J. Animal and Poultry Prod., Mansoura Univ., Vol. 2 (9): 335 - 348,2011

EFFECT OF FEED WITHDRAWAL PRESLAUGHTER ON SOME CARCASS TRAITS OF BROILER

Dorra, Tork M. I.*; T. H. Tag- El-Din; El-Samra H. A. Abo Egla* and Eman A. Elsaid****

*** Poultry Prod. Dept., Fac. Agric., Mansoura Univ.**

**** Poultry Prod. Dept., Fac. Agric., Damietta, Mansoura Univ.**

ABSTRACT

In This study, 48 broiler chicks were used in 8 groups to evaluate the optimum time of pre-slaughter feed withdrawal (FW) for broiler chickens in order to investigate the effect of different pre-slaughter feed withdrawal periods (0.0, 4.0, 8.0 and 12.0 h) and live body weight grade at slaughter (grade A_1 from 1800 to 2000g and grade A_2 from 1600 to 1800g) on weight loss, carcass parts, carcass traits, giblets weight, gizzard content weight, water holding capacity (WHC) and pH values of breast and thigh meat. Some blood plasma constituents (glucose, triglycerides, uric acid and total lipids) and chemical composition of meat as well as determining its effects on meat yield.

The obtained results showed that both of relative and absolute weight loss, carcass parts, dressed carcass, protein and ash content of thigh and breast meat, WHC values were significantly ($p \leq 0.01$) increased gradually with the increasing of FW period from 0.0 up to 12.0 h before slaughtering. On the other hand, both of absolute and relative weight of abdominal fat, giblets and gizzard content, concentration of glucose, pH value and moisture and fat content of breast and thigh meat decreased as the FW period increased. It were observed that the higher values of plasma triglycerides and total lipids were recorded for broiler of 8.0 h FW experimental group.

Results show that the weight grade had significant ($p \leq 0.01$) effects on the absolute weight of abdominal fat, carcass parts and dressed carcass, relative weight of giblets, chemical composition of meat and W H C and pH values. In the same way the relative weight loss, abdominal fat and thigh weight and concentration of glucose was significantly ($p \leq 0.05$) affected by weight grade. However, absolute weight loss, gizzard content and giblets, as well as, relative weight of dressed carcass and concentration of uric acid, plasma total lipids and triglycerides were not significantly affected by weight grade. It was observed that the grade A_2 had higher values of relative weight loss, gizzard content and giblets than grade A_1 by about 7.9, 11.5 and 9.3%, respectively. In comparison the grade A_1 had higher values of absolute weight of abdominal fat, carcass parts and dressed carcass than grade A_2 by about 20.1, 16.5, 14.8 and 14.1%, respectively.

This study revealed that the optimum feed withdrawal times pre-slaughter for broiler chickens ranging from 8.0 to 12.0 h showed the best results of carcass traits and quality. In addition, the slaughtering of broilers at 1600 – 1800g resulted in better values of the same traits than those slaughtered at 1800 – 2000g.

Keywords: broiler, feed withdrawal, meat yield**,** weight loss, pH value, blood constituents.

INTRODUCTION

Feed withdrawal prior to slaughter is one of the most important critical control point because it reduces carcass contamination of pathogenic microorganisms originated from animal excreta (Kim *et. al.,* 2004). One way

to reach a low microbial contamination is a starving period before slaughter, which is able to lower the risk of contamination with faeces (Schedle *et. al.,* 2006). The optimum length of feed restriction time should be such that allows chicks to emit intestinal contents without affecting the yield. The length of feed withdrawal has a significant effect on both weight loss and yield, carcass yield, and weight of gastro-intestinal content as a function of length of the period (0, 3, 6, 9 and 12 h) and the optimum fasting time for pre-slaughter chicks varied depending on slaughter weight; 6 and 9-h fasting were recommendable for 2.5 and 1.5 kg chicks, respectively (Kim *et. al.,* 2007)

Nowadays, quality is a major concern for most of the consumers, especially when buying foods. The most important factor in chicken meat quality is prevention from microbial contamination (Sengor *et. al*., 2006). Careful management of FW programs is important for maximizing yield (Zuidhof *et. al* ., 2004). FW is currently the best-known method to reduce carcass contamination within the gastro-intestinal tract (Thompson and Applegate., 2006 and Nijdam *et. al*.,2005[b]). Stresses before slaughter like feed withdrawal is very important for the poultry industry in respect of meat quality parameters as well as welfare of the birds (Ali *et. al*., 2008).

To be effective, the withdrawal period must be long enough to allow the tract to clear, but short enough to limit live weight and carcass yield losses from feed withdrawal. Further increase in the withdrawal decreased yield due to reduction in moisture content and fat decomposition (Veerkamp, 1986; Lyon *et. al*., 1991).

Therefore, the present study was performed to investigate the effects of feed withdrawal period pre-slaughter and live body weight of broiler chickens at slaughter on weight loss, carcass yield, some plasma constituents, chemical and physical traits of meat.

MATERIALS AND METHODS

This study was carried out at the Laboratory of Poultry Production Department, Faculty of Agriculture, Damietta, Mansoura University during June, 2010. The broilers used in this study were obtained at 38 days of age from one flock reared under the same managerial condition in a private commercial farm located 25 Km east Damietta. The chicks were divided into two grades (A_1& A_2) according to live body weight, The first ranged from 1800 to 2000g (A_1) and the second from 1600 to 1800g (A_2). The birds were fed a commercial diets.

Eighty four 38 - day old – broiler chicks were used in this study and divided according live body weight into two groups (group A_1 from 1800 to 2000g and group A_2 from 1600 to 1800g). Each group of chicks was divided into four experimental treatment groups. Each experimental group (6 birds) assigned for one of feed withdrawal treatment periods (0.0, 4.0, 8.0 and 12.0 hours before slaughtering. The broilers of each group within each live body weight grade were kept at equal area until slaughtering on wood shaving litter . Drinking water was available all the time

Slaughter test

At the end of feed withdrawal time, birds of each group was individually weighed just before slaughtering, sacrificed by sharp knife . Weight loss was calculated as the difference between weights pre-treatment and just after treatment. It was calculated according to the following formula:.

$$S = (WFW - WS)/WFW \times 100\%$$

where WFW is the BW at the time of FW, and WS is the BW at the time of slaughter.

After complete bleeding, they were reweighed to calculate the blood loss by the difference. Thereafter , they were immersed in hot water bath and scalded at 54.4 ^{o}C for 120 seconds and defeathered for 30 seconds. Feather were picked off, then head with neck and shanks were removed from carcasses.

Carcasses were eviscerated and weighed to determine the hot carcass weight. Abdominal fat pad, giblets , head with neck as well as empty gizzard were weighed individually. The gizzard content weight was also recorded. The total edible parts (dressed weight) comprised empty carcass and total giblets (liver, heart and gizzard). All traits were calculated as percentage of the pre-slaughter weight.

Physical analysis

Each carcass was dissected to separate breast and thigh. The pH, water-holding capacity (WHC) and chemical analysis of breast and thigh were determined.

The pH value was measured immediately after dissection using digital *Muscle pH meter9*. The initial pH of the breast and thigh meat was determined 20 minutes post-mortem . Breast and thigh meat (10g) was minced, then dissolved in 50 ml of distilled water and shaking to dissolve for 10 minutes, then filtering after that read the pH for breast and thigh meat.

Water-Holding Capacity: The water-holding capacity of the breast and thigh meat was measured immediately after slaughter by the filter paper method (Kauffman *et. al*., 1986).

Chemical analysis of meat:

The chemical composition(moisture, crude fat, crude protein and ash contents) of chickens meat (breast and thigh) was determined according to AOAC (2005).

Blood plasma constituents:

At slaughtering, blood samples were collected during slaughter into heparinzed tubes and then centrifuged for 15 minutes at 3000 rpm to separate blood plasma. Plasma samples were stored at -20 ^{o}C until analysis. Blood plasma concentration of triglycerides (mg/dl), total lipids (mg/dl), glucose (mg/dl) and uric acid (mg/dl) were determined colormetrically using commercial kits.

Statistical analysis :

Data were statistically analyzed by two way analysis of variance using SAS program (SAS, 2003) . Differences between means were detected according to Duncan's Multiple Range test (Duncan, 1955).

The following Statistical model was used :

$$x_{ijk} = \mu + L_i + P_j + (LP)_{ij} + e_{ijk}$$

Where:
x_{ijk} = An observation,
μ = Overall mean,
L_i = effect of LBW grade (i = 1 and2),
P_j = Effect of FW period (j = 1, 2.3 and 4),
$(LP)_{ij}$ = effect of Interaction between LP (ij = 1,2,3, …..and 8)
e_{ijk} = Random error.

RESULTS AND DISCUSSION

Weight loss (wl)

The application of FW treatment had significant (P≤0.01) effects on both of relative and absolute weight loss (Table 1). It was observed that weight loss values (g or %) were gradually increased according to FW period increasing from 0.0 up to 12.0 h. These results are in agreement with those obtained by Duke *et. al*., (1997) and Buhr *et. al*., (1998) they found that the post-feed withdrawal body weight, expressed as a percentage of pre-feed withdrawal body weight, decreased with the increase linearly in time without feed. Also Sengor *et. al.,* (2006) and Kim *et. al*., (2007) found that the percentage live weight loss increased as the feed withdrawal period increased.

Table 1: Effect of of feed withdrawal period and live weight grade[*] on some carcass traits[**] of broiler chicks at 38 days of age.

Item	Weight loss		Thigh weight		Breast weight		Dressed weight	
	g	%	g	%	g	%	g	%
Weight grade A								
A_1	36.9	1.91^{b}	415.3^{a}	21.92^{a}	423.2^{a}	22.33	1218.9^{a}	64.3
A_2	35.5	2.06^{a}	356.4^{b}	21.29^{b}	368.5^{b}	22.02	1068.9^{b}	63.9
SEM	5.8	0.32	4.9	0.21	7.0	0.37	12.9	0.6
Significance level	N S	*	* *	*	* *	N S	**	N S
Feed withdrawal period B								
B_1 (0.0h)	00.0^{d}	0.00^{d}	375.2	20.95^{b}	371.8^{b}	20.73^{d}	1095.4^{b}	61.1^{c}
B_2 (4.0h)	24.6^{c}	1.38^{c}	391.0	21.94^{a}	383.1^{b}	21.48^{c}	1117.9^{b}	62.8^{b}
B_3 (8.0h)	47.1^{b}	2.56^{b}	393.7	21.87^{a}	411.2^{a}	22.86^{b}	1187.0^{a}	66.0^{a}
B_4 (12.0h)	73.2^{a}	3.99^{a}	383.3	21.67^{ab}	417.2^{a}	23.63^{a}	1175.2^{a}	66.6^{a}
SEM	1.6	0.14	11.8	0.29	12.3	0.34	26.3	0.3
Significance level	**	**	N S	*	**	**	**	**
A B Interaction								
A_1 B_1	00.0	00.0	400.5	20.83	399.4	20.75	1189.5	61.8
A_1 B_2	24.0	1.28	424.8	22.68	419.1	22.37	1181.4	63.1
A_1 B_3	49.2	2.52	423.3	22.23	436.7	22.94	1259.7	66.2
A_1 B_4	74.3	3.81	412.4	21.94	437.5	23.28	1245.0	66.3
A_2 B_1	00.0	0.00	350.0	21.07	344.2	20.72	1001.4	60.3
A_2 B_2	25.2	1.47	357.2	21.19	346.9	20.59	1054.5	62.5
A_2 B_3	45.0	2.60	364.1	21.51	385.8	22.78	1114.2	65.9
A_2 B_4	72.0	4.18	354.2	21.40	397.0	23.99	1105.4	66.9
SEM	3.9	0.22	5.4	0.15	5.9	0.22	14.0	0.4
Significance level	N S	N S	N S	N S	N S	*	*	N S
Overall mean	36.2	1.98	385.8	21.61	395.8	22.18	1143.9	64.1

A_1: From 1800 to 2000 g, A_2: from 1600 to 1800 g. [*]

[**] **Means within each row within each traits having similar letter (s) are not significantly different at 0.05**

On the other hand, the weight grade had significant (P≤0.05)effect on relative weight loss(%), however, this effect was not significant on the absolute weight loss(g). In agreement with the present results, Kim *et. al.,* (2007) found that no significant difference for both 1.5 and 2.5 kg live body weight groups. Where the (A_2) weight grade showed higher value of relative weight loss than the higher grade (A_1) by about 7.9%. The interaction between FW and weight grade was not significantly affected on both of absolute and relative weight loss.

Thigh weight

Thigh weight due to application of feed withdrawal treatment, the weight grade had significant (P≤0.01) effect on the absolute weight of thigh (g), however, this effect was significantly (P≤0.05) on the relative weight of thigh (%).The weight grade A_1 had higher value of absolute thigh weight than the grade A_2 by about 16.5% (Table 1). The same situation was found for the relative weight of thigh where, the grade A_1 recorded higher value than grade A_2 by about 3.0%. The feed withdrawal period was not significantly affected on the absolute weight of thigh. This result agree with Haslinger *et. al.*, (2007) who found that the difference in the weight of thighs was not significant. However, this effect was significant (P≤0.05) on the relative weight of thigh. The lowest values of relative weights of thigh were recorded for 0.0 h FW before slaughtering. The interaction between weight grade and feed withdrawal period was not significantly on both absolute and relative weight of thigh.

Breast weight

Breast weight due to application of feed withdrawal treatment and the weight grade had significant (P≤0.01) effect on absolute breast weight (g), however, this effect was not significant on relative breast weight (%).The weight grade A_1 had higher value of absolute breast weight than the grade A_2 by about 14.8%, however, this effect was not significant for the relative weight of breast, where there is no obvious effect on the relative weight of breast (Table 1). The feed withdrawal period had significant (P≤0.01) effects on both relative and absolute weight of breast. It was observed that breast weight (%) was gradually increased according to FW period increasing from 0.0 up to 12.0 h. Islam *et. al*., (2007) found that weight of breast was higher in the withdrawal birds and had significant differences (P≤0.05) between control and withdrawal group could only be observed for total breast muscle. The interaction between weight grade and feed withdrawal period was not significant for absolute weight of breast, meanwhile, the relative weight of breast weight was significantly (P≤0.05) affected.

Dressed weight

Dressed weight due to application of feed withdrawal treatment and the weight grade had significant (P≤0.01) effect on absolute weight of dressed carcass (g). However, this effect was not significant on relative weight of dressed carcass (%). The weight grade A_1 had higher value of the absolute weight of dressed carcass than the grade A_2 by about 14%. However, this effect was not significant for relative weight of dressed carcass. The feed withdrawal period had significant (P≤0.01) effects on both relative and absolute weight of dressed carcass. The lowest values of absolute and

relative weights of dressing weight were recorded for 0.0 h FW before slaughtering (Table1). These results are in agreement with those obtained by Duke *et. al*., (1997) who found that duration of FW also minimizes shrinkage of the carcass. Similar conclusion was reported by Ali *et. al*.,(2008) who observed that the pre-slaughter and eviscerated weights were decreased as the length of feed withdrawal period increased. The interaction between weight grade and feed withdrawal period was significant ($P \leq 0.05$) on absolute weight of dressed carcass, meanwhile, the relative weight of dressing weight was not significantly affected.

Abdominal fat weight

The application of FW treatment had significant ($P \leq 0.01$) effects on both of absolute and relative weight of abdominal fat (Table 2). It was obviously observed that abdominal fat values were gradually decreased with increasing the feed withdrawal period from 0.0 up to 12.0 hours before slaughtering.

Table 2: Effect of feed withdrawal period and live weight grade* on some carcass traits and some chemical traits of broiler chicks at 38 days of age**.

Item	Abdominal fat weight		Giblets weight		Weight of gizzard content		Moisture content meat of	
	g	%	g	%	g	%	Breast	Thigh
Weight grade A								
A_1	38.9[a]	2.05[a]	122.1	6.43[b]	16.5	0.87[b]	72.9[a]	70.4[a]
A_2	32.4[b]	1.93[b]	117.5	7.03[a]	16.1	0.97[a]	72.7[b]	69.9[b]
SEM	2.2	0.13	2.7	0.15	1.4	0.09	0.21	0.21
Significance level	**	*	N S	**	N S	**	**	**
Feed withdrawal period B								
B_1 (0.0h)	45.5[a]	2.54[a]	134.7[a]	7.53[a]	25.2[a]	1.42[a]	74.2[a]	71.3[a]
B_2 (4.0h)	42.7[b]	2.41[b]	118.0[b]	6.65[b]	17.3[b]	0.98[b]	73.2[a b]	70.6[a]
B_3 (8.0h)	31.9[c]	1.76[c]	115.4[b]	6.44[b]	12.6[c]	0.70[c]	72.1[b]	69.6[a b]
B_4 (12.0h)	22.5[d]	1.26[d]	111.0[b]	6.32[b]	10.1[d]	0.57[d]	71.7[c]	68.9[b]
SEM	1.5	0.07	3.1	0.18	0.9	0.07	0.08	0.21
Significance level	**	**	**	**	**	**	**	**
A B Interaction								
A_1 B_1	48.6	2.53	139.6	7.25	24.3	1.26	74.4	71.7
A_1 B_2	44.7	2.38	118.2	6.32	17.8	0.95	73.3	70.8
A_1 B_3	36.3	1.91	114.5	6.02	13.0	0.68	72.2	69.9
A_1 B_4	26.0	1.38	115.8	6.15	10.8	0.58	71.8	69.1
A_2 B_1	42.4	2.55	129.8	7.81	26.1	1.58	74.1	70.9
A_2 B_2	40.8	2.42	117.7	6.98	16.8	1.00	73.1	70.4
A_2 B_3	27.5	1.62	116.2	6.87	12.1	0.72	72.1	69.4
A_2 B_4	18.9	1.14	106.2	6.45	9.4	0.57	71.5	68.8
SEM	1.5	0.56	2.0	0.11	0.09	0.05	0.14	0.15
Significance level	N S	*	N S	N S	N S	*	*	*
Overall mean	35.7	1.99	119.8	6.73	16.3	0.92	72.8	70.1

A_1: From 1800 to 2000 g, A_2: from 1600 to 1800 g. *

** **Means within each row within each traits having similar letter (s) are not significantly different at 0.05**

Similar conclusion was reported by Petek (2000) who observed that abdominal fat values were varied between 32.6 and 38.1 g in feed withdrawal for 8 hours and 0 hours, respectively. Also Haslinger *et. al.*, (2007) reported that the abdominal fat showed a slight but significant decrease in weight when time of feed withdrawal increased. The lowest values of absolute and relative weights of abdominal fat were recorded for 12.0 h FW. The absolute weight of abdominal fat of grade A_1 was significantly ($p \leq 0.01$) heavier than that of grade A_2 by about 20.1%, The same situation was found for relative abdominal fat weight where the grade A_1 was significantly ($p \leq 0.05$) and recorded higher value than grade A_2 by about 6.2%. Schedle *et. al.,* (2006) found that the weight of abdominal fat was also decreased remarkably ($p \leq 0.05$) by a prolonged starving period. The interaction between weight grade and feed withdrawal period was not significantly on the absolute abdominal fat, meanwhile, the relative weight of abdominal fat was significantly ($P \leq 0.05$) affected.

Giblets weight

Giblets weight due to application of feed withdrawal treatment and the weight grade had significant ($P \leq 0.01$) effect on relative weight of giblets (g), however, this effect was not significant on absolute weight of giblets (%).The weight grade A_2 had higher value of relative giblets weight than the grade A_1 by about 9.3%, where had no obvious effects on absolute weight of giblets. The feed withdrawal period was significantly ($P \leq 0.01$) affected on both relative and absolute weight of giblets. It was observed that giblets weight (g or %) were gradually decreased according to FW period increased from 0.0 up to 12.0 h (Table 2). Similar results reported by Sengor *et. al.,* (2006) who found significantly differences among FW from 0.0 up to 18.0 h in giblets weight, increasing the duration of the withdrawal period of time reduces giblets weight percentage. The interaction between weight grade and feed withdrawal period was not significant on both absolute and relative weight of giblets.

Weight of gizzard content

Gizzard content due to application of feed withdrawal treatment, the weight grade had significant ($P \leq 0.05$) effect on the relative weight of gizzard content (%), however, this effect was not significant on absolute gizzard content (g). The weight grade A_2 had higher value of the relative gizzard content than grade A_1 by about 11.5% (Table 2), however, this effect was not significant for absolute weight of gizzard content. The feed withdrawal period was significant ($P \leq 0.01$) effects on both relative and absolute weight of gizzard content. It was observed that gizzard content weight (g or %) were gradually decreased according to FW period increased from 0.0 up to 12.0 h. Likewise, Northcutt *et. al.,* (1997) reported that length of feed withdrawal (time) and its interaction with grower and replication (time by replication) had a significant effect ($P < 0.05$) on gizzard contents. The interaction between weight grade and feed withdrawal period was not significant on absolute weight of gizzard content, meanwhile, the relative weight of gizzard content was significantly ($P \geq 0.05$) affected.

Physical and chemical traits:
chemical traits

Increasing feed withdrawal time from 0 h to 12 h, (Table3) increased ash and protein content of thigh and breast meat (P≤0.05). The higher weight grade (Table 3) decreased breast and thigh meat content of ash and protein (P≤0.0l). At the time of slaughter, meat content of ash and protein in thigh muscles were lower than meat content of ash and protein in breast muscles. The weight grade had significant (P≤0.01) effect on ash and protein content of thigh and breast meat, where grade A_2 showed higher meat content of ash and protein in breast and thigh muscles. Increasing feed withdrawal time, from 0 h to 12 h, (Table 3) increased fat and moisture content of thigh and breast meat (P≤0.05). The higher weight grade (Table 2 and 4) increased breast and thigh meat content of fat and moisture (P≤0.0l). At the time of slaughter, meat content of fat and moisture in breast muscles were lower than in thigh muscles.

Table 3: Effect of feed withdrawal period and live weight grade[*] on some chemical traits [**]

	Ash meat content of				Protein meat content of			
Item	**Breast**		**Thigh**		**Breast**		**Thigh**	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
Weight grade (g) A								
A_1	5.5 [b]	1.49 [b]	3.6 [b]	1.07 [b]	79.2 [b]	21.46 [b]	66.6 [b]	19.75 [b]
A_2	5.9 [a]	1.61 [a]	4.0 [a]	1.20 [a]	82.7 [a]	22.60 [a]	68.5 [a]	20.67 [a]
SEM	0.08	0.02	0.06	0.03	0.54	0.15	0.51	0.22
Significance level	**	**	**	**	**	**	**	**
Feed withdrawal period (h) B								
B_1 (0.0h)	5.5[b]	1.41[b]	3.6 [b]	1.03[b]	78.6[c]	20.28[b]	64.8 [b]	18.61 [b]
B_2 (4.0h)	5.6[ab]	1.50[ab]	3.8 [a]	1.12[b]	80.2[b]	21.49[b]	65.1 [b]	19.11 [b]
B_3 (8.0h)	5.8[a]	1.62[a]	3.8 [a]	1.17[a]	81.8[b]	22.82[ab]	69.2[ab]	21.03 [a b]
B_4 (12.0h)	5.9[a]	1.67[a]	3.9 [a]	1.23[a]	83.2[a]	23.56[a]	71.1 [a]	22.11 [a]
SEM	0.11	0.11	0.11	0.02	0.81	0.26	0.45	0.14
Significance level	*	*	*	*	*	*	*	*
AB interaction								
A_1 B_1	5.1	1.31	3.3	0.93	77.7	19.89	64.5	18.25
A_1 B_2	5.4	1.44	3.7	1.08	77.9	20.80	64.5	18.83
A_1 B_3	5.6	1.56	3.7	1.11	79.7	22.16	68.4	20.59
A_1 B_4	5.8	1.64	3.8	1.17	81.6	23.01	68.9	21.29
A_2 B_1	5.8	1.50	3.9	1.14	79.4	20.57	65.2	18.97
A_2 B_2	5.8	1.56	3.9	1.15	82.4	22.17	65.6	19.42
A_2 B_3	5.9	1.65	4.1	1.25	83.9	23.41	70.1	21.45
A_2 B_4	5.9	1.68	4.1	1.28	84.8	24.17	73.3	22.87
SEM	0.06	0.02	0.04	0.02	0.44	0.21	0.46	0.23
Significance level	*	*	*	*	*	*	*	*
Overall mean	5.7	1.55	3.8	1.14	81.1	22.06	67.5	20.18

A_1: From 1800 to 2000 g, A_2: from 1600 to 1800 g. [*]

[**] **Means within each row within each traits having similar letter (s) are not significantly different at 0.05**

The weight grade had significant (P≤0.01) effect on fat and moisture content of thigh and breast meat, where grade A_1 showed higher meat content of fat and moisture in breast and thigh muscles. The interaction between weight grade and feed withdrawal period was significant (P≤0.05) effect on ash , protein, fat and moisture content of thigh and breast meat. Similar results reported by Kotula and Wang (1994) who found that expressible moisture decreased in breasts as feed withdrawal time increased**.** Moisture in breasts decreased (P≤0.05*)* with feed withdrawal.

pH value

Increasing feed withdrawal time, from 0 h to 12 h, (Table4) decreased pH values (P≤0.0l) in the breast meat from 6.07 to 5.51 and in thigh meat from 6.51 to 5.92. The higher weight grade (Table 4) increased pH values (P≤0.0l) in the breast meat from 5.72 to 5.85 and thigh from 6.15 to 6.33. The rate and extent of slaughter pH were different between the two different muscles.

Table 4: Effect of feed withdrawal period and live weight grade[*] on some physical and chemical traits[**] of broiler chicks at 38 days of age.

Item	Fat meat content				pH values		Water holding capacity of	
	Breast		Thigh		Breast	Thigh	Breast	Thigh
	Wet	Dry	Wet	Dry				
Weight grade (g) A								
A_1	8.4 [a]	2.25[a]	23.1[a]	6.84[a]	5.85[a]	6.33[a]	59.8 [b]	55.6 [b]
A_2	5.1 [b]	1.38 [b]	18.9[b]	5.69 [b]	5.72 [b]	6.15[b]	61.8 [a]	58.4 [a]
SEM	0.52	0.14	0.71	0.21	0.06	0.07	0.84	0.71
Significance level	**	**	**	**	**	**	**	**
Feed withdrawal period (h) B								
B_1 (0.0h)	8.6 [a]	2.21 [a]	23.8[a]	6.81 [a]	6.07 [a]	6.51 [a]	56.4 [c]	52.7 [c]
B_2 (4.0h)	7.5 [a]	2.01 [ab]	22.7[a]	6.68 [a]	5.95 [b]	6.43 [b]	58.9 [b c]	55.6 [b]
B_3 (8.0h)	5.8 [b]	1.63 [b]	19.9[ab]	6.05 [a b]	5.61 [c]	6.10 [c]	62.2 [b]	59.1 [a b]
B_4 (12.0h)	5.1 [b]	1.42 [b]	17.7[b]	5.51 [b]	5.51 [d]	5.92 [d]	65.7 [a]	60.4 [a]
SEM	0.71	0.22	1.07	0.31	0.04	0.06	0.61	0.6
Significance level	*	*	*	*	**	**	**	**
A B Interaction								
A_1 B_1	9.9	2.53	26.1	7.39	6.18	6.68	54.9	51.5
A_1 B_2	9.1	2.43	24.8	7.24	6.02	6.57	58.1	54.1
A_1 B_3	7.5	2.09	22.2	6.68	5.68	6.16	60.8	57.5
A_1 B_4	7.1	2.01	19.4	6.01	5.53	5.93	65.4	59.1
A_2 B_1	7.2	1.87	21.4	6.23	5.95	6.35	58.1	53.8
A_2 B_2	6.1	1.64	20.6	6.11	5.88	6.28	59.8	57.1
A_2 B_3	4.2	1.17	17.5	5.36	5.55	6.05	63.6	60.8
A_2 B_4	3.1	0.89	16.1	5.02	5.48	5.91	66.1	61.8
SEM	0.41	0.21	0.53	0.13	0.04	0.04	0.55	0.52
Significance level	*	*	*	*	*	**	*	*
Overall mean	6.7	1.82	21.0	6.26	5.78	6.24	60.8	57.1

A_1: From 1800 to 2000 g, A_2: from 1600 to 1800 g. [*]

[**] **Means within each row within each traits having similar letter (s) are not significantly different at 0.05**

At the time of slaughter, pH values in breast muscles were lower than pH values in thigh muscles 6.24 to 5.78. This effect of rapid pH decline was more drastic in breast muscle than in thigh muscle because breast muscle contains a much higher proportion of a-white *(aW)* fibers than does the thigh. The weight grade had significant (P≤0.01) effect on pH value of breast and thigh meat, where the higher grade A_1 showed higher pH values. The effect of the interaction between weight grade and feed withdrawal period was significant (P≤0.05) on breast meat pH value. Also, there was significant (P≤0.01) effect on thigh meat pH value. Similar results reported by Kotula and Wang.(1994). who found that increased feed withdrawal times resulted in decreased pH in the breast and thigh at the time of the death.

Water holding capacity

The FW period affected the WHC values of breast and thigh meat. Increased feed withdrawal time from 0.0 h up to 12.0 h, (Table 4) increased (P≤0.0l) breast meat WHC values from 56.4 to 69.7 and thigh meat from 52.7 to 60.4 at the time of slaughter. Equally, Increased weight grade (Table 4) decreased WHC values (P≤0.0l) in the breast meat from 61.8 to 59.8 and thigh meat from 55.6 to58.4, at the time of slaughter. The rate and extent of slaughter WHC were different between the two different muscles. At the time of slaughter average WHC values in breast meat were higher than WHC values in thigh meat from 57.1 to 60 8. These results agreed with Kotula and Wang (1994) who reported that feed withdrawal significantly increased moisture (P≤0.05) and raised the water holding capacity. However, Castillo *et. al.,* (2007) found no statistical differences in the WHC for the different FW periods.

Some blood plasma constituents

The FW had significant (p≤0.01) effect on concentration of glucose and triglycerides. According to the data of Murray and Rosenberg (1953) and Hazelwood (1986), feed withdrawal causes a decrease in the concentrations of glucose in blood of broilers. In the same way, concentration of total lipids was significantly (p≤0.05) a ffected by FW period (Table 5). However, concentration of uric acid was not significantly affected by the period of FW. It was observed that the higher values of concentration of triglycerides and total lipids recorded at 8.0 h FW before slaughtering. This effect was reflected in high total lipids concentration in low LBW category than those of high LBW category at 0 h and 4 h of FW and the opposite at 8 and 12h of FW. Similarly, Fuentes *et. al*.,(2000) shows that plasma triglyceride concentration declined rapidly during starvation 12 h. Both transport and feed withdrawal decrease triglyceride (TG) values (Van Der Wal *et. al*., 1999 and Nijdam *et. al*., 2005[a]). Moreover, glucose values decreased by increasing feed withdrawal. On the other hand, the weight grade had significant (p≤0.05) effect on concentration of glucose. Against, concentration of uric acid, total lipids and triglycerides was not significantly affected by weight grade, it was being almost higher for broiler of category A_1 than those in category A_2. Regarding, The interaction between weight grade and feed withdrawal period was not significantly affected on blood plasma constituents.

Table 5: Effect of feed withdrawal period and live weight grade[*] on some blood plasma constitutes[**] of broiler chicks at 38 days of age.

	Blood plasma concentration of (mg/dl)			
	Triglycerides	**Total lipids**	**Uric acid**	**Glucose**
Weight grade (g) A				
A_1	134.5	3223.3	7.23	206.71[a]
A_2	125.2	3176.6	7.16	194.38[b]
SEM	19.5	186.4	0.05	5.77
Significance level	N S	N S	N S	*
Feed withdrawal period(h) B				
B_1	63.1 [c]	3244.4[ab]	7.27	221.42 [a]
B_2	56.4[c]	2841.0[b]	7.23	203.92[b]
B_3	276.5[a]	3803.8 [a]	7.21	193.83 [c]
B_4	123.3[b]	2910.6 [b]	7.08	183.00 [d]
SEM	12.6	227.4	0.08	5.44
Significance level	**	*	N S	**
AB interaction				
A_1 B_1	71.3	3216.3	7.34	239.32
A_1 B_2	57.9	2340.8	7.2	207.51
A_1 B_3	287.1	4027.5	7.25	195.00
A_1 B_4	121.7	3308.8	7.04	185.00
A_2 B_1	55.0	3272.0	7.19	203.49
A_2 B_2	54.9	3341.3	7.17	200.33
A_2 B_3	265.8	3580.0	7.17	192.67
A_2 B_4	125.0	2512.5	7.11	181.00
SEM	13.6	136.4	0.04	3.47
Significance level	N S	N S	N S	N S
Overall mean	129.8	3199.9	7.2	200.54

A_1: From 1800 to 2000 g, A_2: from 1600 to 1800 g. [*]

[**] **Means within each row within each traits having similar letter (s) are not significantly different at 0.05**

REFERENCES

Ali, M. Sh.; G. H. Kang and S. T. Joo (2008). A review:, influences of preslaughter stress on poultry meat quality. Asian. Aust. J. Anim. Sci., 21:912-916.

A. O. A. C (2005). Association of official analytical chemist. Official methods of analysis. *18th* ed., Washington, DC.

Buhr, R. J.; J. K. Northcutt.; C. E. Lyon and G. N. Rowland (1998). Influence of time off feed on broiler viscera weight, diameter, and shear. Poult. Sci., 77: 758-764.

Castillo, C.; A. A. Pinto.; G. L. Souza.; N. J. Beraquet.; A. P. Aguiar.; K. M. V. A. B. Cipolli.; C. M. I. Mendes and E. M. Ortega (2007). Effects of feed withdrawal periods on carcass yield and breast meat quality of chickens reared using an alternative system. J. Appl. Poult. Res. 16: 613–622.

Duke, G. E.; B. Maureen and S. Noll (1997). Optimum duration of feed and water removal prior to processing in order to reduce the potential for fecal contamination in turkeys. Poult. Sci. 76:516-522.

Duncan, D. B (1955). Multiple range test and multiple F Tests. Biometrics, 11: 1-42.

Fuentes, E. G.; A. G. Villarino and Marıa. F. Zafra (2000). Hypocholesterolemic activity of dipyridamole: effects on chick plasma and lipoprotein composition and arachidonic acid levels. Environmental Toxicology and Pharmacology., 8: 261–266.

Haslinger, M.; R. Leitgeb.; F. Bauer.; T. Ettle and W. M. Windisch (2007). Slaughter yield and meat quality of chicken at different length of preslaughter feed withdrawal. Poult. Sci., 58: 67–72.

Hazelwood, R. L (1986). Carbohydrate metabolism. *in*:Avian Physiology. 4th ed. P. D. Sturkie, ed. Springer Verlag, New York, NY., 303–325.

Islam, K. M. S.; A. Schumacher.; J. M. Gropp and H. A. Schoon (2007). Yield, carcass and sensory characteristics of broiler meat after withdrawal of anticoccidial semduramicin from feed. Pakistan J. Nutrition 6 : 276 -282.

Kauffman, R. G.; G. Eikelenboom.; P. G. van Der Wal.; l. B. Enge.and M. Zaar (1986). A comparison of methods to estimate water-holding capacity in post-rigor porcine muscle. Meat Sci 18:307-322

Kim, D. H.; H. S. Chae and K. M. Jang (2004). Implications of feed withdrawal in meat safety and quality. Kor. J. Food Sci. Anim. Resour. 24:202-208

Kim, D. H.; Y. M. Yoo.; S. H. Kim.; B. G. Jang.; B. Y. Park.; S. H.Cho.; P. N. Seong.; K. H. Hah.; J. M. Lee.; Y. K. Kim and I. H. Hwang (2007). Effect of the length of feed withdrawal on weight loss, yield and meat color of broiler. Asian-Aust. J. Anim. Sci., (20), 1:106–111.

Kotula, K. L and Y. Wang (1994). Characterization of broiler meat quality factors influenced by feed withdrawal time. J. Appl. Poult. Res., 3: 103-110.

Lyon, C. E.; C. M. Papa and R. L. Wilson (1991). Effect of feed withdrawal on yields, muscle pH, and texture of broiler breast meat. Poultry Sci. 70:1020–1025.

Murray, H. C and M. M. Rosenberg. (1953). Studies on blood sugar and glycogen levels in chickens. Poult. Sci. 32:805-811.

Nijdam, E.; E. Delezie.; E. Lambooij.; M. J. A. Nabuurs.; E. Decuypere and J. A. Stegeman (2005)[a]. Feed withdrawal of broilers before transport changes Plasma hormone and metabolite concentrations. Poult. Sci., 84: 1146–1152.

Nijdam, E.; E. Lambooij., M. J. A. Nabuurs.; E. Decuypere and J. A. Stegeman(2005)[b] Influence of feeding conventional and semisynthetic diets until catching on weight gain, digestive tract mass, and plasma hormone and metabolite concentrations of broilers related to transport. Poult. Sci. 77:516-537.

Northcutt, J.K.; S. I. Savage,and Vest, L.R. (1997): Relationship between feed withdrawal and viscera condition of broilers. Poult. Sci., 76: 410-414.

Petek, M., 2000. The effects of feed removal during the day on some production traits and blood parameters of broilers. Tr. J. Anim. Sci., 24: 447-452.

SAS, (2003). SAS proprietary Software, Release 9. 1. Cary, NC. SAS Institute, Inc.

Schedle, K.; M. Haslinger.; R. Leitgeb.; F. Bauer.; T. Ettle.; W. Windisch (2006). Carcass and meat quality of broiler chickens at different starving periods before slaughter. Vet. Zootech., 35: 1392-2130

Sengor, E.; M. Yardimci.; B. Siriken.; Z. A. Bozkurt.; M. Tekerli.; B. Kenar and E. H. Sahin (2006). Determination of optimum pre- slaughter feed withdrawal time in broiler chickens and its effect on meat yield, microbiological composition of gut content and microbiological quality of the carcass. Turkish Journal of Veterinary & Anim, Sci, 30: 561–569.

Thompson, K.L and T. J. Applegate (2006) . Feed withdrawal alters small-intestinal morphology and mucus of broilers. Poult. Sci., 85: 1535–1540.

Van Der Wal, P. G.; H.G.M. Reimert.; H. A. Goedhart.; B. Engel and T. G. Uijttenboogaart (1999). The effect of feed withdrawal on broiler blood glucose and nonesterified fatty acid levels, postmortem liver pH values, and carcass yield. Poult. Sci., 78:569–573.

Veerkamp, C. H (1986). Fasting and yields of broilers. Poult. Sci, 65:1299-1304.

Zuidhof, M.J.; R. H. McGovern.; B. L. Schneider.; J. J. R. Feddes.; F. E. Robinson and D. R. Korver (2004). Effects of feed withdrawal time on the incidence of fecal spillage and contamination of broiler carcasses at processing. J. Appl. Poult. Res., 13: 171–177.

EFFECT OF FEED WITHDRAWAL PRESLAUGHTER ON SOME CARCASS TRAITS OF BROILER

تأثير منع العلف قبل الذبح على بعض صفات الذبائح فى دجاج اللحم

ترك محمد إبراهيم دره* ، تاج الدين حسن تاج الدين ، السمرة حسن أبو عجلة* و إيمان أحمد السعيد****

*** قسم انتاج الدواجن – كلية الزراعة – جامعة المنصورة.**

**** قسم إنتاج الدواجن – كلية الزراعة بدمياط – جامعة المنصورة.**

استخدم فى هذه الدراسة عدد (48) من بدارى اللحم وقسمت لـ 8 مجموعات لتقييم الوقت الأمثل لسحب العلف قبل الذبح وذلك من خلال دراسة تأثير اختلاف مدة التصويم قبل الذبح (صفر، 4، 8، 12 ساعة)ووزن الجسم عند الذبح (أ من 1800 – 2000 جم'، ب من 1600 – 1800 جم) ودراسة تأثيرهم على صفات محصول اللحم وذلك من خلال مجموعة من القياسات المختلفة ومنها الفقد بالوزن ووزن أجزاء الذبيحة وصفات الذبيحة ووزن الحوائج ووزن محتويات القانصة وبعض الصفات الفيزيائية مثل قدرة اللحم على الاحتفاظ بالماء وقيم الحموضة للحم الصدر والفخذ وبعض صفات بلازما الدم (جلوكوز، حمض اليوريك، الليبيدات الكلية، الجلسريدات الثلاثية) والخواص الكيميائية للحم الصدر والفخذ.

وقد أظهرت النتائج وجود فروق معنوية عند مستوى 1% فى الوزن النسبى والمطلق لكل من الفقد بالوزن ووزن أجزاء الذبيحة ووزن الذبيحة ومحتوى لحم الصدر والفخذ من البروتين والرماد، حيث تزداد زيادة تدريجية بزيادة مدة سحب العلف من صفر حتى 12 ساعة قبل الذبح. بينما لوحظ هناك انخفاض معنوى فى الوزن النسبى والمطلق لكل من وزن الدهن البطنى ووزن الحوائج ومحتويات القانصة وتركيز الجلوكوز ببلازما الدم وقيم حموضة اللحم ومحتوى الصدر والفخذ من الرطوبة والدهون بزيادة مدة سحب العلف قبل الذبح. وقد أظهرت النتائج وجود ارتفاع ملحوظ فى قيم تركيز الجلسريدات الثلاثية والليبيدات الكلية ببلازما الدم فى المجموعة التى تم سحب العلف عنها بـ 8 ساعات قبل الذبح.

أظهرت النتائج وجود اختلافات معنوية عند مستوى معنوية 1% لتأثير اختلاف الوزن قبل الذبح على الوزن المطلق لكل من وزن الدهن البطنى ووزن أجزاء الذبيحة ووزن الذبيحة والوزن النسبى للحوائج والخواص الكيميائية للحم وقوة احتفاظ اللحم بالماء وقيم الحموضة.أيضاً لوحظ وجود اختلافات معنوية عند مستوى 5% لتأثير اختلاف الوزن قبل الذبح على الوزن النسبى لكل من الفقد بالوزن ووزن الدهن البطنى ووزن الفخذ وتركيز الجلوكوز ببلازما الدم.

بينما لم يكن هناك أى تغيير معنوى لتأثير الوزن على الوزن المطلق لكل من الفقد بالوزن ووزن الحوائج ووزن محتويات القانصة وكذلك الوزن النسبى للذبيحة وتركيز حمض اليوريك والليبيدات الكلية والجلسريدات الثلاثية.

لوحظ أن الوزن (ب) أعطى أعلى القيم للوزن النسبى لكل من الفقد بالوزن ووزن محتويات القانصة ووزن الحوائج عن الوزن (أ) بمقدار 7.9، 11.5، 9.3% على التوالى.بالمقارنه بالوزن (أ) حيث سجل أعلى قيم للوزن المطلق لكل من وزن الدهن البطنى ووزن أجزاء الذبيحة ووزن الذبيحة عن الوزن (ب) بمقدار 20.1، 16.5، 14.8، 14.1% على التوالى.

ومن هذه الدراسة يتضح أن الوقت الأمثل لسحب العلف والتصويم قبل الذبح لبدارى اللحم يتراوح من 8 – 12 ساعة ، حيث أدى لنتائج أفضل لتحسين صفات جودة الذبيحة. بالاضافه إلى أن وزن الذبح لبدارى اللحم ذات أوزان من 1600-1800 جم سجلت نتائج أفضل من مثيلتها ذات الوزن من 1800-2000جم عند الذبح.

قام بتحكيم البحث

أ.د / خليل الشحات شريف	**كلية الزراعة – جامعة المنصورة**
أ.د / ابراهيم الوردانى السيد حسن	**كلية الزراعة – جامعة عين شمس**