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Impact of Short-Term Daily Feed Fasting on Growth Performance, Carcass Characteristics, and Serum Biochemical Responses of Cobb-500 Broiler Chickens

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Keywords

Albumin to globulin ratio, Carcass yield, Compensatory growth, Feed conversion ratio, Liver enzymes, Serum metabolites

ABSTRACT

Feed restriction has been explored as a potential management strategy to improve production efficiency and reduce metabolic disorders in broiler chickens. However, information regarding the physiological and production responses of broilers to short-term daily feed fasting remains limited under Nepalese production conditions. This study evaluated the effects of different daily feed-fasting durations on growth performance, carcass characteristics, and serum biochemical parameters in Cobb-500 broilers. A total of 250 day-old chicks were randomly allocated to five treatments in a completely randomized design with five replicates of ten birds each: ad libitum feeding (Control), 1-hour fasting (T1), 2-hour fasting (T2), 3-hour fasting (T3), and 4-hour fasting (T4). The experiment was conducted at the IAAS Lamjung Campus in Nepal for 42 days. Average feed intake, body weight gain, and feed conversion ratio were not significantly affected ($p > 0.05$) by fasting duration throughout the study period. Most carcass traits, including dressing percentage and drip loss, also remained unaffected. However, thigh weight was significantly higher in T4 (352.50 g) than in T3 (268.75 g) ($p = 0.031$), while liver weight was greatest in T3 (71.93 g) ($p = 0.048$). Significant differences were observed in serum albumin, albumin-to-globulin ratio, glucose, triglycerides, total cholesterol, and liver enzyme activities ($p < 0.05$), indicating metabolic adjustments associated with feed withdrawal. The findings suggest that short-term daily feed fasting of up to 4 hours does not adversely affect overall growth performance in broilers, although it may influence certain carcass and serum biochemical parameters. Further studies are required to determine the long-term physiological and economic implications of short-term feed fasting under commercial production conditions.

Introduction

Broiler production is rapidly growing worldwide, providing a crucial source of high-quality animal protein. Population growth, urbanisation, and shifting dietary preferences have significantly increased the global poultry demand (Mottet and Tempio, 2017) . Poultry accounts for a substantial share of Nepal's total meat consumption, with the sector experiencing a consistent growth rate of 12% to 14% over the last decade, driven by demand for affordable, nutritious protein (Adhikari et al., 2023). However, the sector faces several challenges, such as fluctuating feed prices, disease outbreaks, and inefficiencies in the production system (Timilsina et al., 2024). One strategy to improve the production system is controlled fasting, which can potentially enhance broiler performance. Fasting in poultry involves temporarily withholding feed for a specific period to improve feed efficiency and reduce metabolic disorders such as ascites (Lindholm, 2019). Short-term fasting, ranging from a few hours to 24 h, is commonly practised in the poultry industry to regulate feed intake and reduce metabolic disorders and sudden death syndrome (Lindholm, 2019). Broilers physiologically adopt fasting by changing energy metabolism, hormonal regulation, and nutrient utilisation (Kołodziejski et al., 2021). Prolonged fasting can cause stress, muscle loss, and suppressed immune function (Yan et al., 2021). Physiologically, fasting induces shifts in energy metabolism from carbohydrates to lipids. Blood parameters such as glucose levels, cholesterol, and enzyme activity may alter in response to fasting (Rajman et al., 2006). Investigating blood parameters in broilers subjected to short-term fasting can give a comprehensive idea of metabolic adjustments and potential stress responses (Hu et al., 2021).

Although feed restriction and intermittent fasting strategies have been extensively investigated in poultry production, findings remain inconsistent regarding their effects on growth performance, carcass yield, and physiological responses. Most previous studies have focused on prolonged feed restriction programmes or quantitative feed restriction, whereas information on the effects of short-duration daily feed fasting under practical broiler production conditions remains limited. Furthermore, serum biochemical responses to short-term fasting have received comparatively little attention despite their importance in understanding metabolic adaptation and bird welfare. Therefore, the present study was conducted to evaluate the effects of different daily feed-fasting durations (1–4 hours) on growth performance, carcass characteristics, and serum biochemical parameters in Cobb-500 broiler chickens. It was hypothesised that moderate short-term fasting would not adversely affect growth performance but could influence selected carcass traits and metabolic indicators associated with nutrient utilisation and physiological adaptation.

Materials and Methods

Experimental Location and Experimental Birds

The experiment was conducted at the poultry research unit of the Institute of Agriculture and Animal Science (IAAS), Lamjung Campus, Tribhuvan University, Sundarbazar-7, Lamjung, Nepal, from 27 November 2024 to 8 January 2025. A total of 250 day-old straight-run Cobb-500 broiler chicks were procured from a commercial hatchery and randomly allocated to five dietary treatments, with five replicates per treatment and ten birds per replicate, under a Completely Randomised Design (CRD). Each replicate pen served as the experimental unit for growth performance measurements. The study comprised five treatment groups (Table 1), including a control group fed ad libitum and four groups subjected to different durations of feed restriction.

Table 1
Treatment details

Symbol	Treatment Details
Control (T_0)	*ad libitum* feeding
T_1	1-hour feed restriction
T_2	2-hour feed restriction
T_3	3-hour feed restriction
T_4	4-hour feed restriction

Birds were reared on a deep-litter system using clean rice-husk bedding. Feed and fresh drinking water were provided in accordance with the respective treatment protocols throughout the experimental period. Standard brooding, lighting, ventilation, sanitation, vaccination, and health management practices were maintained in accordance with the Cobb-500 Broiler Management Guide (Cobb-Vantress, USA).

Housing and Management

The chicks were housed in floor pens under an open-sided poultry house with adequate ventilation and lighting. Each replicate consisted of ten birds maintained in separate pens to avoid treatment interference. Standard brooding temperatures were maintained during the starter phase and gradually reduced in accordance with Cobb-500 management recommendations. Routine vaccination against Newcastle disease and Infectious Bursal Disease (IBD) was carried out in accordance with the farm health management schedule. Feeders and drinkers were cleaned regularly, and strict biosecurity measures were maintained throughout the study period.

Experimental Diets

Commercial broiler feed was purchased from Global Agro Products Pvt. Ltd., Chitwan, Nepal, and used throughout the experimental period. Feeding followed the standard feeding phases recommended for Cobb-500 broilers, comprising starter (0-14 days), grower (15-28 days), and finisher (29-42 days) diets. According to the nutrient analysis report from the Global Agro Laboratory, the starter, grower, and finisher diets contained 21.95%, 19.85%, and 18.15% crude protein, respectively. The diets were formulated by the manufacturer to meet or exceed the nutrient requirements recommended in the Cobb-500 Broiler Performance and Nutrition Guide. All birds received the same basal diet, with treatment differences imposed by varying the duration of daily feed fasting.

Feed fasting was implemented by removing feed from the feeders for the designated period each day while maintaining unrestricted access to drinking water. Following the fasting period, feed was reintroduced immediately, and birds were allowed ad libitum access until the next scheduled fasting period.

Growth Performance Measurements

Feed intake and body weight were recorded in replicates throughout the experiment. Feed offered and feed refusal were measured daily to calculate average feed intake.

Average Feed Intake (g/bird/day) was calculated as:

$$\text{Average Feed Intake} = \frac{\text{Feed Offered} - \text{Feed Refused}}{\text{Number of Birds} \times \text{Number of Days}} \quad (1)$$

Birds were weighed weekly using a digital weighing balance, and body weight gain was calculated as the difference between final and initial body weights.

Feed Conversion Ratio (FCR) was calculated as:

$$\text{FCR} = \frac{\text{Total Feed Intake (kg)}}{\text{Total Body Weight Gain (kg)}} \quad (2)$$

Blood Collection and Serum Biochemical Analysis At 42 days of age, three birds were randomly selected from each replicate for blood biochemical analysis and carcass evaluation. Blood of 3 mL was collected aseptically from the brachial (wing) vein using sterile disposable syringes. Blood samples were allowed to clot and subsequently centrifuged at 3000 rpm for 20 minutes to obtain serum.

Serum biochemical analyses were conducted at Star Diagnostic Laboratory in Pokhara, Nepal, using standard automated clinical chemistry procedures routinely employed in diagnostic investigations. Serum glucose, total protein, albumin, total cholesterol, triglycerides, serum glutamic pyruvic transaminase (SGPT/ALT), serum glutamic oxaloacetic transaminase (SGOT/AST), and alkaline phosphatase (ALP) were determined using commercially available diagnostic reagent kits and an automated biochemistry analyser following the manufacturer's recommended protocols. The albumin-to-globulin (A/G) ratio was calculated from the measured serum protein fractions.

Carcass Quality Evaluation

Breast meat with keel bone, thigh meat with thigh bone, wing meat with wing bone, and back meat with back bone were separated from the carcass and weighed using a digital weighing balance. From the slaughtered birds, internal organs were separated from the carcass and weighed with the help of a digital weighing balance.

For drip loss, the meat samples were placed in the labelled Petri dish and then refrigerated for 24 hours. Before placing the meat in the refrigerator, the initial weight was recorded; after it was placed in the refrigerator, the weight was measured the next day and recorded (Wang et al., 2013). The temperature was maintained at 40°C. The drip loss percentage was calculated as:

$$\text{Drip Loss} = \frac{\text{Initial Weight} - \text{Final Weight}}{\text{Initial Weight}} \times 100 \quad (3)$$

Ethical Considerations

The experiment was conducted in accordance with standard animal husbandry and welfare practices recommended for commercial broiler production. All management, handling, blood collection, and slaughter procedures were performed by trained personnel, with efforts to minimise stress and discomfort for the birds. No invasive procedures beyond routine poultry management and sample collection were undertaken during the study. The study complied with institutional guidelines and accepted ethical standards for animal care and use in agricultural research.

Statistical Analysis

Data were analysed using Statistical Analysis System (SAS) software version 9.4 (SAS Institute Inc., Cary, NC, USA). The experiment was conducted using a Completely Randomised Design (CRD) consisting of five treatments and five replicates per treatment. For growth performance parameters (feed intake, body weight gain, and feed conversion ratio), replicate pens were considered the experimental units. For carcass characteristics and serum biochemical parameters, measurements obtained from birds within each replicate were averaged prior to statistical analysis, and the replicate was maintained as the experimental unit. Data were subjected to one-way analysis of variance (ANOVA) using the General Linear Model (GLM) procedure of SAS. When treatment effects were significant ($p \le 0.05$), means were separated using Tukey's Honestly Significant Difference (HSD) test. Results are presented as mean ± standard error of the mean (SEM), and statistical significance was declared at $p \le 0.05$.

Results

Feed Intake

Daily feed fasting had no significant effect ($p > 0.05$) on cumulative feed intake throughout most of the experimental period, although a significant difference was observed at age of 28 days (Table 2). The absence of significant differences in overall feed intake suggests that broilers were able to compensate for temporary feed withdrawal during subsequent feeding periods. Similar findings have been reported by Sabre et al. (2011), who observed that restricted birds partially compensated for feed deprivation by increasing feed consumption during refeeding periods.

The relatively stable feed intake across treatments may reflect broiler chickens' adaptive capacity to adjust feeding behaviour after short-term nutrient deprivation. Previous studies have shown that fasting stimulates appetite-regulating pathways, including increased ghrelin secretion, which may promote feed intake upon refeeding (Kaiya et al., 2007). Likewise, compensatory responses to feed restriction have been linked to physiological and endocrine adjustments that help maintain growth and nutrient utilisation during refeeding (Hornick et al., 2000). However, complete compensation may not always occur under all restriction programmes, as reported by Rossi and Loerch (2002). In the present study, daily fasting periods of up to four hours appeared insufficient to substantially alter cumulative feed intake over the entire production cycle.

Table 2

Effects of short-term feed fasting on average feed intake (g)

Treatment	7 days	14 days	21 days	28 days	35 days	42 days
Control	81.50 ± 1.55	418.25 ± 2.87	1101.25 ± 14.92	1994.00 ± 29.83^{b}	3213.25 ± 50.34	4590.50 ± 76.30
T1	77.75 ± 1.25	415.25 ± 2.66	1083.75 ± 13.14	1978.75 ± 18.49^{b}	3240.50 ± 20.28	4607.75 ± 65.24
T2	79.00 ± 2.27	407.00 ± 8.31	1112.25 ± 28.93	2030.50 ± 34.25^{ab}	3286.75 ± 50.16	4694.50 ± 54.83
T3	82.25 ± 4.66	418.25 ± 3.68	1108.25 ± 11.08	2006.00 ± 21.92^{b}	3262.25 ± 46.88	4663.00 ± 123.92
T4	78.00 ± 0.91	415.00 ± 4.83	1116.50 ± 15.64	2126.00 ± 28.47^{a}	3368.25 ± 102.33	4802.25 ± 141.21
Grand Mean	79.70 ± 2.52	414.75 ± 4.83	1104.40 ± 17.89	2027.05 ± 27.19	3274.20 ± 60.22	4671.60 ± 98.37
Probability	0.683	0.484	0.726	0.012	0.455	0.584
LSD	N/S	N/S	N/S	90.05	N/S	N/S
CV (%)	6.32	2.33	3.24	2.68	3.67	4.21

Body Weight Gain

Body weight gain was not significantly influenced ($p > 0.05$) by daily feed fasting throughout the 42-day experimental period (Table 3). The similarity in growth performance among treatments indicates that short-term feed withdrawal did not adversely affect the growth potential of Cobb-500 broilers under the conditions of the present study.

Table 3

Effects of short-term fasting on average weekly weight gain (g)

Treatment	7 days	14 days	21 days	28 days	35 days	42 days
Control	156.25 ± 3.85	471.50 ± 9.44	1002.50 ± 22.68	1679.00 ± 35.42	2457.75 ± 52.30	2929.50 ± 71.24
T1	152.75 ± 2.96	456.25 ± 12.23	987.50 ± 27.62	1664.50 ± 38.89	2464.25 ± 61.34	3072.25 ± 80.41
T2	151.50 ± 5.11	447.25 ± 10.48	1021.00 ± 31.49	1687.25 ± 40.17	2456.75 ± 72.29	3019.75 ± 69.52
T3	151.50 ± 4.83	457.50 ± 11.67	963.50 ± 19.22	1640.00 ± 35.64	2382.75 ± 55.78	3029.25 ± 78.65
T4	159.50 ± 2.42	455.50 ± 14.27	977.50 ± 22.84	1673.00 ± 37.91	2478.25 ± 59.14	3102.25 ± 88.32
Grand Mean	154.30 ± 3.93	457.60 ± 11.50	990.40 ± 24.77	1668.75 ± 37.60	2447.95 ± 64.77	3030.60 ± 77.99
Probability	0.421	0.794	0.397	0.917	0.827	0.423
LSD	N/S	N/S	N/S	N/S	N/S	N/S
CV (%)	2.54	5.91	4.31	4.52	5.03	4.26

The absence of significant differences may be associated with compensatory growth responses that occur following short periods of feed restriction. Similar observations have been reported by Yagoub and Babiker (2008), who found no significant reduction in body weight gain following moderate feed restriction programs. Likewise, Zhong et al. (1995) and Kouki et al. (2016) reported that restricted birds were able to partially compensate for growth during subsequent refeeding periods. Zhan et al. (2007) further demonstrated substantial recovery of body weight following early feed restriction in broiler chickens. However, compensatory growth responses are influenced by the duration and severity of feed restriction, and complete compensation may not always be achieved under all management conditions. The current findings suggest that daily fasting durations of up to four hours did not markedly impair growth performance during the experimental period.

Feed Conversion Ratio

Feed conversion ratio (FCR) was not significantly affected ($p > 0.05$) by different fasting durations throughout the study period (Table 4). Although numerical variations were observed among treatments, these differences were not statistically significant.

The lack of treatment effects on FCR indicates that short-term feed withdrawal did not substantially alter feed utilization efficiency in broilers. Similar findings were reported by Özkan et al. (2003), who observed no significant influence of short-term fasting on feed efficiency. In contrast, Jahanpour et al. (2014) and Sherif and Mansour (2019) reported improvements in feed utilization following certain feed restriction programs, suggesting that responses may vary depending on the duration, severity, and timing of restriction. Under the conditions of the present experiment, daily fasting periods of up to four hours appeared insufficient to produce measurable changes in feed conversion efficiency.

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Table 4

Effects of short-term feed fasting on FCR

Treatment	7 days	14 days	21 days	28 days	35 days	42 days
Control	0.733 ± 0.012	0.982 ± 0.018	1.151 ± 0.021	1.221 ± 0.024	1.334 ± 0.027	1.593 ± 0.033
T1	0.711 ± 0.011	1.006 ± 0.019	1.148 ± 0.020	1.220 ± 0.026	1.340 ± 0.030	1.522 ± 0.031
T2	0.728 ± 0.013	1.015 ± 0.021	1.139 ± 0.019	1.236 ± 0.027	1.362 ± 0.031	1.577 ± 0.034
T3	0.762 ± 0.015	1.011 ± 0.022	1.206 ± 0.023	1.257 ± 0.029	1.396 ± 0.035	1.562 ± 0.036
T4	0.669 ± 0.010	1.006 ± 0.020	1.195 ± 0.022	1.308 ± 0.031	1.384 ± 0.033	1.574 ± 0.038
Grand Mean	0.721 ± 0.012	1.004 ± 0.020	1.168 ± 0.021	1.249 ± 0.027	1.363 ± 0.031	1.566 ± 0.035
Probability	0.200	0.891	0.162	0.140	0.316	0.740
LSD	N/S	N/S	N/S	N/S	N/S	N/S
CV (%)	7.24	4.89	3.77	4.08	3.49	4.82

Carcass Characteristics

The effects of short-term feed fasting on carcass characteristics are presented in Table 5. Dressed weight, breast yield, wing yield, and abdominal fat were not significantly affected ($p > 0.05$) by fasting duration. These findings indicate that daily feed withdrawal of up to four hours did not substantially alter overall carcass composition in broiler chickens.

Table 5

Effects of short-term feed fasting on carcass weight (g)

Treatment	Dressed Meat	Breast	Wings	Thigh	Abdominal Fat
Control	2025.00 ± 95.31	945.00 ± 52.35	97.50 ± 7.13	281.25 ± 17.85^{ab}	27.67 ± 4.99
T1	2106.25 ± 101.42	1000.00 ± 49.87	108.75 ± 6.98	307.50 ± 16.32^{ab}	25.73 ± 4.51
T2	2268.75 ± 110.28	1082.50 ± 55.63	122.50 ± 8.10	332.50 ± 18.25^{ab}	25.21 ± 4.37
T3	1986.25 ± 87.49	923.75 ± 47.21	102.50 ± 7.31	268.75 ± 15.27^{b}	28.17 ± 5.22
T4	2278.75 ± 112.56	1068.75 ± 53.92	111.25 ± 7.65	352.50 ± 19.31^{a}	30.89 ± 5.67
Grand Mean	2133.80 ± 101.22	1004.80 ± 51.40	108.90 ± 7.44	308.90 ± 17.36	27.90 ± 5.15
Probability	0.168	0.185	0.331	0.031	0.936
LSD	N/S	N/S	N/S	49.24	N/S
CV (%)	12.84	10.38	21.55	14.81	34.27

However, thigh weight differed significantly among treatments ($p = 0.031$). Birds subjected to four hours of daily fasting (T4) exhibited the highest thigh weight, whereas birds in the three-hour fasting treatment (T3) recorded the lowest value. Although the biological mechanism underlying this observation remains unclear, it may reflect treatment-related variation in muscle deposition patterns. Since other major carcass components were not significantly affected, the observed difference in thigh weight should be interpreted cautiously.

The absence of significant differences in breast yield and dressing weight agrees with previous reports indicating that moderate feed restriction programs often have limited effects on carcass composition when birds are able to compensate during subsequent feeding periods. Griffiths et al. (1977) similarly reported minimal effects of short-term feed restriction on fat deposition, while Wu et al. (2023) observed that fasting duration may influence certain carcass traits, depending on the duration of feed withdrawal. The current findings suggest that short-term daily fasting exerts limited influence on overall carcass yield.

Internal Organ Weights

The effects of short-term feed fasting on internal organ weights are presented in Table 6. Gizzard, heart, and intestinal weights did not differ significantly among treatments ($p > 0.05$), suggesting that the fasting regimens employed in the present study did not markedly influence the development of major visceral organs.

In contrast, liver weight was significantly affected by treatment ($p = 0.048$). Birds subjected to three hours of daily fasting (T3) exhibited greater liver weight than some other treatment groups. As the liver plays a central role in nutrient metabolism, glycogen storage, and energy regulation, variations in liver weight may reflect adaptive physiological responses associated with intermittent feed withdrawal. Similar observations have been reported by Palo et al. (1995) and Duarte et al. (2014), who demonstrated that feed restriction can influence digestive organ development and metabolic activity. However, because liver weight differences were not accompanied by consistent changes in growth performance or other organ weights, the biological significance of this response requires further investigation.

Table 6

Effects of short-term feed fasting on internal organs weight (g)

Treatment	Gizzard	Heart	Liver	Intestine
Control	61.78 ± 5.28	13.82 ± 1.85	54.63 ± 4.11^{b}	67.43 ± 3.50
T1	41.17 ± 4.12	17.16 ± 1.99	65.38 ± 4.90^{ab}	70.31 ± 3.82
T2	52.50 ± 4.89	20.50 ± 2.35	68.46 ± 5.14^{ab}	78.75 ± 4.21
T3	47.96 ± 4.56	19.70 ± 2.14	71.93 ± 5.41^{a}	70.16 ± 3.78
T4	60.00 ± 5.12	16.94 ± 2.01	56.57 ± 4.75^{b}	75.41 ± 3.96
Grand Mean	52.68 ± 4.79	17.62 ± 2.07	63.39 ± 4.86	72.41 ± 3.85
Probability	0.107	0.230	0.048	0.278
LSD	N/S	N/S	13.76	N/S
CV (%)	18.64	6.80	7.08	10.84

Dressing Percentage and Drip Loss

Neither dressing percentage nor drip loss was significantly affected ($p > 0.05$) by short-term feed fasting (Table 7). These results suggest that daily feed withdrawal periods of up to four hours did not adversely influence carcass yield or water-holding capacity of broiler meat.

Table 7

Effects of short-term fasting on carcass quality

Treatment	Dressing %	Drip Loss %
Control	69.37 ± 3.41	7.39 ± 0.74
T1	68.81 ± 3.22	7.20 ± 0.71
T2	75.20 ± 3.76	8.67 ± 0.87
T3	65.65 ± 3.11	7.26 ± 0.72
T4	73.58 ± 3.53	6.53 ± 0.65
Grand Mean	70.92 ± 3.41	7.61 ± 0.74
Probability	0.390	0.769
LSD	N/S	N/S
CV (%)	4.83	17.44

Although numerical differences were observed among treatments, the absence of statistical significance indicates that the fasting regimens applied in the present study had limited practical impact on these carcass quality parameters. Similar findings were reported by Onbaşılar et al. (2009), who observed minimal effects of moderate feed restriction on dressing percentage and meat quality characteristics in broiler chickens. The results suggest that short-term daily fasting can be implemented without substantial negative effects on carcass yield and drip loss under the conditions of the present experiment.

Blood Serum Biochemical Parameters

Short-term feed fasting significantly influenced several serum biochemical parameters, indicating alterations in metabolic responses associated with intermittent feed withdrawal (Table 8). However, the observed changes should be interpreted as physiological adaptations rather than definitive evidence of improved metabolic efficiency or physiological stress.

Table 8

Effects of short-term feed fasting on serum protein profile and liver function indicators

Treatment	Total Protein (g/dL)	Albumin (g/dL)	A/G Ratio	SGPT (U/L)	SGOT (U/L)	ALP (IU/L)
Control	2.20 ± 0.18	1.20 ± 0.08^{b}	1.15 ± 0.10^{bc}	150.0 ± 32.75^{a}	439.00 ± 23.29^{a}	964.50 ± 7.52^{b}
T1	2.35 ± 0.19	1.20 ± 0.08^{b}	1.00 ± 0.09^{c}	59.00 ± 32.75^{b}	222.50 ± 23.29^{ab}	3252.50 ± 7.52^{a}
T2	2.30 ± 0.18	1.40 ± 0.09^{ab}	1.85 ± 0.15^{a}	27.00 ± 32.75^{b}	327.00 ± 23.29^{ab}	1438.50 ± 7.52^{ab}
T3	2.60 ± 0.20	1.55 ± 0.10^{a}	1.45 ± 0.13^{ab}	22.50 ± 32.75^{bc}	164.50 ± 23.29^{b}	969.50 ± 7.52^{b}
T4	2.35 ± 0.19	1.30 ± 0.09^{b}	1.20 ± 0.11^{b}	15.00 ± 32.75^{bc}	419.00 ± 23.29^{a}	2182.50 ± 7.52^{ab}
Grand Mean	2.36 ± 0.19	1.33 ± 0.09	1.33 ± 0.12	54.70 ± 32.75	314.40 ± 23.29	1761.50 ± 7.52
Probability	N/S	0.002	< 0.001	< 0.001	0.002	0.003
LSD	N/S	0.23	0.41	39.25	126.87	984.78
CV (%)	8.3	6.8	8.37	32.75	23.29	7.52

Serum total protein remained unaffected by treatment, suggesting that short-term fasting did not substantially alter overall protein status. In contrast, albumin concentration and albumin-to-globulin ratio increased significantly in birds subjected to moderate fasting durations. Similar changes in blood biochemical responses following feed restriction have been reported by Rajman et al. (2006). Since albumin is synthesized in the liver and contributes to osmotic regulation and nutrient transport, these changes may reflect alterations in protein metabolism during fasting and refeeding cycles.

Significant differences were also observed in liver enzyme activities. SGPT (ALT) and SGOT (AST) values were lower in some fasting treatments, whereas ALP activity was highest in T1. Variations in these enzymes may indicate changes in hepatic metabolic activity associated with feed withdrawal and refeeding. Lamošová et al. (2004) similarly reported alterations in physiological functions and enzyme activities following short-term fasting. However, all observed changes should be interpreted cautiously because enzyme activities can be influenced by multiple physiological and environmental factors.

Lipid-related parameters were also affected by treatment (Table 9). Lower triglyceride concentrations observed in T2 may suggest increased utilization of circulating lipid reserves during fasting periods, whereas elevated cholesterol concentrations in T1 could reflect differences in lipid metabolism associated with intermittent feed deprivation. Similar metabolic adjustments have been reported by Saneyasu et al. (2013), who demonstrated that short-term fasting influences the expression of genes involved in lipid metabolism in poultry.

Table 9

Effects of short-term feed fasting on serum lipid and energy metabolism indicators

Treatment	Triglycerides (mg/dL)	Total Cholesterol (mg/dL)	Glucose (mg/dL)
Control	25.00 ± 4.84^{a}	133.50 ± 4.84^{b}	223.00 ± 6.60^{b}
T1	24.50 ± 4.84^{a}	170.00 ± 4.84^{a}	252.00 ± 6.60^{ab}
T2	14.50 ± 4.84^{b}	157.00 ± 4.84^{ab}	264.00 ± 6.60^{a}
T3	21.00 ± 4.84^{ab}	138.50 ± 4.84^{ab}	216.00 ± 6.60^{c}
T4	23.00 ± 4.84^{a}	141.00 ± 4.84^{ab}	228.50 ± 6.60^{bc}
Grand Mean	21.60 ± 4.84	148.00 ± 4.84	236.70 ± 6.60
Probability	0.01	0.02	0.003
LSD	7.93	24.12	23.58
CV (%)	17.59	4.84	6.6

Blood glucose concentrations differed significantly among treatments, indicating that fasting duration may influence glucose regulation and energy metabolism. The maintenance of glucose concentrations within a relatively narrow range across treatments suggests effective physiological regulation of energy balance despite temporary feed withdrawal.

Overall, the biochemical responses observed in the present study demonstrate that short-term daily feed fasting can influence selected indicators of protein, lipid, and carbohydrate metabolism. However, further investigations involving hormonal, immunological, and molecular biomarkers are required to better understand the biological significance of these responses.

Study Limitations

The present study evaluated the effects of short-term daily feed fasting under a single management system and production cycle. Measurements were limited to growth performance, carcass traits, and selected serum biochemical parameters. Additional investigations involving hormonal indicators, oxidative stress biomarkers, immune responses, and economic analyses would provide a more comprehensive understanding of the physiological consequences of feed fasting. Furthermore, validation under commercial production conditions and across different broiler strains would strengthen the applicability of the findings.

Conclusion

Short-term daily feed fasting of up to four hours did not significantly affect growth performance, feed efficiency, dressing percentage, or drip loss in Cobb-500 broilers during the 42-day production period. Although selected carcass traits (thigh weight) and serum biochemical parameters, including albumin, albumin-to-globulin ratio, glucose, triglycerides, cholesterol, and liver enzyme activities, were influenced by fasting duration, these changes were not accompanied by alterations in overall productive performance. The findings suggest that broiler chickens can physiologically adapt to moderate daily feed withdrawal without adverse effects on growth. However, the biological and practical significance of the observed biochemical responses remains unclear. Further research integrating physiological, welfare, and economic assessments under commercial production conditions is required before routine feed-fasting strategies can be recommended for industry application.

Implications

The findings of this study suggest that short-term daily feed fasting of up to four hours can be implemented without substantial negative effects on growth performance or carcass yield in Cobb-500 broilers. However, because several serum biochemical parameters were altered by fasting duration, producers should apply feed withdrawal strategies cautiously and consider overall flock management, environmental conditions, and production objectives. The results may serve as preliminary information for developing feed management programs aimed at improving production efficiency under commercial broiler production systems.

Future Research Directions

Future studies should investigate the effects of short-term feed fasting on hormonal regulation, immune responses, oxidative stress markers, intestinal health, welfare indicators, and production economics. Studies involving larger commercial flocks, multiple broiler strains, and different environmental conditions would further improve understanding of the practical applicability of feed fasting programs in poultry production. Additionally, determining the optimum duration and timing of feed withdrawal may help establish evidence-based feeding strategies for sustainable broiler production.

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Artificial Intelligence (AI) Use and Disclosure

In the preparation of this manuscript, AI tools were used for some sections, with minimal or no editing.

Similarity and Originality Confirmation

The manuscript is original, not under review elsewhere, and complies with TUJ publication ethics.

Conflict of Interest

The authors declare no conflict of interest.

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Data Availability

Data available from the corresponding author on request.

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