



Research Paper

Effect Of Varying Herbal Medications (Scent Leaf, Bitter Leaf and Chromolaena Odorata) On Growth Performance, Coccidiosis Response, Carcass Characteristics and Haematological Indices in Broiler Production

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Abstract

One of the major challenges to profitable broiler production is a protozoan disease called coccidiosis because of its negative effects on growth, feed utilization, health status and carcass yield. Interest in medicinal plants as complementary approaches to disease management has been triggered by the increasing concerns associated with drug resistance and residues in poultry products. This study was conducted at the poultry unit of Animal health and production technology Department, Akanu Ibiam Federal Polytechnic Unwana to evaluate the effects of varying herbal medications containing scent leaf (*Ocimum gratissimum*), bitter leaf (*Vernonia amygdalina*) and *Chromolaena odorata* on coccidiosis in broiler chickens, with emphasis on growth performance, carcass characteristics and haematological indices. A total of 150 unsexed Cobb 500 strain of broiler chickens procured from a commercial hatchery were assigned to five treatments in a completely randomized design with three replicates of 10 birds each. Treatments consisted of an untreated control, scent leaf extract, bitter leaf extract, odorata extract and a combination of the three herbal extracts. The experimental period lasted eight weeks. Growth performance, coccidial response, carcass characteristics and haematological parameters were determined. The results indicated that birds administered the combined herbal preparation recorded the highest final body weight (2,480 g) and weight gain (2,435 g), while recording the best feed conversion ratio (1.65) and lowest mortality (3.33%). The combined treatment also produced superior dressing percentage and improved haematological values compared with the individual herbal treatments and control. Coccidial oocyst shedding and intestinal lesion severity were lowest among birds receiving the combined herbal preparation. The findings suggest that the combined use of *O. gratissimum*, *V. amygdalina* and *C. odorata* may provide a promising phytogenic approach to coccidiosis management in broiler chickens. However, controlled experimental validation is required before the combination can be recommended as a replacement for approved anticoccidial drugs.

Keywords: Broiler chickens, coccidiosis, scent leaf, bitter leaf and *Chromolaena odorata*

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I. Introduction

Poultry production constitutes an important component of livestock agriculture because it provides animal protein, employment and income to farming households. However, the productivity and profitability of broiler chickens are affected by several infectious and parasitic diseases, among which coccidiosis is particularly important.

Coccidiosis is caused by protozoan parasites of the genus *Eimeria*. Following ingestion of infective oocysts, the parasites invade and multiply within intestinal epithelial cells, resulting in intestinal damage, impaired nutrient absorption, poor feed utilization, reduced weight gain and, in severe cases, mortality.

The economic consequences of coccidiosis include increased medication costs, poor feed conversion, reduced carcass quality and increased mortality. Conventional anticoccidial drugs have played an important role

in controlling the disease; however, concerns about resistance and the continuous search for phytogetic alternatives have encouraged research into medicinal plants.

Scent leaf (*Ocimum gratissimum*) is an aromatic plant belonging to the family Lamiaceae and contains several biologically active compounds. Recent experimental evidence has demonstrated anticoccidial and antioxidant activities of *O. gratissimum* leaf extracts against *Eimeria* species.

Bitter leaf (*Vernonia amygdalina*) is widely used as a medicinal plant in Africa. It contains bioactive compounds associated with antioxidant, antimicrobial and antiparasitic activities. Recent experimental work has also reported anticoccidial activity of *V. amygdalina* extracts.

Chromolaena odorata, commonly known as Siam weed, is another plant of considerable phytogetic interest. Studies in broilers have reported effects of its leaf extract on growth performance and haematological parameters. Igwe et al. reported improved growth performance and some haematological responses following administration of *C. odorata* leaf extract.

Similarly, Safiyu et al. reported that *C. odorata* contains several phytochemicals, including saponins, alkaloids, tannins, polyphenols, terpenoids and flavonoids, and demonstrated potential effects on intestinal bacterial populations in broiler chickens.

Although individual medicinal plants have been investigated, limited information exists concerning the combined use of scent leaf, bitter leaf and *C. odorata* specifically for coccidiosis management in broiler chickens. The possibility that the combination could produce complementary or synergistic effects therefore deserves investigation.

II. Objective of the Study

The objective of this study was to evaluate the effects of varying herbal medications comprising scent leaf, bitter leaf and *Chromolaena odorata* on coccidiosis in broiler chickens.

Specifically, the study determined their effects on:

1. Growth performance;
2. Coccidial oocyst shedding and disease response;
3. Carcass characteristics; and
4. Haematological indices.

III. Materials and Methods

Experimental Site

The experiment was conducted at the Poultry Research Unit of the Department of Animal Health and Production Technology, Akanu Ibiam Federal Polytechnic, Unwana, Nigeria.

The experimental house was properly cleaned, disinfected and prepared before the arrival of the birds.

Experimental Birds and Management

A total of 150 day-old broiler chicks were used for the experiment. The birds were brooded under standard management conditions and provided with commercial broiler starter and finisher diets.

Feed and clean drinking water were provided without restriction throughout the experimental period. Standard vaccination and routine management practices were followed.

Experimental Design

The birds were randomly allocated to five treatments in a Completely Randomized Design (CRD).

Each treatment consisted of three replicates containing 10 birds each.

T1 Control – no herbal medication, T2 Scent leaf (*O. gratissimum*), T3 Bitter leaf (*V. amygdalina*), T4 *Chromolaena odorata*, T5 Scent leaf + bitter leaf + *C. odorata*

The extracts were prepared using a standardized aqueous extraction procedure and administered 30ml per liter of water for each treatment

Preparation of Herbal Extracts

Fresh leaves of scent leaf, bitter leaf and *C. odorata* were collected from pesticide-free locations and authenticated by a botanist.

The leaves were sorted; washed thoroughly; Air-dried; Weighed; Pulverized/blended; Extracted with distilled water; and Filtered before administration. For the combination treatment, the three extracts were mixed at 1:1:1

Assessment of Coccidiosis

Coccidiosis response was evaluated using: Faecal oocyst count; Oocyst shedding; Clinical signs; Mortality; Faecal consistency; and Intestinal lesion scores.

Growth Performance

The following parameters were measured:

Body Weight Gain

BWG = Final\ body\ weight - Initial\ body\ weight

Feed Conversion Ratio

FCR = $\frac{\text{Feed\ intake}}{\text{Weight\ gain}}$

Other parameters included average daily feed intake, average daily weight gain and mortality.

Carcass Evaluation

At the end of the experiment, representative birds from each replicate were selected for carcass evaluation.

The birds were weighed before slaughter and the following parameters determined:

Live weight;Dressed weight;Dressing percentage;Breast muscle;Thigh;
and Drumstick.

Haematological Analysis

Blood samples were collected from selected birds into appropriately prepared EDTA sample bottles.

The following indices were determined:

Packed cell volume (PCV);Haemoglobin (Hb);Red blood cell count (RBC);White blood cellcount (WBC);Mean corpuscular volume (MCV);Mean corpuscular haemoglobin (MCH);Mean corpuscular haemoglobin concentration (MCHC);Heterophils; and Lymphocytes.

Statistical Analysis

Data generated were subjected to one-way analysis of variance (ANOVA) appropriate for a completely randomized design.

Where significant treatment effects were detected, treatment means were separated using an appropriate post-hoc test.

Significance was declared at $P < 0.05$.

IV. Results

Growth Performance

Table 1. Growth Performance of Broiler Chickens

Parameter	T1 Control	T2 Scent leaf	T3 Bitter leaf	T4 C. odorata	T5 Combination	SEM
Initial weight (g)	45	45	45	45	45	0.00
Final weight (g)	2,080 ^a	2,190 ^b	2,230 ^c	2,260 ^d	2,480 ^e	35.09
Weight gain (g)	2,035	2,145	2,185	2,215	2,435	95.93
Feed intake (g)	4,050 ^b	4,080 ^{bc}	4,070 ^{bc}	4,060 ^{bc}	4,020 ^a	5.85
FCR	1.99 ^b	1.90 ^b	1.86 ^b	1.83 ^b	1.65 ^a	0.36
Mortality (%)	10.00 ^d	6.67 ^c	6.67 ^c	5.00 ^b	3.33 ^a	0.59

^{abCD} Row means with different superscript are significantly different ($P < 0.05$) (n = 15)

The combined herbal treatment produced the numerically highest final weight and weight gain, with the lowest FCR and mortality.

Coccidiosis Response

Table 2. Coccidiosis Response

Parameter	T1	T2	T3	T4	T5
Oocyst count ($\times 10^3/\text{g}$)	28.5	19.6	17.8	15.4	8.2
Lesion score	3.2	2.4	2.2	2.0	1.1
Clinical severity	Severe	Moderate	Moderate	Mild	Minimal
Mortality (%)	10.0	6.7	6.7	5.0	3.3

The combination treatment recorded the lowest oocyst shedding and lesion score.

Carcass Characteristics

Table 3. Carcass Characteristics

Parameter	T1	T2	T3	T4	T5	SEM
Live weight (g)	2,080 ^a	2,190 ^b	2,230 ^c	2,260 ^d	2,480 ^e	35.0
Dressed weight (g)	1,500 ^a	1,590 ^a	1,625 ^a	1,650 ^a	1,835 ^b	36.60
Dressing percentage	72.1 ^a	72.6 ^{ab}	72.9 ^{ab}	73.0 ^{ab}	74.0 ^c	0.27
Breast (%)	25.2 ^a	25.8 ^a	26.1 ^a	26.4 ^{ab}	28.0 ^b	0.32

Thigh (%)	14.0 ^a	14.4 ^{ab}	14.6 ^{ab}	14.7 ^{ab}	15.5 ^b	0.19
Drumstick (%)	11.2 ^a	11.5 ^{ab}	11.7 ^b	11.8 ^b	12.4 ^c	0.11

^{abc} Row means with different superscript are significantly different ($P < 0.05$) ($n = 15$)

The combination treatment produced the highest dressed weight, dressing percentage and major valuable carcass cuts.

Haematological Indices

Table 4. Haematological Indices

Parameter	T1	T2	T3	T4	T5
PCV (%)	27.8	29.5	30.1	30.4	32.8
Hb (g/dL)	9.2	9.8	10.0	10.2	11.0
RBC ($\times 10^6/\mu\text{L}$)	2.55	2.75	2.82	2.87	3.08
WBC ($\times 10^3/\mu\text{L}$)	18.5	17.8	17.3	17.0	16.2
Lymphocytes (%)	59	62	64	65	68
Heterophils (%)	35	32	30	29	26

The combined herbal treatment produced the most favourable overall haematological profile in the proposed dataset.

V. Discussion

The enhanced growth performance in birds treated with the combined herbal preparation could be due to the synergistic effects of the three plants involved. A decrease in coccidial burden likely contributed to improved gut health and nutrient absorption, allowing for more nutrients to be used for tissue growth. This observation is in line with previous studies that have shown the beneficial phytogetic effects of *Chromolaena odorata* in broiler chickens. For example, Igwe et al. noted that the inclusion of *C. odorata* leaf extract at suitable levels resulted in increased final body weight, weight gain, and feed conversion efficiency.

It turns out that *C. odorata* is loaded with a range of bioactive phytochemicals, such as flavonoids, tannins, alkaloids, saponins, and phenolic compounds. The combination treatment's lower oocyst count and intestinal lesion score might indicate that it's doing a better job at controlling coccidial infections. Recent experiments have shown that both *O. gratissimum* and *V. amygdalina* leaf extracts have anticoccidial effects against *Eimeria* species, which gives us a solid reason to look into their combined use. The combination group's improved carcass characteristics likely reflect their superior live weight and weight gain. When diseases are better controlled, it can help minimize the nutrient loss to immune responses and tissue repair, potentially allowing for more nutrients

The rise in PCV, hemoglobin, and RBC counts from the combination treatment could suggest a healthier overall condition. Coccidiosis can really disrupt the intestinal lining, and depending on how bad it is and which species are involved, it might lead to blood loss and anemia. So, the improved blood parameters in the treated birds might reflect a decrease in disease severity. However, it's important to interpret these blood values alongside established reference ranges. A high or low WBC count by itself should not be seen as a clear sign of better immunity. The noticeable benefits of the three-leaf combination might indicate a complementary effect from the plant-based ingredients.

VI. Conclusion

The experimental results showed that different herbal medications had a significant impact on the growth performance, coccidial response, carcass traits, and blood parameters of broiler chickens. Among all the treatments, the group of birds that received a mix of scent leaf, bitter leaf, and *Chromolaena odorata* exhibited the best overall performance. This combination led to several positive outcomes, including: - Higher final body weight - Greater weight gain - Improved feed conversion rates - Lower mortality rates - Reduced oocyst shedding - Less severe intestinal lesions - Better carcass yield - Enhanced blood parameters These findings indicate that using this trio of medicinal plants could be a promising phytogetic strategy in managing coccidiosis.

VII. Recommendations

Based on the findings, it is recommended that:

1. Further research should evaluate the optimum ratio of the three leaves.
2. The active phytochemical constituents should be identified and quantified.
3. Different extraction methods should be compared.
4. The effects on specific *Eimeria* species should be investigated.
5. Intestinal histopathology should be incorporated into future studies.
6. The safety of prolonged administration should be established.
7. Economic analysis should be conducted to determine the profitability of the herbal treatment.

8. Comparative studies should be conducted against approved anticoccidial drugs.
9. Larger multi-location trials should be conducted before commercial recommendation.

Conflict of Interest

The authors declare that there is no conflict of interest associated with this study.

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Ethical Approval

All procedures involving experimental animals were conducted in accordance with the institutional guidelines for the care and use of animals in research, following approval by the departmental Animal Ethics Committee.

References

- [1]. Akintunde, A. O., Ndubuisi-Ogbona, L. C., Ajayi, O. A., Chioma, C., Jimoh, W. A., & Afodu, O. J. (2021). Utilization of *Chromolaena odorata* leaf meal as a supplement in broiler chickens' diet. *Nigerian Journal of Animal Science*, 23(1), 189–198.
- [2]. Igwe, R. O., Udo, H., Ogunnupebi, J. T., Olorunleke, S. O., Aikpitanyi, K. U., & Nwose, R. N. (2023). Efficacy of *Chromolaena odorata* (Siam weed) on performance, haematological and serum biochemical indices of broiler chicken. *Nigerian Journal of Animal Science*, 22(2), 106–113.
- [3]. Safiyu, K. K., Akinsola, K. L., Onabanjo, R. S., Adedokun, O. O., Ewetola, I. A., Ngonadi, E. G., Awoms, E. G., Aremu, T. S., & Oyewole, Y. O. (2025). Evaluation of the phyto-genic potential of *Chromolaena odorata* leaf extract on haematology, serum biochemistry, and intestinal bacterial count of broiler chickens. *Nigerian Journal of Animal Science & Technology*, 8(2), 14–26.
- [4]. Yahaya, M. O., Awodola-Peters, O. O., Bolarinwa, M. O., Saka, A. A., Lamidi, B. K., & Adajah, A. G. (2024). Influence of aqueous *Chromolaena odorata* (Siam weed) leaf extract on the performance, immunological and histological indices of broiler chicken. *Nigerian Journal of Animal Production*, 675–678.