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EFFECT OF YEAST CULTURE ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF DAMASCUS KIDS

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ABSTRACT

Twenty eight Damascus kids weighed 16.5 ±0.219 kg on average were used in feeding trial for 135 days. Animals were divided into four similar groups (7 head each) to study the effect of feeding supplemented rations with yeast culture to growing kids on its performance and carcass characteristics. Four experimental animal groups received four experimental rations as follows:

Treatment-1 (T_1): 2% of LBW concentrate feed mixture + 0.5 % of LBW berseem hay along wheat straw *ad-lib*. (control ration)

Treatment-2 (T_2): control ration + 5gm Moreyeast (Y) /head/day

Treatment-3 (T_3): control ration + 1gm yeast with selenium (YS)/head/day

Treatment-4 (T_4): control ration + 2.5gm (Y) + 0.5 gm (YS)/head/day

The results obtained can be summarized as follow:

1- Using yeast culture as feed additive was not affected on different nutrient contents in experimental rations, however total DM intake was increased with supplemented rations with yeast than that in control one.

2- Animals fed tested rations (containing yeast culture) appeared to higher in total and daily gains especially with (T_3) which get the best daily gain by about 33.67% as compared to control group.

3- Animals fed (T_3) containing 1gm YS/head/day recorded the most economical efficiency 3.27 and 2.19 according to year 2009 and 2011, respectively. This group had the lowest feed cost to get one kg gain, being 7.65 and 13.68 LE for the respective time compared with the other groups.

4- Animals fed T_3 and T_4 tended to be higher in serum glucose level compared with animals fed T_2 and T_1 (control group).

5- Using YS (T_3) lead to be increase in dressing percentage and then edible offals such as heart, spleen, defatted kidney and tests. Moreover, increase in meat percentage was recorded than other treatment and control.

Generally, using yeast culture as feed additives in feeding of growing kids tended to be higher in total and daily gains with lower feed cost to get one kg gain.

Moreover, yeast plus selenium supplementation to rations of growing kids tended to higher in both hot carcass and dressing percentage.

Keywords: Damascus kids, growth, yeast culture, carcass

INTRODUCTION

The use of *Saccharomyces cerevisiae* as a growth promoter for ruminants was first reported in 1925 (Eckles and Williams, 1925). The mechanism in which yeast culture act to enhance animals productivity was unclear until recently. During the past ten years, specific yeast strains of *Saccharomyces cerevisiae* were found to be active in the rumen (Dawson *et*

al.,1990). Strains of yeast differed in their ability to increase the number of viable ruminal bacteria *in vitr*o and *in vivo*. Yeast culture is able to stimulate specific bacterial populations in the rumen leading to increased fiber digestion and lactate utilization (Girard *et al.*, 1993). Robinson (1997) suggest that yeast culture does not improve NDF digestibility in low quality roughages, but it does in alfalfa hay. Gado *et al.* (1998) found that supplementation of yeast culture (*Saccharomyces cerevisiae*) in Egyptian Baladi male goats improved average daily gain. Salem *et al.* (2000) showed that average daily gain was improved by yeast culture supplementation when fed growing crossbreed lambs with 3 gm / head /day yeast culture for three months. On the other hand, Drennon and Moloney (1993) and Kamalamma *et al.* (1996) observed that the body weight was not affected significantly by the yeast culture supplemented in the diet. According to Crosby (1995), there is a quadratic ($p < 0.001$) effect of yeast culture dosage on protozoa population showing a greater population by using 3 g/day of yeast culture in sheep fed on corn-stover diet. While, Angeles *et al.* (1998) found that ruminal protozoa population was not affected by *Saccharamyces cerevisiae.* Mir and Mir (1993) fed steers on level 10 g yeast culture (SC) /head/day with three diets consisted of 75 % alfalfa silage and 25 % barley, 96 % corn silage and 4 % soybean meal or 75 % rolled barley and 25 % alfalfa hay. They showed that yeast culture supplementation did not alter carcass characteristics, however, carcasses of steers fed yeast were heavier than that fed control ration. Lion area and dressing percentage of steers fed yeast were consistently better than those fed control ration, but the effect was not significant. Salem *et al.* (2000) found that yeast culture additive with 3 g /head/day to lambs ration for 90 days was improve carcass weight and slaughter weight.

Recently, yeast culture as feed additives are widely used to increase growth rate, improve animal performance and productivity. The usefulness of such supplements have been depends on the specific nutrient requirements of the animal, the nature of the feed material, management practices, the health and physiological status of the animal, and the economic returns associated with the use of the supplement. In order to obtain the full benefits of a particular feed supplement, it is necessary to have a basic understanding of the mechanisms which account for its ability to improve animal production.

The present study was conducted to examine the effect of addition yeast (*sacchararomyces cerevisiae*) without or with selenium to the kids diet on growth performance, carcasses characteristics and some blood parameters under Egyptian conditions.

MATERIALS AND METHODS

This study was carried out at Sakha Experimental Station (Kafer El-Sheikh Governorate) belonging to Animal production Research Institute, Ministry of Agriculture.

Twenty eight Damascus kids were selected with average age of 3 - 4 months old and 16.5 ±0.219 kg weight. The animals were divided into four similar groups (7 animals each) to study the effects of yeast culture

supplemented rations on kids performance and carcass characteristics. All animals were fed 2 % of LBW concentrate feed mixture, 0.5 % of LBW berseem hay and wheat straw *ad lib*.

Four experimental animals groups were fed four different experimental rations as follow:

Ration-1 (T1): 2% of LBW concentrate feed mixture + 0.5% of LBW Berseem hay + wheat straw as *ad lib.* (control ration).

Ration-2 (T2): control ration + 5 gm Moreyeast (Y) /head /day.

Ration-3 (T3): control ration + 1 gm yeast selenium (YS) /head/day.

Ration-4 (T4): control ration + 2.5 gm Moreyeast + 0.5 gm yeast-selenium/head /day.

Ingredients of concentrate feed mixture were shown in Table (1).

Table (1): Ingredient of concentrate feed mixture and calculated nutritive value used in feeding trial.

Ingredients	%	Calculated feeding value*	
		TDN%	DCP%
Yellow corn	35	28.00	2.06
Undecorticated cotton seed meal	25	15.00	7.65
Wheat bran	15	9.45	0.97
Rice bran	12	7.80	1.08
Soybean meal	5	3.75	1.75
Molasses	5	2.70	0.22
Limestone	2		
Common salt	1		
	100	66.70	13.52

*** calculated from A.P.R.I. (1997)**

The animals were weighed at the beginning of the trial and then biweekly. Damascus kids were fed for 3 weeks as a transitional period on the experimental rations before the start of the experimental work. The experiment feeding period lasted 135 days, during which the water was available all time and the rations were offered twice daily at 8 am and 3 pm . Amounts of consumed feed were recorded. Feed conversion and economical efficiencies were calculated.

The animals were fed to cover the requirements for growth according to NRC (1985).

At the beginning and end of experimental trial, blood samples were collected from the jugular vein before feeding from all animals. The separated serum was directed analysis to enzymes activity determination, while the other part was stored frozen at – 20 C° till the biochemical analysis. Commercial kits were used for all calorimetrical determination.

Economic efficiency was calculated as total output / total input according to the local prices.

Slaughter test:

At the end of the trial, three animals from each group were randomly chosen and weighed on three successive days after being fasted for 16 hours, and then slaughtered.

Slaughtered animals were skinned, dressed out and the hot carcass was weighed. Weights of each of the heart, liver, spleen, kidneys and the fat as well as the tests were estimated. Samples of eye muscle and samples of feed intake were prepared for chemical analysis according to A.O.A.C. (1990).

Data were statistically analyzed according to Statistical Analysis System Users Guide, (SAS), (1998). Separation among means was carried out by using Duncan's New Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Chemical composition of the ingredients of tested rations:

Results obtained in Table (2) showed chemical composition of all nutrients for ingredient such as concentrate feed mixture (CFM), wheat straw, berseem hay and feed additives. It could be noticed that the percentages of nutrients for all different ingredients were almost in the ranges recorded by CLFF (2001). Also, data revealed that the feed additive of YS had higher protein content than that of Y being, 48.52 versus 31.76 % respectively.

Table (2): Chemical composition and calculated feeding value of feed ingredient

Ingredients	DM %	Composition of DM (%)					OM %	Calculated feeding value*	
		CP	EE	CF	NFE	ash		TDN	DCP
Concentrate feed mixture	91.22	15.80	3.69	12.87	58.99	8.65	91.35	66.70	13.52
Berseem hay	90.18	13.52	2.98	28.94	41.76	12.80	87.20	48.00	7.4
Wheat straw	91.66	4.49	1.58	37.90	38.36	17.67	82.33	44.00	3.36
Feed additives:									
Moreyeast (Y)	91.74	31.76	0.60	8.26	54.26	5.21	94.79		
Yeast-selenium (YS)	94.80	48.52	1.20	8.65	34.88	6.75	93.25		
Calculated composition of experimental rations									
Treatment-1 (T1)	100	11.12	2.76	23.05	47.86	12.54	84.79		
Treatment-2 (T2)	100	11.58	2.85	24.47	49.95	12.62	88.88		
Treatment-3 (T3)	100	11.46	2.86	25.07	50.22	12.90	89.61		
Treatment-4 (T4)	100	12.01	2.99	25.51	52.24	13.18	92.85		

Effect of supplementing rations with feed additives on growth performance:

The results obtained in Table (3) showed that there were significant ($p < 0.05$) differences in both total and daily gains. Highly significant ($p < 0.05$) differences were found with animals fed T3 (containing YS) followed by T4 (Y+YS) in total gain and daily gain. Ration supplemented with 1 gm YS (T3) had the highest values in total gain and daily gain being 17.66 kg and 131.0 gm, respectively. Data also showed that using Y with rate of 5 gm / h/d in T2 tended to increase total and daily gain with no significant differences compared to control (Table 3).

Generally, using yeast culture alone or with Selenium as feed additives in ration formulate of kids tended to higher in total and daily gain. The increasing weight as advantages % recorded 13.27, 33.67 and 21.43 % with animals fed rations containing Y, YS and half amount of each of YS and Y, respectively, (Table 3).

Results obtained were agreement with those reported by Salem *et al.* (2000), Abdel-Momin *et al.* (2002) and El-Ashry *et al.* (2003) who found that feed additives (Flavomycin) for lambs had the best average body weight and daily gain followed by those fed *Saccharomyces cerevisia*, while the control group had the lowest average body weight gain. In this respect, Abou'l-Ella (2007) observed that, the daily gain of offspring of ewes supplemented groups significantly ($p < 0.05$) increased compared to those of control group. Also, Lesmeister *et al.* (2004) reported that inclusion of yeast culture with rate of 2 % of the starter ration significantly ($p < 0.05$) increased average daily gain by 15.6 %.

Table (3): Growth performance, feed intake and feed efficiency of kids fed different experimental rations.

Items	Treatments			
	T1	**T2**	**T3**	**T4**
Duration of trial (day)	135	135	135	135
No of kids	7	7	7	7
Growth performance				
Av. initial body weight, Kg.	16.00 ± 0.79	16.33 ± 1.26	16.17 ± 1.01	17.00 ± 1.96
Av. final body weight, Kg.	29.29 ± 1.15	31.33 ± 1.52	33.83 ± 1.08	33.14 ± 1.65
Av. total weight gain, Kg.	13.29 ^{b} ±0.68	15.00 ^{ab} ±1.32	17.66 ^{a} ± 1.12	16.14 ^{a} ± .1.08
Av. daily weight gain, g	98.0 ^{b} ± 0.01	111.0 ^{ab} ±1.01	131.0 ^{a} ± 0.01	119.0 ^{a} ± 0.01
Advantage, %	----------	13.27	33.67	21.43
DM intake (g/h/d)				
Concentrate feed mixture	456	464	462	489
Berseem hay	112	114	113	122
Wheat straw	315	345	361	355
Feed additive				
Moreyeast (Y)	0	4.6	0	0
Yeast-selenium (YS)	0	.0	0.94	0
Moreyeast + OSY-NRCE	0	0	0	2.77
Total DM intake	883.0	927.6	936.9	968.8
Feed conversion				
Kg DM intake/kg gain	9.010	8.356	7.152	8.141

A and b Means within the same row with different superscripts are significantly different at (p< 0.5).

Effect of supplementing ration with feed additives on feed intake and efficiency:

Data presented in Table (3), showed that total dry matter intake increased with treatments (T2), (T3) and (T4) than that of the untreated group (T1), being 927.6, 936.9, 968.8 and 883 gm, respectively. This increase in DM intake may be due to yeast supplementation to the diets, it provide factors stimulating to rumen cellulolytic bacteria when high concentrate diet was used. The same results were obtained by El-Waziry *et*

al (2000) who studied the effect of supplemented yeast culture at two levels (11.25 and 22.5 g /head/ day) in sheep ration, they found that dry matter intake was increased with the two treatments compared to control diet. Also, Abou'l-Ella (2007) revealed that yeast supplementation enhanced significantly ($p < 0.05$) the total dry matter intake and utilization of roughage.

Average feed conversion expressed as kg DMI / kg gain was 9.010, 8.356, 7.152 and 8.141 for treatments (T1), (T2), (T3) and (T4), respectively. Showing improved feed conversion with animals fed tested rations (T2, T3 and T4). Moreover, animals fed (T3) were the most efficient to get more weight with less intake of feed . So, animals fed ration containing 1 gm (YS) gave the highest daily gain (131 gm) with 33.67% as an advantage percentage (Table 3).

The results were agreement with those reported by Drennan (1990) who found that some improvement in feed conversion were found with adding yeast culture to silage as based diet to bulls. Also, El-Waziry *et al* (2000) studied the effect of supplemented yeast culture at two levels (11.25 and 22.5 gm / head / day) in sheep ration, they found that dry matter was increased with two treatments of yeast culture compared to control. Ibrahim *et al* (2002) found that feed conversion was significantly better ($p < 0.05$) for goats fed ration supplemented with commercial microbial supplement than those received the un-supplemented ration. However, differences in feed conversion among control and moreyeast diets were not significant. On the other hand Abou'l -Ella (2007) revealed that supplemented ration with yeast culture enhanced significantly ($p < 0.05$) the total DM intake and more utilization of roughage.

With respect to feed cost and economical efficiency (Table 4), it could be noticed that the animals fed T1 showed the highest feed cost and the lowest economical efficiency. While, animals fed ration containing YS (T3) tended to be lowest feed cost and the highest economical efficiency, followed by those fed T4 and then T2, respectively compared with those fed control ration (T1) according to 2009 and 2011.

Effect of supplemented ration with feed additives on blood profile:

Data presented in Table (5) recorded that animals fed ration (T3) containing 1gm YS tended to be higher glucose, total protein and albumin concentration, being 60.62, 8.00 and 4.83, respectively compared with other groups. Supplement YS to ration (T3 and T4) resulted in higher concentration of glucose, total protein and albumen. Higher significant ($p < 0.05$) differences were found in glucose concentration with T3 and T4, respectively.

On the contrary, supplementing feed additives to tested rations was not affected on urea concentration, as show on Table (5).

It could be noticed that, total protein, albumin and globulin concentration appeared to somewhat higher with feed additive (T2, T3 and T4) compared to control with no significant difference.

Data concerning about the enzyme activity (AST and ALT concentration), shown that yeast with selenium in T3 and T4 had recorded the lowest values in AST than those fed T2 and control.

Table (4): Feed cost and economic efficiency of different experimental rations.

Items	Treatments			
	T1	T2	T3	T4
Av. daily feed intake as fed (gm/head)				
Concentrate feed mixture	499	509	506	536
Berseem hay	124	126	125	135
Wheat straw	344	376	394	387
Moreyeast (Y)	0	5	0	0
Yeast-selenium (YS)	0	0	1	0
Y+YS	0	0	0	3
Total feed intake	967	1016	1026	1061
Av. daily gain (gm)	98.0	111.0	131.0	119.0
Av. feed cost/kg gain (LE) *(2009)	9.96	9.03	7.65	8.87
Economical efficiency*	2.51	2.77	3.27	2.82
Av. feed cost/kg gain (LE) **(2011)	17.44	16.55	13.68	15.98
Economical efficiency**	1.72	1.81	2.19	1.88

*** Based on the assumption that the price of one ton of CFM was 1500 LE; berseem hay was 1000 LE, wheat straw was 300 LE, one kg of moreyeast was 12 LE, one kg yeast with Selenium was 22 LE, while one kg body weight as selling was 25 LE. (according to 2009)**

**** Based on the assumption that the price of one ton of CFM was 2500 LE; berseem hay was 1500 LE, wheat straw was 800 LE, one kg of moreyeast was 15 LE, one kg yeast with Selenium was 25 LE, while one kg body weight as selling was 30 LE. (according to 2011)**

Table (5): Blood profile of animals fed different tested rations during experimental period

Treatment	T1	T2	T3	T4
Glucose (mg/dl)	53.00^{b} ±1.69	51.89^{b} ± 2.93	60.62^{a} ± 1.87	59.63^{a} ± 1.99
Urea (mg/dl)	38.89 ± 2.53	36.58 ± 2.83	36.37 ± 3.74	34.54 ± 2.61
Creatinine (mg/dl)	1.24 ± 0.15	1.09 ± 0.10	1.23± 0.14	1.08 ± 0.13
Total protein (g/dl)	7.17 ± 0.18	7.59 ± 0.37	8.00 ± 0.35	7.85 ± 0.30
Albumin (g/dl)	4.29 ± 0.08	4.34 ± 0.24	4.83 ± 0.28	4.71 ± 0.32
Globulin (g/dl)	2.88 ± 0.06	3.25 ± 21	3.17 ± 0.22	3.14 ± 0.26
AST (IU/L)	16.43 ± 1.69	17.00 ± 1.57	15.83 ± 1.89	15.43 ± 1.29
ALT (IU/L)	33.29 ± 1.64	32.17 ± 1.62	32.50 ± 1.52	33.14 ± 1.37

and b Means within the same row with different superscripts are significantly different at ($p < 0.5$).

The results were agreement with those reported by abdel- Khalek *et al* (2000). They found that significantly ($p< 0.05$) increase in plasma total protein, albumin and glucose concentrations for animals fed Lacto – Sacc compared with control ration. El- Ashry *et al* (2002) indicated that plasma total protein and globulin concentration tended to increase while plasma urea tended to decrease with tested ration. On the other hand, El- Ashry *et al* (2003) found that adding flavormycine and *Saccharomyces cervisiae* increased ($p<0.05$) total protein, albumin, globulin, creatinine, AST and ALT than control ration. The same previous trend was observed by Abou'l -Ella (2007) who found that the total protein and globulin concentration tended to be higher in supplemented ration with feed additives.

Effect of supplemented ration with feed additives on carcass characteristics:

Results of hot carcass weight, dressing percentages and some carcass traits were presented in Table (6). It could be noticed that hot carcass weight recorded 15.19, 16.46, 17.29 and16.74 kg with treatments T1, T2, T3 and T4, respectively, showing higher hot carcass weight with tested rations (T2, T3 and T4) compared with control ration.

Table (6): The effect of yeast culture on carcass characteristics

Treatment	T1	T2	T3	T4
Fasting body weight, Kg (A)	31.00 ± 2.51	32.67 ± 3.18	33.33 ± 1.86	32.33 ± 0.33
Empty body weight, Kg (B)	27.99 ± 1.60	29.66 ± 3.27	30.37 ± 1.38	28.44 ± 0.61
Hot carcass weight, Kg (C)	15.19 ± 1.17	16.46 ± 1.88	17.29± 0.99	16.74 ± 0.67
Dressing (C/A), %	49.03 ± 0.29	50.27 ± 2.17	51.89 ± 1.26	51.74 ± 1.53
Dressing (C/B), %	54.16± 1.21	55.50 ± 2.29	56.95 ± 2.30	58.82 ± 1.32
Edible offals, Kg :				
Hart	0.18 ± 0.01	0.17 ± 0.02	0.21 ± 0.02	0.18 ± 0.03
Liver	0.59 ± 0.04	0.57 ± 0.01	0.57 ± 0.01	0.61 ± 0.03
Spleen	0.05± 0.01	0.06 ± 0.01	0.07 ± 0.01	0.06 ± 0.01
Defatted kidneys	0.10 ± 0.01	0.11 ± 0.01	0.11 ± 0.01	0.11 ±0.00
Tests	0.22 ± 0.02	0.34 ± 0.10	0.30 ± 0.05	0.37 ± 0.14

Estimated dressing percentage based on both fasting body weight and empty body weight appeared to have higher with tested rations. So, using Y or YS as feed additive attainted to higher carcass weight and dressing percentage, as shown in Table (6).

On the other hand different edible offals were not affected by using feed additive, but using a half a mount of Y and YS in (T4) showed some what higher in edible offalis weights with no significant differences.

Data were agreement with those reported by Salem *et al* (2000) who found that growing lambs on yeast culture (3 gm /h/d) attained to improve in carcass weight, slaughter weight and carcass characteristics .Also ,Khattab *et al* (2003) showed that dressing percentage and hot carcass weight were ((p< 0.05) improved with yea-Sacc and lacto – Sacc gropes .

Effect of supplemented ration with feed additive on chemical analysis of carcass:

Data presented in Table (7) revealed that increasing both meat % and bone % with decreasing fat % in carcass of animals fed tested rations (T_2, T_3 and T_4).

The previous trend was correlated with analysis of eye muscle. Moreover, ash content of eye muscle of animals fed tested ration was higher than those fed control ration.

From these results, it could be noticed that animals fed ration containing feed additive had higher hot carcass, decreasing percentage, meat percentage and bone percentage but it give lower fat %.

Table (7): The effect of yeast on chemical analysis of rabies

Treatment	T1	T2	T3	T4
Meat %	59.16 ± 1.27	59.74 ± 0.9	60.58 ± 1.10	60.63 ± 1.26
Fat %	25.64 ± 1.41	24.30 ± 1.11	22.48 ± 0.97	22.12 ± 1.36
Bone %	15.20 ± 0.51	15.96 ± 0.30	16.94± 0.39	16.54 ± 0.97
Analysis of eye muscle :				
Moisture	71.39 ± 1.44	71.96 ± 1.01	70.18 ± 1.59	71.63 ± 0.70
CP	62.23 ± 2.05	64.61 ± 2.66	69.18 ± 1.24	69.45 ± 1.70
EE	30.29± 2.3	27.85 ± 3.34	22.59 ± 0.74	22.12 ± 1.39
Ash	3.40 ± 0.11	3.71 ± 0.14	3.99 ± 0.26	3.63 ±0.10

Generally, it could be concluded that ration containing yeast or yeast plus selenium appeared to higher crude protein and lower crude fat. Moreover, these rations gave more total and daily gains. The kids fed rations containing feed additive such as yeast plus selenium (T_3) had more weight gain and economical efficiency with lower feed cost to get one kg gain. At the same time, there are an increase weight of hot carcass and dressing percentage. So, it could be use yeast plus selenium as feed additives in ration of growing kids to get more weight gain, less feed cost and higher carcass weight and dressing percentage.

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تأثير الخميرة علي النمو و صفات الذبيحة في الجداء الدمشقي

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أستخدم في هذه الدراسة عدد 28 من الجداء الدمشقي بمتوسط وزن 16,5 كجم و استمرت التغذية لمدة 135 يوما لدراسة تاثير الخميرة علي النمو و صفات الذبيحة لهذه الحيوانات. قسمت الحيوانات الي أربعة مجاميع متماثلة و غذيت علي النحو التالي: المجموعة الاولي (الكنترول) غذيت علي عليقة مكونة من (2%علف مركز و 0,5 % دريس برسيم و تبن قمح حتى الشبع) بدون اضافات. و المجموعة الثانية غذيت علي عليقة الكنترول مضاف اليها 5 جم خميرة للرأس يوميا. و المجموعة الثالثة غذيت علي عليقة الكنترول مضاف اليها 1 جم خميرة بالسلنيوم. والمجموعة الرابعة غذيت علي عليقة مثل الكنترول مضاف اليها 2,5 جم خميرة + 0,5 جم خميرة بالسلنيوم.

وكانت أهم النتائج المتحصل عليها كما يلي:

1) استخدام الخميرة أدي لزيادة المادة الجافة المأكولة لحيوانات المعاملة مقارنة بالكنترول.
2) حدث تحسن في النمو اليومي لجميع المجموعات المغذاة علي الخميرة سواء منفردة أو بالسلنيوم أو مخلوط منهما معا مع تفوق المجموعة الثالثة (خميرة بالسلنيوم) بزيادة 33,67% عن الكنترول.
3) حيوانات المجموعة الثالثة حققت أعلي كفاءة اقتصادية (3,27 و 2,19) مع أقل تكلفة غذائية لانتاج كجم وزن حي (7,65 و 13,68 جنيها) خلال عامى 2009 و 2011 على التوالى.
4) وجد أعلي معدل لجلوكوز الدم في المجموعة الثالثة مقارنة بباقي حيوانات المعاملات الأخري و الكنترول.
5) سجلت المعاملة الثالثة أعلي نسبة تصافي للذبيحة و أعلى وزن للأجزاء المأكولة (القلب و الطحال و الكلاوي) وكذلك نسبة اللحم.

من هذه الدراسة يتضح أنه يمكن استخدام الخميرة المنفردة أو المضاف لها السلنيوم أو مخلوط منهما فى تغذية الجداء النامية إلا أن استخدام الخميرة المضاف اليها السيلينيوم أعطت أعلى زيادة وزنية يومية على أقل تكاليف غذائية وأعلى كفاءة غذائية مع زيادة نسبة التصافى للحوم النامية .

قام بتحكيم البحث

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