Egypt. Poult. Sci. Vol. (39) (IV): (851-864) (2019) (1911-1052)

Egyptian Poultry Science Journal

http://www.epsj.journals.ekb.eg/

ISSN: 1110-5623 (Print) – 2090-0570 (Online)

PERFORMANCE AND CARCASS YIELDS OF COBB 500 BROILERS FED DIFFERENT DIETARY PROGRAMS AND BIOACTIVE ADDITIVES

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Received: 05/11/2019 Accepted: 20 /11/2019

ABSTRACT: The experiment was performed to evaluate the impact of feeding different dietary programs having different levels of metabolizable energy (ME) during starter period and those of finisher ones which were less than that of the commercial standard (3150 kcal/kg) by 50, 100 and 150 kcal/kg with or without *Bacillus amyloliquefaciens* and energy enzymes on broilers productive performance and carcass characteristics. A total of 7300 Cobb 500 unsexed one day-old chicks were used. All chicks were fed pre-starter diet contained 23% crude protein (CP) and 2950 kcal ME /kg during the phase of (1-7) days. Afterward, experimental groups consist of 18 feeding programs where each program consists of two phases. During starter phase (8 -17) days, birds fed experimental diets contained constant level of CP (22%) with either of three ME levels (2950, 3000 or 3050 kcal/kg), whereas through the finisher phase (18 – 35 days), birds received diets of constant level of CP (21%) with either of the three graded ME levels being 3100, 3050 or 3000 kcal/kg with or without studied additives for each. Results showed that the best live body weight, body weight gain and feed conversion ratio (FCR) were observed in dietary program included starter diet of 3050 kcal ME/kg and finisher one of 3100 kcal ME/kg with additives inclusion compared with the worst FCR of dietary program included starter diet of 2950 kcal ME/kg and finisher one of 3000 kcal ME/kg without additives. Carcass and abdominal fat weights were significantly improved ($P \leq 0.05$) by either feed programs with additives compared with those un-supplemented. Furthermore, and no significant effects on dressed and carcass cut weight were observed among dietary treatments. It can be concluded that, feeding dietary program included starter diet of 3050 kcal ME/kg with 22% CP and finisher one of 21% CP and 3100 kcal ME/kg (50 kcal/kg less than recommended) with bioactive additives had a beneficial effect on broiler productive performance and carcass yields.

Keywords: Performance, Carcass, Feeding programs, Bioactive additives.

INTRODUCTION

In commercial poultry production, approximately 60 to 70% of cost is factored towards feed (Khan *et al.,* 2016). Within this cost position, the share of cost related to feed energy amounts to about 50 %.Thus, only feed energy covers about one third of the entire cost of broiler production. Therefore, any strategy to reduce energy-related costs without adverse effect on broilers performance and their health may considerably increase the revenue of broiler production. So far, several studies have evaluated the effect of dietary energy on broiler growth performance (Infante-Rodriguez *et al.*, 2016; Abouelezz *et al.*, 2019). It is known that, aside from representing a potential energy source, the presence of dietary NSP may lead to higher intestinal viscosity, lower nutrient digestibility, impaired feed conversion ratio and consequently reduced bird growth performance (Lázaro *et al.*, 2003; Meng *et al.*, 2005).

To maintain the gut health and promote the performance of growing birds, several bioactive additives were supplied to diets. An extensive variety of direct fed microbial is utilized as probiotics, including *Bacillus, Lactobacillus, Streptococcus and Enterococcus* spp. as well as yeasts (Zhang and Kim, 2014). It is hypothesized that the addition of *B. subtilis* to broiler diets with reduced energy levels will help improve broiler performance (Harrington *et al.*, 2015). Along the same line, many studies were conducted to use exogenous enzymes which aim to improve the digestibility of nutrient. Zhou *et al.* (2009) recorded that enzyme supplementation in broiler diets improved the efficiency of energy utilization, especially in lower ME diets.

Therefore, the present study was aimed to evaluate the impact of feeding different dietary programs having different levels of ME during starter period and those of finisher ones which were less than that of the commercial standard (3150 kcal/kg) by 50, 100 and 150 kcal/kg with or without mixture of *Bacillus amyloliquefaciens* and energy enzymes on broilers productive performance and carcass yield.

MATERIALS AND METHODS:

Experimental design, diets and environmental conditions:

A total of 7300 Cobb500 unsexed one day-old chicks were obtained from commercial hatchery of Dakahlia Poultry Company for poultry production. All chicks were fed pre-starter diet with 23% CP and 2950 kcal ME /kg from (1-7) days of age. Then, chicks were weighed and randomly distributed into 3 equal experimental groups with similar average body weight and fed starter diets contained constant level of crude protein (22% CP) and either of three ME levels which were 2950, 3000 and 3050 kcal ME/kg from 8 to 17 day of age. At age of 18 days, birds turned to finisher phase (18-35 d) and fed formulated diets of constant level of crude protein (21%) with lower energy levels than that of the commercial standard (3150 kcal/kg) by 50, 100 and 150 kcal ME/kg with or without studied bioactive additives. Then, 7200 chicks were distributed into 72 floor pens (18 treatments and 4 replicates for each treatment with 100 chicks per replicate). In that, birds fed diets of 2950, 3000 or 3050 kcal ME /kg at starter phase were randomly distributed into 18 experimental groups (six groups for either previous ME levels). Each six groups received either the three levels of ME (3100, 3050 or 3000 kcal/kg) with or without feed additives. The studied feed additives used in the experiment composed of *Bacillus amyloliquefaciens*$3*10^8$ cfu/gram feed by rate of 0.5 kg / ton as a probiotic and mixture of enzymes included a combination of Xylanase, Amylase and Protease by rate of 0.1 kg / ton. The pre-starter, starter and finisher experimental diets were based on corn- soybean and were formulated to be approximately isocaloric and iso-nitrogenous. Ingredients and calculated analysis of the studied diets used in the experiment are shown in Table (1).

The assembly of each pen included a bell drinker and tube feeder as well as provided with appropriate heat, light and ventilation. Birds were vaccinated at age of 7, 18 and 28 days against Newcastle disease. Also, at age of 7 days, birds were vaccinated against infectious of bronchitis and at age of 12 days against infectious of bursal disease (Gumboro). Feed and water were offered *ad-libitum* over the experimental growth periods.

Data collection:

Birds were weighed and their feed intakes (FI) were determined at ages of 8, 18 and 35 days. Also, body weight gain (BWG) and feed conversion ratio (FCR) were calculated. Livability was daily monitored by recording and collecting the number of dead birds. Production efficiency factor (PEF) was calculated at the end of experimental period. The following equation was applied to obtain the production efficiency factor (Lemme *et al*., 2006):

PEF= (final bird weight, kg × livability %) / (age days × feed conversion ratio) × 100

At the end of the experiment (35 days old), 10 birds from each treatment (total of 180 birds) were randomly chosen. Assigned birds were fasted over-night. Broilers were hanged by their feet in steel shackles by hands then; they were slaughtered by cutting the jugular veins of the neck according to the Islamic religion instructions with a sharp knife. After complete bleeding, scalded, de-feathered, and manually eviscerated. Carcass was opened down and all entrails were removed and the empty carcass was separately weighed. Cut up parts weights of carcass in term of front half, breast cap, upper back, saddle, drums, chop as well as abdominal fat and yield wings were weighed. Intestine and ceca lengths (cm) were measured.

Statistical Analysis

Analysis of variance of obtained data was computed using General Linear Model (GLM) procedure SAS 9.0 (2004). Significant differences among means were evaluated using Duncan multiple range test (Duncan, 1955) when significant P-values were obtained from ANOVA. Treatment effects were considered at $P \leq 0.05$.

The statistical model used was as follows:

$Y_{ijkl} = \mu + S_i + F_j + A_k + (SF)_{ij} + (SA)_{ik} + (FA)_{jk} + (SFA)_{ijk} + e_{ijkl}$

Where:

Y_{ijkl}= Observed value of the dependent variable,

μ = Overall mean

S_i= the effect of starter diet

F_j= the effect of finisher diet

A_k= the effect of additives

SF_{ij}= Interaction between starter diet and finisher diet

SA_{ik}= Interaction between starter diet and additives

FA_{jk}= Interaction between finisher diet and additives

SFA_{ijk}= Interaction between starter diet and finisher diet and additives

e_{ijkl}= The residual **(**experimental random error)

RESULTS

Broilers performance:

Data of broilers productive performance traits as affected by different dietary programs are shown in Table (2). There are highly significant variations (P≤0.001) among dietary treatments containing programs in live body weight and body weight gain of the whole experimental period (8-35) days of age. Supplementing finisher diets of different dietary programs with studied additives recorded higher live body weight and body weight gain compared with those of un-supplemented (Table 2). Meanwhile, the best live body weight and weight gain (1930 and 1743g) were recorded by broilers fed dietary program contained starter diet of 3050 kcal ME/kg and finisher one of 50 kcal ME /kg less with studied additives. While, the lowest scores (1760 and 1573g) were obtained by birds received dietary program included starter diet of 2950 kcal ME/kg and finisher one of 3000 kcal ME/kg of but without additives. However, finisher experimental diets of 50 kcal ME /kg less with additives achieved higher significantly improvement (P≤0.001) than those of 100 or 150 kcal ME /kg less without additives, respectively as shown in Table (2).

As shown in Table (2), it is obvious that the amount of feed intake and feed conversion ratio were highly significantly affected (P≤0.001) by different studied dietary programs. Regarding the additives inclusion, it is shown that feeding finisher diets supplemented with studied additives tend to decrease feed intake and improve feed conversion ratio compared to those received un-supplemented ones. However, the lowest amount of feed consumed (2670g) and the best feed conversion ratio (1.53) obtained by the feeding program included starter diet of 3050 kcal ME/kg and finisher one of 3100 kcal/kg with additives supplementation. The opposite was true with dietary program included starter diet of 2950 kcal ME/kg and un-supplemented finisher one of 3000 kcal ME/kg. So, finisher experimental diets of 50 kcal ME /kg less with additives achieved significantly higher an improvement in this regard (P≤0.001) than those received 100 or 150 kcal ME /kg reduction but without additives. Similar to the above-mentioned results, the lowest mortality percentage among dietary treatments was recorded by birds received dietary programs supplemented with studied additives compared with those un-supplemented.

With regard to the production efficiency factor, it is clearly shown that there is a tendency to increase values of PEF as incorporating mixture of tested additives into finisher experimental diets. However, the best value of the PEF (351.1%) among dietary treatments was recorded by chicks fed dietary program included starter diet of 3050 kcal ME/kg and finisher one of 50 kcal ME /kg less with additives, whereas the lowest score (250.9%) was found in feeding program contained starter diet of 2950 kcal ME/kg and un-supplemented finisher one of 150 kcal ME /kg reduction.

Carcass yield

Carcass yield as affected by different studied dietary programs with or without bioactive additives are shown in Table (3). Regarding to the studied additives, there are significant variations ($P \leq 0.05$) in carcass weights among dietary treatments, where supplementing finisher diets of different dietary programs with studied additives achieved higher carcass weight than those un-supplemented. Meanwhile, the best carcass weight (1357.5g) among dietary treatments was obtained by broilers fed dietary program contained starter diet of 3050 kcal ME/kg and finisher one of 3100 kcal ME /kg (50 kcal/kg reduction) supplemented with bioactive additives, whereas the lowest weight (1227.5g) was obtained by program contained 2950 kcal ME/kg (starter diet) and un-supplemented finisher diet of 3000 kcal ME /kg (150 kcal/kg reduction). So, it is worth to note that dietary treatments of 50 kcal ME /kg reduction with additives during finisher phase achieved higher carcass weight than those had 100 and 150 kcal ME /kg reduction with or without additives over all the studied feeding programs.

Inspection in Table (3), there is no significant effect ($P>0.05$) on carcass cut up parts including dressed, front half, breast cap and saddle weights among dietary treatments, exception was detected with drums weights which had significant differences in this respect. However, dietary program included starter diet of 3050 kcal ME/kg and finisher one of 50 kcal ME/kg less than recommended with studied additives gave the best weight of either front half, breast cap or saddle. The opposite was true with drums weight as feeding dietary program included starter diet of 2950 kcal ME/kg and finisher one of 50 kcal ME /kg less with additives had the heaviest weight (194g) which was statistically equal with that of the above-mentioned program.

Data presented in Table (3) show that there is non-significant effect on wings weights and length of intestine as feeding different dietary programs, whereas the opposite was true with abdominal fat weights and ceca lengths which had significant differences in this respect. In that, feeding programs without additives recorded heavier abdominal fat weight than those supplemented with additives but without significance, except that of program contained starter diet of 3000 kcal ME/kg and finisher one of 50 kcal ME /kg reduction. With regard to ceca length, it is clear that supplementing either finisher diets with studied additives recorded longer ceca length than those un-supplemented. The longest length of ceca (21 cm) was observed in broilers fed dietary program contained starter diet of 3050 kcal ME/kg and finisher one of 100 kcal ME/kg reduction with studied additives. While, the shortest length (16 cm) was seen in birds received dietary programs included starter diets of 3050 and 2950 kcal ME/kg and finisher ones of 50 and 150 kcal ME/kg reduction without additives, respectively.

DISCUSSION

Results of the present experiment supported the hypothesis that feeding low energy diets with mixture of bioactive additives can improve the productive performance and carcass characteristics of broilers as evidenced by the best scores of body weight, body weight gain, feed conversion ratio and carcass with its drums and breast weights. It may be due to the function of these additives on finisher diets with lower ME in the studied dietary programs which can be considered as modulators of the gut environment as they increase the population of beneficial micro-organisms, inhibit the proliferation of pathogens in the intestine and improve histological structure of either duodenum or jejunum that reduced energy consumption (Harimurti *et al.,* 2013; Fallah *et al.,* 2013). In according with these results, Kehlet and Sims (2015) demonstrated that diets with 2% lower energy and supplemented with *Bacillus Subtilis* have final live weights equal to those of non-supplemented diets with 2% higher energy. Also, Saleh *et al.* (2019) indicated that feeding low-energy diet significantly decreased body weight compared to that of the control group, whereas diet supplemented with enzymes increased body weight which may be due to the function of enzymes mixture that had a positive effect on the energy utilization (Cowieson and Ravindran, 2008). Different results were reported by Flores *et al.* (2016) who found that the inclusion of xylanase did not have significant impact on body weight or body weight gain throughout the experiment compared to the control group. Also, Jerzsele *et al.* (2012) recorded that dietary *B. amyloliquefaciens* did not affect the growth of broilers.

A tendency to decrease feed consumption as supplementing experimental finisher diets with the tested additives was observed. In accordence with the above mentioned result, Amerah *et al*. (2013) found that dietary supplementation with *B. subtilis* in broilers diets could reduce the amount of feed intake. Such decrement might be due to action mode of bioactive additives inclusion which having a potential energy-sparing effect of ME containing diets as reported by Harrington *et al.* (2015). Along the same line, Lee *et al.* (2014) and Hmani *et al.* (2017) reported that feed intake was statistically decreased with using *B. subtilis* in chicks diet compared with those un-supplemented. Also, Selim *et al.* (2018) showed that enzymes supplementation (xylanase or Pectase or both of them) to broiler diets resulted in significant decrease in the amount of feed intake.

Data of the mortality percentage accord with the finding of Harrington *et al.* (2016) who reported that the percentage of mortality was impaired by decreasing ME level containing diets. It might be due to that the energy density reduction containing diet could alleviate the inflammation in jejunum villi (Kim *et al.,* 2017) and consequently increase mortality rate.

Result of increasing carcass weight as incorporating tested feed additives into experimental diets is in agreement with findings of Hetland *et al.* (2004) who indicated that supplememtal diets with bioactive feed additives resulted in improving carcass weight. Also, results of Govil *et al.* (2017) revealed that significant higher carcass yield was obtained from broilers fed low energy diet supplemented with multi-carbohydrases. Also, non-significant differences were detected with front half, dressed, breast, saddle and wings weight among studied feeding programs. In agreement with these results, Pelicano *et al.* (2003) showed that wings and breast yields of birds fed diet of probiotic remained similar to group received un-supplemented diet. Also, Racevičiūtė-Stupelienė *et al.*

(2007) found similar breast meat yield in birds fed diets with or without probiotic. Also, Molnár *et al.* (2011) indicated that there was no effect of *B. subtilis* supplementation on breast and thigh yields. In accordence with the obtained results by Selim *et al.* (2018) who clearly showed that reducing ME values from normal to negative control (NC), 150 level caused significant reductions in carcass edible parts percentage of broiler meat. On the other hand, abdominal fat percentage had followed a tendency to decrease as supplementing either finisher diets with studied additives but without significance. This result is in agreement with finding of Aksu *et al.* (2005) and Karaoglu and Durdag (2005) where no difference in abdominal fat was reported as supplementing diets with dietary probiotic.

IN CONCLUSION,

dietary program included starter diet of 3050 kcal ME/kg and finisher one of 50 kcal ME/kg less than recommended with adding bioactive additives (*Bacillus amyloliquefaciens* and energy enzymes) had positive effects on the productive performance and carcass yield of broilers. The combined *Bacillus* spp. and energy enzymes should be supplemented for commercial broilers finisher feeds. Also, suggested that further research should be performed to evaluate the studied bioactive additives when added to the dietary containing different ME levels.

Table (1): ingredients and calculated analysis of experimental diets used in the experiment

Ingredients, %	Pre-starter diet	Starter diet			Finisher diet		
Yellow corn	53.49	56.9	55.63	54.38	60.24	59.00	57.70
Soy bean meal,47%	39.81	36.84	37.05	37.30	34.62	34.82	35.10
Vegetable oil	2.19	1.57	2.60	3.64	1.57	2.61	3.63
Limestone	1.67	1.68	1.68	1.67	1.39	1.39	1.39
Mono calcium phosphate	1.55	1.56	1.57	1.57	1.07	1.08	1.08
Vit. & minerals premix[1]	0.30	0.30	0.30	0.30	0.30	0.30	0.30
DL-Methionine	0.24	0.27	0.27	0.27	0.16	0.15	0.15
L – lysine HCL	0.05	0.15	0.15	0.14	-	-	-
L – Threonine	0.00	0.02	0.04	0.02	-	-	-
Sodium chloride (salt)	0.32	0.33	0.33	0.33	0.33	0.33	0.33
Sodium bicarbonate	0.12	0.12	0.12	0.12	0.11	0.11	0.11
Choline chloride	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Coccidiostat[2]	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Anti-mycotoxin[3]	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Anti-clostridium[4]	0.05	0.05	0.05	0.05	-	-	-
Phytase enzyme[5]	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Calculated analysis							
Crude protein, (%)	23	22.000	22.000	22.000	21.000	21.000	21.000
Metabolizable energy, (kcal/kg)	2950	2950	3000	3050	3000	3050	3100
Crude fiber, (%)	2.50	2.48	2.46	2.44	2.49	2.47	2.44
Crude fat, (%)	4.70	4.17	5.15	6.15	4.27	5.27	6.25
Lysine, (%)	1.32	1.32	1.32	1.32	1.08	1.08	1.08
Methionine, (%)	o.50	0.50	0.50	0.50	0.44	0.44	0.44
Methionine + Cystine	0.98	0.98	0.98	0.98	0.76	0.76	0.76
Calcium, (%)	1.00	1.00	1.00	1.00	0.76	0.76	0.76
Available Phosphorus, (%)	0.50	0.50	0.50	0.50	0.38	0.38	0.38
Chloride, (%)	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Sodium, (%)	0.18	0.18	0.18	0.18	0.18	0.18	0.18

[1]Each 3 kg of vitamins and minerals premix contain: Vit. A; 12000000 IU, Vit. E: 10000 mg, Vit. B1: 1000 mg, Vit. B2: 5000 mg, Vit.B6: 1500 mg, Vit, B12: 10 mg, Niacin: 30000 mg, Pantothenic acid: 15000 mg, Vit. K: 2000 mg, Vit. D3; 2200000 IU, Biotin: 50mg, Folic acid: 1000mg, Copper: 4000 mg, Iodine: 2000 mg, Iron: 30000 mg, Manganese: 60000 mg, Zinc: 50000 mg, selenium: 400 mg and cobalt: 100 mg, 2Salinomycin sodium premix, Sacox (Intervet Inc., Millsboro, DE).[3]T5X® Select, feed additives that protect broiler health by deactivation of mycotoxins (multi-vita co.).[4] cap acid®, short chain fatty acid premix (multi-vita co.).

[5]Axtra® PHY 10000 TPT, 6-phytase 10000 FTU/ kg of diet (multi-vita co.).

Table (2): Productive performance and production efficiency factor of broilers fed different dietary programs during experimental growth period (8-35) days

parameters	2950 kcal/kg, 23% CP (Pre-starter diet)																		SEM	P-value
	2950 kcal/kg, 22% CP*						3000 kcal/kg, 22% CP*						3050 kcal/kg, 22% CP*							
	3000 kcal/kg, 21% CP**		3050 kcal/kg, 21% CP**		3100 kcal/kg, 21% CP**		3000 kcal/kg, 21% CP**		3050 kcal/kg, 21% CP**		3100 kcal/kg, 21% CP**		3000 kcal/kg, 21% CP**		3050 kcal/kg, 21% CP**		3100 kcal/kg, 21% CP**			
	Non.	Add.	Non.	Add.	Non.	Add.	Non.	Add.	Non.	Add.	Non.	Add.	Non.	Add.	Non.	Add.	Non.	Add.		
Body weight, g	1760^{l}	1800^{j}	1780^{k}	1850^{f}	1820^{i}	1880^{d}	1800^{j}	1820^{i}	1800^{j}	1860^{e}	1830^{h}	1900^{b}	1840^{g}	1900^{b}	1840^{g}	1900^{b}	1890^{c}	1930^{a}	6.20	0.0001
Body weight gain, g	1573^{l}	1613^{j}	1593^{k}	1663^{f}	1633^{i}	1693^{d}	1613^{j}	1633^{i}	1613^{j}	1673^{e}	1643^{h}	1713^{b}	1653^{g}	1713^{b}	1653^{g}	1713^{b}	1703^{c}	1743^{a}	7.5	0.0001
Feed intake, g	3020^{a}	2880^{d}	2960^{b}	2760^{j}	2870^{e}	2770^{i}	2930^{c}	2740^{k}	2810^{g}	2690^{m}	2790^{h}	2690^{m}	2870^{e}	2740^{k}	2830^{f}	2720^{l}	2770^{i}	2670^{n}	13.18	0.0001
Feed conversion ratio	1.92^{a}	1.79^{d}	1.86^{b}	1.66^{j}	1.76^{e}	1.64^{k}	1.82^{c}	1.68^{i}	1.74^{f}	1.61^{l}	1.70^{h}	1.57^{n}	1.74^{f}	1.60^{m}	1.71^{g}	1.59^{m}	1.63^{k}	1.53^{n}	0.01	0.0001
Mortality rate, %	4.21^{c}	3.12^{h}	2.82^{i}	1.93^{k}	2.62^{j}	2.62^{j}	4.32^{b}	3.32^{g}	4.52^{a}	4.08^{d}	4.08^{d}	2.87^{i}	4.30^{b}	3.79^{e}	4.60^{a}	2.57^{j}	3.55^{f}	2.57^{j}	0.11	0.0001
Production efficiency factor (PEF)	250.9^{q}	278.3^{n}	265.7^{p}	312.3^{g}	287.7^{l}	318.9^{e}	270.4^{o}	299.2^{h}	282.2^{m}	316.6^{f}	295.0^{i}	335.8^{b}	289.1^{k}	326.4^{d}	293.3^{j}	332.6^{c}	319.5^{e}	351.1^{a}	3.39	0.0001

Different letters in the same row indicate significant differences (P<0.05).
SEM: standard error mean
Non: diet without additives, Add: diet with additives, *starter diets, **finisher diets

Table (3): Carcass yield and its cut up parts of broilers fed different dietary programs at age of 35 days

parameters	2950 kcal/kg, 23% CP (Pre-starter diet)																		SEM	P-value
	2950 kcal/kg, 22% CP*						3000 kcal/kg, 22% CP*						3050 kcal/kg, 22% CP*							
	3000 kcal/kg, 21% CP**		3050 kcal/kg, 21% CP**		3100 kcal/kg, 21% CP**		3000 kcal/kg, 21% CP**		3050 kcal/kg, 21% CP**		3100 kcal/kg, 21% CP**		3000 kcal/kg, 21% CP**		3050 kcal/kg, 21% CP**		3100 kcal/kg, 21% CP**			
	Non.	**Add.**	**Non.**	**Add.**	**Non.**	**Add.**	**Non.**	**Add.**	**Non.**	**Add.**	**Non.**	**Add.**	**Non.**	**Add.**	**Non.**	**Add.**	**Non.**	**Add.**		
Carcass weight, g	1227.50^{k}	1268.75^{ij}	1239.75^{k}	1302.50^{de}	1278.00^{ghi}	1283.00^{fghi}	1258.50^{j}	1281.75^{fghi}	1257.50^{j}	1296.25^{ef}	1290.00^{efg}	1337.75^{b}	1275.50^{hij}	1323.00^{bc}	1287.50^{efgh}	1317.50^{cd}	1318.50^{cd}	1357.50^{a}	6.02	0.04
Dressed weight, g	1330.03	1375.02	1345.32	1410.44	1364.09	1415.08	1363.32	1380.47	1364.58	1408.02	1390.98	1445.33	1382.76	1435.07	1387.18	1435.83	1426.95	1477.80	0.91	0.21
Front half, g	568.00	590.50	581.00	614.25	586.25	599.50	575.25	597.75	590.75	613.75	612.75	624.00	592.25	624.25	600.50	626.25	628.50	632.50	4.71	0.94
Breast cap, g	415.50	444.25	432.50	461.25	431.75	467.75	419.00	454.25	448.00	467.50	443.25	470.75	442.25	466.00	418.00	424.50	438.50	472.00	4.00	0.93
Saddle, g	511.25	529.00	511.50	535.50	528.50	544.25	533.25	534.75	515.50	532.25	524.50	549.00	539.00	537.75	533.25	534.75	533.25	556.50	6.21	0.93
Drums, g	168.75^{hi}	186.75^{bc}	166.25^{ij}	171.50^{gh}	168.75^{hi}	194.00^{a}	168.50^{hi}	177.00^{ef}	141.50^{k}	179.25^{de}	163.50^{j}	183.00^{cd}	174.50^{fg}	181.25^{d}	165.50^{ij}	183.25^{cd}	179.75^{de}	190.25^{ab}	1.99	0.01
Wings, g	131.50	142.00	136.50	142.75	134.25	139.75	138.75	140.75	135.00	140.75	138.75	152.00	136.00	145.75	137.75	143.75	142.25	156.75	1.12	0.96
Abdominal Fat, g	15.50^{c}	15.00^{c}	16.50^{bc}	16.75^{bc}	17.75^{bc}	17.25^{bc}	15.00^{c}	15.00^{c}	17.25^{bc}	16.00^{bc}	23.25^{a}	18.50^{b}	16.75^{bc}	15.75^{c}	17.00^{bc}	15.50^{c}	23.25^{a}	21.75^{a}	1.61	0.04
Intestine Length, cm	162.40	163.20	165.00	175.40	161.60	178.00	167.00	167.60	165.80	171.20	160.60	168.40	172.80	188.20	153.80	162.60	162.80	184.00	1.62	0.06
Ceca Length Cm	16.00^{f}	17.20^{de}	16.60^{e}	17.20^{e}	17.80^{de}	18.80^{cd}	17.80^{de}	18.30^{cd}	17.80^{de}	18.80^{cd}	17.00^{e}	18.40^{cd}	19.00^{bc}	20.00^{ab}	16.60^{e}	21.00^{a}	16.00^{f}	18.50^{cd}	0.22	0.01

Different letters in the same row indicate significant differences (P<0.05), SEM = standard error mean, .Non: diet without additives, Add: diet with additives, *starter diets, **finisher diets

Performance, Carcass, Feeding programs, Bioactive additives.

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الملخص العربي

الأداء ومحصول الذبيحه لكتاكيت التسمين (كب 500) المغذاه علي برامج غذائية وإضافات حيويه مختلفه

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أجريت التجربه بإحدى المزارع الأهلية بمنطقة الأندلس بمحافظة البحيرة خلال الفترة من شهر ابريل إلى شهر مايو 2018 لتقييم استجابة كتاكيت التسمين المغذاه علي برامج غذائية مختلفة تتضمن ثلاثة مستويات من الطاقة الميتابوليزمية خلال فترة البادئ ولكل مستوى من المستويات السابقة تم استخدام ثلاثة تراكيب علفية ذات طاقة ميتابوليزمية أقل بمقدار 50 ، 100 ، 150 كيلو كالورى/ كيلو جرام من العلف القياسى المستخدم تجارياً (3150 كيلو كالورى/ كيلو جرام) مع أو بدون خليط من الانزيمات والبروبيوتك كإضافة غذائية وتأثير ذلك على الأداء الإنتاجى لكتاكيت اللحم وصفات الذبيحة.

تم استخدام عدد 7200 كتكوت غير مجنس عمر يوم من سلالة (الكب 500) وتم تغذيتها علي علف قبل البادئ لمدة اسبوع يحتوي علي 23% بروتين خام و2950 كيلو كالوري/كجم طاقه ميتابوليزمية بعد ذلك وزعت الكتاكيت عند عمر 8 أيام عشوائياً إلى ثلاثة مجموعات متماثله لمرحلة البادئ مع التغذية المتضمنة علي مستوى ثابت من البروتين (22%) مع مستويات مختلفه من الطاقه الميتابوليزمية (3050، 3000، 2950 كيلو كالورى/ كيلو جرام) وتم توزيع كل مجموعة عشوائياً عند عمر 18 يوم إلى تحت ثلاثة مجموعات تجريبية لمرحلة الناهي تحتوي علي مستوي ثابت من البروتين (21%) وثلاثة مستويات من الطاقة الميتابوليزمية (3100، 3050، 3000 كيلو كالوري/كجم) وهى أقل من المستوى القياسى 3150 كيلو كالوري/كجم بمعدل (50، 100، 150 كيلو كالورى / كجم)، قسمت كل تحت مجموعه إلى مجموعتين أضيف لأحدهما خليط من الاضافات الغذائية والأخرى بدون ليتشكل بذلك 18برنامج غذائي.

أظهرت النتائج المتحصل عليها أن أعلى وزن جسم حي وأعلي زياده مكتسبة وكذلك أيضاً أفضل معامل تحويل غذائي وأقل كمية علف مستهلكه كان في البرنامج الغذائي الذي احتوي علي العلف البادئ بمستوي طاقة 3050 كيلو كالوري/كجم وعلف ناهى بمستوى 3100 كيلو كالوري/كجم مع الإضافة وعكس هذه النتائج تم الحصول عليها في البرنامج الغذائي المحتوي علي 2950 كيلو كالوري/كجم في مرحلة البادئ و3000 كيلو كالوري/كجم في مرحلة الناهي بدون إضافة، كما أظهرت النتائج أن البرامج الغذائيه المحتوية علي الإضافة موضوع الدراسة أدت إلى تحسن معنوى في وزن الذبيحة بينما لم يكن هناك تأثير معنوي للمعاملات علي قطعيات الذبيحة المختلفة.

يستنتج من هذه الدراسة أن أفضل استجابة للبرامج الغذائية المدروسه تضمنت علف بادئ يحتوى 3050 وعلف ناهى يحتوى 3100 كيلو كالورى طاقة ممثلة / كيلو جرام مع وجود مخلوط من الباسيلس والانزيمات كاضافات ساهمت في زيادة الاستفاده من طاقة البرامج العلفيه والغذائيه.