentage, while the T4 group, treated with 0.4% aloe vera gel mixed with diets, had the lowest giblet percentage. The T2 group, treated with 0.2% aloe vera gel, exhibited the highest breast meat percentage, whereas the T1 group, treated with 0.1% aloe vera gel mixed in the diets, had the lowest breast meat percentage. The drumstick percentage ranged from 13% to 16%, with the highest value

observed in the T2 group and the lowest in the T1 group.

Overall, adding Aloe vera gel positively affected the growth performance and carcass characteristics of the broiler chickens. It improved growth performance naturally, without the need for any chemical substances, while also addressing concerns about resistance. The application of Aloe vera gel in drinking water had the best overall effect on broiler growth performance and carcass characteristics at 35 days of age. The effectiveness of incorporating Aloe vera into broiler feeds depends on various influences, such as the dosage, various compositions of the diet, broiler genetics, the form of Aloe vera used, and several other considerations. Further research is warranted to explore the underlying mechanisms responsible for these effects and determine the optimal dosage and duration of Aloe vera supplementation in broiler diets.

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