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Assessment of *Acinos arvensis* Leaf Powder as a Natural Replacement for Chemical Antibiotics in Hubbard Broilers: Effect on Growth, Nutrient Utilization and Blood Parameters

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ABSTRACT

This research examined how well *Acinos arvensis* leaf powder (AALP) can perform as a natural feed additive instead of synthetic antibiotics in broiler chickens. The trial used 200 one-day-old Hubbard broiler chicks that were allocated randomly to 5 different treatment groups created by means of Completely Randomized Design (CRD) of 4 replicates per treatment with each replicate having 10 chicks. The treatment groups included: T1 (negative control); T2 (positive control group with 25 g/kg Neomycin addition to basal diet); T3, T4 and T5 (treatment groups with AALP addition at the rate of 30, 60 and 90 g/kg and basal dietary formulation). The phytochemical analysis of AALP indicated high levels of flavonoids (809.2 mg/g) and phenolic compounds (313.5 mg/g) as well as tannins (112.4 mg/g), alkaloids (76.44 mg/g), saponins (189.5 mg/g) and steroids (100.2 mg/g). During the period of 42 days of trial, growth rate and digestibility showed a clear tendency of increasing alongside with the AALP supplementation level in diets. The greatest weight gain at the end of the trial period and best Feed Conversion Ratio (FCR) were observed in T5 treatment group being significantly superior over the negative control (T1) group and surpassing Neomycin group (T2). Digestibility ratio values for dry matter, crude protein, ether extract, ash and crude fibres showed the higher results in T3 – T5 treatment groups due to the positive influence of the polyphenolic profile of AALP on the digestive system performance. Hematological indices including PCV, Hb, RBC, WBC, and lymphocytes were estimated to be higher in T3-T5 than those in T1, as well as intermediate in T2, but still complied with the normal physiological limits. This shows that *Acinos arvensis* leaf powder exhibits a high level of safety, as well as has very high effectiveness as an immunomodulator leading to growth, and it is capable of being a complete substitute for synthetic antibiotics in broiler production.

Keywords: *Acinos arvensis*, Phytogenics, Neomycin, Nutrient Digestibility, Hematology, Broiler Performance.

1. INTRODUCTION

An increase in cases of antimicrobial resistance attributed to the persistent use of Antibiotic Growth Promoters (AGPs) has become a worldwide epidemic (Alagbe et al., 2020). In addition to the presence of harmful residues in animal products, synthetic antibiotics are hazardous to human health and the environment (Alagbe et al., 2020). This has led to current research in animals focusing on proving the safety of natural feed additives, especially phytogenic feed supplements (Muritala et al., 2022). While synthetic products like Neomycin can fight off pathogens effectively, their indiscriminate use leads to constant selective tension on pathogenic organisms (Hernandez and Alagbe, 2025a). The effects of Neomycin can be observed via its functions in eliminating non-beneficial bacteria's that are capable of causing negative in the intestinal flora. Although this will lead to a reduction in the competition for nutrients within microbiomes residing in the gastrointestinal tract, the use of the antibiotic frequently results in the loss of the mucosal layer and reduction of bacteria diversity in the gut (Singh et al., 2022). Lastly, when the antibiotic is used long-term, it may kill those microorganisms that play an important role in improving the metabolic function and absorption of nutrient by the host (Singh et al., 2021).

It is now essential to discover certain, underused plant resources with wide curative abilities, capable of promoting growth, with preserving birds' welfare. Among possible nature-based substitutes is the implementation of such medicinal plant as *Acinos arvensis*. *Acinos arvensis* is a strong medicine and aromatic plant of the family Lamiaceae, which is widely spread throughout a majority of European, American and Asian regions and territories (Kaya et al., 1999a, 1999b). Its leaves include several phytoactive compounds like phenol, flavonoids, tannins, alkaloids, saponins and steroid substances (Couladis et al., 2002). The presence of these substances in the leaves assists in the destruction of pathogens (certain gram-positive and gram-negative bacteria) (Kaya et al., 1999c), in addition to their antioxidant, immune-modulatory, anti-cancerous, anti-diarrheal, anti-helminthic and liver-protective actions (Ojediran et al., 2024a). Leaf infusion from *Acinos arvensis* have been used for the treatment of toothache, abdominal pain, headache, and sexually transmitted infections (Duru et al., 2004).

Research has shown that the inclusion of herbs such as *Polyalthia longifolia*, *Moringa oleifera*, neem, mango leaf and several others to poultry diet may promote performance, preserve the quality of meat, improve stability of resistance toward stressor and also boost blood values (Muritala et al., 2022; Hernandez and Alagbe, 2025b; Ayodele et al., 2022; Falowo, 2022; Shittu et al., 2024; Emmanuel and Alagbe, 2026a, 2026b, 2026c). It was indicated that inclusion of *Albizia lebbeck* on diet of broilers at 50 g/kg diet increase intestinal villus height as well as enhance the release of endogenous digestive enzyme (i.e. Amylase, trypsin and lipase). Besides that, while some antibiotic may create micro-toxicity to the tissue of liver and change profile of blood, it is commonly seen that phytogenic often maintain red blood cells and white blood cells index (Ayodele et al., 2022).

Although *Acinos arvensis* shows promise, little has been published about its systemic supplementation in commercial broiler production, let alone interactions with the Hubbard strain. Providing these data, the present study will establish an objective replacement to chemical growth promoters with a safe and all-natural food source.

2. MATERIALS AND METHODS

Experimental Area Description

The study was conducted in the College of Agricultural Sciences, Gandhi Research Institute, Rajasthan, India. The region is located between North-Western part of India with 69° 29′ to 78° 17′ longitude (Yadav et al., 2023). The study was carried out between Jan – March, 2026.

Ethical Approval and Pre-Experimental Operations

The trial was conducted under strict compliance with the College's guidelines for the management of birds. The deep-litter brooding house was thoroughly swept, washed with water and detergent mixed with Aquaclean followed by disinfection with a double strength Morigad® + Cleacare® (1:1 to 20 liter's of water) 2 weeks before the stocking of the birds to eliminate bacteria's and other pathogens. Foot bath was also prepared at the entrance of the pen to maintain biosecurity.

Collection and botanical Identification of *Acinos arvensis* leaves

The Collection and Botanical Identification of *Acinos arvensis* Collection: Fresh, mature, plant parts viz leaves were collected from the natural habitat of acinos arvensis. Voucher specimen of the plant was then sent to the biological science Department, Gandhi College of

agriculture, Rajasthan, India and got validated by botanist (Mr. Ram Singh) and given catalogue no. AAD/2-23A/2001 and conserved in Institutions' herbarium.

Processing of *Acinos arvensis* Leaf

Harvested *A. Arvensis* leaves were sorted for foreign debris removal, washing with distilled water after brushing off any attached soil particle under tap water . Clean A. Arvensis leaves were laid on a plastic tray to air dry under well ventilated, shaded pavilion, at the ambient temperature of 25°C - 28°C for 16 days until constant weight and then grinding into fine particles by laboratory hammer mill (1.0 mm mesh screen with impact breaker and classifier) and saved as powder form as AALP, stored at 4°C in well sealed light protected Amber polyurethane bags for preventing from photo-oxidation for inclusion into feed.

Broiler birds, management and feeding trial

A total number of 200 day old commercial broiler chicks (Hubbard strain) of both sexes and average body weight 50.55±0.12g was selected for present trial. The chicks were obtained from a recognized breeding farm of Rajasthan State, India. Upon their arrival at the center, day old broiler unsexed commercial broiler chicks were uncaged and arranged into five dietary treatments according to Complete Randomized Design (CRD) in quadruplicate. The each treatment contained10 birds per replication (n=40 birds per treatment) were allocated and distributed in deep litter system house as previously sanitized. Inside pens the temperature was around 330C during first week (using chick-guiders and electric heating bulbs) gradually reduced at the rate of 2.50C per week and then followed up to 240C temperature in the pen throughout the trial. Live vaccines were administered against New castle Disease (ND) and Infectious Bursal Disease (IBD) on their specific age according to localized epidemiological calendar adopted locally. Clean water and ration were available ad-lib throughout 42 days of experiment.

Diet formulation

The basal (standard) rations were isocaloric, isonitrogenous and met the NRC (1994) requirements for Broiler starter and finisher. Dietary treatments were as described with the following labels applied to the 5 experimental dietary groups:

Treatment 1 (T1): Standard feed alone (Negative Control)

Treatment 2 (T2): Standard feed + Neomycin antibiotic at 25 g/kg of diet (Positive Control)

Treatment 3 (T3): Standard feed + AALP at 30 g/kg of diet

Treatment 4 (T4): Standard feed + AALP at 60 g/kg of diet

Treatment 5 (T5): Standard feed + AALP at 90 g/kg of diet

Growth Performance Parameters

Body Weight Gain (BWG) =Final Body Weight − Initial Body Intake

Feed Intake (FI) =Total Feed Offered−Total Feed Leftover

Feed Conversion Ratio (FCR) = Total feed consumed ÷ Body weight gain

Nutrient Digestibility trial

At 42nd day of trial, five birds from each treatment group were transferred into individual metabolic cages to facilitate Collection of Excreta. Feaces of birds in metabolic cages were collected for a duration of 7 days where the initial two days acted as the adaptation period and the last 5 days are the collection period. Whole day's excreta output per bird were collected, measured and then Oven-dried at 60C for 72h. Then it was pooled per group and stored in separate plastic bags for further analysis. Oven dried feed samples were immediately taken to the lab for the analysis for Determination of Dry matter (DM), Crude Protein (CP), Crude fibre (CF), Ether Extract (EE), Ash as per AOAC official analytical methods (2000). Apparent nutrient digestibility per cent was then computed according to the following Formula by the use of direct calculation method:

$$\text{Apparent digestibility (\%)} = (\text{Nutrient intake Nutrient excreted} / \text{Nutrient intake}) \times 100$$

Blood Collection and haematological studies

On day 42 the blood samples were drawn from the 5 randomly selected birds/treatment used for Haematological studies. Each sample consisted of 2.5mL of collected blood at time from the bronchial vein by sterile hypodermal needles; then the blood collected in sample

tubes add with ethylene diamine tetraacetic acid (EDTA) to act as anticoagulant, were mixed by gentle inversion until homogenous, kept in an ice pack until carried to the laboratory for analysis. The Haematological profile included were: PCV, Hb, RBC count, WBC and Lymphocyte count was measured by Mindray BC-2800 Vet Auto Hematology Analyzer (Mindray Bio-Medical Electronics Co., Shenzhen, China), which set at absorption 540 nm, CV<1.5, Sensitivity: down to 0.1g/dL. The procedure follows was as specified in user's manual.

Statistical Analysis

The data obtained (growth performance, nutrient digestibility and blood profile) were subjected to one way of Analysis of Variance (ANOVA) using GLM (General Linear Model) procedure of SPSS (Version 22.0). Variances between treatment were significant by using Duncan's Multiple Range Test at $p<0.05$.

3. RESULTS AND DISCUSSION

3.1. Results

In Table 1, the chemical characteristics on leaf powder of *Acinos arvensis* reported the flavonoid compounds found as 809.2 mg/g and phenol as 313.5 mg/g. The values found for tannin are 112.4 mg/g, alcaloids 76.44 mg/g, saponin 189.5 mg/g and steroid was 100.2 mg/g with flavonoid > phenols > saponins > tannin > steroid > alcaloids respectively as presented in the Figure 1.

Table 1. Chemical Composition of Standard diet Utilized in the Experiment

Feedstuffs	Amount (%)	Amount (%)
Maize	50.00	52.00
Corn barn	2.70	4.70
Soybean meal	32.00	28.00
Fish meal	5.00	2.00
Limestone	3.00	4.00
Bone meal	6.00	8.00
Min-Vitamin Premix	0.25	0.25
Methionine	0.25	0.25
Lysine	0.25	0.25
Salt	0.35	0.35
Toxin binder	0.20	0.20
Total	100.0	100.0
Analyzed values (%)		
Crude protein	23.08	21.02
Ether extract	4.20	3.80
Crude fibre	3.48	3.91
Calcium	1.17	1.18
Phosphorus	0.53	0.57
Methionine	0.57	0.56
Lysine	1.13	1.14
Metabolizable Energy (kcal/kg)	2986.7	3109.8

Each 2.5 kg of vitamins and minerals combination contains: Vit. A 6000000 IU, Vit.B1 2000mg, Vit.B24000mg, Vit.D3 900.000 IU, Vit E 40.000mg, Vit. K3 2000 mg, Pantothenic acid 10.000mg; Nicotinic acid, 50.000g; Vit. B6 2000 mg; Vit. B12 10 mg, Folic acid 3.0g, Biotin 50 mg, Cu 5g, choline 250.000mg, Mn 60g, Fe 50g, Co 0.1 g, Se 0.1 g, Zn 50 g and Iodine 0.2 g

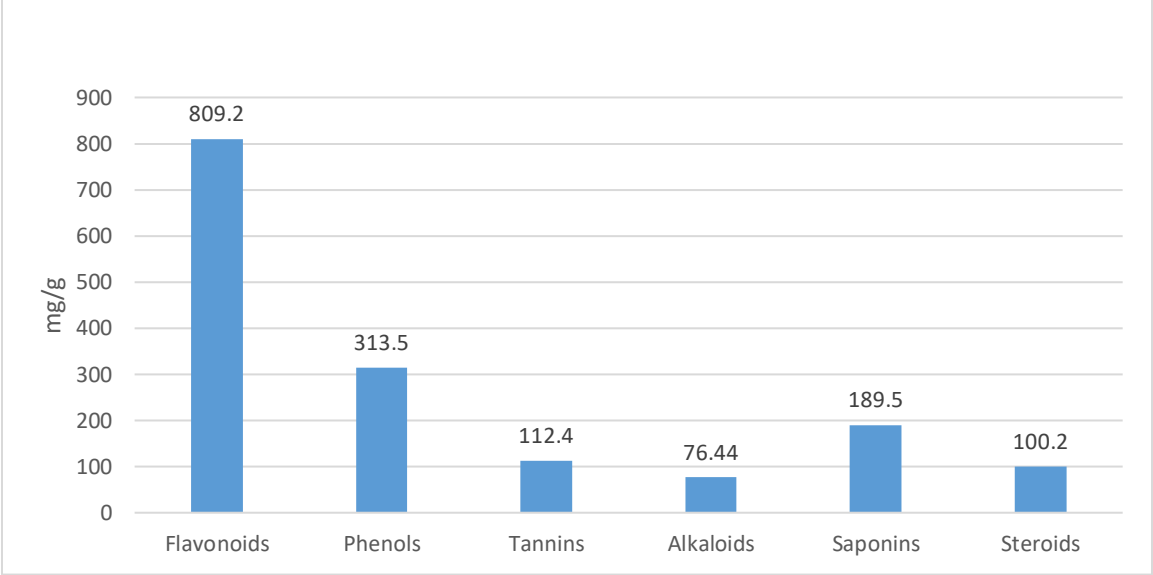

Figure 1. Phytochemical composition of *Acinos arvensis* leaf powder

Growth performance of broiler chickens fed diet with *Acinos arvensis* leaf powder is revealed in Table 2. Average daily gain (ADG) and average daily feed consumption values follow similar pattern. Average daily weight gain in T1 (41.81 g) was lower than T2 (49.57 g), T3 (49.50 g), T4 (50.05 g) and T5 (50.67 g) ($P<0.05$). Similarly, average daily feed intake was higher in T5 (119.1 g) than T4 (112.2 g), T3 (112.1 g), T2 (111.9 g) and T1 (103.1 g) ($P<0.05$). Feed conversion ratio ranged from 2.00 – 2.46 and its value was higher in T1, intermediate in T2 through T4 and lower in T5 (($P<0.05$).

In Table 3, apparent digestibility of broiler chickens fed diet supplemented with *Acinos arvensis* leaf powder showed that dry matter (70.80 – 83.01 %), crude protein (69.64 – 80.92 %), crude fibre (48.17 – 58.48 %), ether extract (39.86 – 50.06 %) and ash (42.56 – 57.53 %) were highest in T5, intermediate in T2 through T4 and lowest in T1 ($P<0.05$).

Haematological indices of broiler chickens fed diet supplemented with *Acinos arvensis* leaf powder is displayed in Table 4. Pack cell volume, red blood cell, haemoglobin, white blood cell and lymphocyte concentrations were influenced ($P<0.05$) by the treatment and their values varied from 28.73 – 33.97 %, 10.33 – 12.19 ($\times10^6$/L), 9.50 – 12.91 g/dL, 2.98 – 4.72 ($\times10^9$/L) and 2.41 – 3.75 ($\times10^9$/L) respectively.

Table 2. Growth performance of broiler chickens fed diet supplemented with *Acinos arvensis* leaf powder

Parameters	T1	T2	T3	T4	T5	SEM
Duration of the experiment	42	42	42	42	42	-
Number of birds	50	50	50	50	50	-
Initial body weight (g/b)	51.22	50.89	51.14	50.55	50.67	0.01
Final body weight (g/b)	1807.1^{c}	2132.8^{b}	2150.7^{b}	2152.8^{b}	2566.8^{a}	108.2
Body weight gain (g/b)	1755.9^{c}	2081.9^{b}	2099.6^{b}	2102.3^{b}	2516.1^{a}	98.74
Average daily weight gain (g/b)	41.81^{c}	49.57^{b}	49.50^{b}	$50.05b^{a}$	59.90^{a}	0.08
Cumulative feed intake (g/b)	4331.4^{c}	4700.2^{b}	4711.2^{a}	4712.8^{a}	5005.1^{a}	161.3
Average daily feed intake (g/b)	103.1^{c}	111.9^{b}	112.1^{a}	112.2^{a}	119.1^{a}	0.13
Feed conversion ratio	2.46^{a}	2.25^{b}	2.24^{b}	2.24^{b}	2.00c	0.02

^{abc} Means on the same row having different superscripts are significantly different ($P < 0.05$)

Treatment 1 (T1): Basal feed alone (Negative Control)

Treatment 2 (T2): Basal feed + Neomycin antibiotic at 25 g/kg of diet (Positive Control)

Treatment 3 (T3): Basal feed + AALP at 30 g/kg of diet

Treatment 4 (T4): Basal feed + AALP at 60 g/kg of diet

Treatment 5 (T5): Basal feed + AALP at 90 g/kg of diet

Table 3. Apparent digestibility of broiler chickens fed diet supplemented with *Acinos arvensis* leaf powder

Parameters	T1	T2	T3	T4	T5	SEM
Dry matter	70.80^{c}	78.94^{b}	79.02^{b}	79.67^{b}	83.01^{a}	0.09
Crude protein	69.64^{c}	73.56^{b}	75.11^{b}	75.19^{b}	80.92^{a}	0.07
Crude fibre	48.17^{c}	51.64^{b}	55.09^{b}	56.11^{b}	58.48^{a}	0.03
Ether extract	39.86^{c}	44.89^{b}	46.66^{b}	47.23^{b}	50.06^{a}	0.02
Ash	42.56^{c}	53.90^{b}	55.16^{b}	56.09^{b}	57.53^{a}	0.02

^{abc} Means on the same row having different superscripts are significantly different ($P < 0.05$)

Treatment 1 (T1): Basal feed alone (Negative Control)

Treatment 2 (T2): Basal feed + Neomycin antibiotic at 25 g/kg of diet (Positive Control)

Treatment 3 (T3): Basal feed + AALP at 30 g/kg of diet

Treatment 4 (T4): Basal feed + AALP at 60 g/kg of diet

Treatment 5 (T5): Basal feed + AALP at 90 g/kg of diet

Table 4. Haematological indices of broiler chickens fed diet supplemented with *Acinos arvensis* leaf powder

Parameters	T1	T2	T3	T4	T5	SEM
PCV (%)	28.75^{b}	30.09^{a}	33.76^{a}	33.84^{a}	33.97^{a}	0.02
RBC ($\times 10^{6}$/L)	10.33^{b}	12.00^{a}	12.05^{a}	12.11^{a}	12.19^{a}	0.01
Hb (g/dL)	9.50^{b}	12.50^{a}	12.68^{a}	12.72^{a}	12.91^{a}	0.01
WBC ($\times 10^{9}$/L)	2.98^{b}	4.05^{a}	4.61^{a}	4.68^{a}	4.72^{a}	0.001
Lymphocytes ($\times 10^{9}$/L)	2.41^{b}	3.02^{a}	3.46^{a}	3.57^{a}	3.75^{a}	0.001

^{abc} Means on the same row having different superscripts are significantly different ($P < 0.05$)

Treatment 1 (T1): Basal feed alone (Negative Control)

Treatment 2 (T2): Basal feed + Neomycin antibiotic at 25 g/kg of diet (Positive Control)

Treatment 3 (T3): Basal feed + AALP at 30 g/kg of diet

Treatment 4 (T4): Basal feed + AALP at 60 g/kg of diet

Treatment 5 (T5): Basal feed + AALP at 90 g/kg of diet

3.2. Discussion

The phytochemial analysis of *Acinos arvensis* shows extremely high concentration of biologically active ingredients which act in driving these physiologoical responses of the selected treatments. Flavanoids is strong antioxidant, which enhance morphological villi by promoting nutrient digestion and nutrient Absorption, and neutralize effects of free radicals (Singh et al., 2021, Ojediran et al., 2024a). Phenol has strongly antibacterial activities which could disintegrate bacterial cells membrane thereby hindering proliferation of the organism, it is stimulate secreting digestive enzyme (Singh et al., 2022). Moderate concentration of tannins have the ability to exert mild astrigent action that help to modulate transit time through the GI tract, maintain appropriate GI integrity and reduced inflammatory responses (Ojediran et al. 2024b, Hernandez and Alagbe, 2025b). Alkaloids are healthiness to promote a healthy GI system whereas, sapone is improve cell memrbrane permeability enhancing absorbability and steroids helps to promote a balanced metabolism.

The excellent improvement in broiler performance of (*Acimos arvensis*; 90 g/kg, T5) to both the antibiotic fed birds (T2), negative control (T1), strongly confirms the existence of synergistic effect between dietary phytogenic ingredients that manipulate growth performance via altering avian intestine flora. It has been generally accepted that bioactive phytonutrients like flavonoids and phenols contained in *Acimos arvensis* (flavonoids = 809.2 mg/g, phenols = 313.5 mg/g) exert powerful physiologic alterations on the mucosa structure such as enhancing villus height, increasing the depth of the intestinal crypts, which enhance the total absorptive surface area (Abd El-Hack et al., 2016, Alagbe, 2026). In opposition, chemical antibiotic like Neomycin (25 g/kg), stimulate intestinal performance principally thru killing broadly the intestinal microbial population; While *A. Arvensis* leave can selectively kill the bad gut microorganisms (due to its compounds' membrano-lytic activities), It can also, however, stimulate secretion of endogenous enzymes (amylase from pancreas, enterokinase from intestinal lining, trypsin, etc.), these endogenous enzymes play pivotal roles in digestion and nutrient absorption, which will lead to a more efficient nutrient conversion into productive tissue hence low (FCR), In comparison to poor (FCR) of T1. T5 (90 g/kg, Aa) achieved lowest (FCR), which coincide with Adeyemi et al., (2021) who found improved efficiency of food conversion in broiler chicks fed supplement with *Crassocephalum crepidioides* leaves. In a same direction, Oloruntola et al., (2022)

also reported increased final body weight of the broilers fed on different concentrations of *Anacardium occidentale* leaves. Feed conversion range (FCR) from 2.00 to 2.46 in the current study falls within acceptable level reported by Liu *et al*. (2022) with an FCR of 2.00 to 2.50 birds treated with *Macleaya cordata* extract.

In this investigation, it is observed that the apparent digestibility of DM, CP, EE, CF and Ash at Different Treatments at various stage have been improved on Treatments (T3-T5) as against any of the Other Treatment (T3- T5 > T2 > T1) at the conclusion of trial (Day 42). This was probably an indication for the existence of potentiality and synergy in the action of some phyto-compounds in the leaf powder of *Acino arvans*. Enhanced apparent Crude Protein and Dry Matter Digestibility of T3- T5 showed a multiplication of activities of normal gut bacteria and non existence of gut irritation in the intestinal tissue allowing the use of absorb nutrient for growth and metabolic activity instead for intestinal tissue respond to inflammation and injury (Adewale et al., 2021; Alagbe and Anorue, 2006). The phyotochemicals assist to facilitate Bile acid secretion promoting a more effective hydrolysis of Crude Fiber. The phyochemicals found in (*Acinos arvensis*) stimulate effective transport of digested nutrient across the intestinal cell membranes which lead higher (ash) utilization (Mineral absorption) by activating increased penetration capacity across a biological membrane due to the property of some phytochemicals like saponins and steroids to enable emulsification of the diet and to increase intestinal and/or biliary secretion, thereby increasing the extent and rate of digest fat (Musa et al., 2020). This present finding conforms with the report of Falowo (2022) on evaluation of the benefits of phytobiotic and synbiotic feed additives on the performance of broiler chicken. Also, Olafadehan *et al*. (2020) reported that dry matter and crude protein values of 79.06–85.00 % and 68.00 – 82.00% were obtained for different levels of *Daniellia oliveri* extract in Broiler.

Dietary treatment altered significantly all the examined haematological parameter $P<0.05$ including Packed cell volume, haemoglobin (PCv) concentrations (hb), red blood cell (rbc), White blood cell, lymphocyte count. Although all were within normal value reference range of healthy bird according to Hoffmann et al. (2015). The pcv value, hb and rbc were observed to be within normal biological acceptable values that include (28.00 - 37.00 %), (6.50 - 13.00 g/dL) and (1.58 - 3.28) × 10^{12} /l for PCv Hb and Rbc respectively reported by Chand et al. (2018); Oyawoye and Ogunkunle (2004). Increased pcv, rbc and hb values indicates to adequate supply of both iron and oxygen for efficient transporting of absorbed nutrients into cells of animals for their maintenance (Alagbe, 2026). The results show lack of any chronic diseases in all treatments. White blood cell are immune cell which play an immune role that is to protect your body against disease, infections, and inflammation (Daniel et al., 2023; Alagbe et al., 2020). Low white blood cells make it difficult to fight of infections due to insufficient antibodies in the body. White blood cell and lymphocytes values were within the normal limits of broiler chickens (1.20 - 5.00 (10^6 /l) and 2.00 - 4.00 (10^6/l respectively), according to Schalm et al. (1975); Swenson (1970); Mitruka and Rawnsley (1977).

4. CONCLUSION

In conclusion, *Acinos arvensis* leaf powder (AALP) has proven to be a potent, safe, and highly effective medicinal plant especially its supplementation at 90 g/kg (T5) diet which significantly improved final body weight gain and the lowest (most efficient) Feed Conversion Ratio (FCR), outperforming both the un-supplemented negative control (T1) and the synthetic Neomycin antibiotic group (T2). Apparent digestibility for Dry Matter, Crude Protein, Ether Extract, Crude Fibre, and Ash were optimized in T5, driven by the synergistic action of high flavonoids and phenols in stimulating endogenous enzyme secretion and stabilizing gut integrity. Haematological parameters in all the treatment were all within the standard reference range for healthy birds.

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Author Contributions

Alagbe Olujimi John, designed the work, laboratory analysis and correction of manuscripts, Togun Mary, Aliyu, K.I, Agubosi O.C.P and Daniel Anorue did the statistical analysis, data collection and correction of manuscript.

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Conflict of interest

The authors declare that they have no conflicts of interest, competing financial interests or personal relationships that could have influenced the work reported in this paper.

Ethical approval

In this article, the animal regulations are followed as per the ethical committee guidelines of College of Agricultural Sciences, Gandhi Research Institute, Rajasthan, India; the authors observed the *Acinos arvensis* Leaf Powder as a Natural Replacement for Chemical Antibiotics in Hubbard Broilers. The Animal ethical guidelines are followed in the study for species observation & identification. (Ethical approval code: ASD/2091/008H).

Informed consent

Not applicable.

Data availability

All data associated with this study will be available based on the reasonable request to corresponding author.

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