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# Impact of Breed and Feed Restriction on Some Productive and Carcass Traits in Broiler Chickens

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**Abstract:** ***In this experiment we monitored, the performance of two commercial broiler strains (Cobb 500 and Hubbard classic) reared under different feed restriction systems. A total of 420 day-old broiler chickens divided into two breeds, 210 each, were randomly allotted to seven equal treatments, 30 birds each, with three replicates of 10 birds each. Based on the exposed feed restriction, group of birds was fed ad libitum throughout the whole experiment as a control (T0), another six groups were fed restricted as: T1 (8 h/day in 10-20 days of age), T2 (16 h/day in 10-20 days of age), T3 (8 h/day in 20-30 days of age), T4 (16 h/day in 20-30 days of age), T5 (8 h/day in 30-40 days of age), T6 (16 h/ day in 30-40 days of age). The data recorded included body weight, body weight gain, feed efficiency ratio, mortality and carcass traits. Results Indicated that, the highly significant measurements of live body weight, weight gain and better feed efficiency values under treatments were recorded for Cobb-500 broiler strain (1.800, 3.51 and 0.35 respectively) compared to Hubbard classic (1.775, 3.31 and 0.33, respectively). With regard to carcass traits, Cobb birds showed the highest highly significant ($p \leq 0.001$) dressing % and significant ($p \leq 0.05$) giblets wt. (79.4% and 130.14 gm., respectively) compared to the Hubbard one (75.02% and 123.51 gm., respectively). Body weight, weight gain and feed efficiency were not significantly ($p > 0.05$) affected by feed restriction in the two breeds. The control group showed ($p \geq 0.05$) non-significantly higher body weight, gain and efficiency followed by short term restriction groups (8 hrs.) at any stage of life cycle, while the lowest non significant values were obtained by long term restriction groups (16 hrs.). The control group showed the highest significant ($P \leq 0.05$) dressing % and giblets wt., followed by short term restriction groups (8 hrs.) at any stage of life. In an overall conclusion it can be concluded that, Cobb-500 broiler strain is appeared to be the most economic to rear response to their performance records and feed restriction system did not significantly affect the performance of broiler chickens but resulted in improvement of farm economy.***

**Keywords**: broiler, breed, feed restriction, body weight, and carcass traits.

## 1. Introduction

Growth performance of broiler chickens has been increased spectacularly over the last 30 years mainly due to the genetic progress, improvements of nutrition and controlled environment, so that it takes only 33 days to reach finishing BW of about 2 kg **(Wilson, 2005).** The production performance of the broiler chicks is greatest when free access to feed and water is given. Feed, incidentally, is the most expensive factor in growing broiler birds **(Obioha, 1992).** To maximize the genetic potential for rapid growing broiler, it is nowadays thought to be crucial to provide all nutrients and environmental conditions. However, extremely high density of nutrients and energy render broilers more susceptible to various metabolic diseases including ascites, sudden death syndrome and leg abnormality and subsequently resulted in surging mortality and economic loss **(Olkowski et al., 2008).** For these reasons, fast growth rate of broiler has been blamed for welfare concerns and then the broiler industry has attempted to find the solutions to these concerns. Thus, numerous researches have been conducted to find the appropriate ways of solutions such as programs controlling feed intakes to stay healthy by way of controlling optimal growth rates. Unfortunately this growth rate is accompanied by increased body fat deposition, high mortality and high incidence of metabolic diseases and skeletal disorders ***(Zubair and Leeson, 1996)***. These situations most commonly occur with broilers that consume feed *ad libitum* **(*Pasternak and Shalev, 1983; Nir et al., 1996*).** Thus feed restriction has been proposed to reduce these problems. Early feed restriction programs used to reduce abdominal and carcass fat in broiler chickens rely on the phenomenon called compensatory growth or catch up growth to produce market body weight similar to control groups, Compensatory growth or catch-up growth is defined as abnormally rapid growth relative to age. Food restriction in poultry has been commonly used to reduce metabolic disorders (e.g., ascents), control body weight, and reduce reproductive problems in both meat-type and egg-type chickens **(Zubair and Leeson, 1994; Fassbinder and Karasov, 2006)**. This means that there is potential to underfeed broiler chickens for some time, without affecting weight at normal market age.

Therefore, this study aimed to investigate the effect of breed (Cobb 500 and Hubbard classic) and feed restriction on some productive (body weight, body gain, feed intake, feed efficiency and mortality) and carcass traits on broiler chickens.

## 2. Materials and Methods

### 2.1 Experimental birds

This study was conducted at the Poultry Unit belonging to the Department of Animal Husbandry and Wealth Development, Faculty of Veterinary Medicine, Mansoura University during the period from March 2014 to May 2014. A total of 420 one-day-old chickens of two different breeds (Cobb and Hubbard), 210 birds each were used in this study. At 10 days of age, each group was randomly allotted to three subgroups of 10 birds each as a replicates. This experimental design was started at 10 days of age and lasted for 45 days. The experimental design was described in table 1.

**Table 1:** The experimental design of feed restricted groups

| Group | N | feed restriction |
|---|---|---|
| Group I | 30 | Birds were fed ad libitum (control group) |
| Group II | 30 | Birds were fed restricted 8 h/day in 10-20 days of age. |
| Group III | 30 | Birds were fed restricted 16 h/day in 10-20 days of age. |
| Group IV | 30 | Birds were fed restricted 8 h/day in 20-30 days of age. |
| Group V | 30 | Birds were fed restricted 16 h/day in 20-30 days of age. |
| Group VI | 30 | Birds were fed restricted 8 h/day in 30-40 days of age. |
| Group VII | 30 | Birds were fed restricted 16 h/day in 30-40 days of age. |

Each group including 3 replicates of 10 birds each. These groups were repeated for each breed (210 birds for Cobb and 210 birds for Hubbard).

### 2.2. Management

The experimental birds were brooded together in the brooding unit (deep litter system) under the same environmental conditions as one group for 9 days using 100 watts electric bulb, 30°C brooding temperature and 14 hours of light per day were provided for chickens. Good ventilation and fresh air were provided to reduce ammonia concentration in the house. Chickens were fed a concentrate diet formulated according to **NRC, 1994** (Table 2) and clean fresh water was available all times. Vitamin E and Selenium, AD3E, prophylactic antibiotics and anticoccidial drugs were also provided.

**Table 2:** Composition of diet fed to chickens during experiment

| *Ingredients* | *Starter (1-21)* | *Grower (22-42)* |
|---|---|---|
| Yellow corn | 56.9 | 63 |
| Soybean meal | 33.5 | 28.17 |
| Corn gluten | 2.9 | 1.77 |
| Inert | 0 | 0.4 |
| Oyster shell | 1.1 | 1.1 |
| Dicalcium phosphate | 2 | 1.7 |
| Salt | 0.3 | 0.3 |
| Vitamin/mineral premix[1] | 0.5 | 0.5 |
| DL-Methionine | 0.1 | 0.03 |
| L-Lysine | 0.0 | 0.03 |
| Animal fat | 2.65 | 3 |
| Vitamin E | 0.10 | 0.10 |
| Total | 100 | 100 |
| **Calculated nutrient content** | | |
| Crude fat | 0.06 | 0.06 |
| Dry matter | 89.03 | 89 |
| Moisture | 10.97 | 11 |
| ME (Kcal/Kg) | 3000 | 3050 |
| Protein (%) | 21.5 | 19.5 |
| Calcium | 0.81 | 0.83 |
| Available P | 0.40 | 0.41 |
| Lysine | 1.19 | 1.18 |
| Methionine | 0.48 | 0.49 |
| Methionine+ cystine | 0.81 | 0.73 |

*For each kg of the diets; vitamin A, 9,000,000 IU; vitamin D3, 2,000,000 IU; vitamin B1, 1,800 mg; vitamin B2, 6,600 mg;vitamin B3, 10,000 mg; vitamin B6, 3,000 mg; vitamin B12,15 mg; vitamin E, 18,000 mg; vitamin K3, 2,000 mg; vitamin B9,1,000 mg; vitamin B5, 30,000 mg;folic acid, 21 mg; nicotinic acid, 65 mg; biotin, 14 mg; choline chloride, 500,000 mg; Mn,100,000 mg; Zn, 85,000 mg; Fe, 50,000 mg; Cu, 10,000 mg; I, 1,000 mg; Se, 200 mg.*

### 2.3. Data Recording and Statistical Analysis

Body weight of each replicate was recorded to the nearest gram (gm) at the beginning of the experiment, then weekly till the end of the experiment using digital balance (Sartorius). Weekly weight gain was calculated by subtracting the body weight between two successive weights using the following formula:

**BWG = Bw2-Bw1** ***Where:*** Bw1= previous week's body weight Bw2= former body weight.

The amount of feed consumed in kilograms was calculated weekly. Feed efficiency was calculated from each replicate as gram body weight gain /g feed consumed. At the end of the experiment, 5 birds from each replicate were fastening for 10 hours before slaughter ***(El-Bahy, 2003).*** Then each replicate were individually weighed to the nearest gram, and slaughtered. Following a four minutes bleeding time, each bird was dipped in a water bath for two minutes, and feathers were removed by hand, then the weights of hot carcass and giblets (gizzard, liver and heart) were recorded. Carcass without any organs was weighted 15-30 minutes after slaughtering, and then the percentage of the weight relative to market weight was calculated.
***Dressing out percentage*** = Hot carcass weight / Live weight x100.

Data were analyzed using the General Linear Model (GLM) procedure of the Statistical Analysis System package ***(SAS, 2002***). Preliminary test was applied to the percentage data before comparison and analysis, and found that data was homogeneous and did not need transformation to the corresponding arcsine angle, and also found a non-significant effect of replicate. All data are expressed as the Least Square Mean (LSM) ± S.E. with the exception of the mortality rate and dressing%, which were expressed as a percentage.

## 3. Results

The impact of breed and feed restriction on live body weight and weight gain of two breeds of broiler chicken (Cobb-500 and Hubbard classic) are presented in table (3). The findings of this study reveal that, the highly significant measurements of live body weight and weight gain were recorded for Cobb-500 broiler strain (1.800, 3.51 and 0.35 respectively) compared to Hubbard classic (1.775, 3.31 and 0.33, respectively). Body weight and weight gain were not significantly affected by feed restriction in the two breeds. In Cobb breed, control group showed non-significantly higher body weight and gain (1.837 and 3.70, respectively), followed by short term restriction groups (8 hrs.) at any stage of life cycle (10-20 or 20-30 or 30-40- days of age) (1.817 and 3.60, respectively) for T1, (1.803 and 3.51, respectively) for T3, and (1.829 and 3.62, respectively) for T5, while the lowest non significant values were obtained by long term restriction groups (16 hrs.). The same was in Hubbard one, control group showed non-significantly higher body weight and gain (1.803 and 3.50, respectively), followed by short term restriction groups (8 hrs.) at any stage of life cycle (10-20 or 20-30 or 30-40- days of age) (1.800 and 3.42, respectively) for T1, (1.790 and 3.31, respectively) for T3, and (1.809. and 3.40, respectively) for T5, while the lowest non significant values were obtained by long term restriction groups (16 hrs.).

**Table 3:** The effect of breed and feed restriction on body weight and gain

| *Breed* | *Treatments* | *Traits* | |
|---|---|---|---|
| | | *Final weight* | *Gain* |
| Cubb | Control | $1.837 \pm 0.56^{a}$ | $3.70 \pm 0.45^{a}$ |
| | T1 | $1.817 \pm 0.67^{a}$ | $3.62 \pm 0.66^{a}$ |
| | T2 | $1.764 \pm 0.51^{a}$ | $3.39 \pm 0.69^{a}$ |
| | T3 | $1.803 \pm 0.56^{a}$ | $3.51 \pm 0.48^{a}$ |
| | T4 | $1.761 \pm 0.40^{a}$ | $3.24 \pm 0.53^{a}$ |
| | T5 | $1.829 \pm 0.65^{a}$ | $3.60 \pm 0.66^{a}$ |
| | T6 | $1.789 \pm 0.75^{a}$ | $3.52 \pm 0.71^{a}$ |
| | Total | $1.800 \pm 0.58^{A}$ | $3.51 \pm 0.59^{A}$ |
| Hubburd | Control | $1.809 \pm 0.22^{a}$ | $3.50 \pm 0.25^{a}$ |
| | T1 | $1.800 \pm 0.50^{a}$ | $3.42 \pm 0.46^{a}$ |
| | T2 | $1.704 \pm 0.11^{a}$ | $3.19 \pm 0.49^{a}$ |
| | T3 | $1.790 \pm 0.42^{a}$ | $3.31 \pm 0.28^{a}$ |
| | T4 | $1.751 \pm 0.30^{a}$ | $3.04 \pm 0.33^{a}$ |
| | T5 | $1.803 \pm 0.45^{a}$ | $3.40 \pm 0.46^{a}$ |
| | T6 | $1.769 \pm 0.55^{a}$ | $3.32 \pm 0.51^{a}$ |
| | Total | $1.775 \pm 0.36^{B}$ | $3.31 \pm 0.39^{B}$ |

*Means of different levels within the same column with small letters having different superscripts are significantly different ($p < 0.05$). *Means of different levels within the same column with capital letters having different superscripts are significantly different ($p < 0.05$).

The effect of breed and feed restriction on feed intake and feed efficiency are recorded in table (4) which showed that, Cobb birds had the highest values of feed intake and efficiency (9.83 and 0.35, respectively) compared to Hubbard one (9.79 and 0.33, respectively) under the effect of treatment and this was reflected in its increase in weight and gain as illustrated in table (3). Feed intake and feed efficiency were not significantly affected by feed restriction. In Cobb breed, control group showed non-significantly ($p \geq 0.05$) higher feed intake and efficiency (10.05 and 0.37, respectively), followed by short term restriction groups (8 hrs.) at any stage of life cycle (10-20 or 20-30 or 30-40- days of age) (9.84 and 0.37, respectively) for T1, (10.00 and 0.35, respectively) for T3, and (9.97 and 0.36, respectively) for T5 while the lowest non significant values ($p \geq 0.05$) were obtained by long term restriction groups (16 hrs.). The same was in Hubbard one, control group showed non-significantly higher feed intake and efficiency (10.00 and 0.35, respectively), followed by short term restriction groups (8 hrs.) at any stage of life cycle (10-20 or 20-30 or 30-40- days of age) (9.79 and 0.34, respectively) for T1, (9.95 and 0.33, respectively) for T3, and (9.92 and 0.34, respectively) for T5, while the lowest non significant values were obtained by long term restriction groups (16 hrs.).

**Table 4:** The effect of breed and feed restriction on feed intake and efficiency

| *Breed* | *Treatments* | *Traits* | |
|---|---|---|---|
| | | *Intake* | *Efficiency* |
| Cubb | **Control** | $10.05 \pm 0.34^{a}$ | $0.37 \pm 0.04^{a}$ |
| | **T1** | $9.84 \pm 0.38^{a}$ | $0.37 \pm 0.08^{a}$ |
| | **T2** | $9.62 \pm 0.52^{a}$ | $0.35 \pm 0.07^{a}$ |
| | **T3** | $10.00 \pm 0.34^{a}$ | $0.35 \pm 0.07^{a}$ |
| | **T4** | $9.50 \pm 0.57^{a}$ | $0.34 \pm 0.05^{a}$ |
| | **T5** | $9.97 \pm 0.17^{a}$ | $0.36 \pm 0.07^{a}$ |
| | **T6** | $9.89 \pm 0.30^{a}$ | $0.35 \pm 0.07^{a}$ |
| | **Total** | $\mathbf{9.83 \pm 0.37^{A}}$ | $\mathbf{0.35 \pm 0.45^{A}}$ |
| Hubburd | **Control** | $10.0 \pm 0.29^{a}$ | $0.35 \pm 0.02^{a}$ |
| | **T1** | $9.79 \pm 0.33^{a}$ | $0.34 \pm 0.06^{a}$ |
| | **T2** | $9.57 \pm 0.47^{a}$ | $0.33 \pm 0.05^{a}$ |
| | **T3** | $9.95 \pm 0.29^{a}$ | $0.33 \pm 0.02^{a}$ |
| | **T4** | $9.45 \pm 0.52^{a}$ | $0.32 \pm 0.03^{a}$ |
| | **T5** | $9.92 \pm 0.12^{a}$ | $0.34 \pm 0.05^{a}$ |
| | **T6** | $9.85 \pm 0.25^{a}$ | $0.33 \pm 0.05^{a}$ |
| | **Total** | $\mathbf{9.79 \pm 0.32^{B}}$ | $\mathbf{0.33 \pm 0.04^{B}}$ |

*Means of different levels within the same column with small letters having different superscripts are significantly different ($p < 0.05$). *Means of different levels within the same column with capital letters having different superscripts are significantly different ($p < 0.05$).

With regard to carcass traits, table (5) showed that Cobb birds showed the highest highly significant ($p \leq 0.001$) dressing % and significant ($p \leq 0.05$) giblets wt. (79.4% and 130.14 gm., respectively), compared to the Hubbard one (75.02% and 123.51 gm., respectively). Under the effect of treatments, in Cobb breed, the control group showed the highest significant ($P \leq 0.05$) dressing % and giblets wt., (87.18 and 159.00, respectively) followed by short term restriction groups (8 hrs.) at any stage of life cycle (10-20 or 20-30 or 30-40- days of age) (86.26 and 158.66, respectively) for T1, (76.68 and 129.00, respectively) for T3, and (76.52 and 127.33, respectively) for T5 while the lowest significant values ($p \geq 0.05$) were obtained by long term restriction groups (16 hrs.). The same was in Hubbard one, control group showed the highest significant ($P \leq 0.05$) dressing % and giblets wt., (81.06 and 154.40, respectively), followed by short term restriction groups (8 hrs.) at any stage of life cycle (10-20 or 20-30 or 30-40- days of age) (80.76 and 150.60, respectively) for T1, (79.26 and 125.25, respectively) for T3, and (74.10 and 104.04, respectively) for T5, while the lowest values were obtained by long term restriction groups (16 hrs.).

**Table 5:** The effect of breed and feed restriction on carcass traits

| *Breed* | *Treatments* | *Traits* | |
|---|---|---|---|
| | | *Dressing %* | *Giblets wt. (gm)* |
| Cubb | Control | $87.18^{a} \pm 0.40$ | $159.00^{a} \pm 0.57$ |
| | T1 | $86.26^{ab} \pm 0.50$ | $158.66^{a} \pm 0.67$ |
| | T2 | $83.72^{b} \pm 0.85$ | $119.02^{c} \pm 0.57$ |
| | T3 | $76.68^{b} \pm 0.50$ | $129.00^{b} \pm 0.57$ |
| | T4 | $69.46^{b} \pm 0.80$ | $104.01^{e} \pm 0.68$ |
| | T5 | $76.52^{b} \pm 0.55$ | $127.33^{b} \pm 0.87$ |
| | T6 | $76.03^{c} \pm 0.35$ | $114.00^{d} \pm 0.55$ |
| | TOTAL | $79.40 \pm 0.56^{A}$ | $130.14 \pm 0.64^{A}$ |
| Hubburd | Control | $81.06^{a} \pm 0.20$ | $154.40^{a} \pm 0.83$ |
| | T1 | $80.76^{a} \pm 0.51$ | $150.60^{b} \pm 0.60$ |
| | T2 | $62.83^{e} \pm 0.32$ | $124.42^{d} \pm 0.53$ |
| | T3 | $79.26^{b} \pm 0.31$ | $125.25^{c} \pm 0.55$ |
| | T4 | $74.10^{c} \pm 0.15$ | $102.20^{g} \pm 0.53$ |
| | T5 | $74.10^{c} \pm 0.15$ | $104.40^{e} \pm 0.52$ |
| | T6 | $73.06^{d} \pm 0.12$ | $103.30^{f} \pm 0.63$ |
| | TOTAL | $75.02 \pm 0.25^{B}$ | $123.51 \pm 0.59^{B}$ |

*Means of different levels within the same column with small letters having different superscripts are significantly different ($p < 0.05$). *Means of different levels within the same column with capital letters having different superscripts are significantly different ($p < 0.05$).

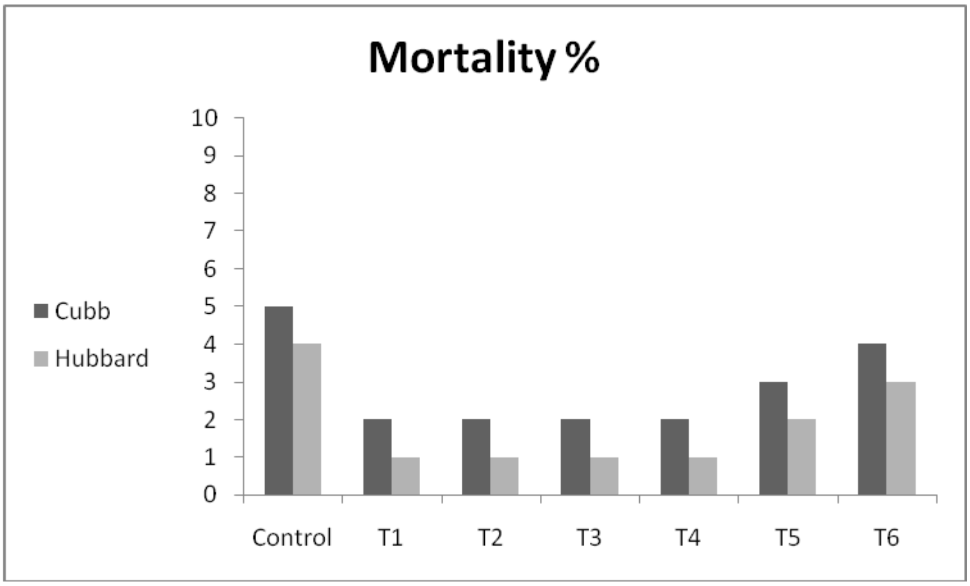


**Figure 1:** showed the effect of breed and feed restriction on mortality%.

The effect of breed and feed restriction on mortality % is shown in figure (1). We can demonstrate that the mortality rate was significantly higher ($p<0.05$) in Cobb breed (28.57%) than the Hubbard one (18.57%) and this may be due to increase the body weight and gain especially at the end of the experiment. Under the effect of treatment the control group showed the highest non significant ($P>0.05$) mortality %, followed by 8 hr feed restricted group from 30-40 days of age in the two breeds, while the lowest percentages were obtained from 10-30 days of age whatever at 8 or 16 hrs feed restricted groups in the two breeds.

## 4. Discussion

The findings of this study revealed that the highest significant ($P\leq0.05$) measurements of live body weight, weight gain and better feed efficiency values under treatments were recorded for Cobb-500 broiler strain than the Hubbard one. These results are in agreements with those of ***(Hossain et al., 2011; Gonzales et al., 1998; Sarker et al., 2001 & 2002 and Abdullah et al., 2010)*** who indicated that Cobb-500 broiler strain achieved heavier body weight and higher weight gain than the other strains. The improved body weight gain of this strain, possibly due to higher feed intake and several other factors might be involved with here. Results also showed that feed restriction did not significantly affects on body weight and weight gain in the two breeds. The lack of significant effect of feed restriction systems on the live body weight and gain especially at the last weeks of age may be due to gradual physiological adaptation of the birds to the different feeding regimes and probably improving the efficiency of conversion of the feed available to them and this may be associated with several investigator as ***Saber et al. (2011),*** who indicated that feed intake, body weight gain, feed conversion ratio (FCR) and final weight at 1-42 days were not significantly affected by feed restriction. Also, ***Offiong et al., 2002, Saleh, 2004 and Tumova (2002)*** stated that on 1-42 days, all treatments had similar body weight gain. Moreover, ***Deaton (1995)*** stated that restricting feed supply was found to have no significant effect on broiler performance during growing period. In addition, ***Benyi and Habi (1998)*** reported that chicks fed ad libitum grew faster and were found to be heavier than those on restricted feeding regimes. On the contrary, ***Sandilands et al. (2006)*** found that the weight of birds in all restricted treatments increased faster than that of control birds in the grower period. Also, ***Hassanien (2011)*** showed that feed restriction decreased significantly ($p<0.05$) body weight of all treatments at 2 and 3 weeks of age as compared to the control treatment.

The non significant effect of feed restriction on feed intake and efficiency were in agreements with those reported by ***Saber et al. (2011) and (Plavink and Hurwits, 1991)*** who cleared that feed intake and feed conversion ratio (FCR) were not significantly affected by feed restriction. The feed intake for ad libitum fed birds and restricted birds was not significantly different. The study of ***Fanooci and Torki (2010)*** showed that no significant difference in the overall FCR (9-49 d) between chicks fed the restricted and non-restricted control.

These result, also same with those described by ***Leeson and Zubair (1996)*** who stated that when the chickens are treated ration restriction, it will cause disruption of growth, but when the chickens get back normal intake of nutrients the growth will come back normal again. This phenomenon can be explained because the chicken consuming protein and energy of diet rations less than their needs. In addition, ***Jones and Farrell (1991) and Mahmud et al (2004)*** cleared that the feed conversion had no significant difference in 1-42 day. On the contrary, ***Hassanien (2011)*** showed that feed restriction decreased significantly ($p<0.05$) feed consumption in all treatments that fasted 8 or 6 h as compared by control treatment at 3 and 6 weeks of age.

Moreover, ***(Hassanabadi and Moghaddam, 2006) and (Sahraei and Shariatmadari, 2007)*** found that the feed restriction increase feed intake. The higher feed intake can be related to the hypertrophy of the gastrointestinal tract that occurs after the restriction period.

Concerning the carcass traits, Cobb birds showed the highest highly significant ($p\leq0.001$) dressing % and significant ($p\leq0.05$) giblets wt. (79.4% and 130.14 gm., respectively), compared to the Hubbard one (75.02% and 123.51 gm., respectively). In accordance to these results, ***Coneglian et al., (2010)*** concluded that Cobb breed, considered as having a rapid initial growth, was superior to Ross, which shows slower initial growth rate, carcass and cuts yield. Moreover, ***Fernandes et al., (2013)*** found that there was a significant difference ($p<0.05$) between breeds in carcass cuts. In addition, ***Stringhini et al. (2003)*** did not observe differences on yield carcass or cuts between breeds. Likewise**, Moreira et al. (2003)** did not find significant differences on the carcass yield when breeds selected for conformation were slaughtered at 42 or 49 days old, neither for males or females.

The results of this study also indicated that different feed restriction systems significantly affect the relative percentages of liver, gizzard, head, and giblets and the overall dressing percentage. These findings agreed with those reported by ***(Cherry et al., 1978; Washburn and Bondari, 1978)*** who reported that feed restricted birds have been shown to have lower carcass content at market age than birds fed ad libitum. On the contrary, ***Palo et al. (1995)*** and ***Hassanien (2011)*** indicated that restricted feeding did not affect the carcass characteristics and the relative weights of different organs, except the relative weight of liver.

In recent reports ***Fontana et al., 1992 and Scheideler and Baughman (1993)*** observed no effect of feed restriction regimens on carcass content***. On basilar et al., (2009)*** observed that 4 h daily feed removal had no significant effects on body weight, feed intake, feed efficiency, and carcass characteristics. Some studies have shown that feed restriction could decrease fat content and increase protein deposition in carcasses, thus resulting in the improved carcass composition ***(Jones and Farrell, 1992; Nielsen et al., 2003).***

Concerning the mortality rate, Cobb breed achieved a significantly higher mortality rate ($p<0.05$) (28.57%) than the Hubbard one (18.57%) and this may be due to increase the body weight and gain especially at an early age. Under the effect of treatment the control group showed the highest non significant ($P>0.05$) mortality %, followed by 8 hr feed restricted group from 30-40 days of age in the two breeds, while the lowest percentages were obtained from 10-30 days of age whatever at 8 or 16 hrs feed restricted groups in the two breeds.

Poultry nutritionist suggested that the high growth rate in modern broiler chicks is the main reason for this problem. These results were in consistence with ***(Deaton, 1995; Scheideler and Baughman, 1993)*** who found non significant difference between control and feed restriction groups. On the contrary, ***Bowes et al. (1998)*** in his experiments of feed restriction showed that SDS occurrence in feed restriction groups was 0 % and in ad libitum feed intake groups was 3.33 %.

## 5. Conclusion

In conclusion, Cobb-500 birds recorded heavier body weight compared to Hubbard classic birds. In general, the potential of feed restriction programs as a management tool, related to reduce maintenance requirements and consider one of the main techniques in growth curve manipulation for increasing production efficiency in broiler chicken. As well as, lead to economical saving in cost of feeding in broiler chicken production, thus may be usefulness for commercial broiler chick's production farms.

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