EFFECTS OF ADDING DIFFERENT DIETARY LEVELS OF GUAR MEAL ON PRODUCTIVE PERFORMANCE OF BROILER CHICKS

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SUMMARY

The present study was designed to investigate the effect of feeding various levels (0, 2.5, 5.0, 7.5 and 10%) of gaur meal to replace soybean meal in the five dietary treatments in starter (0 -11 d.), grower (12 – 22 d.) and finisher$_1$ (23-35 d.) diets then all broiler chicks fed on finisher$_2$ diet (36- 42 d., 0.0% guar meal) on broiler performance, carcass characteristics and economical evaluation. A total of 180 one day old broiler chicks of Hubbard breed were used for the experiment with 6 chicks per replicate and 6 replicates per treatments. Results indicated that adding guar meal at inclusion rates of 5% to practical broiler diets as a replacement of soybean meal up to 35 days of age then feds 0.0% guar meal diet up to 42 days of age, would have a positive effect on the cost of production and the economical efficiency of broiler chicks, without any adverse effect on productive performance or carcass traits of the broilers comparable to the control (0% gaur meal). On the other hand, chicks fed on above 5% gaur meal diets showed significantly decreased values of productive performance and reduction of the calculated economical efficiency percentages.

Keywords: *guar meal, broiler chicks, carcass characteristics and economical efficiency*

INTRODUCTION

Feeding cost is considered the most expensive item (60 to 70%) in the whole poultry production process and protein sources generally is the most expensive component of feeds for broiler chickens (Wilson and Bayer, 2000 and Saleh *et al*. 2004). Soybean meal (SM) production in Egypt is not adequate to supply broiler feed, so it depends on the use of imported SM. A decrease in the availability of SM and an increase in the price for feed have a direct impact on the poultry industry worldwide and in some cases, production output is reduced (Ayuk, 2004 and Donohue and Cunningham, 2009). Some low-income and food deficit countries have shut down their broiler farms due to the high cost of feed (Sakib *et al*., 2014), to compensate for this change, any feedstuffs must be able to substitute for (SM) totally or partially and not have a negative impact on the efficiency or quality of poultry production (Ojewola *et al*., 2006).

Guar meal (GM) is a relative inexpensive high protein meal and sold at about half the price of (SM), making it an appealing potential source of protein in poultry feeds (Hussein, 2012b). Guar meal a by-product of guar gum isolation, contains 33 to 46% crude protein with high amino acid contents, which is a mixture of germs and hulls at an approximate ratio of 25% germ to 75% hull (Turki *et al*., 2011).

Since that guar meals germ fractions energy, protein, methionine and phosphorus is higher than in soybean meal, addition of guar meal as a partial replacement for soybean meal in poultry diets may be a useful economic strategy for decreasing feed costs while maintaining production levels, but some of the anti-nutritional agents in guar meal limit the usage of high levels of this meal in broiler diets (Mohayayee and Kazem, 2012; Lee *et al*., 2003a and Conner, 2002).

Previous studies reported that the negative effects of adding guar meal on body weight and feed conversion ratio might be attributed to the presence of anti-nutrient compounds in guar meal such as Guar gum, trypsin inhibitor, saponins, poliphenols and hemagelotenins or some other unknown toxic substances. Guar meal contains 5-13% of dry matter triterpenoid guar saponin (Hassan *et al*., 2007) and 13-18% gaur gum, residual galactomannans gum (Lee *et al*., 2004).

On the other hand, numerous investigations have shown some beneficial physiological functions of galactomannans. Such as, decreased plasma cholesterol (Yamamoto *et al*., 2000; Maisonnier *et al*., 2001), inhibited colonization of pathogenic gastrointestinal bacteria (Bengmark, 1988) and enhances macrophage activation thus exhibiting immunostimulatory activity (Duncan *et al*., 2002).

Guar gum addition in broiler chicken diets increased digesta viscosity and decreased nutrient digestibilities, with most pronounced effects being observed for lipids, then for proteins and lowest for starch (Maisonnier *et al*., 2001). So, guar gum decrease growth and performance of broiler chickens even when guar gum containing meals are fed at low concentrations (Vohra and Kratzer, 1964a).

Therefore, the objectives of this study were to evaluate the possibility of partial replacing soybean meal with guar meal in traditional corn-soy diets and measuring growth performance, carcass characteristics chicks health condition and economical efficiency.

MATERIALS AND METHODS

This experiment was carried out in poultry experimental unit, Agricultural Experiment and Research Station at Shalakan, Faculty of Agriculture, Ain Shams University, in order to investigate the productive performance, carcass characteristics chicks health condition and economical evaluation of broiler chicks (Hubbard) as affected by using guar meal (GM) as a partial replacer of soybean meal (SM) in the diets. Chemical composition of SM and GM used in present study (on air dried basis) are shown in Table (1). During the experimental period, which lasted 42 days, chicks were fed on the experimental diets. Five experimental diets were formulated in which (control diet) was 0.0 GM, in the other four experimental diets GM were incorporated at levels of 2.5%, 5%, 7.5% and 10% to obtain starter (0-10 days), grower (11-22 days) and finisher$_1$(23-35 days) diets then all chicks fed on finisher$_2$ diet which contain 0.0 GM from 36-42 days as described in Table (2)

Table (1): Chemical composition of Soybean meal (SM) in comparison with Guar meal(GM)

Ingredients	Dry matter	Organic matter	ME Kcal/kg**	CP %	EE %	Crude fiber %	Ash%
Soybean meal 44 %*	88.89	94.11	2225	43.4	2.55	6.11	5.89
Guar meal 50 %	89.49	92.07	3965	49.6	7.07	7.66	6.13

**The figures for soybean meal were calculated according to NRC (1994).

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Diets were formulated according to the recommended nutrient by Hubbard manual for broiler chicks and were offered in mash form.

One hundred and eighty day-old unsexed broiler chicks (Hubbard) were randomly allocated to five treatments of 36 birds in 6 replicates (6 chicks per replicate). Chicks were reared in electrics heated batteries under similar conditions of management during the experimental period, 42 day of age.

Chicks were individual weight to nearly gram at 0, 11, 28, 35 and 42 days intervals during experimental period. At the same time, feed consumption was recorded, while live body weight gain and feed conversion were calculated. Accumulative mortality rate was obtained by adding the number of dead birds during the experiment divided by the total number of chicks at the beginning of the experimental period to get mortality percentage.

At the end of experiment period (42 days of age), slaughter tests were performed using four chicks of both sexes around the average mean of body weight of each treatments to determine some carcass traits, dressing %, total giblets % (Gizzard, liver and heart) and total edible parts (carcass and giblets) were expressed as percentage of live body weight. Carcass parts % were evaluated using breast, thigh, drumstick and wing weights and percentages was calculated in relation to carcass weight.

Economics efficiency of broiler chicks was calculated and the prices figures were based on the recent prices of local market for ingredients and selling prices of chicks in Qaliobia region, Egypt at October, 2016.

Statistical analysis was conducted using the General Linear Model (GLM) procedure of SAS (2004). Means were compared using Duncan's Multiple Range Test (Duncan, 1955) and level of significances was set at minimum of ($P \leq 0.05$).

The statistical model was:

$$Y_{ij} = \mu + T_i + e_{ij}$$

Where:

Yij	= observation of the parameter measured	μ= overall mean	
Ti	= effect of treatment (i: 1 to 6)	eij	= random error

RESULTS AND DISCUSSION

Chemical composition and nutritive values of Soybean meal (SM) and Guar Meal (GM)

Results of proximate analysis (on dry weight basis) of GM used in this experiment in comparison with SM is illustrated in Table (1). The analysis indicated that GM was higher in crude protein (49.6%), compared to SM (43.4%). Ether extract was relatively higher in GM (7.07%) than those found in SM (2.55%). While ME kcal/kg were higher in GM (3965) than those found in SM (2225). Crude protein, Ether extract and ME contents of GM indicate a possibility of using it to replace SM partially as an protein and energy sources in broilers and layers diets (**Srivastava *et al*., 2011**). On the other hand, GM contained higher values of crude fiber (7.66%) and crude ash (6.13) compared to SM (6.11% and 5.89% respectively).

Kamran *et al*. (2002) reported that, since the germ fraction of GM contains energy, protein, methionine and phosphorus in higher levels than in soybean meal, addition of GM as partial replacement (<10%) of soybean meal in poultry diets may be a useful economic strategy for decreasing feed costs without any negative effects on production.

Productive performance

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 7.5% (T_3) or 10% (T_4) GM during studied period (0- 42 days) reflected the lowest significant ($P<0.05$) results in both live weight and weight gain compared with the other treatments (control and T_{1-2}). However, during the studied period (0 – 42 days) chicks live body weight decreased by about 18% (T_3) and 15% (T_4) (1923.9 and 1993.9 versus 2320.0 g) compared with the control group.

On the other hand, chicks fed control diets (0.0% GM) gave slightly higher live body weight (2320g) compared to those fed diets containing lower levels of GM (2.5 or 5.0%), which being 2253.1 and 2212.1 g respectively, the differences were statistically not significant. The explanation of that could be related to the fact that, growth inhibition that follows the addition of GM in diet may be attributed to the residual gum content of the meal and or some of the anti-nutritional agents (trypsin inhibitors, saponins) present in GM limit it usage at high level in broiler diets (Anderson and Warnick, 1964; Couch *et al*., 1967b; Conner, 2002; Lee *et al*., 2003b and Lee *et al*., 2005).

Responses of chicks fed diets containing GM (T_{1-4}) showed that chicks fed diet containing 2.5% GM supported the highest body weight and gain than those fed the three other higher levels (5, 7.5 or 10%). The corresponding values were 2253.1, 2212.1, 1923.9 and 1993.9 g. respectively and the differences in some cases failed to be significant compared with those fed control diet. Similar observation was reported by (Vohra and Kratzer, 1964a) who stated that, raw GM depresses growth in chickens at inclusion rates as low as 7.5% and 10% seems to be the maximum rate acceptable (Patel and Mc Ginnis, 1985). These results are in agreement with those obtained by Mohammed *et al*. (2012) who reported that the lower dietary levels of GM supported chicks growth compared with those fed higher levels and GM can be fed to broiler chicks at levels up to 2.5% of the diet without negative effects on growth at 6wks of age (Lee *et al*., 2005).

While Tyagi *et al*. (2011) concluded that roasted GM could replace SM up to 10% in starter period (0 – 21 days) and finisher period (22 – 42 days of age) without any adverse effect on body weight gain of broiler chickens.

Feed consumption and feed conversion ratio

Data in Table (3) indicated that during experimental period (0 -42 days of age), the addition of the GM to experimental treatments (T_{2-4}) led chicks to consume insignificantly less feed than control and feed conversion showed the same trend expect T_2. Chicks fed control diet were more efficient in converting their feed into gain compared with those fed GM at levels 2.5 (T_1), 7.5 (T_2) or 10.0% (T4) and the differences failed to be significant. This may be due to the fact that unpalatability of the diet and to its highest anti-nutritional agents present in GM (Anderson and Warnick, 1964).

Patel and McGinnis (1985) reported that high level of GM in broiler diets will increase the passage of ingesta in the intestines, resulting in a lower feed utilization, a lower body weight and an decrease in feed consumption, resulting in a poor feed conversion in chicks. In addition Anderson and Warnick (1964), Almirall *et al*. (1995), Smith *et al*. (1997) and Turki (2011) reported that GM is sticky in nature and increased intestinal viscosity and decreased nitrogen retention, energy utilization, fat absorption, decreased digestibility coefficients of all macronutrients and decreased digestive enzyme activity throughout the small intestine. These findings were in contrast with the results obtained by Mohammed *et al*. (2012), who found no significant difference between feed consumption as well as feed conversion of chicks fed GM diets (3, 6 and 9% GM) and those chicks fed no GM diet at all experiment period (8 - 42 days).

Mortality rate and health condition

Under the condition of the present study all chicks appeared healthy and the total mortality rate was 5.6% during the total experimental period (0 – 42 days of age), without any clear differences among treatments. Hence, it seems that the different inclusion rate of GM had no adversely influenced health conditions and mortality rate.

Carcass characteristics and carcass parts

Tables (4 and 5) showed the effect of GM on carcass characteristics and carcass parts for the broiler chicks of both sexes (Mixed sex), slaughtered at 42 days of age.

Experimental treatments with GM (T_{1-4}) had no significant effect on studied parameters compared with control. The corresponding values for dressing percentages ranged between 66.90 and 70.80%, while total edible parts (Hot carcass weight + giblets weight) percentages ranged between 70.89 and 75.00%, respectively. However, Breast % increased and wing %, drumstick and thigh % decreased by feeding broiler chicks the lowest level of GM (T_1) compared to those fed control diets (0.0% GM) and the chicks fed (T_1) diets gave the highest values of 70.80, 75.00 and 46.47% for carcass, total edible parts and breast percentages, respectively and the differences were insignificant.

Similar observations have been reported by Tyagi *et al*. (2011) and Mohayayee and Kazem (2012) who concluded that adding GM to broiler diets had no significant effect on carcass traits (relative weight of carcass and giblets), cut up parts and immune organs weight.

On the other hand, the broiler chicks fed GM at levels 7.5 or 10.0% showed the lowest values (67.25 and 66.90% respectively) for dressing percentages and 71.27 and 70.89% respectively for total edible parts percentages and the differences were insignificant compared with the control group. These results are in agreement with the results of Muhammed *et al*. (2002) who reported that the dressing percentage of broiler chicks decreased with the increase of dietary GM from 5 to 10 and 15%.

Economical evaluation

Data for economical evaluation are summarized in Table (6). The economical evaluation were calculated on the basis of the recent prices at October/ 2016 of local market for feed ingredients and selling price of live broiler chickens in El-Qaliobeya region, Egypt.

The average cost/kg of finial experimental diet shown in Table (6). It was clear that suing GM (T_{1-4}) relatively reduced the cost/kg final diets compared with control group. This difference could be explained on the basis that metabolizable energy (ME) and crude protein (CP), content of SM which was much lower than GM 2225 versus 3965 ME and 43.4 versus 49.6% CP. By using GM, it was necessary to decrease the level of the expensive ingredients in diets (Soybean oil and corn gluten meal), in order to keep experimental diets Iso-caloric and Iso-nitrogenous.

In general, using GM in particular (T_{1-4}) relatively reduced the total cost / broiler chicks compared with those fed the control diet during the total experimental period (0 – 42 days) and the corresponding reduction values were 2.00, 6.55, 13.09 and 7.15%, respectively.

However, the obtained results showed that GM incorporated at 5% (T_2) on the expense of SM supported the calculated economic efficiency percentage of broiler chicks by about (8.15%) higher than control diet (without GM).

Adding the GM at either 2.5, 7.5 and 10% as inclusion rates resulted in reduction of the calculated economic efficiency percentages compared with control and the corresponding reduction values were 4.81, 27.04 and 23.03%, respectively. These results are in agreement with the results of Gutierrez *et al*. (2007) and Turki *et al*. (2011) who demonstrated that, the addition of guar meal as a partial replacement for soybean meal in poultry diets may be a useful economic strategy for decreasing feed costs while maintaining production levels. They suggested that guar meal can be fed to high-production laying hens or broiler chicks at levels up to 5% of the diet without unfavorable effects on birds performance.

CONCLUSION

From the previous results, it could be concluded that, from the economic point of view, the greatest improve was recorded by broiler chicks fed 5% guar meal in the diet compared to the control (0.0% guar meal). Treatments above 5% had negative effects on all parameters investigated and decreased performance in all parameters examined.

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Table (2): Composition and calculated analysis of the experimental diets for broiler chicks at 0- 42 days of age.

Ingredient (%)	Starter(1-10 days)					Grower (11-22 days)					Finisher 1(23-35 days)					Finisher 2
	Control	T1	T2	T3	T4	Control	T1	T2	T3	T4	Control	T1	T2	T3	T4	(36-42 days)
Yellow corn	52.05	53.25	54.44	55.64	56.52	55.91	57.14	58.32	59.51	60.86	56.8	57.98	59.20	60.44	61.68	63.53
Soybean meal (44%)	31.50	29.00	26.50	24.00	21.50	30.00	27.50	25.00	22.50	20.00	28.25	25.75	23.25	20.75	18.25	22.00
Guar meal (50%)	0	2.50	5.00	7.50	10.00	0	2.50	5.00	7.50	10.00	0	2.50	5.00	7.50	10.00	0
Corn gluten meal (60%)	7.20	6.82	6.47	6.10	5.78	4.86	4.50	4.15	3.78	3.40	4.40	4.03	3.67	3.30	2.90	6.50
Wheat bran	2.00	2.00	2.00	2.00	2.00	1.50	1.50	1.50	1.50	1.50	2.00	2.00	2.00	2.00	2.00	0
Soy bean oil	3.0	2.2	1.35	0.55	0.02	3.65	2.80	2.00	1.20	0.25	5.00	4.20	3.35	2.25	1.65	4.00
Di Calcium Phosphate	1.85	1.85	1.85	1.84	1.83	1.60	1.60	1.60	1.60	1.60	1.34	1.34	1.34	1.34	1.34	1.40
Limestone	1.30	1.30	1.33	1.33	1.33	1.50	1.50	1.50	1.50	1.50	1.35	1.36	1.37	1.37	1.38	1.40
Common Salt	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Premix *	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Dl-Methionine	0.29	0.28	0.28	0.27	0.27	0.28	0.28	0.27	0.26	0.26	0.21	0.21	0.20	0.19	0.19	0.30
L-Lysine	0.21	0.20	0.18	0.17	0.15	0.10	0.08	0.06	0.05	0.03	0.05	0.03	0.02	0.01	0.01	0.27
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Calculated analysis **																
Crude protein %	23.00	22.99	23.00	23.00	23.00	21.00	21.00	21.00	21.00	21.00	20.00	20.00	20.00	20.00	20.00	19.03
ME ,Kcal/kg	3029	3031	3031	3034	3050	3076	3077	3079	3082	3077	3171	3173	3173	3173	3173	3214
C/P ratio	131.7	131.8	131.8	131.9	132.6	146.5	146.5	146.6	146.7	146.5	158.5	158.6	158.6	158.6	158.6	169
Calcium %	1.00	1.00	1.01	1.00	1.00	1.01	1.01	1.01	1.01	1.00	0.90	0.90	0.90	0.90	0.90	0.91
Av. Phosphorus %	0.50	0.50	0.50	0.50	050	0.45	0.45	0.45	0.45	0.45	0.40	0.40	0.40	0.40	0.40	0.40
DL-Methionine %	0.64	0.63	0.64	0.63	0.63	0.61	0.62	0.61	0.60	0.61	0.53	0.54	0.53	0.52	0.53	0.60
Meth. + Cyst. %	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.84	0.84	0.84	0.84	0.84	0.87
L-Lysine %	1.3	1.3	1.3	1.3	1.3	1.15	1.15	1.15	1.15	1.15	1.06	1.06	1.07	1.07	1.08	1.07
Crude Fiber %	3.88	3.92	3.96	3.99	4.03	3.75	3.79	3.83	3.87	3.91	3.70	3.73	3.77	3.81	3.85	3.20

Control= 0.0% GM, T1= 2.5% GM, T2= 5% GM, T3= 7.5% GM, T4= 10.0% GM.

**Premix, vitamin and mineral mixture supplied each kg diet: Vit A 12000 IU, Vit D3 2500 IU, Vit E 12mg, Vit k3 3mg, Vit B1 1mg, Vit B2 6mg , Vit B6 3mg, Vit B12 13mg, Niacin 30mg, P   antothenic acid 12mg, Folic acid 1mg, Biotin 75mg, choline chloride 600mg, copper 5mg, Manganese 70mg, Zinc 50mg, Iron 60 mg, Selenium 0.1mg and cobalt 0.1mg.*

***Calculated according to feed composition tables for animal and poultry feedstuffs used in Egypt (2001)*

Table (3): Effect of feeding different dietary treatments on productive performance of broiler chicks (0-42 days).

Item	Treatments					
	Control	T1	T2	T3	T4	Sig
Initial body weight (g)	42.55±0.08	41.93±0.22	42.03±0.40	42.42±0.24	41.27±0.30	N.S
Final live body weight (g)	2320.00±59.53[a]	2253.10±56.388[a]	2212.10±97.37[a]	1923.90±68.92[b]	1993.90±75.63[b]	**
%	100	97.12	95.34	82.93	85.94	
Body weight gain (g)	2277.50±59.55[a]	2211.20±56.42[a]	2170.10±97.32[a]	1881.40±68.92[b]	1953.60±75.72[b]	**
	100	97.09	95.28	82.61	85.78	
Feed consumption (g)	3708.20±111.98	3708.30±40.00	3497.80±156.65	3424.70±139.53	3607.90±113.87	N.S
%	100	100	94.33	92.35	97.29	
Feed conversion ratio	1.63±0.040[c]	1.68±0.052[bc]	1.62±0.085[c]	1.82±0.040[ab]	1.85±0.041[a]	**
%	100	103.06	99.38	111.65	113.49	
Mortality rate	3/36	1/36	1/36	2/36	3/36	

***a, b** and c means the same row with different superscripts are significantly different sig. = significance , **(P≤0.01),*
N.S = Non significant
Control = 0.0% GM, T1= 2.5% GM, T2= 5% GM, T3= 7.5% GM, T4= 10.0% GM.

Table (4): Effect of feeding different dietary treatments on carcass characteristics and carcass parts of broiler chicks at 42 days of age.

Item	Treatments					
	Control	T1	T2	T3	T4	Sig
	Carcass parts % (LBW)					
LBW* (g)	2243.33±56.66[a]	2152.67±36.33[ab]	2094.00±81.05[abc]	1930.00±55.24[c]	1989.30±32.35[bc]	**
Carcass weight(g)	1560.67±74.51[a]	1524.00±36.71[a]	1422.67±82.26[ab]	1298.00±31.26[b]	1330.67±15.76[b]	*
Breast %	44.30±**2.52**	46.47±1.35	43.14±1.00	43.23±1.42	42.97±1.42	N.S
Thigh %	30.42±1.26	29.01±0.34	31.07±0.77	30.06±0.83	31.27±0.31	N.S
Drumstick %	14.44±0.54	13.93±0.86	14.88±0.43	15.55±1.35	14.57±0.51	N.S
Wings %	10.82±0.26	10.60±0.20	10.90±0.44	11.16±0.35	11.17±0.31	N.S

LBW = Live body weight
*a, b and c means the same row with different superscripts are significantly different sig. = significance , **(P≤0.01), * (P≤0.05) , N.S = Non significant*
Control= 0.0% GM, T1= 2.5% GM, T2= 5% GM, T3= 7.5% GM, T4= 10.0% GM.

Table (5): Effect of feeding different dietary treatments on carcass characteristics of broiler chicks at 42 days of age.

Item	Treatments					Sig
	Control	T1	T2	T3	T4	
	Carcass characteristics %					
LBW (g)	2243.33±56.66^{a}	2152.67±36.33^{ab}	2094.00±81.05^{abc}	930.00±55.24^{c}	1989.30±32.35^{bc}	**
Carcass %	69.67±1.61	70.80±1.02	67.84±1.31	67.27±0.30	66.90±0.31	N.S
Liver %	2.17±0.10	2.05±0.09	2.16±0.28	2.04±0.07	1.98±0.38	N.S
Gizzard %	1.57±0.08	1.60±0.36	1.51±0.14	1.45±0.06	1.51±0.05	N.S
Heart %	0.59±0.04	0.56±0.01	0.57±0.03	0.52±0.01	0.50±0.06	N.S
*Giblets%	4.33±0.09	4.21±0.32	4.24±0.06	4.00±0.11	3.99±0.49	N.S
Total edible parts %**	74.00±1.65	75.00±0.73	72.08±1.25	71.27±0.20	70.89±0.69	N.S

LBW = Live body weight
**Giblets = Liver + Gizzard +Heart*
*** Total edible parts = Carcass + giblets*
*a, b and c means the same row with different superscripts are significantly different sig. = significance , **(P≤0.01), * (P≤0.05) , N.S = Non significant*
Control =0.0% GM, T1= 2.5% GM, T2= 5% GM, T3= 7.5% GM, T4= 10.0% GM.

Table (6): Effect of feeding different dietary treatments on economical efficiency of broiler chicks at 42 days of age.

Item	Treatments				
	Control	T1	T2	T3	T4
Live body weight (g)	2320.00	2253.10	2212.10	1923.90	1993.90
Price /kg body weight* (LE)	19	19	19	19	19
Total revenue/ chick (kg)	44.08	42.81	42.30	36.55	37.88
Total Feed intake / chick (kg)	3.708	3.708	3.497	3.424	3.607
Price/ kg Feed (LE)*	5.606	5.496	5.385	5.275	5.170
Total Feed cost / chick (LE)	20.78	20.37	18.83	18.06	18.64
Fixed cost /chick (LE)	9	9	9	9	9
Total cost /chick (LE)	29.78	29.37	27.83	27.06	27.65
Relative %	100	98.0	93.45	86.91	92.85
Net revenue (LE)	14.30	13.44	14.47	9.49	10.23
Economic efficiency (EE)	48.07	45.76	51.99	35.07	37.00
Relative (EE) %	100	95.19	108.15	72.96	76.97

Control = 0.0% GM, T1= 2.5% GM, T2= 5% GM, T3= 7.5% GM, T4= 10.0% GM.
** The price figures for diets and selling live broiler during October/ 2016.*

تأثير استخدام مستويات مختلفة من كسب الجوار فى علائق بدارى التسمين على الأداء الإنتاجى

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أجريت تجربة للتعرف على تأثير تغذية كتاكيت التسمين على مستويات مختلفة من كسب الجوار (صفر، ٢.٥، ٥.٠، ٧.٥ و ١٠.٠%) كبديل لكسب فول الصويا فى خمسة علائق تجريبية فى البادئ (صفر – ١١ يوم) والنامى (١٢ – ٢٢ يوم) والناهى١ (٢٣ – ٣٥ يوم) ثم تغذت جميع الكتاكيت على عليقة ناهى٢ (٣٦ – ٤٢ يوم وصفر % كسب الجوار) على الأداء الإنتاجى وصفات الذبيحة والعائد الاقتصادى.

استخدمت فى التجربة ١٨٠ كتكوت تسمين من سلالة الهبرد عمر يوم، قسمت إلى مجموعات من ٦ كتاكيت فى كل مكرر واستخدمت ٦ مكررات فى كل معاملة غذائية (٥ معاملات غذائية).

النتائج أوضحت أن استخدام ٥% كسب الجوار فى علائق بدارى التسمين بديل لكسب فول الصويا لمدة ٣٥ يوم (بادئ، نامى، ناهى١) ثم ٧ أيام (ناهى٢، صفر% كسب جوار) له تأثير إيجابى على تكاليف الإنتاج والعائد الاقتصادى لبدارى التسمين بدون تأثير سلبى على الأداء الإنتاجى وصفات الذبيحة بالمقارنة بمعاملة الكنترول (صفر % كسب الجوار). استخدام كسب الجوار بنسبة أعلى من ٥% يخفض معنوياً من قيم قياسات الأداء الإنتاجى والعائد الاقتصادى لبدارى التسمين.