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EFFECTS OF DIETARY INCLUSION OF GUAR KORMA MEAL LEVELS WITH OR WITHOUT ENZYME SUPPLEMENTATION ON PERFORMANCE OF LOCAL STRAIN CHICKS (ANSHAS)

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SUMMARY

This study aimed to evaluate the effect of inclusion of guar korma meal (GKM) as a partial replacement for soybean meal (SBM) in commercial local strain (Anshas) diets on growth performance, digestibility, slaughter traits and economical efficiency. The experimental period lasted for 3 months. Chicks received (GKM) at 0, 2.5, 5, 7.5 and 10% with or without *β*-mannase enzyme (Hemicell®) supplement. Results indicated that GKM without enzyme can be used as a feed ingredient without adverse effect at level 2.5%. Using GKM in levels more than 2.5% depress weight gain, feed conversion and nutrients digestibility. Addition of enzyme to the diets improve weight gain, feed conversion and nutrients digestibility of diets containing 5% of GKM. Feed intake increased as the level of GKM in diets increased. Enzyme supplement had no effect on feed intake. Enzyme supplement could not overcome the adverse effect of GKM on nutrients digestibility only in diets contain 7.5 and 10% of GKM. Dressing percentage decreased as the level of GKM in diet increased. Addition of enzyme to the diets contain GKM improved dressing percentage. GKM can be used without enzyme addition at level 2.5% without adverse effect on dressing percentage.

From the nutritional and economical points of view, results indicated that GKM can be used as a feed ingredient at level 2.5% without enzyme supplement. When enzyme was added to the diets level of GKM can be increased up to 5% without any adverse effect.

Keywords: *Guar korma meal, enzyme, performance, digestibility, carcass and economical efficiency.*

INTRODUCTION

Guar Korma Meal (GKM) is a relatively inexpensive high protein meal produced as a by-product of guar gum manufacture. Guar korma meal is the main by-product of guar gum production with a protein content of approximately 380 g/ kg (Nagpal *et al.*, 1971). It is a mixture of germs and hulls at an approximate ratio of 25% germ to 75 % hull (Lee *et al.*, 2004). Guar korma meal contains approximately 35-45% crude protein (Nagpal *et al.*, 1971 and Lee *et al.*, 2004).

Guar korma meal contains 13-18% residual galactomannan gum (Anderson and Warnick, 1964; Nagpal *et al.*, 1971 and Lee *et al.*, 2004). Beta-mannan, also referred to as *β*-galactomannan, is a polysaccharide with repeating units of mannose, with galactose or glucose, or both, often found attached to the *β*-mannan backbone. The solubility of *β*-mannan in water increases as the number of galactose molecules on the mannan backbone increases (Hsiao *et al.*, 2006). The high amino acid content of the guar korma meal makes it a useful protein source for broilers and layers (Mishra *et al.*, 2013). Approximately 88% of the nitrogen content in guar korma meal is true protein that makes it potentially useful as an ingredient for poultry feed (Verma and McNab (1984); Lee *et al.* (2003a, b) and Lee *et al.* (2005). Nadeem *et al.* (2005) reported that amino acids availability ranged from 64 to 93% for guar korma meal residual guar gum. A highly viscous galactomannan polysaccharide, is probably the primary factor responsible for the reported ill effects (Verma and McNab, 1982), although other antinutritional factors such as saponins (Curl *et al.*, 1986) and polyphenols (Kaushal and Bhatia, 1982) have been reported to cause liver, kidney, and intestinal damage in mice and rats (Berman ***et al.,*** 1995 and Diwan ***et al.,*** 2000). Therefore, growth inhibition that follows the addition of guar korma meal in diet may be attributed to the residual gum content of the meal (Lee *et al.*, 2005).

Some of the anti-nutritional agents (trypsin inhibitors, gum residue, saponins) present in guar meal limit its usage at high levels in broiler diets (Anderson and Warnick, 1964). The deleterious effects attributed to the trypsin inhibitors have been an issue of contradiction because it was reported that guar korma meal contained lower levels of trypsin inhibitor than processed SBM (Bochers and Ackerson, 1950 and Conner, 2002). Inclusion of guar korma meal in poultry diets reduces broiler chicken growth by 25-30% (Vohra and Kratzer, 1965). On contrary, Bochers and Ackerson (1950) believed that guar beans contain no trypsin inhibitor. Most researchers believe that gum residue, not trypsin inhibitor, causes the anti-nutritive effects of guar korma meal. Quantitation of trypsin inhibitor activity in guar beans, guar korma meal, soybeans, and soybean meal proved that less trypsin inhibitor occurs in guar korma meal than in heat-treated commercially processed soybean meal (Lee *et al.*, 2004). Anti-nutritional components like guar gum (β-mannan), saponins and trypsin inhibitors limit the use of guar korma meal in broiler diets (Hussain *et al.*, 2012). However, residual gum in guar korma meal increases intestinal viscosity in chickens, which reduces growth and feed efficiency (Lee *et al.*, 2003a).

The negative effects of adding guar korma meal on body weight and feed conversion ratio might be attributed to that guar korma meal contains 5-13% of dry matter triterpenoid guar saponin (Hassan *et al.*, 2007) and 13-18% guar gum, residual galactomannan gum (Lee *et al.*, 2004). So, guar korma meal used in poultry diets was limited by its adverse effects on growth rate (Thakur and Pradhan, 1975a). β-mannan is considered a major anti-nutritional factor when higher levels of guar korma meal are used in poultry diets (Hussain *et al.*, 2012).

Guar korma meal in poultry feed has been limited because of reported adverse effects, which include diarrhea, depressed growth rate, and increased mortality, when fed at relatively high levels (Verma and McNab 1982)**.** Patel and McGinnis (1985) found that 10% seems to be the maximum acceptable rate. An inclusion rate of 2.5% untreated guar korma meal can support growth, feed consumption, feed:gain ratio, and meat yield equivalent to those of a corn-soybean meal diet (Conner, 2002). The antinutritional effects are more pronounced in young birds (Verma and McNab, 1982). The residual gum present in the hull fraction (and to a lesser extent in the germ) is thought to be the main cause of the antinutritional value of guar korma meal. The gum increases intestinal viscosity, preventing the correct mixing of digesta and their contact with digestive secretions. It also causes watery and sticky feces (Lee *et al.*, 2009). The effects on animal performances of other antinutritional factors present in guar korma meal, notably anti-trypsin inhibitors, are less certain (Lee *et al.*, 2004). High levels of GKM in broilers diets deleteriously affect growth performance, FI, FCR and blood lipids, and the optimal level of GKM is low being 25% (as a partial replacement for SBM) without adverse effects on growth performance, carcass traits, blood lipids or economical efficiency of broilers. (Salma *et al.*, 2015).

Supplementing the diet with the β-mannanase enzyme improved the negative effects of the galactomannan content of guar korma meal. β-mannanase hydrolyses the galactomannan complex of guar korma meal. As a result, the guar gum induced viscosity in digesta is reduced, which increases the digestibility of starch (Zangiabadi and Torki, 2010 and Ehsani and Torki, 2010) and improves the metabolizable energy of guar korma meal. In this way, â- mannanase supplementation helps in achieving superior feed conversion and better growth performance in broilers fed guar korma meal (McNaughton *et al.*, 1998 and Daskiran *et al.*, 2004).

Since the germ fraction of guar korma meal contains energy, protein, methionine and phosphorus in higher levels than that in soybean meal (SBM), addition of guar korma meal as a partial replacement (< 10%) of SBM in poultry diets may be a useful economical strategy for decreasing feed costs without any negative effects on production (Kamran *et al.*, 2002). Jackson *et al.* (2004) found that β-mannanase enzyme (Hemicell) improves weight gain and feed conversion in broiler.

The objective of this study is to determine the effect of using guar korma meal (GKM) as a feed ingredient with or without β- mannanase enzyme (Hemicell) supplement on growth performance, nutrients digestibility, some physiological parameters and economical efficiency.

MATERIALS AND METHODS

The experiment was conducted at Poultry Research Station (anshas), Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture, Egypt. Four hundred and five anshas chicks, at one day old, were randomly assigned into nine equal experimental groups (45birds each) with three replicates (15 birds each). Diets were fed from 1 day to 12 weeks. The composition and calculated analysis of the experimental diets are shown in Table (1).

All diets were formulated to be isonitrogenous (about 19% CP) and isocaloric (about 2800ME/ kg diet). A corn-Soybean basal diet that met all the requirements recommended by Agriculture Ministry Decree (1996) was fed to birds of the control group (T_1). Groups T_2, T_3, T_4 and T_5 are diets contain GKM as a feed ingredient without enzyme supplementation, where GKM represents 2.5, 5, 7.5 and 10%, replacement from SBM, respectively. While, groups T_6, T_7, T_8 and T_9 are diets contain GKM the same levels but with Hemicell supplements at level of 0.3g/ kg diet. Hemicell® - HT is β- mannanase enzyme witch extracted from *Bacillus Lentus* and obtained from Hemgen crop. U. S. A. and contain 160 million units/ kg.

Chicks kept under the same management system, diets and water were offered to chicks' *ad-libitum* throughout the experimental period. Live body weight (LBW) and feed intake were recorded weekly, then body weight gain (BWG) and feed conversion were calculated. The chemical composition of dietary treatments, and excreta were done according to the methods of A.O.A.C. (1990). Three males of each treatment were used during the last week of experiment to determine the digestibility of nutrients.

At the end of the experiment, 3 birds of each treatment were randomly slaughtered to determine carcass, liver, gizzard and heart weight, then giblets and dressing percentages were calculated. The economical and the relative economical efficiency (REE) were calculated in relation to local market prices at time of the experiment.

Table (1). Composition and calculated analysis of experimental diets.

Ingredients	Control	Diets contain GKM			
		2.5%	5%	7.5%	10%
Yellow corn	59.84	59.54	59.70	59.55	59.50
Soybean Meal-44%	24.20	21.60	18.50	15.10	12.00
Guar Korma Meal-50%	0.00	2.50	5.00	7.50	10.00
Wheat Bran	8.20	8.60	9.00	10.01	10.63
Corn Gluten 60%	4.00	4.00	4.00	4.00	4.00
Dical. Phos.	1.53	1.53	1.53	1.53	1.53
Lime stone	1.52	1.52	1.52	1.52	1.52
Salt	0.37	0.37	0.37	0.37	0.37
Premix*	0.30	0.30	0.30	0.30	0.30
DL-Methionine	0.04	0.04	0.08	0.12	0.15
Total	100	100	100	100	100
Calculated analysis:					
Crude Protein (CP %)	18.99	19.16	19.17	19.12	19.14
ME kcal/ g	2800	2800	2806	2803	2804
Crude Fiber (CF %)	4.12	4.11	4.08	4.08	4.06
Ether extract (EE %)	3.05	3.12	3.20	3.29	3.38
Calcium %	1.00	0.99	0.98	0.97	0.96
Avail. Phosphorus %	0.45	0.44	0.43	0.43	0.42
Lysine %	0.95	0.87	0.79	0.69	0.60
Methionine %	0.40	0.39	0.41	0.43	0.44
Met + Cys %	0.73	0.70	0.70	0.70	0.69
Sodium %	0.16	0.16	0.16	0.16	0.16

**The vitamin mineral premix added to 1kg of the experimental diets contains: Vitamin A: 10.000IU; Vitamin D3: 2.000IU; Vitamin E: 10mg; Vitamin K: 2mg; Vitamin B1: 1mg; Vitamin B2: Vitamin B6: 1.5mg; Vitamin B12: 10 microgram; Pantothenic: 10mg; Niacin: 30 mg; Folic acid: 1mg; Biotin: 50microgram;Choline chloride: 250 mg; Iron: 30mg; Manganese: 60mg; Copper: 4mg; Iodine: 0.3mg; Cobalt: 0.1mg; Zinc: 50mg and Selenium: 0.1mg.*

Data obtained were statistically analyzed by the SAS program (SAS, 1996) using one-way analysis of variance (included 9 treatments), as in the following model:

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

Were Y_{ij} = individual observation; μ= overall mean; T_i = the effect of treatments, and e_{ij} = the experimental error. Differences between treatments means were separated using Duncan's (1955) new multiple range test at a probability level of 0.05.

RESULTS AND DISCUSSION

Effect of using GKM as feed ingredient with or without Hemicell supplements on growth performance:

Effect of using GKM as feed ingredient with or without Hemicell supplementation on growth performance are shown in Table (2). The initial value of live body weight (LBW) were nearly the same which due to the effect of randomization procedure.

Table (2). Effect of GKM replacement with or without Hemicell supplement on performance of anshas chicks.

Treatments	Initial LBW	Final weight (g)	Feed intake (g)	Body weight gain (g)	Feed conversion
Control	30.00	993.33^{a}	2740.00^{c}	963.33^{a}	2.84^{e}
2.5	29.00	990.33^{a}	2886.67^{abc}	961.33^{a}	3.00^{dce}
5.0	30.00	979.67^{b}	2897.33^{abc}	949.67^{b}	3.05^{dc}
7.5	30.66	945.00^{d}	2881.33^{abc}	914.33^{d}	3.15^{bc}
10.0	29.66	911.67^{f}	2990.00^{ab}	882.00^{f}	3.39^{a}
Enz-2.5	30.33	995.00^{a}	2816.67^{bc}	964.67^{a}	2.92^{de}
Enz -5.0	29.33	993.67^{a}	2860.00^{abc}	964.33^{a}	2.97^{dce}
Enz -7.5	30.00	955.00^{c}	3012.67^{a}	925.00^{c}	3.26^{ab}
Enz-10.0	29.33	928.33^{e}	2977.00^{ab}	899.00^{e}	3.31^{ab}
Mean of SE	±0.59	±3.21	±54.29	±3.30	±0.06
Probability	N.S	<0.0001	0.04	<0.0001	<0.0001

a,b,c,d,e and f = Means in the same column differently superscripted are significantly different (p<0.05).
N.S= non significant.

Increasing the level of guar korma meal without Hemicell supplement overall the period of the experiment significantly decreased LBW and body weight gain (BWG). The lowest value of BWG was 882g with group received 10% GKM. Whereas, there were no differences between treatments contain 2.5% guar and the control (961.33 and 963.33 g, respectively). Diet contain GKM with enzyme increased LBW, the best value was 964.33g with group received 5% GKM.

The negative effect of high levels of guar meal inclusion in chicken diets on chick performance is documented by several researchers and they attributed this effect to guar gum residues in guar meal. These results are in agreement with those of Kamran *el al*. (2002), which recorded that the birds consuming lower level of guar korma meal gained more weight than those consumed higher levels of guar meal. Also, Thakur and Pradhan (1975a); Brahma and Siddiqui (1978); Nagra *et al.*, (1985a); Nagra *et al.*, (1985b); Patel and McGinnis (1985); Nagra and Virk (1986); Khan (1996); Rajput *et al.* (1998) reported that increasing guar meal level in diet decreased BWG.

Feed intake (FI) was significantly increased with increasing GKM with or without Hemicell supplement. This result agreed with Thakur and Pradhan (1975a); Sagar *et al.* (1978); Gharaei *et al.* (2012), Mishra *el al*. (2013) and Mohamed (2014), while, disagree with Verma and McNab (1982); khan (1996) and Kamran *et al.* (2002). The increase in feed intake may be due to that GKM depressed the digestibility of starch and deprive the birds of the available energy (Edward *et al.*, 1988), which increase the feed intake to compensate the depress in digestibility.

The results (table 2) indicate that the higher level of GKM (more than 2.5% without enzyme) depress feed conversion (FC). While, Hemicell addition to the diets that contain GKM improve FC at level 2.5 and 5%. This result is in agreement with Thakur and Pradhan (1975a); Jackson *et al.*, (1999), Kamran *et al.* (2002); Gharaei *et al.* (2012). Mishra *el al*. (2013) who found that GKM had a negative effect on FC. The improvement in FC with enzyme supplementation may be due to that GKM decrease glucose metabolism and retarded insulin secretion rates in swine (Leeds *el al*., 1980).

Also, GKM contains *β*-mannan, saponins and trypsin inhibitors that limits the use of guar meal in broiler diets. These anti-nutritional factors have been reported to depress growth in birds, but at lower levels, some of these *β*-mannan and saponins have positive effects on bird health and performance. *β*-mannan is considered a major anti-nutritional factor when higher levels of guar korma meal are used in poultry (Lee *et al.*, 2003b; Lee *et al.*, 2004; Lee *et al.*, 2005 and Hussain *et al.*, 2012). The high content of galactomanan in guar korma meal increases digesta viscosity and suppress nutrient digestibility which cause growth depression in broiler chicken (Almirall *el al*., 1995). On the other hand, guar korma meal depressed the digestibility of starch and deprives the birds of the available energy (Edward *et al.*, 1988).

Mishra *el al*. (2013) reported that the residual indigestible polysaccharides, such as pectin and *β*-galactomanan, present in the guar korma meal increase the intestinal viscosity and inhibited the performance of broiler. Growth depression of chickens fed with guar korma meal may be overcome by treating the feed with enzymes capable to hydrolyzing it (Gharaei *et al.*, 2012). The improvements in performance with adding enzyme may be due to that β-mannanase liberate more energy by improving the digestibility of starch (Ehsani and Torki 2010).

Digestibility of nutrients

The effect of using GKM as feed ingredient with or without Hemicell supplementation on digestibility traits are distinct in Table (3).

Table (3). Effect of GKM replacement with or without Hemicel supplementation on nutrients digestibility traits.

Treatments	DM	OM	CP	CF	EE	NEF
Control	74.87	80.87^{a}	83.81^{ab}	27.75^{a}	75.56^{a}	80.70
2.5	74.91	80.65^{a}	83.73^{ab}	26.59^{a}	74.93^{a}	80.08
5.0	74.53	79.41^{bcd}	81.68^{cd}	24.53^{b}	72.01^{b}	79.50
7.5	71.73	79.08^{cd}	80.58^{de}	22.50^{c}	71.61^{b}	77.31
10.0	71.31	78.83^{b}	79.23^{e}	20.73^{d}	70.15^{b}	79.77
Enz-2.5	75.99	80.92^{a}	84.29^{a}	27.73^{a}	75.87^{a}	80.09
Enz -5.0	74.39	80.52^{ab}	82.56^{bc}	26.72^{a}	75.28^{a}	79.11
Enz -7.5	72.29	80.40^{ab}	81.95^{cd}	22.28^{cd}	72.09^{b}	79.17
Enz-10.0	72.29	80.11^{abc}	81.09^{cd}	22.22^{cd}	71.88^{b}	78.62
Mean of SE	±3.34	±0.37	±0.50	±0.54	±0.64	±3.73
probability	N.S	0.003	<0.0001	<0.0001	0.05	N.S

a,b,...= Means in the same column with different superscripts, differ significantly (P<0.05).
N.S= non significant.

The results indicate that the increasing level of GKM decreased the digestibility of all nutrients, while, adding *β*-mannanase enzyme to the diets contain GKM improve all nutrients digestibility. Using guar korma meal in diets at level 2.5% did not have any adverse effect on digestibility of all nutrients. The digestibility coefficient of the diets contain high level of GKM (7.5 and 10%) with Hemicell supplements were less than the control group. These results are in accordance with the finding of Zangiabadi and Torki (2010); Ehsani and Torki (2010) and Hussain *et al.* (2012). The improvement in nutrients digestibility with enzyme supplement may be due to that *β*-mannanase hydrolyses the galactomannan complex of guar meal. As a result the guar gum induced viscosity in digesta is reduced, which increases the digestibility of starch (Zangiabadi and Torki, 2010 and Ehsani and Torki, 2010) and improves the metabolizable energy of guar korma meal. In this way, *β*-mannanase supplementation helps in achieving superior feed conversion and better growth performance in broilers fed with guar korma meal (McNaughton *et al.*, 1998 and Daskiran *et al.*, 2004).

Slaughter traits

The effect of experimental diets on slaughter traits are represented in Table (4). Using GKM as a feed ingredient without enzyme supplement significantly decreased the percentage of carcass and heart. While, gizzard and liver was insignificantly decreased. Carcass, liver, gizzard and heart were increased with adding Hemicell. The results indicate that dressing percentage decreased with increasing the level of GKM (without enzyme) in diet, but using GKM at level 2.5% have no adverse effect on dressing. Hemicell supplement to the diet improves the percentage of dressing percent. The higher value of dressing percentage was 79.18 for group received 2.5% GKM with Hemicell supplement. These results are in agreement with Thakur and Pradhan (1975b); Karman *et al.* (2002) and Mishra *el al*. (2013).

Table (4). Effect of GKM replacement with or without Hemicell supplement on slaughter traits (%).

Treatments	Carcass	Liver	Gizzard	Heart	Giblits	Dressing
Control	64.[59a]	7.03	6.17	1.29a	14.48[a]	79.08ab
2.5	63.55[ab]	6.77	6.00	1.30[a]	14.06[ab]	77.61bc
5.0	61.99[cd]	7.16	5.72	1.15[b]	14.04[ab]	76.03d
7.5	61.22[d]	5.92	5.53	1.12[b]	12.56[b]	73.78e
10.0	59.20[e]	5.88	5.57	1.03[b]	12.48[b]	71.68f
Enz-2.5	64.53[a]	7.03	6.31	1.30[a]	14.65[a]	79.18a
Enz -5.0	64.22[a]	7.06	5.61	1.15[b]	13.82[ab]	78.04ab
Enz -7.5	62.66[bc]	6.84	5.84	1.15[b]	13.83[ab]	76.50cd
Enz-10.0	61.90[cd]	6.23	5.18[b]	1.08[b]	12.49[b]	74.39e
Mean of SE	±0.39	±0.37	±0.28	±0.04	±0.04	±0.51
Probability	<0.0001	N.S	N.S	0.001	0.03	<0.0001

a,b,...= Means in the same column with different superscripts, differ significantly (P<0.05). N.S= non significant.

Economical efficiency

The effects of dietary replacement of GKM with or without Hemicell supplement on economical efficiency are shown in Table (5). The results indicate that the chicks fed control diet, diet containing 5 and 2.5 % GKM with Hemicell supplement recorded the highest values of relative economical efficiency (100, 99.93 and 99.45% respectively), while those fed 10% GKM with or without enzyme and 7.5% GKM with enzyme recorded the lowest REE value (91.89, 90.90 and 89.14%, respectively). This finding is in agreement with Salma *et al.* (2015), who reported that the addition of GKM as a partial replacement for SBM as a protein source in poultry diet may be useful economical strategy for decreasing feed cost. The low price of GKM can be useful in increasing the percentage of REE only when GKM is used in 5% with Hemicell supplement, accordingly, Hemicell supplement can overcome the adverse effect of GKM.

Table (5). Effect of using GKM with or without Hemicell supplement on economical efficiency

Treatments	Body Weight Gain(g)	Feed Intake (g)	Total feed coast/ chick (LE)	Body Weight Gain (kg)	Feed Coast/ kg Weight gain	Total Revenue/ Kg weight Gain (LE)[1]	Net revenue / chick (LE)[2]	Economic Efficiency[3]	Relative Economic Efficiency %[4]
Control	963.33	2740.00	6.86	0.96	7.12	24.08	17.22	2.51	100.00
2.5	961.33	2886.67	6.96	0.96	7.24	24.03	17.07	2.45	97.65
5.0	946.66	2897.33	6.86	0.95	7.23	23.74	16.88	2.46	97.99
7.5	914.33	2881.33	6.69	0.91	7.31	22.86	16.17	2.42	96.31
10.0	882.00	2990.00	6.72	0.88	7.62	22.05	15.33	2.28	90.90
Enz-2.5	964.67	2816.67	6.90	0.96	7.15	24.12	17.22	2.50	99.47
Enz -5.0	964.33	2860.00	6.87	0.96	7.13	24.11	17.24	2.51	99.93
Enz -7.5	925.00	3012.60	7.14	0.93	7.72	23.13	15.98	2.24	89.14
Enz-10.0	899.00	2977.00	6.80	0.90	7.56	22.48	15.68	2.31	91.89

Total price for feeds was calculated according to the price of different ingredients available in ARE.

[1]*The price was calculated due to the local market the price of one Kg of enzyme (120 LE) and one ton of Guar korma meal (1900 LE) and price of one Kg live weight was 25 LE.*

2Net revenue= total revenue/ chick- total feed cost.

3Economic efficiency= net revenue/ total feed coast.

[4]*Relative economic efficiency of the control, assuming that the relative E1 of the control (T1) =100*

CONCLUSION

It can be concluded from the previous results that GKM could be applied at 2.5% without enzyme and up to 5% with enzyme supplement (Hemicell) in Egyptian local strain (anshas) diets without adverse effect on growth performance, digestibility of nutrients, dressing percentage and economical efficiency.

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تأثير إحلال مستويات مختلفة من كسب الجوار مع أو بدون إضافة الإنزيمات على أداء الدجاج المحلى (أنشاص)

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تهدف هذه الدراسة إلي تقييم الإحلال الجزئي لكسب الجوار بدلا من كسب فول الصويا في علائق الدجاج المحلى (أنشاص) على الأداء الإنتاجي وكفاءة الهضم وخصائص الذبح والكفاءة الاقتصادية. استخدم فى التجربة عدد 405 كتكوت محلى (أنشاص) عمر يوم وقسمت عشوائيا الى9 مجموعات كل منها فى ثلاث مكررات وبكل مكرر 15 كتكوت . إستمرت التجربة لمدة 3 شهور. غذيت الكتاكيت على علائق تحتوى على كسب الجوار بنسب 0 و 2.5 , 5, 7.5 و 10% كسب جوار مع أو بدون إضافة الإنزيم.

أظهرت النتائج انه يمكن استخدام كسب الجوار بدون تأثيرات سلبية حتى 2.5% أما استخدامه بمستوى أعلى من 2.5% يؤدى إلى نقص الوزن الحى ومعامل التحويل الغذائي وكفاءة الهضم. أدى إضافة الإنزيم إلي العليقة التي تحتوى على 5% كسب جوار إلي تحسن الوزن الحى ومعامل التحويل الغذائي وكفاءة الهضم. ادى زيادة كسب الجوار في العليقة إلي زيادة معدل الغذاء المأكول و لم يكن لإضافة الإنزيمات تأثير على الغذاء المأكول. إضافة الإنزيمات للعلائق التي تحتوي علي نسبة عالية من الجوار (7.5 و 10% جوار) لم يستطيع مساعدة هذه المجموعات في التغلب علي التأثير العكسي للجوار.

زيادة مستوى الجوار في العليقة أدى إلي نقص نسبة التصافي للذبيحة.بينما ادى إضافة الإنزيمات للعلائق التي تحتوى على الجوار إلي تحسن نسبة وزن التصافي للذبيحة . لذلك من وجهة النظر الغذائيه والاقتصاديه يمكن استخدام كسب الجوار كجزء من مكونات العليقة بنسبة 2.5% بدون إضافة الإنزيمات. ويمكن رفع نسبة استخدام الجوار إلى 5% في حالة إضافة الإنزيمات للعليقة .