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Article

The Growth performance and some blood traits in broilers under different lighting regimens

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Abstract: 50 chicks (unsexed) were raised from the Rose 308 broiler strain, which were prepared from one of the private hatcheries. The rearing was done on the floor and 5 treatments were used with (10) chicks per treatment. The birds were raised in cages with dimensions of 100 cm * 150 cm, with all appropriate conditions provided. Water and feed were provided freely throughout the study period. When receiving the chicks, the temperature was 32-35 and the relative humidity was 60-65. The treatments were: The first treatment was a continuous lighting system (24) hours. The second treatment: Intermittent lighting system (8 pm - 12 midnight). The third treatment: Intermittent lighting system (8 pm - 12 am). The fourth treatment: Intermittent lighting system (8 am - 12 pm). The fifth treatment: Intermittent lighting system (8 am - 12 pm). The lighting was programmed from the first day of the experiment (14 days old) until the end of the experiment (35 days old). The birds were weighed at the beginning of the experiment at the beginning of the experiment at the age of (14) days and at the end of the experiment at the age of 5 weeks for each treatment to measure body weight and weight gain and the amount of feed consumed and the feed conversion factor were measured. On day (35) of the chicks' age, (5) ml of femoral vein blood was withdrawn and placed in tubes free of anticoagulant to prepare blood serum. This is to perform a number of blood serum tests, including glucose, cholesterol, triglycerides, HDL, LDL, vLDL, total protein, albumin protein, and thyroxine hormone. Light rationing did not negatively affect productive traits. An increase in thyroxine hormone was recorded when the lighting system was turned off for (8) hours.Light rationing system improved most of the lipid parameters in the blood serum of broilers. We recommend using other lighting periods in subsequent experiments and measuring the concentrations of important hormones such as growth hormone and melatonin hormone and Highlighting other tests such as antioxidant tests and histological tests.

Keywords: broiler, light rationing, light intensity, thyroxine, blood traits

Introduction

Fattening broilers under continuous lighting achieves maximum feed consumption, and thus accelerates growth, however, this may not lead to improved feed conversion ratio or economic returns (Abo Ghanima et al., 2021). While some studies have shown that the use of continuous lighting inhibits growth, and also causes physiological stress to the bird (Fidan et al., 2016). Therefore, the interest in changing lighting periods to improve broiler productivity and health status, Bayram, and Özkan, (2010) mentioned in depth research on lighting systems and that physical activity decreases significantly during dark hours, and thus energy consumption for this activity decreases, and therefore the application of intermittent lighting leads to improved productive efficiency in birds. Senaratna, et al. (2018) also showed that the productive performance of broilers improves with intermittent lighting system (1 hour of light and 2 hours of darkness) compared to continuous lighting system, adding that intermittent lighting systems have led to higher productivity of broilers compared to continuous lighting, and he also indicated that intermittent lighting reduces leg deformities and sudden death syndrome, as well as improving the vitality of birds and their metabolic processes. Mahmud, et al. (2011) indicated that intermittent lighting provides birds with similar feeding opportunities, and improves feed conversion efficiency. In a study to evaluate the effect of different lighting systems on the productive performance of broilers, they concluded that the average feed consumption of broilers that were subjected to intermittent lighting systems was lower compared to those that were subjected to continuous lighting, but this decrease was not significant, while the average live weight and feed conversion ratio of broilers under the intermittent lighting system were significantly better than those that were subjected to continuous lighting. It was also mentioned that the use of intermittent lighting did not significantly affect feed consumption compared to continuous lighting (Onbasilar et al., 2007). The use of the intermittent lighting system led to a significant increase in both feed consumption and live weight, but the feed conversion ratio was not affected, as the increase in feed consumption led to an increase in live weight (Yang, et al., 2015). Farghly and Makled (2015) indicated an improvement in the feed conversion ratio of broilers subjected to intermittent lighting and a significant improvement in the live body weight of broilers, and that birds provided with sufficient dark periods had fewer health problems compared to those kept under continuous or near-continuous lighting. The study aimed to compare continuous lighting systems with different intermittent lighting systems on the productive and physiological performance of broiler chickens. The eyes of poultry are much larger than the eyes of humans and other mammals when compared to the ratio of eye weight to brain (Gunturkun, 2000). The physical structures that light must traverse are similar in bird species compared to other species, with light passing through the cornea, anterior chamber, lens, vitreous body and finally reaching the retina and its photoreceptors where it is converted into electrical signals (Gunturkun, 2000). Birds, like mammals, have two types of photoreceptor cells in the retina: rods and cones. Cones are mostly active during periods of good light and are responsible for color perception, while rods provide color vision during low light conditions (Hunt, et al., 2009). The visual system in birds has anatomical and physiological features that make vision in birds more acute (Kosonsiriluk, 2007). Birds rely on visual acuity more than any other sense, due to their ability to fly and their need to search for food (Lind et al., 2013). They can take individual consecutive images of (150-250) images/second compared to (25-30) images/second in humans (Thiele, 2009). Light is sensed through photoreceptors located in the eye, hypothalamus, and pineal gland (Prescott, et al., 2003). Photoreceptors are biotransducers that convert light (photon energy) into nerve impulses (Al-Daraji, 2007). In birds, photoreceptors are of four types (sensitive to short, long, medium and ultraviolet wavelengths) and are called Tetrachromatic, while in humans, they are of three types, called Trichromatic (Osorio et al., 1999). Photoperiod is one of the main variables in lighting programs for poultry. Until recently, semi-continuous (23 D 1: L) or continuous (24 D 0: L) lighting programs were used (Yang et al., 2015). Birds are sensitive to the length of the light period. Wild birds usually start building their nests, mating and laying eggs during the spring when the day length increases, and stop laying eggs and mating behavior during the periods of the year when the day length decreases. Domesticated birds also respond in a similar way to the length of the light period (Yue and Li, 2023). Light periods in poultry houses are among the factors affecting their production rates. The best live weight and feed consumption rates for broilers were obtained when using the lighting system (20 hours of light: 4 hours of darkness) for the period (1-5) weeks (Shynkaruk et al., 2022). (Abou-Kassem et al., 2022) showed that the lighting period of 16 hours/day for the period (1-5) weeks led to a significant decrease in body weight and weight gain rates and an improvement in feed conversion efficiency for broilers at the age of 35 days, when compared with (22) hours of light/day. Olanrewaju et al., (2018) indicated that using the lighting system (22 hours of light: 2 hours of darkness) and the system (2 hours of light: 2 hours of darkness) on broilers led to a significant increase in body weight and weight gain rates compared to birds raised under Lighting regime (8 h light: 16 h dark) at 56 days of age and no significant differences were found between the different regimes in feed intake rates and feed conversion efficiency.

The light periods used in broiler production have changed with increasing understanding of its effect on production and welfare, while intermittent lighting has provided better growth and improved welfare compared to continuous lighting, so its use has been recommended in broiler production projects (Council of the European Union, 2007; National Chicken Council, 2014).

Classen and Riddell, (1989) reported that the use of intermittent lighting (L: 2D2) led to an improvement in the productive performance of broiler chickens, in addition, its use led to a reduction in the incidence of sudden death syndrome compared to birds close to continuous lighting (23L: 1D). Simmons (1982) reached a similar conclusion that the improved health of birds provided with intermittent light was likely due to increased activity during light periods compared to the relatively low activity at all times in birds exposed to continuous lighting.

The physiological effects of intermittent light were investigated, and it was found that birds raised with intermittent light had increased levels of plasma growth hormone (GH) than those with less than 23L:1D (Ohtani and Leeson, 2000; Kühn et al., 1996; Apeldoorn et al., 1999; Abbas et al., 2008; Zheng et al. 2013; Das and Lacin, 2014; Olanrewaju et al., 2018.

Materials and Methods

The study was conducted in the poultry field / College of Agriculture / University of Basrah, from 12/4/2024 until 4/5/2024 50 chicks (unsexed) were raised from the Rose 308 broiler strain, which were prepared from one of the private hatcheries. The rearing was done on the floor and 5 treatments were used with (10) chicks per treatment. The birds were raised in cages with dimensions of 100 cm * 150 cm, with all appropriate conditions provided. Water and feed were provided freely throughout the study period. When receiving the chicks, the temperature was 32-35 and the relative humidity was 60-65.

The treatments were as follows

The first treatment was a continuous lighting system (24) hours. The second treatment: Intermittent lighting system (8 pm - 12 midnight). The third treatment: Intermittent lighting system (8 pm - 12 am). The fourth treatment: Intermittent lighting system (8 am - 12 pm). The fifth treatment: Intermittent lighting system (8 am - 12 pm). The lighting was programmed from the first day of the experiment (14 days old) until the end of the experiment (35 days old). The birds were weighed at the beginning of the experiment at the beginning of the experiment at the age of (14) days and at the end of the experiment at the age of 5 weeks for each treatment to measure body weight and weight gain and the amount of feed consumed and the feed conversion factor were measured. On day (35) of the chicks' age, (5) ml of femoral vein blood was withdrawn and placed in tubes free of anticoagulant to prepare blood serum. This is to perform a number of blood serum tests, including glucose, cholesterol, triglycerides, HDL, LDL, vLDL, total protein, albumin protein, and thyroxine hormone. The data of the experiment were analyzed using a completely randomized design (CRD) using the ready statistical analysis program (SPSS, 2009). To test the significance of the difference between the averages, Duncan's test was used at a significance level of (0.05>P). The mathematical model was used in the data analysis as follows:

$Y_{ij}=\mu+T_i+e_{ij}$

Y_{ij} = the value of the observation j related to the treatment i

μ = the general average of the studied trait

T_i = the effect of the level i of the feeding factor T (where T = 5(

eij = the effect of the random experimental error that accompanies any observation and which is distributed randomly naturally with a mean of zero and variance = 62 e

Results and Discussion

Table No. (1) indicates the effect of light rationing on the productive traits (initial weight at the age of two weeks and final weight at the age of five weeks and total weight gain, total feed consumption and total feed conversion efficiency). From the table, we note that there are no significant differences between the experimental factors compared to the control treatment.

Table No. (1) Effect of light rationing on productive traits of the fifth week of broiler chickens (arithmetic mean + standard error(

Treatments	Total feed conversion efficiency	Total feed consumption / kg	Total weight gain / kg	Final weight / kg (fifth week)	Initial weight / kg (second week)
T1	1.690a ±0.172	2.290a ±0.162	1.335a ±0.084	1.736a ±0.092	**0.401a** **±0.020**
T2	1.730a ±0.165	2.195a ±0.074	1.286a ±0.099	1.707a ±0.090	**0.407a** **±0.017**
T3	1.622a ±0.089	2.215a ±0.062	1.335a ±0.047	1.780a ±0.070	**0.421a** **±0.041**
T4	1.689a ±0.057	2.150a ±0.620	1.234a ±0.070	1.667a ±0.051	**0.427a** **±0.031**
T5	1.717a ±0.047	2.090a ±0.172	1.220a ±0.042	1.647a ±0.028	**0.432a** **±0.028**

*Significant / Different letters vertically represent significant differences / Control treatment week 2 / T1 Continuous lighting / T2 Standard lighting (darkness from 8 pm to 12 am) / T3 Regulated lighting (darkness from 8 pm to 4 am) / T4 Regulated lighting (8 am to 12 pm) / T5 Regulated lighting 8 am to 4 pm)(

Prakbaran et al. (1991) observed that broiler chickens gave the best average body weight at 42 days of age when reared in a lighting program (8 h light:16 h dark) compared to (12 h light:12 h dark) and (14 h light:10 h dark). Chaturvedi et al. (1992) showed that broiler birds raised under a short-light system (6 hours of light: 18 hours of darkness) for a period of (3-12) weeks had significantly increased body weights at 12 weeks of age compared to birds raised under a natural light system (13.5 hours of light: 10.5 hours of darkness) and a light system (16 hours of light: 8 hours of darkness). The average weight gain reached its maximum at the fifth week, and did not change occurs after that age. When broiler birds were raised under a long-light system (16 hours of light: 8 hours of darkness), there was a significant increase in the body weight rate compared to birds raised under a short-light system (8 hours of light: 16 hours of darkness) for the period (2-6) weeks of their age, as the weight rate reached (103 and 93.1) grams, respectively (Oishi and Obara, 1994). In a study conducted by Boon et al. (2000) in which they used different lighting systems in broiler chicken farming (6, 9, 12, 15, 18) hours of light/day for the period (1-8) weeks, the results of the study showed that the lighting system (15 hours of light) per day recorded the highest body weight rate, as the average body weights reached (213, 241, 261, 294, and 262) g, respectively, for the broiler chicken line designated for meat production, while the average body weights for the line of birds designated for egg production reached (131, 154, 187, 195, and 182) g, respectively, and no significant differences appeared in the rates of weight gain between the groups of birds. When using two lighting systems in broiler farming: the first is continuous lighting (24 hours of light) and the second is (13 hours of light: 11 hours of darkness) for a period of (3-5) weeks of the birds' age, a significant increase in the live body weight at the age of 42 days was shown for both sexes in birds raised under the second lighting system compared to the first system, as it reached (182.91 and 171.44 g), respectively, for females, while for males it was (155 and 151.77) g, respectively (De jager, 2003). In a study conducted by Khalil et al. (2006) to compare two lighting systems used in broiler farming, the long lighting system (16 hours of light: 8 hours of darkness) daily, and the natural lighting system (11.3 hours of light: 12.7 hours of darkness), the results showed a significant increase in the average body weight of males and females raised under the long lighting system compared to birds raised under the natural lighting system at the age of 42 days. The average weight was (195.36 and 182.28) gm respectively for males and (209.37 and 196.0) gm respectively for females, and there was a significant increase in the average weight gain of birds raised under the long lighting system compared to birds raised under the natural lighting system for the period (3-6) weeks. It was (97.52 and 82.01) gm respectively for males, while for females it was (107.35 and 90.93) gm respectively. In a study that used lighting programs (12 hours of light: 12 hours of darkness), (16 hours of light: 8 hours of darkness) and (8 hours of light: 16 hours of darkness) for the period (3-26) weeks, the results showed no significant differences in body weight rates of broiler birds at the age of 42 days, which amounted to (217.3, 211.68 and 225.65) g, respectively (Elnagar et al., 2007). Coban et al. (2009) indicated in a comparative study of two lighting systems, the first continuous lighting (24 hours) and the second in which the breeding cage was divided into two sections: one dark, and the other section used the continuous lighting system for the period (3-43) days of the birds' age. The results of the study indicated a significant increase in the body weight of birds raised under the second system compared to the first system, and the emergence of a significant superiority in the cumulative weight gain rate for birds raised under the second system compared to the first system. Mahmud et al. (2009) did not find significant differences in the average live body weight between groups of birds raised under continuous lighting system (24 h) and lighting system (20 h light:4 h dark). When using intermittent lighting programs (11 h continuous light + light and dark cycle 1:2) daily and (11 h continuous light + light and dark cycle 1:3) daily, and comparing them with the continuous lighting system (24 h) for the period (3-6) weeks of the birds' age, a significant increase was observed in the average weight gain of birds raised under the lighting system (11 h continuous light + light and dark cycle 1:3) compared to other lighting systems (Mahmud et al., 2011). Jatoi et al. (2013a) conducted a study on the effect of constant and intermittent lighting on the productive and reproductive performance of broiler birds. Five lighting systems were used (8 h light : 16 h dark), (8 h light : 6 h dark : 2 h light : 8 h dark), (8 h light : 7 h dark : 1 h light : 8 h dark), (8 h light : 7.5 h dark : 0.5 h light : 8 h dark) and (16 h light : 8 h dark) for the period (3-14) weeks. The results showed significant differences in the average live body weight between the different treatments, as the lighting system treatment (8 h light : 6 h dark : 2 h light : 8 h dark) recorded a significant increase in the average body weight compared to the other systems. De jager (2003) indicated that broiler birds raised under continuous lighting system (24 h) or lighting system (13 h light : 11 h dark) daily for the period (3-5) weeks did not show significant differences in the rate of feed consumption between the birds of both systems. Classen (2004) noted when comparing different lighting regimes (12 h light: 12 h dark), (8 h light: 16 h dark), (4 h light: 20 h dark) that the dark period stopped feed consumption, which led to a reduction in the total amount of feed consumed, causing a reduction in growth rate. When the lighting regime (12 h light: 12 h dark) was followed continuously or intermittently (cycle: 6 h light: 6 h dark) or (cycle: 1 h light: 1 h dark), the results indicated a significant increase in the feed conversion efficiency of birds raised under the lighting regime (12 h light: 12 h dark) compared to other lighting regimes. The results of a study conducted by Gewehr et al. (2005) on broiler birds indicated that The continuous lighting systems (24 hours), the system (15.5 hours of light: 8.5 hours of darkness), and the system (8.5 hours of light: 15.5 hours of darkness) were followed for the period (3-5) weeks of the birds' age. The results of the study indicated a significant decrease in the amount of feed consumed by the birds that were raised under the lighting system (15.5 hours of light: 8.5 hours of darkness), which amounted to (24.68 and 2

3.78)and 24.82) g feed/bird/day respectively. Khalil et al. (2006) showed that feed consumption of broiler birds was significantly higher when birds were raised under a long lighting system (16 h light: 8 h dark) compared to a natural lighting system (11.3 h light: 12.7 h dark), as the amount of feed consumed reached (480.51 and 443.52) g/bird respectively during the period (3-6) weeks, in addition to a significant improvement in the feed conversion efficiency of birds raised under a long lighting system compared to a natural lighting system, as it reached (4.69 and 5.13) g feed/g weight gain respectively. Coban et al. (2009) noted a significant increase in the amount of feed consumed when raising broiler birds. In cages divided into two sections: one dark and the other light compared to birds raised in cages equipped with continuous lighting, which reached (814.8 and 789.9) g/bird respectively, in addition to the improvement in the feed conversion efficiency of birds in the first system compared to the continuous lighting system, which reached (4.63 and 4.99) g feed/g weight gain respectively. When following the continuous lighting systems (23 hours of light: 1 hour of darkness), the intermittent lighting system (2 hours of light: 2 hours of darkness), and the short lighting system (8 hours of light: 16 hours of darkness) for the period (8-48) days, no significant differences appeared in the feed conversion efficiency at the age of 56 days, while a significant decrease was observed in the amount of feed consumed by birds raised under the short lighting system (Olanrewaju et al., 2012). Table No. (2) indicates the effect of light rationing on the concentration of thyroxine in blood serum in the fifth week at the probability level (P<0.05). The fifth treatment (44.58) had a significant superiority compared to the control treatment (30.21(

Table No. (2) Effect of light rationing on the concentration of thyroxine hormone in the blood serum of the fifth week of broiler chickens (arithmetic mean + standard error(

treatment	Thyroxine
T1	**$14.57^{b}\underline{+}0.577$**
T2	**$14.71^{b}\underline{+}0.794$**
T3	**$13.69^{b}\underline{+}0.958$**
T4	**$14.95^{b}\underline{+}0.626$**
T5	**$44.58^{a}\underline{+}2.309$**

*Significant / Different letters vertically represent significant differences / Control treatment of the second week / T1 continuous lighting / T2 regulated lighting (darkness from 8 pm to 12 am) / T3 regulated lighting (darkness from 8 pm to 4 am) / T4 regulated lighting (8 am to 12 pm) / T5 regulated lighting (8 am to 4 pm).(

Table No. (3) indicates the effect of light rationing on blood serum glucose concentration in the fifth week at the probability level (P<0.05). It recorded a significant superiority of the control treatment (259) over the second treatment (240), the third treatment (245) and the fourth treatment (246(

No significant differences were recorded for the concentrations of total protein and albumin protein between the experimental treatments and the control treatment

Table No. (3) Effect of light rationing on the concentration of glucose and blood proteins in the blood serum of the fifth week of broiler chickens (arithmetic mean + standard error(

Treatment	Albumin	Total protein	Glucose

T1	1.2 ^{a} ±0.15	3.3 ^{a} ±0.12	**255^{a}±2.88**
T2	1.1 ^{a} ±0.05	3.2 ^{a} ±0.14	**240^{b}±8.20**
T3	1 ^{a} ±0.14	3 ^{a} ±0.15	**245^{ab}±7.4**
T4	1.1 ^{a} ±0.09	2.9 ^{a} ±0.17	**246^{ab}±3.46**
T5	1 ^{a} ±0.1	2.9 ^{a} ±0.06	**256^{a}±2.3**

*Significant / Different letters vertically represent significant differences / Control Treatment of the second week / T1 Continuous lighting / T2 Lighting Regulated (darkness from 8 pm to 12 midnight) / T3 Regulated lighting (darkness from 8 pm to 4 am) / T4 Regulated lighting (8 am to 12 pm) / T5 Regulated lighting (8 am to 4 pm(

The normal range of cholesterol concentration in the blood serum of broiler birds at the age of 42 days is 6.14 mmol/L for males and 5.19 mmol/L for females (Blaszczyk et al., 2006). The level of cholesterol in the blood serum of birds is greatly affected by genetics, nutrition, sex and the surrounding conditions of the bird (Al-Daraji et al., 2008). Soliman et al. (2006) indicated that when using the intermittent lighting system on broiler birds, a significant decrease in the concentration of blood cholesterol was shown compared to birds raised on the continuous lighting system. El-Neney (2003) noted a significant increase in serum cholesterol concentration in birds raised under intermittent lighting compared to continuous lighting. El-Fiky et al. (2007) indicated that there were no significant differences in serum cholesterol concentration in birds raised under different lighting systems. El-Slamoney et al. (2010) noted that when using lighting systems (natural day length), (natural day length + 2 hours of lighting), and (natural day length + 4 hours of lighting), there were no significant differences in serum cholesterol concentration in birds exposed to different lighting systems. The normal range of serum glucose concentration in broiler birds is 182.2 mg/100 ml blood (Vatsalya and Arora, 2011). El-Fiky et al. (2007) showed that broiler birds raised under different lighting systems had no significant effect on serum glucose concentration. Onbasilar et al. (2007) confirmed that when using the intermittent lighting system (1 hour of light: 3 hours of darkness) periodically and the continuous lighting system (24 hours), there were no significant differences in the concentration of blood glucose in the blood serum of birds exposed to both systems, which reached 220.55 and 219.60 mg/100 ml of blood, respectively. While the results of the study by Abdul Ghuffar (2008) showed a significant increase in the level of glucose in the blood serum of birds exposed to the intermittent lighting system (1 hour of light: 2 hours of darkness) periodically and (1 hour of light: 3 hours of darkness) periodically compared to the natural lighting system (12 hours of light: 12 hours of darkness) and the intermittent lighting system (1 hour of light: 1 hour of darkness) periodically, which reached (268.14, 247.14, 237.50 and 228.38) mg/100 ml of blood, respectively. The total protein concentration in the blood serum of birds is a good indicator of health status and production (Abbas, 2006). The total protein concentration in the blood serum of broiler birds was estimated at 5.45 g/

100ml of blood serum at 42 days of age (Deka and Borah, 2008). Albumin is one of the main protein components in the blood of birds, and it is important in maintaining osmotic pressure, in addition to its role in transporting nutrients such as minerals (Abbas, 2006). The concentration of albumin in the blood serum of broiler birds at 42 days of age was estimated at 2.5 g/100 ml of blood. As for globulin, it was estimated at 2.97 g/100 ml of blood (Deka and Borah, 2008). Abdul Ghuffar (2008) noted that there was a significant increase in the concentration of total protein in the blood serum of birds raised under intermittent lighting systems (1 hour of light: 1 hour of darkness) periodically, (1 hour of light: 2 hours of darkness) periodically, and (1 hour of light: 3 hours of darkness) periodically compared to the natural lighting system (12 hours of light: 12 hours of darkness) amounting to 3.01, 3.01, 2.77, and 2.70

g/100 ml of blood, respectively. In addition, there was a significant decrease in the concentration of albumin in the serum of birds raised under the lighting system (1 hour of light: 3 hours of darkness) periodically compared to other intermittent lighting systems and the natural lighting system, amounting to (1.44, 1.51, 1.48, and 1.50) g/100 ml of blood, respectively, while no significant differences were found in the concentration of globulin in the blood serum of birds exposed to different lighting systems. Soliman et al. (2006) confirmed that there were no significant differences in the concentration of total protein, albumin, and globulin between birds raised under two lighting systems of continuous and intermittent lighting. Ibrahim (2005) indicated that when using different lighting systems on birds, there were no significant differences in the concentration of total protein and albumin in the blood serum. El-Fiky et al. (2008) stated that the differences in the concentration of blood proteins (total protein, albumin, and globulin) in the blood serum of birds raised under the short lighting system and birds raised under the continuous lighting system did not reach the level of significance. While the results of the study by El-Badry et al. (b2009) showed a significant decrease in the concentration of total protein and albumin in the blood serum of birds raised under the lighting system (6 hours of light: 18 hours of darkness) compared to the lighting systems (24 hours) daily and (18 hours of light: 6 hours of darkness) and (12 hours of light: 12 hours of darkness), as the concentration of total protein reached 5.87, 6.28, 6.57 and 6.61 g/100 ml of blood, respectively, while the concentration of albumin reached 2.32, 3.05, 2.67 and 2.99 g/100 ml of blood, respectively, while the concentration of globulin was not significantly affected by the lighting system used. Table No. (4) indicates the effect of light rationing on serum cholesterol in the fifth week at the probability level ($P<0.05$), as there was a significant difference in cholesterol concentration for the third treatment (100), the fourth treatment (121), and the fifth treatment (121) compared to the control treatment (130). A significant difference was recorded for the concentration of triglycerides for the second treatment (28) and the fifth treatment (21) compared to the control treatment (37). A significant improvement was recorded for the concentration of high-density lipoproteins for the second treatment (91) compared to the control treatment (110). A significant difference was recorded for the concentration of low-density lipoproteins for the experimental treatments compared to the control treatment (12). A significant difference was recorded for the concentration of very low-density lipoproteins for the second treatment (5.6) and the fifth treatment (4.2) compared to the control treatment (7.4.(

Table No. (4) Effect of light rationing on the concentration of lipids in the blood serum for the fifth week of broiler chickens (arithmetic mean + standard error(

v LDL	LDL	HDL	T.G	Cholesterol	treatment
$7.2^{c}\pm0.17$	$9.8^{d}\pm0.11$	$110^{a}\pm2.8$	$36^{cd}\pm2.8$	$127^{b}\pm4.24$	T1
$5.6^{b}\pm0.28$	$15^{f}\pm0.28$	$110^{a}\pm2.4$	$28^{b}\pm1.3$	$131^{b}\pm2.31$	T2
$8.2^{c}\pm0.13$	$1.8^{a}\pm0.17$	$91^{b}\pm3.8$	$41^{d}\pm1.1$	$100^{a}\pm2.98$	T3
$6.8^{c}\pm0.23$	$5.2^{b}\pm0.73$	$109^{a}\pm4.6$	$34^{bc}\pm1.5$	$121^{a}\pm3.46$	T4
$4.2^{a}\pm0.64$	$6.8^{c}\pm0.37$	$110^{a}\pm3.6$	$21^{a}\pm3.9$	$121^{a}\pm3.75$	T5

*Significant / Different letters vertically represent significant differences / Control treatment week 2 / T1 continuous lighting / T2 regulated lighting (darkness from 8 pm to 12 Night) / T3 regulated lighting (darkness from 8 pm to 4 am) / T4 regulated lighting (8 am to 12 pm) / T5 regulated lighting (8 am to 4 pm)(

Light rationing did not negatively affect productive traits. An increase in thyroxine hormone was recorded when the lighting system was turned off for (8) hours.Light rationing system improved most of the lipid parameters in the blood serum of broilers.
We recommend using other lighting periods in subsequent experiments and measuring the concentrations of important hormones such as growth hormone and melatonin hormone and Highlighting other tests such as antioxidant tests and histological tests.

Conclusion

Results from the study indicated that routing broiler productivity was not compromised when intermittent lighting regimens are implemented, however blood serum lipid profiles and thyroxine hormone levels were significantly changed. The study finds that specific lighting systems, such as 8 h darkness cycles, can improve physiological parameters without deleterious effect on growth performance. These results highlight the value of lighting as a low cost, non-invasive management strategy to improve broiler health and welfare. Other lighting durations are studied in the future as possible alternatives to evaluate their impact on growth hormone, melatonin and antioxidant markers. Furthermore, histological studies could reveal deeper details of the mechanisms associated with these physiological changes.

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