

DATE PALM WASTE IN STARTER-GROWER DIETS AND IMPACT ON PRODUCTIVE AND PHYSIOLOGICAL PERFORMANCE OF BROILERS

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SUMMARY

The current study was designed to evaluate growth performance, carcass characteristics and some blood plasma parameters on unsexed Hubbard broiler chicks fed different levels of protein and Mid-rib of date palm (MDP) up to five weeks of age. Four dietary treatments, using 160 chicks, each group comprised of 40 chicks in 5 replicates of 8 chicks each. Two levels of crude protein (required level; control) and (low [-2% crude protein]; T1) and two levels of MDP (5%; T2 and 10%; T3) were used to replace yellow corn grains found in control diet. At the end of experimental period at 5 weeks of age, 3 birds from each treatment were randomly selected and slaughtered for carcass, tibia and some plasma parameters. Obtained results indicated that chicks fed required protein diet (control) showed the highest live body weight and best feed conversion ratio compared with those fed low protein diet (T1). Moreover, chicks fed MDP (T2 or T3) diets reflected the lowest live body weight and worse feed conversion ratio compared with other dietary treatments. In regard to carcass characteristics parameters; carcass weight, total edible parts and abdominal fat % and carcass parts % (wing and drumstick %), recorded insignificant figures were observed when chicks fed different dietary treatments. However, liver, giblets, thigh and breast percentages recorded significant differences within dietary treatments. Additionally, tibia bone measurements (wet tibia weight, tibia length, tibia width and tibia Seeder index) showed insignificant differences within dietary treatments. Also blood plasma parameters [total protein, albumin, globulin, uric acid, total lipids, triglycerides, cholesterol and alanine transaminase (ALT)] were not altered, while; plasma aspartate transaminase (AST) concentration was increased by feeding low protein diets (T1). In conclusion, feeding broiler chickens on balanced diets is more successful in regard to growth performance, feed conversion ratio and carcass characteristics.

Key words: *date palm, broilers, performance, blood plasma, tibia traits.*

INTRODUCTION

Feedstuffs for economical poultry production are considerably limited in many regions of the world, such problem has become even worse by the tendency of using grains in the production of biofuels and the subsequent increase in the prices of feedstuffs. This is becoming even worse due to the use of different crops such as maize in biofuel production and the subsequent increase in the price of energy sources in poultry and animal rations (Farrell, 2005; Lumpkins and Batal, 2005; Swiątkiewicz and Koresleski, 2008; El-Deek et al., 2010).

A considerable attention has been paid to use untraditional feedstuffs such as agro-industrial by-products in formulating poultry diets to achieve a suitable efficiency of utilization and economic efficiency of production. Several attempts have been practiced to replace maize with date wastes in broiler diets (whole inedible dates, date pits, Mid-rib (MDP) and Pinne of date palm, PDP) but less consideration was given to the utilization of MDP. (El-Faham, 2005; El-Deek et al., 2010 and El Faham et al., 2013). Egypt, Kingdom of Saudi Arabia, Iran, Iraq, United Arab Emirates, Algeria and Pakistan are seven leading countries that produce more than 90% of the world's date supply. Also, dates are used for the production of molasses, alcohol, vinegar, yeast and several other products and the date by-products could be used in animal and poultry feeding (Daghir 2008; El-Deek et al., 2008).

Hussein et al. (1998) concluded that using whole dates or date pits, by 100 g/ kg in broiler starter rations had no adverse effect on growth and FCR of growing chicks. Also, El-Deek et al. (2010) indicated

possible inclusion of whole inedible date in broiler rations up to 150g/kg feed, during the period of 15 to 42 days of age without adverse effects on growth performance and meat quality. El-Faham (2005) concluded that, it is possible from the economic point of view to include MDP or PDP by 5% level in broiler diets (starter, grower and finisher). On the other hand, El-Faham et al. (2013) reported no harmful effects on performance of growing chicks upon feeding date palm waste 5, 10 and 15% in starter, grower and finisher diets, respectively, supplemented with 5.0 kg Zado or 1.0 kg sodium sulphate/ ton.

Recently, reduced dietary protein and /or metabolically energy levels have been the subject of numerous investigators (Abd-Elsamee et al., 2001; Attia et al., 2001; El-Faham and Ibrahim, 2004). These authors concluded that body weight and feed conversion were significant improved with increasing crude protein level. However, chicks fed on low protein diets supplemented with essential amino acids (Han et al., 1992) or with Enramycin (Abd-Elsamee et al., 2001) or with phytase enzyme (Attia et al., 2001) could perform equivalently to those fed on higher protein diets. Thus, this study aims to investigate the effect of different levels of protein and Mid-rib of date palm (MDP) in broiler diets during starting and growing periods on growth performance, carcass characteristics and some physiological parameters.

MATERIALS AND METHODS

The present trial was conducted at poultry experimental unit, Agriculture Experiment and Research station at Shalakan, Faculty of Agriculture, Ain Shams University.

Experimental diets and birds:

Mid-rib of date palm waste (MDP) were collected from El-Wadi el-Gedid Governorate. MDP used in this study were sun dried and crushed to about 1 mm³ as a maximum size using a heavy-duty high-rotation hammer mills. A representative sample of MDP was collected for proximate chemical analyses (Table 1), for assessment dry matter (DM), crude protein (CP), crude fiber (CF), ether extract (EE), nitrogen-free extract (NFE), crude ash (CA) and organic matter (OM), according to AOAC (1990). One

Table (1): Chemical composition of mid-rib of date palm (MDP) and yellow corn.

Assay %	Mid-rib of date palm *	Yellow corn **
Dry matter	88.10	88.00
Crude protein	2.69	7.70
Crude fiber	34.02	2.30
Ether extract	2.98	3.80
Nitrogen-free extract	41.70	72.22
Crude ash	6.71	14.00
Organic matter	93.29	86.00
ME (Kcal/ kg) ***	695	3350

* Chemical composition parameters were determined in feed analysis lab, poultry production department. Faculty of Agriculture, Ain Shams University. ** Yellow corn parameters were calculated according to CLFF Bulletin (2001). *** According to El-Faham (2005).

hundred sixty unsexed one-day-old Hubbard broiler chicks were randomly distributed into 4 treatments with 5 replicates of 8 chicks. The four experimental treatments were as follows:

Control	Required protein + Required energy
Treatment 1 (T1)	Low protein (- 2 %) + Required energy
Treatment 2 (T2)	Required protein + Low energy (5% MDP)
Treatment 3 (T3)	Required protein + Low energy (10% MDP)

As shown in Table (2), the experimental diets were based on corn-soy diets and control diets formulated to meet the nutrient requirements of broiler chicks according to NRC (1994).

Growth performance:

Individual live body weight and group feed consumption were recorded at the end of 3 and 5 weeks of age, while live body weight gain and feed conversion (feed/gain) were calculated every 3 or 2 weeks in relation to the feeding regimes.

Table (2): Composition and chemical analysis of the starter and grower diets.

Ingredient %	Starter diets (0-3 weeks)				Grower diets (4-5 weeks)			
	Control	T1	T2	T3	Control	T1	T2	T3
Yellow Corn	46.72	54.30	41.72	36.72	54.75	60.28	49.75	44.75
Mid-rib (MDP)	-	-	5.00	10.00	-	-	5.00	10.00
Soybean Meal (44%)	36.20	30.15	36.20	36.20	30.15	25.29	30.15	30.15
Full-fat Soybeans	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Soy Oil + Sunflower Oil	3.65	2.00	3.65	3.65	2.00	1.50	2.00	2.00
Mono calcium phosphate	1.58	1.68	1.58	1.58	1.35	1.40	1.35	1.35
Limestone	1.60	1.62	1.60	1.60	1.50	1.48	1.59	1.50
Salt (NaCl)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
DL-methionine	0.34	0.20	0.34	0.34	0.20	0.12	0.20	0.20
L-lysine HCl	0.08	0.22	0.08	0.08	0.22	0.10	0.22	0.22
Vitamin & Mineral Mix*	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Choline chloride 50%	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chemical Analysis (Calculated) **								
Crude protein %	22.93	20.93	22.56	22.43	20.93	19.06	20.68	20.51
Crude fiber %	4.25	3.99	5.84	7.42	3.99	3.77	5.58	7.17
ME (Kcal/kg)	3030	3029	2897	2765	3029	3055	2896	2764
Calorie/Protein ratio	132	145	128	123	145	160	140	135
Calcium %	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90
Available phosphorus%	0.51	0.52	0.51	0.51	0.45	0.45	0.45	0.45
Lysine %	1.48	1.40	1.48	1.48	1.40	1.21	1.40	1.40
Methionine %	0.72	0.55	0.72	0.72	0.55	0.45	0.55	0.55
Methionine + cysteine %	1.09	0.87	1.09	1.09	0.87	0.77	0.87	0.87

* Each 3 kg of premix contains: 15000000 I.U VIT. A, 50 g. VIT. E, 3000 mg. VIT. K3, 3000 mg. VIT. B1, 8000 mg. VIT. B2, 4000 mg. VIT. B6, 20 mg. VIT. B12, 15000 mg. Pantothenic acid, 60000 mg. Niacin, 1500 mg. Folic acid, 200 mg. Biotin, 200000 mg, vit. C, 700 gm. Choline chloride, 80 gm. Mn, 80 gm. Zn, 60 gm. Iron, 10 gm. Cu, 1 gm. Iodine, and 0.2 gm. Selenium, where CaCo₃ was taken as a carrier up to 3kg, the inclusion rate was 3kg premix /Ton feed. ** The figures for ingredients were calculated according to CLFF Bulletin (2001).

Carcass characteristics:

At the end of the experiment (5 weeks), 3 birds from each treatment were randomly selected and sacrificed for carcass measurements. Carcass, heart, liver, gizzard and abdominal fat were weighed and relative weights to live body weight were calculated. Carcass parts % were evaluated using (breast, thigh, drumstick and wing) weights and percentages were calculated in relation to carcass weight.

Bone traits:

Tibia bones were removed, cleaned of all soft tissues and weighed. Tibia length and width were determined using a digital micrometer according to the methods described by Samejima (1990). The Seedor index (SI) was determined according to Seedor et al. (1991).

Blood parameters:

Blood samples were collected from slaughtered birds and plasma were separated by centrifugation at 3000 (rpm) for 15 minutes. Clear plasma samples were separated into Eppendorf tubes and kept in deep freezing at (-20°) c until bio-chemical analysis. All biochemical parameters of plasma were colorimetrically determined using commercial diagnosing kits produced by (Bio-Diagnostics Company, Egypt).

Statistical Analysis:

Data were statistically analyzed by analysis of variance (ANOVA) one-way using the General Linear Model (GLM) procedure of SAS (2004). Mean were compared using Duncan's Multiple Range Test (Duncan, 1955) where the level of significance set at minimum (P<0.05).

RESULTS AND DISCUSSION

Chemical composition and nutritive values of MDP against yellow corn

Results of proximate analysis (on dry weight basis) of Mid-rib of date palm (MDP) used in this research in comparison with yellow corn was summarized in Table (1). The experimental data showed that yellow corn contains high amounts of crude protein, ether extract, crude ash and nitrogen free extract as compared to MDP. On the other hand, MDP contained highest value in crude fiber (34.02%), while yellow corn was lower (2.30). This high fiber percentage may limit the diet inclusion level of most of date wastes, especially date pits, MDP and PDP in poultry diets (Jumah et al., 1973; Yeong et al., 1981; Sawaya et al., 1984; El-Boushy and Van Der Poel, 1994; El-Faham, 2005). The calculated metabolizable energy (ME) was 695 kcal/ kg in MDP on the basis of its chemical composition according to Carpenter and Clegg (1956). This was much lower than yellow corn (3350 kcal/ kg) according to NRC (1994).

Live body weight and body weight gain

The live body weight and body weight gain of broiler as affected by dietary treatments are illustrated in Table (3). It is worth to note that the chicks fed low protein diets (T1) during studied periods (0-3 and 0-5 weeks) reflected the lowest insignificant results in both live body weight and body weight gain compared with control group. However, during the starting period (0-3 weeks), chicks decreased by 8.7% (808.67 vs. 885.33 g), while in whole experiment period (0-5 weeks) were 3.7% (1914.27 vs. 1989.47). The explanation of that could be related to the fact that control diets were formulated to meet the optimum nutrient requirements for broiler chicks based on the recommendations of NRC (1994). On the other hand, chicks fed 5% MDP gave slightly higher live body weight gain during starting period (0-3 wks) being (814.50 vs. 757.00) or whole experimental period being (1801.87 vs. 1775.57), with significant differences. There were significant ($P < 0.05$) differences among treatments in body weight compared with control group. In the same order, chicks fed 10% MDP showed the highest reduction in body weight gain being 9.6 and 10.8% in starting and whole experimental periods respectively compared with the control group. A possible explanation for this reduction may be due to its highest fiber content over 7% in starter or grower diets which reduce digestibility and availability of nutrient (Table 2). The same trend was observed by some investigators (Sawaya et al., 1984; El-Boushy and Van Der Poel 1994;

Table (3): Effect of different dietary treatments on growth performance of broiler chicks

Item	Dietary treatments				SE	Sig.	
	Control	T1	T2	T3			
	Initial body weight	47.83	46.83	47.50	47.00	1.53	NS
LBW (g)	3 weeks body weight	885.33 ^a	808.67 ^{ab}	862.00 ^{ab}	804.00 ^b	22.54	*
	5 weeks body weight	2037.30 ^a	1961.10 ^{ab}	1849.37 ^{bc}	1822.57 ^c	27.81	*
	Body weight gain (g)	837.50 ^a	761.83 ^{ab}	814.50 ^{ab}	757.00 ^b	22.48	*
Starter (0 - 3) weeks	Feed intake (g)	1100.00	1184.00	1182.00	1192	30.79	NS
	FCR (g feed/g gain)	1.31 ^c	1.55 ^a	1.45 ^b	1.57 ^a	0.016	*
Grower (4 - 5) weeks	Body weight gain (g)	1151.97 ^a	1152.43 ^a	987.37 ^b	1018.57 ^{ab}	30.68	*
	Feed intake (g)	2255 ^{ab}	2427 ^a	2154 ^b	2246 ^{ab}	52.30	*
	FCR (g feed/g gain)	1.96	2.12	2.19	2.20	0.09	NS
Overall (0 - 5) weeks	Body weight gain (g)	1989.47 ^a	1914.27 ^{ab}	1801.87 ^{bc}	1775.57 ^c	27.54	*
	Feed intake (g)	3355	3611	3336	3438	80.16	NS
	FCR (g feed/g gain)	1.68 ^b	1.89 ^a	1.85 ^{ab}	1.94 ^a	0.05	*

^{a,b} Means within the same row with different superscripts are significantly different. * = Significance ($P \leq 0.05$), NS = Non significant FCR: Feed Conversion Ratio.

El-Faham, 2005). Also, Onwudikee, (1986a, 1986b), reported that dates contain lower levels of essential amino acids, such as lysine, methionine leucine and isoleucine and its content which are not enough to meet optimum requirements for chick growth. The responses of chicks fed different experimental diets showed that chicks fed low protein diets (T1; -2% crude protein) presented higher body weight than those fed the two different levels of MDP (low energy diets; 5 and 10% MDP), T2 or T3. The corresponding

figures were 1961.10, 1849.37 and 1822.57 g respectively and the differences failed to be significant compared with those fed control diet (2037.30 g). These findings were in contrast with those obtained by El-Faham et al. (2013) who recommended to use (MDP) at inclusion rate of 5, 10 and 15% in starter, grower and finisher chick diets, respectively without any adverse effects on productive performance comparable to the control of (Sasso x Gemmizah, Egyptian local strain). In the same order, Vandepopuliere et al. (1995) stated that feeding broiler chicks on diets containing higher levels of whole dates (43%) and date pits (27%) presented better productive performance. They found it difficult to determine if the positive growth response of chicks was due to higher fat levels or using date pits in diets.

Feed consumption and feed conversion ratio

Data in Table (3) indicated that feed intake per bird, (g) was insignificantly increased by feeding low protein diets (T1) compared with those fed control diets. The increase in feed intake during starting, growing and whole experimental period being 7.6%. This might be due to the fact that T1 diets contained lower protein compared to the control diets. In the same order, genetically, broiler chicks require more dietary protein to maximize growth during short rearing periods. Feed conversion showed the same trend since chicks fed control diet were more efficient in converting their food into gain compared with those fed (T1) diets and differences were significant ($P \leq 0.05$). It was obvious from (Table 3) that the effect of MDP (T2, T3) on feed intake and feed conversion during different experimental periods led chicks to consume more feed than control especially in starter period (0-3 weeks) without significant differences between treatments. In the same order, the figures of feed conversion ratio (FCR) presented significant differences between chicks fed diets containing MDP (T2, T3) compared with those fed control diets. The best FCR was detected for chicks fed control diets (1.68). On the other hand, the worst FCR were found in birds fed higher levels of 10% MDP (1.94), which could be due to lower body weight gain and higher feed intake (Table 3) as a result of higher dietary fiber content. Onwudikee (1986b) showed that high level of fiber in poultry diets showed negative response on the availability of amino acids and increase the passage of ingesta in the intestines, resulting in an increase in feed intake, a lower body weight and a poor feed conversion (Jumah et al., 1973).

Carcass characteristics

Table (4) shows the effect of different dietary treatments on carcass characteristics and carcass parts of broiler chicks slaughtered at the end of the experiment (5 weeks of age). Experimental treatments (T1-3) had no significant effect on studied parameters compared with control, except liver and giblets

Table (4): Effect of different dietary treatments on carcass characteristics, at 5 weeks.

Item	Dietary treatments				SE	Sig.	
	Control	T ₁	T ₂	T ₃			
Live body weight (g)	1996.67	1755.00	1776.67	1760	160	NS	
Carcass weight (g)	1460.00	1260.00	1278.33	1241.67	50	NS	
Carcass %	73.12	71.80	71.95	70.55	1.29	NS	
Liver %	1.44 ^b	2.57 ^a	1.88 ^{ab}	2.18 ^{ab}	0.24	*	
Gizzard %	1.18	1.24	1.31	1.33	0.10	NS	
Heart %	0.33	0.49	0.38	0.47	0.10	NS	
Giblets %	2.94 ^b	4.29 ^a	3.56 ^{ab}	3.98 ^a	0.26	*	
Total edible parts %	76.09	76.08	75.52	74.53	0.85	NS	
Abdominal fat %	1.69	1.68	1.87	1.61	0.28	NS	
Carcass (%)	Wing	9.70	9.84	12.61	11.54	1.11	NS
	Drumstick	13.73	14.05	15.01	15.46	1.73	NS
	Thigh	37.88 ^a	36.38 ^a	23.96 ^b	28.03 ^{ab}	2.01	*
	Breast	38.69 ^b	39.74 ^b	48.43 ^a	45.36 ^a	2.50	*

*a, b Means within the same row with different superscripts are significantly different. * = Significance ($P \leq 0.05$). NS = Non significant*

percentages. The corresponding values for carcass percentages ranged between 70.55 and 73.12%, while total edible part percentages ranged between 74.53 and 76.09% and broiler chicks fed control diets gave the highest figure while, chicks fed 10% MDP had the lowest figures and differences among treatments

were insignificant. On the contrary, liver and giblets percentage figures showed significant difference between treatments, in which control group reflected the lowest figures compared with other treatments (T1-3) and the corresponding figures being 1.44 and 2.94%, while chicks fed low protein diets (T1) gave the highest figures, being 2.57 and 4.29% respectively and in most cases differences between treatments were significant ($P \leq 0.05$).

Carcass parts percentages

The results in Table (3) shows the relationship between dietary treatments and carcass parts of broiler chicks. No significant differences in wing and drumstick percentages were obtained due to experimental treatments, but there was significant increase in breast percentages by feeding MDP diets (T2, T3) compared with those fed control or T1 diets, the corresponding figures were (48.43 and 45.36 vs. 38.69 and 39.74%), respectively. On the contrary, chicks fed MDP diets (T2, T3) showed the lowest thigh percentage figures being 23.96 and 28.03%, respectively while, chicks fed control or T1 diets had the highest figures being 37.88 and 36.38%, respectively. The differences among treatments were significant ($P \leq 0.05$). Similar observations have been reported by El-Faham et al. (2013), Al-Homidan (2003) and Hussein et al. (1998). They concluded that adding date waste to broiler diets had no effect on carcass yield. In addition, these findings are in contrast with the results obtained by El-Faham (2005), who reported that added MDP in broiler chicks diets, significantly decreased dressing and breast% but increased drumstick %.

Bone measurements

Results in Table (5) show the relationship between different dietary treatments and some tibia measurements. Wet tibia weight ranged between 10.59 and 9.5 (g.) and chicks fed diets containing MDP (T2, T3) gave the lowest figures while, chicks fed control diets or T1 diets gave the highest figures and differences among treatments were insignificant. In the same order, tibia length (cm), tibia width (cm) and tibia Seeder index figures, presented similar trend, in which control group reflected higher figures compared with other treatments and the corresponding figures being 8.53, 0.63 and 0.61 (cm), respectively. Differences among treatments were not significant. Similar observations have been reported by El-Faham et al. (2013) who reported that, no adverse effects of MDP inclusion at different levels with or without different feed additives on tibia measurements.

Table (5): Effect of different dietary treatments on some bone measurements

Item	Dietary treatments				SE	Sig.
	Control	T1	T2	T3		
Wet tibia weight (g)	10.61	10.59	10.01	9.5	0.54	NS
Percentage of body weight	0.53	0.61	0.56	0.54	0.14	NS
Tibia length (cm)	8.53	8.40	8.23	8.17	0.13	NS
Tibia width (cm)	0.63	0.62	0.62	0.57	0.02	NS
Tibia seeder Index	0.61	0.60	0.59	0.56	0.02	NS

NS = Non significant

Blood plasma parameters

Table (6) showed the effect of different treatments on some plasma parameters. It is clear that, although, total protein, Albumin, globulin and A/G ratio have not significant different between treatments, total protein and globulin values for chicks that fed 5% MDP (T2) diets have the lowest values being 5.70 and 1.79 (g/dl) respectively, while (T1) diets recorded higher levels, being 7.75 and 3.80 (g/dl) respectively. Which means, treatment (T1) had improved immunity of birds compared to other groups. On the other hand, T2 diets recorded the highest value for A/G ratio (2.18) compared with other treatments without any significant differences between treatments. Regarding kidney functions as uric acid concentration, different treatments were not significantly affected on kidney function and the corresponding values for uric acid ranged between 3.55 and 4.16 (mg/dl) and lower value for birds fed low protein diet (T1), and these results were logic as consuming lower protein presents inferior blood plasma uric acid concentration. According to lipid metabolism, chick fed (T1) diets showed the lowest triglycerides figure (60.66 mg/dl) and the highest total lipids and cholesterol being (497.03 and 210.23

mg/dl) respectively, compared with other treatments. Generally, inclusion of MDP in diets (5 - 10%), had decreased lipid metabolism, as presented in Table (6), especially for cholesterol values when comparing control group with (T1) group [173.27 and 179.33 vs. 183.50 and 210.23] for control and T1, respectively. Besides, differences between treatments were insignificant. Concerning liver function, aspartate transaminase (AST) was significantly different between treatments, while alanine transaminase (ALT) was not affected. In addition birds fed (T1) diets gave the highest figures (41.00 and 18.04 RFU/ml) for AST and ALT respectively compared to other treatments. These results are fairly logic as AST value represents liver function and reflect any stress on bird's body which in turn affect liver enzymes (AST and ALT). Also, dietary protein level was effective in altering blood plasma AST levels. In the present trial, decreasing dietary protein level had decreased AST concentration as presented with (T1) group. On the other hand, obtained results disagreed with Dairo et al. (2010) and Saleh (2016) they reported that, plasma AST and ALT were not affected by decreasing dietary protein by 1%.

Table (6): Effect of different dietary treatments on some plasma parameters

Item	Dietary treatments				SE	Sig.
	Control	T1	T2	T3		
Total protein (g/dl)	6.72	7.75	5.70	6.69	0.54	NS
Albumin (g/dl)	3.99	3.94	3.91	3.77	0.13	NS
Globulin (g/dl)	2.73	3.80	1.79	2.92	0.51	NS
A/G ratio	1.46	1.04	2.18	1.29	0.40	NS
Uric acid (mg/dl)	3.87	3.55	4.16	4.10	0.95	NS
Total lipids (mg/dl)	428.23	497.03	411.63	409.25	95.80	NS
Triglycerides (mg/dl)	83.33	60.66	61.33	64.67	6.00	NS
Cholesterol (mg/dl)	183.50	210.23	173.27	179.33	21.60	NS
AST (RFU/ml)	27.50 ^{ab}	41.00 ^a	21.17 ^b	30.85 ^{ab}	4.75	*
ALT (RFU/ml)	15.11	18.04	17.97	13.66	1.34	NS

*a,b Means within the same row with different superscripts are significantly different. * = Significance (P≤0.05). NS = Non significant*

CONCLUSION

After reviewing results of the present study, it is clear that feeding broiler chickens on balanced diets is more successful in regard to growth performance, feed conversion ratio and carcass characteristics.

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مخلفات نخيل البلح فى علائق البادىء-النامى والتاثير على الاداء الانتاجى والفسىولوجى لدجاج التسمين

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الدراسة الحالية صُممت بهدف تقييم الأداء الإنتاجى، وصفات الذبيحة وبعض مقاييس بلازما الدم على كتاكيت من صنف Hubbard غير مُجنس مُغذاة علائق مختلفة فى مستوى البروتين ومخلفات جريد نخيل البلح (MDP) حتى عمر خمسة أسابيع. فى أربعة معاملات غذائية، بإستخدام عدد 160 كتكوت، إحتوت كل مجموعة على 40 كتكوت فى 5 مكررات بكل منها 8 كتاكيت. تم إستخدام مستويين من بروتين العليقة [مستوى الإحتياجات: مجموعة المقارنة (control)] و مستوى بروتين منخفض (-2% بروتين خام) كما فى المجموعة (T1) ومستويين من (MDP) للمجموعة (T2) معدل 5% وللمجموعة (T3) معدل 10% كبإستبدال للذرة الصفراء فى عليقة المقارنة. فى نهاية التجربة، عند عمر 5 أسابيع، تم إختيار 3 طيور عشوائياً من كل معاملة لإجراء الذبح وقياسات الذبيحة وصفات عظام الساق وبعض مقاييس بلازما الدم. أوضحت النتائج المتحصل عليها أن الطيور المغذاة عليقة المقارنة (control) سجلت أعلى وزن جسم حى وأفضل معامل تحويل غذائى عند مقارنتها مع الطيور المغذاة عليقة منخفضة البروتين (T1). بالإضافة إلى أن الطيور المغذاة علائق (MDP) فى (T2) و (T3) قد سجلت أقل وزن حى وأسوأ معامل تحويل غذائى عند مقارنتها بالمعاملات الأخرى. فيما يتخص بمقاييس الذبيحة: وزن الذبيحة، مجموع الأجزاء المأكولة، نسبة دهن البطن، نسبة اجزاء الذبيحة (جناح - دبوس)، فقد أتضح عدم وجود فروق معنوية بين الطيور المغذاة العلائق المختلفة. بالرغم من تسجيل فروق معنوية بين المعاملات المختلفة لمقاييس النسبة المئوية لكل من الكبد، الحوائج والصدر. كذلك أوضحت مقاييس عظم الساق (وزن رطب، طول، سُمك ودليل Seeder) عدم وجود إختلافات معنوية بين المعاملات الغذائية المختلفة. كما إتضح أيضاً من قياسات بلازما الدم (بوتين كلى، الببومين، جلوبيولين، حمض يوريك، كوليستيرول، إنزيم ALT) عدم تأثرها بالمعاملات المختلفة، بالرغم من زيادة تركيز إنزيم (AST) فى بلازما الدم عند تغذية الطيور عليقة منخفضة البروتين (T1). والخلاصة أن تغذية بدارى التسمين على علائق متزنة يعتبر أكثر نجاحاً فيما يتعلق بالأداء الإنتاجى، معامل التحويل الغذائى وصفات الذبيحة.