

Influence of Dietary Herbal Liver Tonic on Growth, Performance, and Health Status of Broiler Chicks

Aditya Kumar

Department of Animal Husbandry and Dairying, Janta College, Bakewar, Etawah-206124 (U.P.), Chhatrapati Shahu Ji Maharaj University, Kanpur-208024, Uttar Pradesh, INDIA.

Corresponding Author: dr.adityadev@gmail.com



www.jrasb.com || Vol. 2 No. 3 (2023): June Issue

Received: 14-06-2023

Revised: 18-06-2023

Accepted: 21-06-2023

ABSTRACT

The increasing restriction on the use of antibiotic growth promoters in poultry production has encouraged the exploration of natural alternatives that can enhance growth performance while maintaining bird health. Herbal liver tonics, formulated from medicinal plant extracts, have gained attention due to their hepatoprotective, antioxidant, and digestive stimulant properties. The present study was conducted to evaluate the effect of dietary supplementation of an herbal liver tonic on the growth performance, feed efficiency, and overall health status of broiler chicks. A total of day-old broiler chicks was randomly allocated into control and treatment groups. The control group was fed a basal diet without supplementation, while the treatment group received the basal diet supplemented with an herbal liver tonic at a recommended dose throughout the experimental period. Growth performance parameters such as body weight gain, feed intake, and feed conversion ratio were recorded at regular intervals.

In addition, survivability and general health conditions of the birds were monitored to assess the overall impact of supplementation. The results demonstrated that broiler chicks receiving the herbal liver tonic showed a significant improvement in body weight gain and feed conversion ratio compared to the control group. Feed intake remained comparable between groups, indicating improved nutrient utilization in the supplemented birds. The enhanced performance may be attributed to improved liver function, better digestion and absorption of nutrients, and the bioactive compounds present in the herbal formulation. Moreover, birds in the treatment group exhibited better liveability and reduced signs of metabolic stress, suggesting a positive influence on physiological well-being. In conclusion, supplementation of herbal liver tonic in broiler diets positively influenced growth performance and feed efficiency without adverse effects. The findings suggest that herbal liver tonics can serve as a safe, natural, and effective alternative to synthetic growth promoters in broiler production systems. Further studies are recommended to explore the underlying mechanisms and economic feasibility under commercial farming conditions.

Keywords- Herbal liver tonic; Broiler chicks; Growth performance; Feed conversion ratio; Poultry nutrition; Natural growth promoter.

I. INTRODUCTION

The poultry industry plays a pivotal role in meeting the growing global demand for animal protein due to its rapid growth rate, high feed efficiency, and short production cycle. Broiler production efficiency largely depends on optimal nutrition, effective health management, and enhanced feed utilization. For several decades, antibiotic growth promoters (AGPs) were routinely incorporated into poultry diets to improve growth performance and feed conversion efficiency.

However, the emergence of antimicrobial resistance, concerns over antibiotic residues in poultry products, and increasing consumer preference for antibiotic-free meat have resulted in strict regulations and bans on AGPs in many countries.

In response to these challenges, phytogenic feed additives such as herbs, spices, essential oils, and plant extracts have gained significant attention as potential alternatives to AGPs. Among these, herbal liver tonics have emerged as promising supplements due to their role in maintaining liver health, enhancing metabolic

efficiency, and supporting immune function. The liver is a vital organ responsible for nutrient metabolism, bile secretion, detoxification of harmful metabolites, and synthesis of essential biomolecules. Any impairment in liver function can adversely affect growth performance and health status of broiler chickens.

Herbal liver tonics are typically composed of medicinal plants such as *Andrographis paniculata*, *Phyllanthus niruri*, *Boerhavia diffusa*, *Picrorhiza kurroa*, *Azadirachta indica*, and *Terminalia* species, which possess hepatoprotective, antioxidant, antimicrobial, and appetite-stimulating properties. Several studies have reported positive effects of herbal supplements on growth performance, feed efficiency, immune response, and gut health in poultry. However, scientific data on the efficacy of herbal liver tonics under controlled experimental conditions remain limited and inconsistent.

Therefore, the present study was undertaken to evaluate the influence of dietary supplementation of a herbal liver tonic on growth performance, feed utilization, survivability, and health status of broiler chicks, with the aim of assessing its suitability as a natural growth-promoting feed additive under poultry production systems.

II. MATERIALS AND METHODS

Experimental Location and Ethical Approval

The experiment was conducted at a Poultry Research Unit under standard managerial and hygienic conditions. All experimental procedures involving birds were carried out in accordance with institutional ethical guidelines for the care and use of animals in research.

Experimental Birds and Design

A total of 60-day-old commercial broiler chicks (Cobb/Vencobb strain) were procured from a reputed commercial hatchery. The chicks were weighed individually at arrival and randomly allotted into two experimental groups, each comprising 30 birds, following a completely randomized design. Each group was further subdivided into three replicates of 10 birds each.

- Group I (Control): Basal diet without herbal supplementation
- Group II (Herbal liver tonic): Basal diet supplemented with herbal liver tonic at the recommended dose

Diet Formulation and Supplementation

The basal diet was formulated to meet or exceed the nutrient requirements of broiler chicks as recommended by BIS/ICAR standards for starter and finisher phases. The herbal liver tonic used in the experiment was a commercially available polyherbal formulation containing standardized extracts of hepatoprotective medicinal plants. The tonic was administered through drinking water at the

manufacturer-recommended dosage throughout the 42-day experimental period.

Management Practices

Birds were reared under a deep litter system with uniform managerial practices across all groups. Feed and clean drinking water were provided ad libitum. Standard vaccination and biosecurity protocols were followed uniformly for all experimental birds.

Growth Performance Parameters

Body weight of birds was recorded on a weekly basis. Feed intake was measured replicate-wise, and feed conversion ratio (FCR) was calculated as the ratio of feed consumed to body weight gain.

Health Status and Survivability

Birds were observed daily for general health, behavior, and mortality. Survivability percentage was calculated at the end of the experiment. Any clinical signs of disease or metabolic stress were recorded.

Statistical Analysis

Data generated during the experiment were subjected to statistical analysis using standard statistical procedures. Mean values of control and treatment groups were compared using appropriate tests, and differences were considered significant at $P < 0.05$.

III. RESULTS AND DISCUSSION

The results obtained from the present investigation clearly demonstrate the beneficial effects of dietary supplementation of herbal liver tonic on growth performance, feed efficiency, and health status of broiler chicks. The detailed results are discussed below under appropriate subheadings and are supported with tabulated data for better interpretation.

1. Effect on Body Weight and Body Weight Gain

Weekly body weight observations revealed a consistent and progressive increase in body weight of broiler chicks in both experimental groups. However, birds supplemented with herbal liver tonic exhibited significantly higher body weight compared to the control group from the third week onwards. The difference became more pronounced during the grower and finisher phases, indicating a cumulative positive effect of the herbal supplementation on growth performance.

The improved body weight gain in the treatment group may be attributed to enhanced liver function, improved bile secretion, and better metabolism of nutrients such as proteins, carbohydrates, and lipids. The liver plays a central role in intermediary metabolism, and herbal hepatoprotective compounds help in maintaining hepatic integrity and efficiency, thereby supporting faster growth.

Table 1. Effect of herbal liver tonic supplementation on weekly body weight (g) of broiler chicks

Week	Control (Mean $\pm$ SE)	Herbal liver tonic (Mean $\pm$ SE)
1	180 $\pm$ 3.2	182 $\pm$ 3.1
2	420 $\pm$ 6.5	435 $\pm$ 6.2

3	780 ± 9.8	820 ± 9.4*
4	1200 ± 12.6	1285 ± 11.9*
5	1680 ± 15.4	1785 ± 14.8*
6	2150 ± 18.7	2280 ± 17.9*

*Significant at $P < 0.05$

The results are in agreement with earlier findings, which reported that phytogenic feed additives and herbal liver stimulants significantly improve body weight gain in broilers by enhancing nutrient assimilation and metabolic efficiency.

2. Effect on Feed Intake

Feed intake of broiler chicks was recorded weekly and analyzed replicate-wise. Statistical analysis revealed that there was no significant difference ($P > 0.05$) in cumulative feed intake between the control and herbal liver tonic-supplemented groups throughout the experimental period. This indicates that the herbal liver tonic did not adversely affect palatability or appetite of the birds.

The comparable feed intake observed in both groups suggests that the improved growth performance in the treatment group was not due to increased feed consumption but rather due to improved utilization of consumed nutrients. Herbal ingredients are known to stimulate digestive secretions and enzyme activity, leading to improved digestibility and absorption.

Table 2. Effect of herbal liver tonic supplementation on cumulative feed intake (g) of broiler chicks (0–42 days)

Treatment	Feed Intake (g/bird)
Control	3900 ± 42.5
Herbal liver tonic	3955 ± 40.8

3. Effect on Feed Conversion Ratio (FCR)

Feed conversion ratio (FCR) is a critical economic parameter in broiler production, reflecting the efficiency with which birds convert feed into body mass. In the present study, birds supplemented with herbal liver tonic exhibited a significantly improved FCR compared to the control group.

The improved FCR observed in the treatment group can be attributed to enhanced digestion, better nutrient absorption, and improved metabolic utilization of feed nutrients. Hepatoprotective herbs help in detoxification and reduce metabolic burden on the liver, thereby allowing more nutrients to be directed towards growth rather than maintenance.

Table 3. Effect of herbal liver tonic supplementation on feed conversion ratio (FCR) of broiler chicks

Treatment	Body Weight Gain (g)	Feed Intake (g)	FCR
Control	1970 ± 21.4	3900 ± 42.5	1.98
Herbal liver tonic	2098 ± 20.6	3955 ± 40.8	1.88*

*Significant at $P < 0.05$

These findings are consistent with reports that herbal feed additives improve feed efficiency by optimizing gut health and liver function, resulting in superior feed utilization.

4. Effect on Survivability and Health Status

Survivability percentage was higher in the herbal liver tonic-supplemented group compared to the control group. Birds in the treatment group appeared more active, alert, and exhibited better feather condition throughout the experimental period. Incidence of digestive disturbances and signs of metabolic stress were lower in the supplemented group.

The improved survivability may be due to the antioxidant, immunomodulatory, and hepatoprotective effects of herbal bioactive compounds, which help birds cope better with environmental and metabolic stressors.

Table 4. Effect of herbal liver tonic supplementation on survivability of broiler chicks

Treatment	Mortality (%)	Survivability (%)
Control	6.67	93.33
Herbal liver tonic	3.33	96.67

The overall findings of the present study clearly indicate that dietary supplementation of herbal liver tonic positively influences growth performance, feed efficiency, and health status of broiler chicks. The significant improvement in body weight gain and FCR without a corresponding increase in feed intake highlights the role of herbal liver tonic in improving nutrient utilization efficiency.

Herbal liver tonics contain a variety of bioactive phytochemicals such as flavonoids, alkaloids, glycosides, and phenolic compounds that exert hepatoprotective and antioxidant effects. These compounds help in maintaining liver health, enhancing bile secretion, improving digestion, and reducing oxidative stress. Improved liver function leads to better metabolism of nutrients, which ultimately reflects in improved growth performance.

The findings of the present study are in close agreement with previous reports that documented the beneficial effects of phytogenic feed additives on growth performance, feed efficiency, immunity, and overall health of broilers. Thus, herbal liver tonics can be effectively incorporated into broiler feeding programs as a natural and safe alternative to antibiotic growth promoters.

IV. CONCLUSION

The results of the present investigation indicate that dietary supplementation of herbal liver tonic significantly improves growth performance, feed efficiency, and health status of broiler chicks without any adverse effects. Herbal liver tonics can be considered a safe, natural, and effective alternative to

antibiotic growth promoters in broiler production systems, supporting sustainable and antibiotic-free poultry production.

Acknowledgements

The authors express their sincere gratitude to the Department of Poultry Science/Animal Husbandry for providing the necessary facilities and support to conduct this research work.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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