



Efficacy of Ganorich, a Garlic-Oregano-Cinnamon-Based Phytogenic Additive, on Growth, Carcass Yield, and Immunity in Broiler Chickens

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Abstract

In response to global restrictions on antibiotic growth promoters (AGPs) in animal production, phytogenic feed additives have emerged as promising alternatives. This study evaluates the efficacy of Ganorich-a proprietary herbal blend of garlic (*Allium sativum*), oregano (*Origanum vulgare*), and cinnamon (*Cinnamomum spp.*) on growth performance, carcass characteristics, and immunity in broiler chickens. A total of 240 Cobb 400 broilers were divided into four groups: control and three test groups receiving Ganorich at 0.5, 1.0, and 1.5 g/kg feed. The trial lasted 42 days. Results showed significant improvement ($P < 0.05$) in body weight, feed conversion ratio (FCR), dressing percentage, and blood biochemical profiles in treated groups, particularly at 1.0 and 1.5 g/kg inclusion levels. Ganorich supplementation reduced mortality and enhanced total protein, albumin, and white blood cell count, while lowering serum cholesterol. These findings suggest Ganorich as an effective phytogenic feed additive for improving growth and health in broilers.

Keywords: Phytogenic Additive; Ganorich; Broiler Performance; Garlic; Oregano; Cinnamon; Feed Efficiency; Immune Status

Abbreviations

AGP: Antibiotic Growth Promoter; FCR: Feed Conversion Ratio; BWG: Body Weight Gain; WBC: White Blood Cell; DMRT: Duncan's Multiple Range Test; NRC: National Research Council

Introduction

The prohibition of antibiotic growth promoters (AGPs) in live-stock production-particularly enforced by the European Union through Regulation (EC) No. 1831/2003-has prompted a global search for safe, sustainable alternatives that can support growth, enhance health, and improve feed efficiency without contributing to antimicrobial resistance [1]. In this context, phytogenic feed additives-derived from herbs, spices, and essential oils-have garnered increasing attention for their multifunctional properties, including antimicrobial, anti-inflammatory, antioxidant, and digestive-stimulant effects [2].

Among the most promising phytogenic agents, garlic (*Allium sativum*), oregano (*Origanum vulgare*), and cinnamon (*Cinnamomum spp.*) have been extensively investigated. Garlic contains allicin, a sulfur-based compound known for its broad-spectrum antimicrobial activity, hepatic support, and enhancement of nutrient utilization [3,4]. Oregano, rich in carvacrol and thymol, supports intestinal health by modulating the gut microbiota and enhancing mucosal immunity [5,6]. Cinnamon is recognized for promoting gastrointestinal motility and reducing oxidative stress, thereby supporting digestive enzyme activity and nutrient absorption [7,8].

Ganorich, a proprietary polyherbal formulation developed by Aminorich Nutrients B.V., combines garlic, oregano, and cinnamon in optimized ratios. It is available in both powder and liquid forms and is formulated to enhance gut health in broilers by promoting

villus development, microbial balance, and systemic immunity. The synergistic action of its phytoconstituents is expected to deliver cumulative benefits that surpass those of individual plant compounds-resulting in improved growth performance, carcass yield, and immune competence [9,10].

This study was undertaken to evaluate the efficacy of Ganorich Powder at different dietary inclusion levels in broiler diets. Specifically, the objective was to assess its impact on growth performance, feed conversion ratio (FCR), mortality, carcass yield, and selected blood biochemical and immune parameters in Cobb 400 broilers. The ultimate goal was to determine the optimal dosage that enhances broiler productivity while offering a natural, effective alternative to conventional AGPs.

Materials and Methods

The trial was carried out for 42 days at a commercial broiler farm in Haryana, India. Birds were housed in a deep-litter system under standard commercial conditions. Throughout the study, temperature, humidity, ventilation, lighting, and biosecurity were carefully managed to create a uniform and stress-free environment for all groups.

A total of 240 day-old Cobb 400 broiler chicks were procured from a single hatchery to ensure uniformity. On arrival, chicks were weighed, wing-banded for identification, and randomly assigned to four dietary treatments, each with 60 birds divided into three replicates of 20. The control group (T0) was fed a standard corn-soybean meal-based diet, while the other three groups received the same basal diet supplemented with Ganorich Powder at 0.5 g/kg (T1), 1.0 g/kg (T2), or 1.5 g/kg (T3). Ganorich, a blend of garlic, oregano, and cinnamon in optimized ratios, was mixed thoroughly into the feed each day to ensure even distribution.

Birds were raised on clean, dry rice-husk litter, which was turned regularly to maintain aeration and reduce ammonia build-up. For the first 10 days, chicks were brooded under infrared lamps, after which temperature control relied on ambient conditions, supported by ventilation fans. A 23 hours light: 1 hour dark schedule was maintained throughout the trial, and clean water was available at all times.

The feeding program was divided into three phases: starter (day 1-14), grower (day 15-28), and finisher (day 29-42). Diets met or exceeded the nutrient requirements recommended by the National Research Council (1994). Feed was offered ad libitum, and any leftovers were weighed daily to determine consumption.

Growth performance was assessed by recording body weights weekly and calculating feed intake. Feed conversion ratio (FCR) was obtained by dividing total feed intake by total weight gain for each replicate. Health was monitored twice daily, and any mortality was recorded immediately. Dead birds were necropsied to determine probable cause of death.

On day 42, two birds per replicate were randomly selected for carcass evaluation. After a 12-hour fast with water provided, the birds were humanely slaughtered. Dressing percentage, breast yield, thigh yield, and the relative weights of liver and spleen were recorded. Blood samples were taken from the brachial vein of the same birds before slaughter, and serum was analyzed for total protein, albumin, and cholesterol using commercial diagnostic kits. White blood cell counts and lymphocyte percentages were determined using standard hematological methods.

All data were analyzed using one-way ANOVA in SPSS. Differences between treatment means were tested using Duncan's Multiple Range Test, with significance accepted at $P < 0.05$. Results are expressed as mean $\pm$ standard error of the mean (SEM).

Results

Supplementation of Ganorich had a clear and measurable impact on broiler performance, carcass traits, and blood parameters over the 42-day trial period.

Growth performance

Body weight gain increased progressively with higher inclusion levels of Ganorich. As shown in table 1, birds in the T3 group (1.5 g/kg) achieved the highest final body weight at day 42 (3200 ± 30 g), followed by T2 (3080 ± 32 g) and T1 (2950 ± 28 g), all of which were significantly higher ($P < 0.05$) than the control group (2850

± 30 g). The improvement in weight gain was noticeable from the first week and continued throughout the experimental period, suggesting that Ganorich enhanced nutrient utilization and growth efficiency.

Feed conversion ratio (FCR)

Feed efficiency also improved with Ganorich supplementation. Table 2 shows that the lowest FCR was recorded in T3 during the final phase (1.65), while the control group maintained the highest value (1.80). Across all feeding phases, birds receiving Ganorich exhibited better feed conversion, with statistically significant differences (P < 0.05) in most periods. These results indicate that the phytogetic blend improved digestion and metabolic efficiency.

Mortality rate

Cumulative mortality decreased as the inclusion level of Ganorich increased (Table 3). The control group recorded the highest mortality at 6.2%, while T3 had the lowest at 2.8%. Postmortem examinations suggested that reduced mortality in supplemented groups was associated with better gut health and improved immune resilience.

Carcass characteristics

Ganorich supplementation resulted in significant improvements in dressing percentage, breast muscle yield, and thigh yield (Table 4). Birds in T3 recorded the highest dressing percentage (77.5%) and breast yield (24.5%), which were both significantly higher than the control values of 72.5% and 19.8%, respectively (P < 0.05). No adverse effects were observed on liver or spleen weights, confirming that the additive was well tolerated at all tested levels.

Blood biochemical and immune parameters

As presented in table 5, Ganorich supplementation positively influenced several serum parameters. Total protein and albumin concentrations were significantly higher in T2 and T3 compared to the control, indicating improved protein metabolism. Serum cholesterol decreased in a dosedependent manner, with the lowest levels observed in T3 (120 mg/dL). White blood cell counts and lymphocyte percentages were also higher in supplemented groups, reflecting an enhanced immune response.

Discussion

The present study demonstrates that dietary supplementation

Age (Days)	T0 (Control)	T1 (0.5 g/kg)	T2 (1.0 g/kg)	T3 (1.5 g/kg)
7	180 ± 5 g	190 ± 4 g	200 ± 6 g	210 ± 5 g
14	490 ± 10 g	510 ± 9 g	530 ± 8 g	550 ± 10 g
21	990 ± 15 g	1020 ± 12 g	1050 ± 14 g	1100 ± 15 g
28	1620 ± 20 g	1660 ± 18 g	1720 ± 22 g	1780 ± 20 g
35	2250 ± 25 g	2320 ± 22 g	2400 ± 26 g	2500 ± 24 g
42	2850 ± 30 g	2950 ± 28 g	3080 ± 32 g	3200 ± 30 g

Table 1: Body Weight Gain (BWG) Across Treatment Groups.

Age (Days)	T0 (Control)	T1 (0.5 g/kg)	T2 (1.0 g/kg)	T3 (1.5 g/kg)
1-7	1.48 ± 0.02	1.45 ± 0.03	1.42 ± 0.02	1.40 ± 0.02
8-14	1.55 ± 0.03	1.50 ± 0.02	1.47 ± 0.03	1.44 ± 0.02
15-21	1.60 ± 0.02	1.55 ± 0.03	1.50 ± 0.02	1.48 ± 0.03
22-28	1.68 ± 0.03	1.62 ± 0.02	1.58 ± 0.03	1.54 ± 0.02
29-35	1.75 ± 0.02	1.70 ± 0.03	1.65 ± 0.02	1.60 ± 0.03
36-42	1.80 ± 0.03	1.75 ± 0.02	1.70 ± 0.03	1.65 ± 0.02

Table 2: Feed Conversion Ratio (FCR) Across Treatment Groups.

Treatment	Mortality Rate (%)
T0	6.2
T1	4.7
T2	3.5
T3	2.8

Table 3: Mortality Rate Across Treatment Groups.

Parameter	T0 (Control)	T1 (0.5 g/kg)	T2 (1.0 g/kg)	T3 (1.5 g/kg)
Dressing (%)	72.5 ± 1.2	74.2 ± 1.3	76.0 ± 1.5	77.5 ± 1.4
Breast Muscle (%)	19.8 ± 0.5	21.2 ± 0.6	23.0 ± 0.7	24.5 ± 0.6
Thigh Yield (%)	16.5 ± 0.4	17.0 ± 0.5	17.5 ± 0.6	18.0 ± 0.5
Liver Weight (g)	42.0 ± 1.8	43.5 ± 1.7	44.0 ± 1.9	45.2 ± 1.8
Spleen Weight (g)	4.2 ± 0.3	4.4 ± 0.2	4.6 ± 0.3	4.8 ± 0.2

Table 4: Carcass Yield Comparison.

Parameter	T0 (Control)	T1 (0.5 g/kg)	T2 (1.0 g/kg)	T3 (1.5 g/kg)
Total Protein (g/dL)	3.1	3.5	4.2	4.6
Albumin (g/dL)	1.5	1.7	2.0	2.3
Cholesterol (mg/dL)	160	145	130	120
WBC (×10 ³ /mm ³)	9.5	10.2	11.1	11.8
Lymphocytes (%)	55	58	62	65

Table 5: Blood Biochemical and Immune Parameters.

of Ganorich, a garlic-oregano-cinnamon-based phytogetic additive, can significantly improve growth performance, feed efficiency, carcass yield, and immune status in broiler chickens. These effects appear to be dose-dependent, with the most pronounced benefits observed at inclusion levels of 1.0 and 1.5 g/kg of feed.

The improvement in body weight gain and feed conversion ratio observed here aligns with previous research on phytogetic feed additives. Garlic contains allicin, which enhances digestive enzyme activity and promotes better nutrient absorption [3,11]. Oregano, rich in carvacrol and thymol, has been shown to improve intestinal morphology and microbial balance, resulting in better growth performance [12,13]. Cinnamon’s bioactive compounds, including cinnamaldehyde, have been reported to stimulate gastric motility and modulate gut microbiota, contributing to improved feed utilization

[7,14]. The synergistic action of these components likely explains the consistent improvements seen in Tables 1 and 2.

The reduction in mortality rates in supplemented groups, as shown in table 3, is indicative of enhanced health status, possibly due to the antimicrobial and immunomodulatory effects of the phytogetic compounds. Similar findings were reported by Hashemi and Davoodi (2010), who observed reduced incidence of enteric diseases in broilers receiving herbal blends containing garlic and oregano. Phytogetics are known to inhibit the growth of pathogenic bacteria such as *E. coli* and *Clostridium perfringens*, thereby reducing gut inflammation and disease risk [15].

Carcass trait improvements (Table 4), particularly the increased dressing and breast muscle percentages, suggest that Ganorich

supplementation promotes efficient protein accretion. This may be linked to improved nutrient digestibility and amino acid availability, as reported by Jamroz., *et al.* (2003) when oregano oil was used in broiler diets. Importantly, no negative effects on liver or spleen weights were detected, indicating the additive is safe for long-term use at the tested doses.

The biochemical and hematological improvements observed in Table 5 support the notion that Ganorich positively influences metabolic and immune functions. Increased total protein and albumin reflect better protein synthesis and liver function [16], while reduced cholesterol levels are consistent with the hypocholesterolemic effects of garlic and cinnamon documented in poultry studies (Chowdhury *et al.*, 2002; Anderson *et al.*, 2004). Elevated WBC counts and lymphocyte percentages in the supplemented groups indicate an enhanced immune response, which may improve disease resistance [17].

Overall, the findings of this study reinforce the potential of phytogenic feed additives as effective alternatives to antibiotic growth promoters. By improving gut health, nutrient utilization, and immune status, Ganorich offers a natural and sustainable solution for poultry producers aiming to enhance productivity while meeting regulatory and consumer demands for antibiotic-free production. Further research could explore its efficacy under field conditions with varying environmental stressors, as well as its potential synergistic effects when combined with probiotics or organic acids.

Conclusion

The findings of this study clearly demonstrate that Ganorich, a garlic-oregano-cinnamon-based phytogenic feed additive, effectively enhances broiler performance. Supplementation at 1.0 to 1.5 g/kg of feed significantly improved body weight gain, feed conversion efficiency, carcass yield, and immune parameters. Additionally, a reduction in mortality and serum cholesterol, coupled with improved blood protein and lymphocyte levels, indicates both performance and health benefits. The synergistic action of the phytoconstituents-allicin (garlic), carvacrol and thymol (oregano), and cinnamaldehyde (cinnamon)-supports improved gut health, nutrient utilization, and systemic immunity. These findings indi-

cate that Ganorich may serve as a promising natural alternative to AGPs in broiler diets

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Conflict of Interest

The authors declare that there is no conflict of interest related to this study.

Bibliography

1. Windisch W., *et al.* "Use of Phytogenic Products as Feed Additives for Swine and Poultry". *Journal of Animal Science* 86.14 (2008): E140-E148.
2. European Commission. "Regulation (EC) No. 1831/2003 of the European Parliament and of the Council on Additives for Use in Animal Nutrition". *Official Journal of the European Union* L268 (2003): 29-43.
3. Amagase H. "Clarifying the Real Bioactive Constituents of Garlic". *The Journal of Nutrition* 136.3 (2006): 716S-725S.v
4. Issa KJ and Omar JA. "Effect of Garlic Powder on Performance and Lipid Profile of Broilers". *Open Journal of Animal Sciences* 2.2 (2012): 62-68.
5. Botsoglou NA., *et al.* "Effect of Dietary Oregano Essential Oil on Performance of Chickens and on Iron-Induced Lipid Oxidation of Breast, Thigh, and Abdominal Fat Tissues". *British Poultry Science* 43.2 (2002): 223-230.
6. Lee KW., *et al.* "Essential Oils in Broiler Nutrition". *International Journal of Poultry Science* 3.12 (2004): 738-752.

7. Al-Kassie GAM. "Influence of Two Plant Extracts on Broiler Performance". *Pakistan Veterinary Journal* 29.4 (2009): 169-173.
8. Barreto MSR, *et al.* "Plant Extracts Used as Growth Promoters in Broilers". *Revista Brasileira de Ciência Avícola* 10.2 (2008): 109-115.
9. Greathead H. "Plants and Plant Extracts for Improving Animal Productivity". *Proceedings of the Nutrition Society* 62.2 (2003): 279-290.v
10. Hashemi SR and Davoodi H. "Phytogenics as New Class of Feed Additive in Poultry Industry". *Journal of Animal and Veterinary Advances* 9.17 (2010): 2295-2304.
11. Alagawany M., *et al.* "The usefulness of oregano and its derivatives in poultry nutrition". *World's Poultry Science Journal* 74.2 (2018): 213-230.
12. Anderson RA., *et al.* "Cinnamon improves glucose and lipids of people with type 2 diabetes". *Diabetes Care* 27.12 (2004): 3215-3218.
13. Brenes A and Roura E. "Essential oils in poultry nutrition: Main effects and modes of action". *Animal Feed Science and Technology* 158.1-2 (2010): 1-14.
14. Chowdhury SR., *et al.* "Effects of dietary garlic on cholesterol metabolism in laying hens". *Poultry Science* 81.12 (2002): 1856-1862.
15. Hashemipour H., *et al.* "Effect of thymol and carvacrol feed supplementation on performance, antioxidant enzyme activities, fatty acid composition, digestive enzyme activities, and immune response in broiler chickens". *Poultry Science* 92.8 (2013): 2059-2069.
16. Jamroz D., *et al.* "The influence of phytogetic extracts on performance, nutrient digestibility, carcass quality, and gut microbial status in broiler chickens". *Journal of Animal and Feed Sciences* 12.3 (2003): 583-596.
17. Ranasinghe P., *et al.* "Medicinal properties of 'true' cinnamon (*Cinnamomum zeylanicum*): A systematic review". *BMC Complementary and Alternative Medicine* 13 (2013): 275.