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The effect of different periods of early fasting on the economic and productive traits of broiler at Al-Muthanna Governorate

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Abstract:

This study aimed the effect of different periods of early fasting on productive and economic traits of broiler. A total of 180 chicks of the ROSS 308 were used, one day, 43 g average weight, were randomly distributed into three treatments, as follows; the first treatment (T1) free feeding from one day until the end of the experiment (6 weeks) as a control treatment, the second treatment (T2) was lifted feed two days apart per week during the period of food rationing starting from 7-21 days, and the third treatment (T3) was provided feed between one and the other reciprocally during the same time rationing period, after the end of the fasting period in the second and third treatment at the age of 21 days, it was provided for brood rearing until the 6-week marketing date. The results of the experiment indicated a compensatory growth for the birds in the two treatments of time rationing, as the weight rates of the living body in the fasting treatments (T2 and T3) compared with the control treatment at the age of 6 weeks, the results showed that early fasting treatments were significantly (P≤0.05) improved in the productive and economic traits studied compared with the control treatment. The results showed the superiority of T2 on weight gain, reflected on the increase in revenue generated, as well as a decrease in feed consumption in T3, which was reflected in the feed costs, as a result showed in T3 exceeded the amount of profit per chicken, 0.16 $ compared to the control treatment.

Keywords: *early fasting, economic, productive traits, broiler, Al-Muthanna Governorate*

I. Introduction

The intense genetic selection carried out by geneticists for broiler breeds produced hybrids, it is characterized by fast growth and high transformative efficiency of food intake (Werpruk, 2003; Naji, 2006), rapid growth achieved the goals for which it was to increase production and expected profits (Naji et al., 2003), however, the rapid growth during the early ages, especially the first three weeks of broiler life, was negatively reflected in the immune response of birds (Qureshi and Havenstein, 1994). Which facilitates pathological injuries such as ascites, sudden death syndrome, leg deformities, skeletal structure, and a high percentage of mortality in flocks,

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so it is necessary to slow growth during early life, to be compensated in later periods, if the conditions were in place to compensate for the shortfall in growth beyond the end of the food rationing period, called a compensatory growth (Tumova et al. 2002). There are many nutritional fasting systems, including quantitative, qualitative, optical and temporal, which includes raising the feed from the front of the chicks to different times, for a period of hours, a day, or different days during the period of fasting food (Deaton, 1995).The present study aimed to know the effect of the use of temporal food rationing systems on the productive and economic traits of broilers.

II. Material and methods

This experiment was conducted in the poultry field located at agricultural research and experimental station of the Faculty of Agriculture, Al-Muthanna University, from 20/3/2018 to 2/5/2018. A total of 180 broiler chicks Ross308 were used, one day, 43 g weight, were randomly distributed to three treatments, with 45 chicks per treatment, with three replicates (15 chicks per replicate) as follows:

T1: (control) without fasting.

T2:Feed was raised two days apart per week, Sunday and Wednesday during the food fasting period from 7-21 days.

T3: Feed was provided for spawning from one day to the next along the time of food fasting from 7 to 21 days.

The chicks were fed to the control diet during the first week, thereafter, two dietary fasting treatments were fed to the temporal food fast system, except for control treatment, and continued feeding on control treatment until 21 days of breeding, after the end of the temporal fasting, all the treatments were fed on the growth diet (Table 1).

Market prices were approved to sell the kg of live body weight, which amounted to 2 $, in calculating the value of the weight increase. Feed costs were calculated based on the purchase price, which is about 0.5 $ kg of diet.

Table 1. The basal diets used and chemical analysis during the experiment.

Feed ingredients	Starter 1-21 days	Finisher 22-42 day
Maize	55	55
Soy bean meal (44% CP)	33	30
Wheat	9.5	11
Vit./ Min. Premix*	1	1

Plant oil	0.5	2
Limestone	0.6	0.6
Salt	0.4	0.4
		Chemical analysis
Crude protein (%)	20.95	19.75
Metabolisable energy (Kcal/kg)	3020	3151
Calcium (%)	0.92	0.84
Phosphorus (%)	0.46	0.44
Lysine (%)	1.33	1.23
Methionine (%)	0.54	0.49
Methionine+ Cysteine(%)	0.90	0.84
Folic acid	1.3	1.2

*Composition per kg diet: Vit A: 40000IU; Vit D:80000IU; Vit E: 40000 ng; Vit k3: 800 mg; Vit B1: 1000mg; Vit B2: 6000mg; Vit B6: 500 mg; VitB12: 25 mg;Niacin: 6000 mg; Panthothenic acid: 2000 mg; Folicacid: 200 mg; Biotin: 8 mg; Mn: 300000 mg; Fe: 8000mg; Zn: 20000 mg; Co: 80mg; I: 400 mg; Se: 40 mg;Choline: 800000 mg.

Timing fast systems were used from 7-21 days, after the end of the food fasting period, the feed was provided *ad libitum* to the chicks up to 42 days, during the experiment period, was measured, live weight (g), weight gain (g), feed consumption and conversion efficiency, recorded over a 42-day trial period, the value of the production index was calculated according to the formula referred to by Naji (2006).

The experiment was carried out using Complete Random Design (CRD), data were analyzed using the SAS statistical program (2001, SAS). The averages were compared using the Dunkin-polynomial test with a significant level (0.05) to determine the significance of the differences between the averages.

III. Results and Discussions

Table 2. show that a significant differences (P≤0.05) in the live body weight at the age of 21 days between the control treatment T1 (without food fasting) with T2 (Feed was raised two days apart per week, Sunday and Wednesday during the food fasting period from 7-21 days) and T3 (Feed was provided for spawning from one day to the next along the time of food fasting from 7 to 21 days).

Table 2. The effect of temporal early feed fasting on body weight (g) of broiler (Means± standard error).

Treatments	Age (day)	
	21	42
T1	746.0±3.90a	2006.0±11.23
T2	611.0±4.25b	2012.0±13.20
T3	571.0±4.32c	2007.0±13.22
Sig.	0.05	N.S

N.S no significant differences.*The different letters indicate significant differences at the probability level of 0.05.

T1 was significantly improvement (P≤0.05) compared to the two treatments of time-dietary rationing in terms of body weight ratio at age 21 days. The reason for the decrease in body weight in the treatment of feed fasting compared to the control treatment may be due to the lack of spawning on its energy and protein requirements, the result of feed withdrawal from the front of the chicks for different days during the period of food rationing time, reflects negatively on growth and body weight rate (Yu et al., 1990; Osullivon et al., 1991; Yousefi et al., 2001; Fariborz et al., 2007 and Ibrahim 2004). As for the significant differences that appeared between the two treatments of the fasting feed time, due to the severity and duration of the food fasting program used in T3, which feed was provided between a day and an extra during the rationing period, therefore, the significant decrease in body weight of this treatment appeared compared to T2 feed fasting, that the effect of temporal food rationing was less severe (Robinson, 1992).

As for the age of 42 days, no significant differences were seen all treatments, because of compensatory growth in the fasting treatment s, the birds were very desirous of eating feed as need of energy and protein, to compensate for the missed growth during fasting for different days in the period of feed fasting, the result showed weights approaching or equal to the control treatment (Sayda et al., 2011; Ahmed and Butris, 2014; Olukomaiya et al., 2015; Alkhair et al., 2017).

Table 3.and4. shows the weight and value gain from the age 1 to 21 days, the significant increase (P≤0.05) was in control treatment compared to the fasting treatments, whereas, the significant increase (p≤0.05) in weight and value gain from the age of 21-42 days was in fasting treatments compared to the control treatment,

as the weight and value gain from the age 1 to 42 days, they were not significant between the treatments in the experiment (1kg=2dolare).

Table 3. The effect of temporal early feed fasting on weight gain (g) of broiler (Means± standard error).

Treatments	Age (day)		
	21	42	1-42
T1	706.0±1.88a	1258.0±4.30b	1964.0±14.20
T2	571.0±1.90b	1401.0±5.10a	1972.0±13.17
T3	531.0±1.70c	1434.0±5.30a	1965.0±14.32
Sig.	0.05	0.05	N.S

N.S no significant differences.*The different letters indicate significant differences at the probability level of 0.05

Table 4. represents the weight gain value created from Table 3, depending on the selling price of a kg of live body weight, which is about 2 $, showed the superiority of the T2 at the marketing date for the total period

Table 4. The effect of temporal early value feed fasting on weight gain ($)of broiler chickens (Means± standard error).

Treatments	Age (day)\ value		
	21	42	1-42
T1	1.412	2.516	3.928
T2	1.142	2.802	3.944
T3	1.062	2.868	3.930
Sig.	0.05	0.05	N.S

. N.S no significant differences.*The different letters indicate significant differences at the probability level of 0.05

Table 5. and 6. showed a significant decrease (P≤0.05) in the feed consumption and the feed consumption value in the feed fasting treatments from 7-21 days compared to the control treatment, the decrease

in feed consumption was higher, with the increase in the feed lift time in front of the chicks during the time of feed fasting, feed consumption increased during the second period (21-42 days), as the birds were consuming feed significantly from the age 21 to 42 days, the severity of fasting during the period of food rationing time, explain this excessive eating to returns to the fasting state of food, as the state of fasting leads to an increase in the level of corticoid hormone in the blood plasma, which stimulates eat when birds return to free feeding after the end of the fasting days (Bouillon and Berdanier, 1981; Ibrahim, 2004; Ahmed and Butris, 2014; Forborz et al., 2007)

Table 5. The effect of temporal early feed fasting on feed consumption (g) of broiler (Means± standard error).

Treatments	feed consumption (day)		
	21	42	1-42
T1	1233.18±5.11a	2462.90±18.20b	3696.08±26.18a
T2	930.73±4.90b	2505.78±20.20a	3436.51±27.80b
T3	870.84±4.10c	2509.50±25.10a	3380.34±28.90b
Sig.	0.05	0.05	0.05

*The different letters indicate significant differences at the probability level of 0.05.

Table 6. show the value of feed consumed per treatment based on the purchase price of feed, which is 0.5 $ per kg, the schedule was created based on Table 5, the results showed the superiority of T3, which recorded the lowest cost of feed consumption for a period of 1-42 days.

Table 6. The effect of temporal early feed fasting on value feed consumption ($) of broiler (Means± standard error).

Treatments	value feed consumption (day)		
	21	42	1-42
T1	0.616a	1.232b	1.848a
T2	0.465b	1.253a	1.718b
T3	0.436c	1.255a	1.690b

Sig.	0.05	0.05	0.05

*The different letters indicate significant differences at the probability level of 0.05.

A significant increase (P≤0.05) was observed in the feed consumption of fasting treatments compare with control treatment, as for the total feed consumption over the period from 1 to 42 days, the significant increase (P≤0.05) was in the control treatment compared to the two treatments of dietary time rationing, because of the effect of fasting on feed during the rationing period, improve the efficiency of digestion and absorption of food in groups of birds fed to standard feed, provides the opportunity for birds to rest while slowing the speed of food passage into the gut, reflected in the food conversion factor (Naji et al., 2005).(1kg=0.5 dolare)

Table 7. shows the amount of profit realized from the use of fasting, as it turns out that the T3 transaction is the best among the transaction during the breeding period, so the study recommends following the fasting method on day per week during the breeding period.

Table 7. represents the profit realized for the feed restriction treatments per bird based on Table 4., regarding the revenues resulting from the weight gain, and table 6. on costs for feed consumption by approving sale and feed prices, the table showed that the feed restriction treatments were superior to the control treatment, T3 was superior compare with T2, achieve the highest possible profit per bird, an increase of 0.16$ compare with the control treatment, this means achieving a profit increase of 160 $ per thousand broilers, in addition to the decrease in mortality to half for the feed restriction treatments, which will undoubtedly increase the profits of legalization transactions, therefore, the study recommends adopting the time restriction technique, improved the productive and economic traits, achieved price and technical efficiency, h led to achieving economic efficiency.

Table 7. The effect of temporal early feed fasting on profit($) (Means± standard error).

Treatments	Age (day)		
	21	42	1-42
T1	0.796	1.284	2.080
T2	0.949	1.549	2.226
T3	0.626	1.613	2.240
Sig.	0.05	0.05	N.S

N.S no significant differences.*The different letters indicate significant differences at the probability level of 0.05.

Table 8. indicates that a significant differences (P≤0.05) in the feed conversion at the age of 21 days, feed conversion factor significant improved (P≤0.05) in the T2 and T3 nutritional ration treatments compared to

the T1 control treatment, the feed conversion in the two time-feeding fast treatments was better than the control treatment (Proudfoot et al., 1983; Ibrahim, 2004 and Naji et al., 2005). Significant improvement continued at age 21-42 and from age 42 of the feed conversion to obtain compensatory growth after the end of the food fasting period (Mazzuco et al., 2000 and Sayda et al., 2011 and Ahmed and Butris, 2014).

Table 8. The effect of temporal early feed fasting on feed conversion (g diet/ g weigh gain) of broiler (Means± standard error).

Treatments	Age (day)		
	21	42	1-42
T1	1.74±0.03a	1.95±0.02a	1.88±0.02a
T2	1.63±0.02b	1.78±0.01b	1.74±0.01b
T3	1.64±0.01b	1.75±0.02b	1.72±0.02b
Sig.	0.05	0.05	N.S

N.S no significant differences.*The different letters indicate significant differences at the probability level of 0.05.

Table 9. indicates a significant decrease (P≤0.05) in mortality in the fasting treatments compared to the control treatment, with a significant increase (P≤0.05) in the Productive Index values compared to the control treatment, it is concluded that the temporal feed fasting have a significant effect (P≤0.05) on the Production Index values, because gave the best live body weight with a significant improvement (P≤0.05) in the food conversion treatment, with a significant decrease in mortality, that give an indication of the preference of the productive Index (Naji et al., 2003; Ibrahim, 2004, and Naji et al., 2005).

Table 9. The effect of temporal early feed fasting on mortality (%) and Production Index of broiler (Means± standard error).

Treatments	Mortality (%)	Production Index
T1	4.44±0.04a	242.77±1.85b
T2	2.22±0.03b	287.36±1.30a
T3	2.22±0.02b	278.43±1.45a
Sig.	0.05	0.05

*The different letters indicate significant differences at the probability level of 0.05.

Explains the significant decrease in total mortality in the experiment, to the effect of the food fasting process, which slowed growth during this period, thus improving bird health and vitality, not exposed to diseases, usually occurring during the initiation stage such as ascites, sudden deathand leg distortions (Robinson et al., 1992; Fontana et al., 1992; Ibrahim, 2004; Naji et al., 2005; Foriborz et al., 2007; Sayda et al. 2011 and Abdullah et al., 2012).

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