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Investigation on the effects of feeding timetable on estradiol, progesterone, triiodothyronine and tetraiodothyronine in broiler breeder flocks

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ABSTRACT

This experiment was performed in order to study of the effect of the timetable, amount and frequency of feeding on hormonal metabolites of broiler breeder. Experiment was conducted in a completely randomized design with 15 treatments for 1, 2, 3 and 4 times a day feeding with 4 replications. The nutritional composition of all experimental groups was similar. The 1st treatment involves once feeding per day (4 am with 100% of the diet), the 2nd treatment includes feeding twice per day (4 am and 16 pm as much as 50% of the total diet per each time), the 3rd treatment including feeding twice per day (4 am and 16 pm as much as 75 and 25% of the total diet respectively), the 4th treatment consisted of feeding twice per day (4 am and 12 am as much as 50% of the total diet respectively), the 5th treatment consisted of feeding twice per day (4 am and 12 am as much as 75 and 25% of the total diet respectively), 6th treatment includes feeding twice per day (6 am and 16 pm as much as 75 and 25% of the total diet respectively), 7th treatment including feeding twice a day (6 am and 16 pm per 50% of the total diet respectively), 8th treatments fed 3 times per day (4 am, 12 am, and 16 pm as much as 50, 25 and 25% of the total diet respectively), 9th treatment fed 3 times per day (4 am, 12 am, and 16 pm as much as 33% of the total diet respectively), 10th treatments include eating 3 times per day (4 am, 12 am, and 16 pm as much as 25, 50 and 25% of the total diet respectively), 11th treatment fed 3 times per day (4 am, 12 am, and 16 pm, as much as 25, 25 and 50% of the total diet respectively), 12nd treatment included 3 feeding per day (4 am, 12 am, and 16 pm, as much as 50, 25 and 25% of the total diet respectively), 13rd treatment included fed 3 times per day (4 am hours, 12 am, and 16 pm as much as 33% of the total diet respectively), 14th treatment fed 4 times per day (4 am, 12 am, and 16 pm per 33, 22, 22 and 22% of total diet), 15 treatments consists of 4 feeding per day (4 am, 8 am,12 am, and 16 pm as much as 50, 17, 17 and 17% of the total diet, respectively). Hormonal parameters were measured in chickens at 31st and 36th weeks of age. The statistical results of this experiment show plasma hormone concentrations at the age of 31 weeks in treatment with more than one feeding per day was significantly different from controls ($P<0.05$). The concentration of T3, T4, progesterone and estradiol at the age of 31 weeks with diet changes more than once a day showed a decreasing trend.

Keywords: Broiler breeder, Feeding time, T3, T4

INTRODUCTION

Poultry feed comprises a major part of modern poultry farming duties. Nutritional and physiological point of view of economic importance. Physiologically, the chicken can continue its activities properly by proper nutrition your body needs all the material available to him. The economy should be kept in mind that about 75% of the poultry everyday

expenses comprise costs related to food. Therefore, having regard to the quantity and quality of poultry feed, today is a very important. Any improvement in the poultry industry and scientific progress will play an important role in promoting human welfare.

Any kind of stress effects on the central nervous system (CNS) lead to the release of corticotrophin-releasing factor, pituitary gland and the secretion of ACTH from the previous. These hormones cause the release of aldosterone and corticosterone by the adrenal plasma. Out of reach of water birds, harassment and abuse or improper management, noise and crowding and congestion In cage birds, are all factors that increase and decrease in egg production and shortening lipogenes are laying period [1].

Hormone estrogen increases the growth and development of ovarian follicles to FSH, follicle development in the oviduct, which helps to store calcium salts in the bones of the laying period, the growth of secondary sexual tissues, and stimulates intestinal absorption of some dietary nutrients, especially material mineral is needed for egg formation [2].

Since the trial's impact on the amount and frequency of feeding broiler breeder hormone metabolites are lacking. Based on this test, and the effect of feeding on hormonal metabolites of broiler breeder hens.

MATERIALS AND METHODS

Time, location and experimental salon conditions

The experiment was conducted in 2012. Ross 308 broiler breeder flocks tested over 31 weeks to 38 weeks of age was conducted for eight weeks. In this study, 480 broiler breeder hens (420 hens and 60 roosters) at 38-31 weeks of age treatments fifteen Ross 308 strains (including four replicates of each treatment and each replication consisted of seven hens and a rooster) groups. Fifteen treatments (dietary programs) were applied according to Table 1.

Table 1: The timetable and amount of feed in the studied treatments

Timetable→ Parameters↓	Percent of the total feed ration	Feeding time	Percent of the total feed ration	Feeding time	Percent of the total feed ration	Feeding time	Percent of the total feed ration	Feeding time
1 (Control)	100	4 am	-	-	-	-	-	-
2	50	4 am	50	16 pm	-	-	-	-
3	75	4 am	25	16 pm	-	-	-	-
4	50	4 am	50	12 am	-	-	-	-
5	75	4 am	25	12 am	-	-	-	-
6	75	6 am	25	16 pm	-	-	-	-
7	50	6 am	50	16 pm	-	-	-	-
8	50	4 am	25	12 am	25	16 pm	-	-
9	33	4 am	33	12 am	33	16 pm	-	-
10	25	4 am	50	12 am	25	16 pm	-	-
11	25	4 am	25	12 am	50	16 pm	-	-
12	50	6 am	25	12 am	25	16 pm	-	-
13	33	6 am	33	12 am	33	16 pm	-	-
14	33	4 am	22	8 am	22	12 am	22	16 pm
15	50	4 am	17	8 am	17	12 am	17	16 pm

Studied traits

Measured traits in this experiment consisted of estradiol, progesterone concentration, tetraiodothyronine concentration, and the concentration triiodothyronine.

Measured traits

Peak blood during the first two stages (31 weeks and 36 weeks of the onset of peak production, peak production day). At each sampling of each treatment trial, a view of the vein wing before feeding, and two hours after feeding than 5 CC blood was drawn into tubes sterilized containing the anticoagulant EDTA and transferred immediately on ice were placed. Blood samples for measurement of blood after one hour fifteen minutes at 3000 rpm centrifuge, separating the plasma and at - 20 °C were transferred. Sampler use of hormonal parameters e separate containers for blood samples discharge and then were transferred to centrifuge.

Plasma hormone concentrations of estradiol, progesterone, triiodothyronine, tetraiodothyronine ELISA method and distribution coefficients, respectively, 7.1%, 7.8%, 6.2% and 5.8 were measured.

Test data were analyzed in a completely randomized design.

RESULTS

In this experiment, estradiol, T3, T4 and progesterone hormone levels were assessed as parameters. The statistical results of this experiment show plasma hormone concentrations at the age of 31 weeks in treatment with more than one feeding per day was significantly different from controls (P<0.05). The concentration of T3, T4, progesterone and estradiol at the age of 31 weeks with diet changes more than once a day showed a decreasing trend (Table 2).

In the present study, plasma hormone concentrations at the age parameters between treatments more than 36 weeks of feeding two meals a day, compared with the control group was highly significant (P<0.05).

In this experiment, all treatments with more than one meal a day diet estradiol concentrations were higher in the control treatment (Table 2).

Changes in plasma hormone concentrations at the age of 31 weeks with 36 weeks of parameters between treatments that your food more than once received The control group showed a highly significant difference (P<0.05). Progesterone levels also experiment except the thirteen treatments, the trend of the other treatments (Table 2).

The results of the statistical analysis of the difference in hormonal parameters in broiler breeder age 31 weeks to 36 weeks showed Between treatments two, three or four meals a day and one meal a day compared with a highly significant difference (P<0.05). Also in this experiment, it was observed that the treatments significantly increased feeding at night at age 31 weeks to 36 weeks the amount of progesterone in progesterone concentrations did not change (Table 2).

Rating treatments were tested in this manner for each of the traits based on the evaluation criteria and the transverse axis of the tables 3 and 4 is presented. Scores based on the formula presented in this paper and insertion characteristics were obtained from the formula is obtained by using Excel software the values obtained using the treatments can be compared in terms of quality.

Table 2: Effects of feeding frequency and time on mean (±SE) some hormonal concentrations in broiler breeder at 31-36 weeks of age

Treatment	Estradiol (pg/ml)	Progesterone (ng/dl)	Triiodothyronine (ng/dl)	Tetraiodothyronine (ng/dl)
1 (Control)	387.38^{bc}± 15.08	3.09^{a}± 0.14	105.91^{a} ± 6.55	2.16^{ab} ± 0.10
2	368.70^{b} ± 2.97	2.41^{a}±0.06	84.51^{bc} ± 8.38	2.08^{a}± 0.12
3	395.01^{ab} ± 3.70	2.73^{a}± 0.15	102.93^{ab}± 13.88	2.22^{ab}± 0.10
4	396.56^{ab}± 4.64	2.47^{a}± 0.13	91.40^{abc}± 3.61	2.17^{ab}± 0.11
5	405.04^{a}± 3.95	2.73^{a}± 0.12	84.52^{dc}± 2.34	2.15^{ab}± 0.13
6	403.28^{a}± 4.04	2.79^{a}± 0.09	82.59^{c}± 2.08	2.18^{ab}± 0.14
7	370.21^{d}± 2.38	2.56^{a}± 0.06	84.99^{bc} ± 8.39	2.02^{ab}± 0.06
8	398.45^{ab}± 3.07	2.95^{a}± 0.10	90.34^{abc}± 2.33	2.14^{ab}± 0.09
9	395.24^{ab}± 3.68	3.06^{a}± 0.11	85.85^{bc} ± 3.28	2.14^{ab}± 0.09
10	371.43^{d}± 1.38	2.55^{a}± 0.06	86.71^{bc} ± 9.28	2.03^{ab}± 0.04
11	368.57^{d}± 3.01	2.53^{a}± 0.70	84.74^{bc} ± 8.08	2.02^{b} ± 0.05
12	398.93^{ab}± 4.10	3.08^{a}± 0.03	91.57^{abc}± 2.43	2.16^{ab}± 0.07
13	394.77^{ab}± 3.33	3.11^{a}± 0.06	90.30^{abc}± 3.28	2.12^{ab}± 0.10
14	369.85^{d}± 1.14	2.37^{a} ± 0.03	85.34^{bc} ± 8.53	2.07^{ab}± 0.04
15	375.23^{cd}± 3.42	2.41^{a}± 0.04	82.27^{bc} ± 8.54	2.00^{b}± 0.07
SEM	1.74	2.31	1.80	0.02
CV (%)	4.94	499.62	22.07	11.90

In each column, means with the same letter, have not significant different (P<0.05).

Table 3: Score for each of the test treatments were studied based on the sub-ordinate function method

Treatment	Estradiol pg/ml	Progesterone ng/dl	Triiodothyronine ng/dl	Tetraiodothyronine ng/dl	Total Scores
1 (Control)	0.48423	0.02703	0.00000	0.27273	0.78399
2	0.59644	0.44595	0.90525	0.63636	2.58400
3	0.27502	0.51351	0.12606	0.00000	0.91459
4	0.23252	0.37838	0.61379	0.22727	1.45196
5	0.79552	0.51351	0.90482	0.71818	2.93203
6	0.04826	0.43243	0.98646	0.18182	1.64897
7	0.95503	0.44324	0.88494	0.10909	2.39230
8	0.18070	0.21622	0.65863	0.36364	1.41919
9	0.26871	0.06757	0.84856	0.36364	1.54848
10	0.12158	0.35676	0.81218	0.66364	1.95416
11	0.60660	0.28378	0.89552	0.40909	2.19499
12	0.16753	0.04054	0.35676	0.27273	0.83756
13	0.28160	0.00000	0.66032	0.45455	1.39647
14	0.16490	0.67014	0.87014	0.68182	2.38700
15	0.23502	0.87014	0.24273	1.00000	2.34789

Table 4: Scores for each of the studied treatments based on the evaluation index method

Treatment	Estradiol pg/ml	Progesterone ng/dl	Triiodothyronine ng/dl	Tetraiodothyronine ng/dl	Total Scores
1 (Control)	54.61156	51.48629	144.58867	71.44928	322.13580
2	-52.62151	48.54257	25.36862	36.66667	57.95635
3	98.41179	49.92785	127.98700	97.53623	271.30020
4	107.30961	50.36075	63.75302	75.79710	297.22048
5	155.98928	49.92785	25.42433	67.10145	381.00558
6	145.88595	50.18759	14.67224	80.14493	290.89071
7	-43.95331	49.19192	28.04271	10.57971	43.86103
8	118.15920	50.88023	57.84773	62.75362	289.64078
9	99.73211	51.35642	32.83380	62.75362	246.67595
10	-36.94987	49.14863	37.62488	14.92754	64.75118
11	-53.36778	49.06205	26.64995	10.57971	32.92393
12	120.91466	51.44300	64.70009	71.44928	308.50703
13	97.03406	51.57287	57.62488	54.05797	260.28978
14	-46.01990	48.36941	29.99257	32.31884	64.66092
15	-15.13586	48.54257	12.88951	1.88406	48.18028

DISCUSSION

Effect of increasing the number of hours in a 24 hour feeding on plasma biochemical parameters in broiler breeder production peaks at age 31 and 36 weeks of age showed, Treatments in their diet than the control group received more than one day at the end of 36 weeks, there is no significant difference in blood parameters.

In these experiments, increased feeding frequency and time between age 31 and 36 weeks was not significantly different between treatments. Some researchers effect of high-dose injections of progesterone in the reproductive performance of broiler breeder hens were tested and found broiler breeder hens feed intake in excess of that needed to cause metabolic and hormonal changes begin to weaken and ultimately leads to reproductive function [3].

In this study, high concentrations of free and frequent ovulation in hens fed was restricted, However, the high rate of ovulation leading to increased production of broiler breeder hens eggs can be found in either of incubation feeding high doses of progesterone injections gave similar answers.

The experiment was conducted at the end of the experiment showed that estradiol levels in the treatments that received more than once a day increased. This trend may be associated with increased egg production. The obtained results showed estradiol levels in the two age groups 37 and 39 weeks of age, feed twice a day were observed [4]. But the report Sun et al [5] conducted in this regard is inconsistent. Significant differences in estradiol levels during peak times between the two groups and fed a restricted diet they did not release.

In this study, feed restriction in broiler breeder will reduce the concentration of T3 and T4. There are many studies, T3 was reported that feed restriction during the growing hunger in birds decreased and returned to normal after feeding.

Harvey and Klandorf [6] found that when chicks are exposed to periods of starvation and subsequent feeding, Changes in thyroid function occur. Another study reported two hormones T3 and T4 for mitotic cell division is required Electron transport system and are involved in protein synthesis [7]. Open Hymr (1979) stated that reduced iodine deficiency element 3T and 4T hormones that result in growth, reproduction and development of intellectual influence.

The study by Sun et al (2006) in two groups of hens fed with food restriction and free-feeding did, T3 rate in freely feeding hens feed restriction than it was before light stimulation. However, significant differences between the two dietary groups during light stimulation after the first egg was found, and 36 weeks T4 rate of feed restriction group, fed up after the release was stimulated by light. But then, there was no difference between the two groups.

T3 the reduction in feed-restricted diet reduced iodine levels in the blood. The birds are fed freely, Continuous iodine from the bloodstream into thyroid tissue taken there after being ionized by absorption of thyroglobulin is stored. Iodine molecules later thyrotrophic pituitary hormones are influenced by hormones released into the blood is old. More T3, T4 hormone activity, but the amount is significantly less than T4 hormone [8]. Furthermore, there are other reports about effect of diet on other parameters such as gastrointestinal microflora [9, 10].

CONCLUSION

In conclusion the results of this experiment, it can increase to twice a day and feed times improve broiler breeder hormones produced during peak ($P<0.05$).

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