

EFFECT OF DIFFERENT FEEDING PROGRAM AT FIRST DAY ON PERFORMANCE AND ECONOMIC INDEX OF BROILER CHICKENS

SHAHLA. M.S. KIRKUKI

Animal Production Department, Faculty of Agricultural Sciences, Sulaimani University, Sulaimani, KGR, Iraq.

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ABSTRACT

A total of 132 one day old Ross (308) broiler chickens were used to determine the effect of four treatments (feed program) on broiler performance and economic index. At delivery the chicks were weighted. As well as, the body weight, weight gain, feed intake, feed conversion ratio was recorded at day 14, 21, 28, 35 and 42. Economic index was recorded at 42. Four treatments includes: feeding immediately after delivery in the hatchery and continue to the farm (T1); fasting for 12 hours after hatch with access to water (T2); fasting for 12 hours with access to water containing 5% sugar followed by feeding the diet (T3); or feeding a diet immediately at the farm (T4). Interaction between treatments and different periods, were significantly ($p < 0.05$) effected on body weight, although, the effect of treatments at each period did not significant. Overall of body weight/ period was significantly ($p < 0.05$) higher at day 42 followed by the least periods. Significant ($p < 0.05$) effect of interaction between treatments with periods, treatments and periods were observed in feed intake and weight gain. Feed conversion ratio did not significantly affected by different periods. Economic index did not significantly affected by different treatments. Values of economic index were numerally influenced of: body weight, body weight gain, feed intake, viability% and feed conversion ratio.

Key words: Feeding program, first day old, broiler, economic index, performance.

INTRODUCTION

During the last few decades, because of undergone intensive genetic selection of broiler chickens for better growth performance (Shariatmadari, 2012). The number of days required to reach market weight continues to decline, and the first few days of life have become a greater portion of the whole life cycle of the broiler (Wang, 2014). Which, make the getting the birds off to a good start more importance. Early access to feed can provide advantages to growth that continue for up to 35 days post hatch (Bhanja *et al.*, 2010).

The importance of strategies of nutrition and feeding during the starter stage was increased. During commercial production of poultry, over 24 - 48 hours or may be for up to 72 hours holding period may occur before they reach farms, or prior to access to feed (Noy and Sklan 1998; Willemsen *et al.*, 2010; Abed *et al.*, 2011). The time of deprivation of chicks may increase when the distance to farm was very far.

These chicken do not have access to feed or/and water, so the body weight decreased and intestine and muscle developments of bird are reduced (Sklan *et al.*, 2000; Peebles *et al.*, 2005; Noy and Uni, 2010). Other studies have been conducted to evaluate the effect of delay in access to feed for newly hatched chickens on broiler growth performance (Nir and Levanon 1993; Noy and Sklan, 1999; Bigot *et al.*, 2003; Berri *et al.*, 2007). While, Juul – Madsen *et al.* (2004), Vargas *et al.* (2009) and Rammouz *et al.* (2011) found that post hatching delay in feed access did not affect chicken body weight at market age. El-Husseiny *et al.* (2008) indicated that a decrease in body weight gains and higher feed to gain ratio, resulting from holding chicks without feed, continued to affect chicks up to 6 weeks post hatch.

Studies have found that the active transport system for glucose and fructose start developing 1 hour after feeding sucrose to 1 day old chicks (Sheshukova and Ozols 1986) and the mucosa responded to the adaptive changes in sucrase activity (Ozols and Sheshukova, 1985). Glucose, sucrose and glycerol may have potential to increase chicken performance. Glucose and sucrose are mono and disaccharide carbohydrates and can be easy utilized by chickens. Earlier research found that chicks acquire more energy from a glucose based diet than a corn based

Corresponding author: Dr. SHAHLA. M.S. KIRKUKI

E-mail address: shahlan26@gmail.com

Present address: Animal Production Department, Faculty of Agricultural Sciences, Sulaimani University, Sulaimani, KGR, Iraq.

diet until day 21 post hatch (Batal and Parsons, 2002). However, Sorbara *et al.* (2006) found that using glucose and sucrose to replace starch as the energy source improved chick growth performance during the first 7 days post hatch. Providing nutrients early is important because newly hatched chicks have active satellite cells, responsible for muscle growth, that benefit from early access to nutrients. Feed restriction at an early age resulted in inhibition of satellite cell proliferation and differentiation (Yue *et al.*, 2012).

Determining the poultry production profitability is essential for the farmers' economic progress, and may contribute for the development of public and private policies (Mendes *et al.*, 2014). One of the most convenient measures of success is profitability of production, because it is observable and it is not subject to interpretation (Duffy and Nanhou, 2003). Economic European Production Efficiency Factor is used in many countries of the world as a tool for measuring growing performances to broiler chicken (Van, 2003). Therefore, the factors involved in the European Production Efficiency Factor are body weight gain, feed conversion ratio and viability and are considered universal measures for evaluating broilers performance (Marcu *et al.*, 2013). The European Production Efficiency Factor was used for expressing production efficiency in a single index. European Production Efficiency Factor is used to express the overall production profile (Perić *et al.*, 2009; Nabizadeh, 2012).

This study presents a part of the trial that aimed to estimate the productive performance and economic effects of feeding program at first day of chicken's broilers.

MATERIALS AND METHODS

A total of 132 one day-old Ross 308 broiler chicks were allocated randomly to four treatments having three replicates with constituted 33 chicks per treatments. The four treatments (feeding program) include; feeding immediately after delivery in the hatchery and continue to the farm (T1), fasting for 12 hours after hatch with access to water (T2), fasting for 12 hours with access to water containing 5% sugar followed by feeding the diet (T3), or feeding a diet immediately at the farm (T4). Commercial feed (CP = 22.0% and ME = 3,100 kcal/ kg) was used as a starter for feeding from 1 to 3 week of age and another feed (CP = 18.0% and ME = 3,200 kcal/ kg) as a finisher from 4 to 6 week of age. Feed and water were consumed ad libitum except at day 7-14. Compensatory growth normally is induced by feed restriction during day 7-14 of age was used by decreasing light to 16 hour as described by (Leeson and Summers (2001).

At delivery chicks were weighing for each treatments, and performance parameters investigated during the

experimental periods were: body weight, average daily weight gain, feed conversion ratio, the mortality, for each periods (14, 21, 28, 35 and 42) days old age, as well as the economic efficiency of growth, through the calculation of European Production Efficiency Factors and European Broiler Index were at day 42.

For analysis of performance indicators such as: body weight gain, average daily gain, feed conversion ratio, viability, European Production Efficiency Factors and European Broiler Index the following formulas were used:

Body weight gain (grams on period) = Body weight (g) at the end period - Body weight (g) in first day

Average daily gain (g/chick/d) = Body weight Gain/ days number of growth period

FCR (kg feed/kg gain) = cumulative feed intake (kg)/total weight gain (kg)

Viability (%) = chicks remaining at the end of period (%)

European Production Efficiency Factors = [Viability (%) x Body weight (kg)]/ [age (day) x Feed conversion ratio] x100

European Broiler Index = [Viability (%) x Average daily gain (g/chick/d)]/ [Feed conversion ratio x 10].

Statistical Analysis

The analysis of variance was done for all recorded Data to find out the differences between treatments, periods and their interaction by Statistical Program PASW Statistics Student Version 18 SPSS. An ANOVA using the general linear models procedure included the main effects of treatments, periods and their interaction broiler performance. Duncan Multiple Range Test (Duncan, 1955) was used to test the significant differences between the means of the levels.

RESULTS

Although, the effect of interaction between treatments and different periods was significant ($p < 0.05$) as showed in (Table 1), the effect of treatments on live body weight at each period was not significant. In spite of these results, the differences were numerically. The highest body weight was obtained by birds in T1 at age 14, 21 and 28 day, while T4 followed by T1 delivered the highest value of body weight at age 35 and 42 day. Furthermore, body weight of birds in T3, higher than T2 about (89g). Effect of periods on body weight was significant ($p < 0.05$), normally the body weight at day 42 (2891.63g) significantly ($p < 0.05$) had the highest mean followed by least ages (35, 28, 21, 14 and 1) day (2133.00, 1433.63, 384.33, 192.17 and 39.04g), respectively.

Table 1: Effect of interaction of treatments and different periods and periods on live body weight (g).

Treatment*	Live body weight (g).					
	Periods (day)					
	1	14	21	28	35	42
T1	39.33 ^e	203.33 ^{de}	406.67 ^d	1531.17 ^c	2110.83 ^b	2903.33 ^a
T2	38.33 ^e	186.67 ^{de}	373.33 ^d	1417.67 ^c	2063.83 ^b	2804.17 ^a
T3	39.00 ^e	185.33 ^{de}	370.67 ^d	1380.00 ^c	2084.67 ^b	2893.67 ^a
T4	39.50 ^e	193.33 ^{de}	386.67 ^d	1405.67 ^c	2272.67 ^b	2965.33 ^a
Overall mean/ Period	39.04 ^f	192.17 ^e	384.33 ^d	1433.63 ^c	2133.00 ^b	2891.63 ^a
Mean ±Std. Error	1178.97± 16.71					

^{a-e} interaction means of different letters differ significantly (P<0.05).

^{a-f} Overall of Body Weight (g)/ Period means of different letters differ significantly (P<0.05).

*(T1): feeding immediately after delivery in the hatchery and continue to the farm; (T2): fasting for 12 hours after hatch with access to water; (T3): fasting for 12 hours with access to water containing 5% sugar followed by feeding the diet or (T4): feeding a diet immediately at the farm

Results in (Table 2) showed although, there was no significant differences between treatments at different periods, there was an oscillatory in feed intake, likewise T1 and T4 intake numerically higher than T2 and T3 at day 14 and 21. Furthermore, birds in T3 followed by T2 at day 28 numerically intake the bigger amount of feed compared with other

treatments, while T4 intake highest amount of feed intake at day 35 and T1 return to overcome the other treatments at day 42. However the birds at T4 significantly (p<0.05) intake higher amount of feed (5440.61g) of overall means, followed by T1, T2 and T3 (5385.59, 5132.73 and 5076.11g), respectively.

Table 2: Effect of interaction of treatments and different periods, overall means/ treatment of treatments and overall/ period on feed intake (g/ bird).

Treatment	Feed intake (g/bird)					Overall Mean/ Treatment
	Periods (day)					
	1-14	15-21	22-28	29-35	36-42	
T1	247.12 ^e	416.67 ^e	1810.61 ^{abc}	1301.52 ^{cd}	1609.67 ^{abcd}	5385.59 ^{ab}
T2	224.09 ^e	296.97 ^e	1937.88 ^{ab}	1259.09 ^{cd}	1414.70 ^{bcd}	5132.73 ^{bc}
T3	220.67 ^e	248.49 ^e	2089.39 ^a	1146.06 ^d	1371.50 ^{bcd}	5076.11 ^c
T4	244.15 ^e	359.09 ^e	1833.33 ^{abc}	1590.91 ^{abcd}	1413.13 ^{bcd}	5440.61 ^a
Overall mean/ Period	236.03 ^d	330.30 ^e	1917.80 ^a	1324.39 ^c	1452.25 ^d	-----
Mean ±Std. Error	1051.75±93.14					5258.76± 552.25

^{a-e} interaction means of different letters differ significantly (P<0.05).

^{a-e} overall of Body Weight (g)/ Period means of different letters differ significantly (P<0.05).

^{a-c} overall of Body Weight (g)/ treatment means of different letters differ significantly (P<0.05).

*(T1): feeding immediately after delivery in the hatchery and continue to the farm; (T2): fasting for 12 hours after hatch with access to water; (T3): fasting for 12 hours with access to water containing 5% sugar followed by feeding the diet or (T4): feeding a diet immediately at the farm.

The effect of interaction between treatments with periods, treatments and different periods on body weight gain was significant (p<0.05)(Table 3). The highest value of body weight gain at day 28 attributed to higher amount of feed intake at this period. At the end of experimental the difference between treatments was significant (p<0.05), birds in T4 obtained significantly (p<0.05) higher weight gain

(2925.83g) than birds in T2 (2765.83g), but did not significantly differed with T1 and T3 (2864.33 and 2854.33g), respectively. Furthermore, the effect of different periods was significant (p<0.05), at day 28 birds generally had the highest value of weight gain (1049.29g) compared with the followed periods day 35 and 42 (699.38 and 758.63g), respectively.

Table 3: Effect of interaction of treatments and different periods on body weight gain (g).

Treatment	Body weight gain (g)					Overall mean/ Treatment
	Periods (day)					
	1-14	15-21	22-28	29-35	36-42	1-42
T1	146.33 ^e	185.33 ^e	1009.33 ^{abc}	704.67 ^{bcd}	818.67 ^{abcd}	2864.33 ^{ab}
T2	148.33 ^e	186.67 ^e	1044.33 ^{ab}	646.17 ^d	740.33 ^{bcd}	2765.83 ^b
T3	164.00 ^e	203.33 ^e	1124.50 ^a	579.67 ^d	782.83 ^{bcd}	2854.33 ^{ab}
T4	153.83 ^e	193.33 ^e	1019.00 ^{abc}	867.00 ^{abcd}	692.67 ^{cd}	2925.83 ^a
Overall mean/ Period	153.13 ^c	192.17 ^c	1049.29 ^a	699.38 ^b	758.63 ^b	-----
Mean ± Std. Error	570.52±49.466					2852.59±205.25

^{a-e} interaction means of different letters differ significantly (P<0.05).

^{a-c} overall of Body Weight (g)/ Period means of different letters differ significantly (P<0.05).

^{a-b} overall of Body Weight (g)/ treatment means of different letters differ significantly (P<0.05).

*(T1): feeding immediately after delivery in the hatchery and continue to the farm; (T2): fasting for 12 hours after hatch with access to water; (T3): fasting for 12 hours with access to water containing 5% sugar followed by feeding the diet or (T4): feeding a diet immediately at the farm

The effect of interaction between treatments and different periods was significant (p<0.05) on feed conversion ratio (Table 4). The T1 at day 21 had the highest value of feed conversion ratio (2.28) compared with other treatments at all different periods. In addition, the T3 of overall means (1.42)

day had significantly (p<0.05) the better value of feed conversion ratio (1.86) compared with T1 (2.01). Concerning the overall of feed conversion ratio for different periods the differences were not significant. However, at day 28 birds had the better feed conversion ratio (1.85).

Table 4: Effect of interaction of treatments and different periods, treatments and periods on feed conversion ratio.

Treatment	Feed conversion ratio					Overall mean/ Treatment
	Periods (day)					
	1-14	15-21	22-28	29-35	36-42	1-42
T1	2.05 ^{ab}	2.28 ^a	1.86 ^b	1.85 ^b	1.99 ^{ab}	2.01 ^a
T2	1.85 ^b	1.88 ^b	1.86 ^b	1.94 ^b	1.94 ^b	1.89 ^{ab}
T3	1.83 ^b	1.82 ^b	1.86 ^b	2.00 ^{ab}	1.80 ^b	1.86 ^b
T4	1.91 ^b	1.92 ^b	1.80 ^b	1.84 ^b	2.08 ^{ab}	1.91 ^{ab}
Overall mean/ Period	1.91	1.98	1.85	1.910	1.95	-----
Mean ± Std. Error	1.919±0.02					1.86±0.06

^{a-b} interaction means of different letters differ significantly (P<0.05).

^{a-b} overall of Body Weight (g)/ treatment means of different letters differ significantly (P<0.05).

*(T1): feeding immediately after delivery in the hatchery and continue to the farm; (T2): fasting for 12 hours after hatch with access to water; (T3): fasting for 12 hours with access to water containing 5% sugar followed by feeding the diet or (T4): feeding a diet immediately at the farm

There is no significant effect of different treatments on Viability (%), European Production Efficiency Factors and European Broiler Index at day (42) of old (Table 3).

The higher values was recorded in broilers from T4 for European Production Efficiency Factor (369.65)

and European Broiler Index (255.31), followed by broilers from T3 for European Production Efficiency Factor (365.03) and European Broiler Index (253.13) and T2 for European Production Efficiency Factor (353.26) and European Broiler Index (243.90) and the values of European Production Efficiency Factor (341.47) and European Broiler Index (238.74) was

obtained by birds in T1. However, chickens in the T1 were lower than T4 and T3 with up to (8.25 and 6.90 %), respectively for European Production Efficiency Factor and with up to (6.94 and 6.03 %), respectively for European Broiler Index. Increasing values of the two indices (European Production Efficiency Factor and European Broiler Index) at T4 chicks, shows that

the performances obtained are better than to the T1, T2 and T3 chicks. The economic efficiency assessment on European Production Efficiency Factor and European Broiler Index was positively influenced by the growth performances, body weight, average daily gain, feed conversion ratio and recorded viability for boiler.

Table 3: Effect of feeding program at first day on Viability (%), European Production Efficiency Factors and European Broiler Index at day 42 of old.

Treatments*	Viability (%)	European Efficiency Factors	Production European Broiler Index
T1	99.33	341.47	238.74
T2	100.00	353.26	243.90
T3	98.33	365.03	253.13
T4	100.00	369.65	255.31
Mean ± Std. Error	99.42±1.5	357.35±34.29	247.77±24.17

*(T1): feeding immediately after delivery in the hatchery and continue to the farm; (T2): fasting for 12 hours after hatch with access to water; (T3): fasting for 12 hours with access to water containing 5% sugar followed by feeding the diet or (T4): feeding a diet immediately at the farm.

DISCUSSION

Results in (Table 1) showed the significant ($p < 0.05$) effect of interaction between treatments and different periods on body weight, in spite of the significant differences of interaction, the effect on body weight of treatments at each period numerically. Whereas, the birds which had the highest body weight were obtained by birds in T1 at age 14, 21 and 28 day numerically, while T4 followed by T1 delivered the highest value of body weight at age 35 and 42 day, in addition of the T3 higher than T2 about (89g). These may be due to chick in T1 and T4 as well as T3 compared with T2 (fasting without any additional) did not be exposed to energy deficit by nutritional and sugar supplies. The effect of fasting, delayed and deprivation of feed for different periods at the early days of age were discussed by previous literatures. Likewise, Dibner *et al.* (1998) how reported that without additional nutritional supplies in the first 24 hours, the chicks are clearly in energy deficit and will invariably lose weight. Noy and Sklan (1999) providing water immediately post hatch resulted in heavier chicks compared with chicks that had delayed accessed to feed until 8 days age. Early access to feed can provide advantages to growth that continue for up to 35 days post hatch (Bhanja *et al.*, 2010). Bigot *et al.* (2003) found feed deprivation for 48 hours post hatch caused a (7%) loss in body weight while body weight increased by (36%) for early fed chicks. The results at day 42 in this study was supported by Rammouz *et al.* (2011) who reported that a 6 to 12

hour post hatching delay in feed access did not affect chicken body weight at market age. Vargas *et al.* (2009) found that 12 hours feed delay at hatch and did not affect other growth performance throughout the trial. Juul-Madsen *et al.* (2004) found that by delaying access to feed for 24 hours after hatching did not have impact on body weight at market age. Also they reported that early fed chickens were (6.1%) heavier at market age than those with a 48 hour delay in access to feed. While, Abed *et al.* (2011) found that body weight at market age was lower for the group with a 48 hour delay but the chicks from the 16 and 32 hour feed delay weighed the same. Also they found 16 and 32 hour feed delay had negative effects on body weight until the birds were 21 days old compared to chicken which had immediate access to feed, and by day 28 and 35 post hatch, there was no longer a difference in body weight. Cengiz *et al.* (2012) found that broiler chicks were subjected to 36 hours post hatch delayed access to feed and water, body weight and feed consumption reduced during first 4 weeks of the production cycle. Hooshmand (2006) found significant ($p < 0.05$) effect of feeding program when use starter diet immediately after hatch, restarted, fasting, and sugar corn feeding programs. Saki (2005) reported that body weight was decreased by chickens, which were not accessed to feed compared to that group which was fed by starter diet immediately after hatching. Although, the difference of body weight between T2 (2804.17g) and T3 (2893.67g) not significant, the differences was numerically, this result may be attributed to

supplementation of sugar, which consider as resource of energy and potential to increase chicken performance and can be easy utilized by chickens (Batal and Parsons, 2002; Sorbara *et al.*, 2006; Wang, 2014).

Results in (Table 2) showed significant ($p < 0.05$) effect of interaction between treatments and different periods, although there was no significant differences between treatments at different periods, as well as there were an oscillatory in feed intake, likewise T1 and T4 intake numerically higher than T2 and T3 at day 14 and 21. These may be attributed to that chicks in these treatments exposed to early feed had the faster development of the digestive system. The finding of lower weight gain in fasted chicks during the first week of life is consistent with reports by Batal and Parsons (2002) and Boersma *et al.* (2003). Lower weight gain in fasted groups could be attributed to lower feed intake and poor development of digestive tract. Most of the energy and nutrients consumed by birds <4 weeks goes toward growth (Tabler, 2008). These results were supported by previous studding. Murakami *et al.* (1992) reported that daily feed intake increased linearly for 15 days post-hatch the fed chicks. Ullah *et al.* (2012) reported that chicks in early age, the development of the digestive system is much faster than the rest of the body which. The length and weight of the digestive system significantly increase in the first week of life (Nitsan *et al.*, 1991a). Nitsan *et al.* (1991b) reported that digestion and absorption of nutrients early in life depends primarily on pancreatic enzyme activity, which in the chick is weak at hatch.

Feed intake stimulate these secretions dramatically which are noticed in the first week of life. Furthermore, birds in T3 followed by T2 at day 28 numerically intake the bigger amount of feed compared with other treatments, while T4 intake highest amount of feed intake at day 35 and T1 return to overcome the other treatments at day 42. However the birds at T4 significantly ($p < 0.05$) intake higher amount of feed (5440.61g) of overall means, followed by T1, T2 and T3 (5385.59, 5132.73 and 5076.11g), respectively. The birds at day 28 intake significantly ($p < 0.05$) highest amount of overall mean feed compared with other periods (Table 2). This may be due to end of the compensatory growth program of birds at day 21, and birds return to continue feeding to compensatory growth after favorable conditions are provided again. However, feed intake during the first days post hatch as well as over the whole production cycle was improved by early access to feed. Zubair and Leeson (1996) reported that the animals can exhibit an accelerated growth rate that will reduce the difference between these individuals with initially reduced growth rate and individuals with normal growth rate. The overall advantages throughout the production period may provide by compensatory growth (Wang, 2014). However, Abed

et al. (2011) found that the feed intake during the first 10 days post hatch as well as over the whole production cycle was improved by early access to feed. Mohebodini *et al.* (2009) reported a decrease in feed intake of broiler chickens as a result of feed restriction. While, Hooshmand (2006) observed no significant differences in overall feed intake. The sucrose based and starch based control diets did not affect feed intake (Batal and Parson, 2004). Also, Leeson and Summers (2001) and Jiang *et al.* (2008) reported that the feed intake was reduced by providing glucose to newly hatched birds. Tabedian *et al.* (2010) found Feed intake was not different for the experimental groups at 7-21 days of age for fasting 24 hour and control feed intake appeared to be only slight immediately posthatch; intake increased with time resulting in body weight increases after digestion and metabolism of the ingested feed (Sklan *et al.*, 2000). Vargas *et al.* (2009) found that a 12 hours feed delay at hatch only had a negative effect on feed intake during first 10 days post hatch.

It is observation that the effect of interaction of treatments and periods on weight gain significant ($p < 0.05$) (Table 3). At Furthermore, the overall mean of weight gain at day 28 was significantly ($p < 0.05$) higher than the means in the other periods. This attributed to the significant ($p < 0.05$) higher feed intake at this period. However, the effect of treatments on overall means of body weight was also significant ($p < 0.05$), birds in T4 obtained significantly ($p < 0.05$) higher weight gain than birds in T2, but did not significantly differed with T1 and T3. Results in this study were supported by Murakami *et al.* (1992) reported that rapid growth during 14 days after hatch was observed in the fed chicks. Also, Noy and Sklan (1999) reported that the chicken growth rate was affected by delayed feed access. If feed is provided early, chicks can gain around (11g) body weight during first 2 days post hatch (Mahmoud and Edens, 2012). The reason was summarized by Bigot *et al.* (2003) who reported that muscle development corresponds with the time between hatch and availability of feed. Sklan *et al.* (2000) reported that when chicks leave the hatchery they are 3 grams heavier on average than unfed birds. And at day 21 post hatch, these chicks were still heavier than chicks that were not fed until placement. Lower weight gain in fasted chicks in first week is in agreement with those of (Batal and Parsons, 2002). This result could be attributed to lower feed intake and poor development of digestive tract (Tabedian *et al.*, 2011). May be because of, the important of feed intake in the youngest birds. Most of the energy and nutrients consumed by birds younger than four weeks goes toward growth (Tabler, 2008). This means that if nutrients are restricted early in the bird's life, it reduce the bird performance (Tabedian *et al.*, 2011). When feed consumption starts soon after hatch, the nutrients provided by the feed are complementary to

the yolk nutrients (Murakami *et al.*, 1992). Initiation of feed consumption as close to hatch as possible is necessary to support early muscle development, which may ultimately affect meat yield (Tabeidian *et al.*, 2011). Muscle development is seriously compromised when feed is withheld during the first few days after hatch and feeding the semisolid diet containing the egg powder and glucose syrup for 48 hours resulted to higher weight gain in birds. This could be related to higher feed intake in this group (Table 2). In this study, increasing the energy of early diet by feeding glucose syrup in a semi-solid diet did not result to higher post hatch performance which may be due to immaturity of digestive enzyme secretion. This may occur because glucose is absorbed with no additional enzymatic activity, which yields no stimulation of intestinal processes. These results in consist with El-Husseiny *et al.* (2008) who indicated that a decrease in body weight gains and higher feed to gain ratio, resulting from holding chicks without feed, continued to affect chicks up to 6 weeks post hatch. The overall FCR was not affected by delay in first feeding (Abed *et al.*, 2011). Wei *et al.* (1984) reported that sucrose and glucose fed chicks did not show significant differences in weight gain. Jiang *et al.* (2008) indicated that providing an 8% glucose solution did not affect chick weight gain during day 3 to day 10 post hatches. (Cengiz *et al.*, 2012). The chicken growth rate was affected by delayed feed access.

The interaction effect of treatments ant different periods on feed conversion ratio were significant ($p < 0.05$). Birds in T1 had significantly ($p < 0.05$) lower feed conversion ratio compared with other treatments at day 21. Feed to gain ratio for the first 10 days post hatch was suppressed by a 48 hours delay in access to feed but not for other delay times (Abed *et al.*, 2011). During the first week of access to feed and water, the birds expressed the lowest feed to gain ratio than any other period (Wang, 2014). Furthermore, effect of treatment also significant ($p < 0.05$). Birds in T2 had the better feed conversion ratio followed by T3, while the differences of feed conversion ratio at different periods were not significant. These results indicated that although the body weight and weight gain of treatments which received feed immediately were high the treatments with delay feeding reached to high conversion ratio at marketing age. These results were supported by Hooshmand (2006) who found the feed conversion ratio was better of fasting groups compared with other groups. Also they found no interactions and overall were observed between feeding program and supplement in feed conversion ratio. Also, Tabeidian *et al.* (2010) found no significant differences in feed conversion ratios occurred among the treatment diet groups and after first week, no significant differences in feed conversion ratios occurred among the treatment diet groups. Also these finding are in agreement with research of Noy and Sklan (1999),

Batal and Parsons (2002) and Saki (2005). While, Murakami *et al.* (1992) reported that increase of daily feed intake for post-hatch the fed chicks resulted in a high efficiency (80%) of feed utilization. Wei *et al.* (1984) reported that sucrose and glucose treated chicks did not show a significant differences in weight gain and feed conversion ratio. Batal and Parson (2004) reported that glucose based diets resulted in a better feed to gain ratio than sucrose based and starch based diets. An earlier study reported that 5% dietary glucose or sucrose did not affect chicken feed to gain ratio (Wei *et al.*, 1984).

Although, the differences between treatments were not significant of economic index (Table 5). The higher values were obtained by birds in T4 (369.65 and 255.31) for European Production Efficiency Factor and European Broiler Index, respectively. However, chickens in the T1 were lower than T4 and T3 with up to (8.25 and 6.90 %) and (6.94 and 6.03 %), for European Production Efficiency Factor and European Broiler Index, respectively. Increasing values of the two indices (European Production Efficiency Factor and European Broiler Index) at T4 chicks, shows that the performances obtained are better than to the T1, T2 and T3 chicks. The lower value of economic index in T1 may be attributed to lower viability% and high feed intake and lower feed conversion ratio compare with T4. This result was supported by Brudnicki *et al.* (2015) who reported that it should be pointed out that the data recorded for the greater body weight and a higher viability rate in the experimental group birds. Economic profit may come at the cost of reduced bird performance, health, and welfare if densities are excessive (Estevez, 2007).

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تأثير برامج التغذية المختلفة عند عمر يوم واحد على الأداء الإنتاجي والاقتصادي لفروج اللحم

شهلة محمد سعيد كركوكي

E-mail: shahlan26@gmail.com

Assiut University web-site: www.aun.edu.eg

استخدم في التجربة 132 فرخ من فروج اللحم من سلالة 308 عند عمر يوم واحد. لدراسة تأثير 4 معاملات (برامج التغذية) في اليوم الاول من العمر على الاداء الانتاجي والاقتصادي لفروج اللحم، عند استلام الافراخ تم تسجيل وزن الجسم، الزيادة الوزنية، العلف المتناول، ومعامل التحويل الغذائي في يوم 14، 21، 28، 35 و 42 من عمر الفراخ، وكانت المعاملات كالاتي: تغذية الافراخ مباشرة بعد الاستلام من المفقس الى الحقل (المعاملة الاولى)؛ تصويم الافراخ لمدة 12 ساعة مع توفير المياه (المعاملة الثانية)؛ تصويم الافراخ لمدة 12 ساعة مع توفير المياه باضافة 5% سكر (المعاملة الثالثة)؛ تغذية الافراخ مباشرة عند الوصول الى الحقل (المعاملة الرابعة). وكان تأثير التداخل بين المعاملات والفترات المختلفة على وزن الجسم معنويا ($p < 0.05$)، بالرغم من ان تأثير المعاملات عند كل فترة لم يكن معنويا. وان المعدل الكلي لوزن الجسم كان معنويا اعلى عند عمر 42 يوم يتبعها اعمار الاقل. وكان تأثير التداخل والمعاملات والفترات المختلفة على العلف المتناول والزيادة الوزنية معنويا ($p < 0.05$). بينما لم يتأثر معنويا معامل التحويل الغذائي باختلاف الفترات. كما لم يتأثر الدليل الاقتصادي معنويا بالمعاملات المختلفة، بينما كان التأثير عدديا بكل من الصفات الانتاجية: وزن الجسم، الزيادة الوزنية، العلف المتناول، نسبة الحيوية ومعامل التحويل الغذائي.