Influence of Dietary Yeast Culture (*Saccaromyces cerevisiae*) on Growth Performance and Some Blood Parameters of Fayoumi Chicks during Summer

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ABSTRACT:

The effects of supplementing diets with three levels (zero, one and two g/kg diet) of Yea-Sacc^{1026} (YS) on growth performance, carcass characteristics, some blood parameters and economic efficiency of Fayoumi chicks were examined. One hundred fifty, 3 weeks old Fayoumi chicks were used and randomly assigned to three groups. Each group received one of the dietary YS levels. The experiment lasted 10 weeks (from 3 to 13 weeks).

Inclusion of one g YS per kg diet significantly ($P<0.05$) increased body weight of Fayoumi chicks as compared to the other treatments. The overall means of body weight gain of Fayoumi chicks which received YC were significantly higher than control. Chicks which received diets supplemented with YS showed significant reduction in the total amount of feed consumed as compared to the control. Feed consumption was significantly lower as a result of supplementing 2 g YC/kg diet than the other treatments. Significant improvement of feed conversion efficiency (11.25%) was achieved as a result of feeding either level of YS.

Plasma total protein, glucose, calcium, and inorganic phosphorus were not significantly altered by feeding diets supplemented with YS. Significant ($P<0.05$) decrease in average plasma triglycerides and cholesterol levels were found in Fayoumi chicks which received the dietary YS.

Relative weights of feather, liver, gizzard, abdominal fat, and gonadal organs were not significantly affected by dietary treatments. However, males that received the YS in their diets showed significant increase in their relative eviscerated carcass as compared to the control. Significant increase of spleen weight percentage in chicks which received the diet supplemented with 1g YS/kg diet.

Feeding diets supplemented with YS resulted in improvement of economic efficiency. About 16.18% and 10.53% increase in economic efficiency was observed in groups which received the diet supplemented with 1 and 2 g YS/kg diet, respectively.

These results indicate that supplementing diet with one g YS/kg diet was the most effective for improving growth performance, eviscerated carcass percentage, and the best economic efficiency. Therefore, it is recommended to use this level of Yea-Sacc^{1026} under summer condition.

Key words: Yeast Culture, Fayoumi Chicks, Growth Performance, Carcass Characteristics, Blood Parameters

INTRODUCTION

Inclusion of microbial products (probiotics) such as yeast culture to poultry diets has gained great deal of interest. Growth enhancement as a response to dietary yeast culture was reported by many researchers. Onifade *et al.*, 1999 observed an increase in body weight, body weight gain, feed intake and feed conversion ratio of broilers supplemented with Saccharomyces cerevisiae. Kumprechtova *et al.* (2000) indicated positive effects of probiotics application on broiler performance at a lower crude protein level. These results suggest a possibility of reducing the environmental nitrogen load. Higher digestion coefficients of crude protein, ether extract, crude fiber, and nitrogen free extract were recorded in quails fed diets supplemented with yeast culture (Ali *et al.*, 2000). Growth rate enhancement of broilers grown on recycled litter and fed yeast culture residue was reported (Stanley *et al.*, 2004).

Antibacterial mechanism of probiotics, including low pH, low redox potential, miscellaneous inhibitory substances (e.g., H_2S, bacteriocins, fatty acids, and deconjugated bile acids), and competition for nutrients and adhesion to receptor sites were suggested (Nurmi and Rantala, 1973 and Barrow, 1992). Supplementation of bacterial probiotics in broiler feed not only caused improvement in performance, but also stimulated the immune system of broilers. Significant reduction in frequency of Salmonella typhimurium colonization in yeast fed broilers was observed (Line *et al.*,1998).Controlling intestinal coliforms and, to some extent, coccidial oocyts in broilers received yeast culture residues in their diet were reported (Stanley *et al.*, 2004).

Probiotics have been used to reduce costs of animal production as antimicrobial agents led to new insights into the influence of intestinal flora on the host (Fulller, 1989). The growth-promoting effects of probiotics used in animal feeds as growth promotants have also been ascribed to suppression of urea hydrolysis and subsequently reduced ammonia production in the gastrointestinal tract (Kim and Kim, 1992).

The objective of this study was to evaluate the efficacy of dietary a commercial yeast culture (Yea-Sacc^{1026}) in growth enhancement, carcass characteristics, some blood parameters and economic efficiency of Fayoumi chicks reared during hot summer.

MATERIALS AND METHODS

Birds

One hundred fifty, 3-week old Fayoumi chicks were used in this study. Birds were housed in brooder batteries with wire floors at the Poultry Experimental Farm, Faculty of Agriculture, Suez Canal University. Chicks were weighed, wing banded and randomly allotted to three groups. Within each group 50 chicks were divided randomly to five replicates of 10 chicks each. Birds were provided with feed and water *ad-libitum*. Light was maintained at 24 hours throughout the study which was terminated when chicks were 13 wks old. Individual body weights and feed consumption per replicate were recorded biweekly to calculate feed conversion efficiency (g feed consumed /g weight gain). Birds were exposed to ambient Ismailia province environmental conditions during summer months (June, July and August). The average daily temperature and relative humidity during the course of the study were 33.3^{0}C and 47% respectively.

Experimental diets

Two types of basal diet were formulated to meet the nutritional requirements for Fayoumi chicks as suggested by Sabri *et al.* (1995). The starter diet (0-3wks) containing 22% crude protein and 2900 Kcal ME/kg diet, followed by a grower diet (3-13wks) containing 18% and 2900 Kcal ME/kg diet. The composition and calculated analysis of the basal diet are shown in Table (1). Dry matter, crude protein (Kjeldahl N X 6.25), crude fiber, ether extract, and ash were analyzed using the standard methods of the Association of Official Analytical Chemists (AOAC, 1995).

Yea-Sacc^{1026} (Alltech commercial. Biotechnology products, Alltech Inc. 3031 Catnip Hill. Nicholasvill KY. USA) as probiotics, containing naturally occurring microorganisms (Saccharomyces cerevisiae). Three levels (zero, one and two g/kg diet) of probiotic YS were supplemented to the basal diets of Fayoumi chicks. Experimental diet one, chicks received zero YS in their diets and served as control. In experimental diets two and three, chicks received 1 or 2 g YS/kg feed in their diets, respectively.

Blood sampling

Blood samples were taken from brachial veins of five males and five females chosen randomly from each dietary treatment at 13 wks of age. Blood samples were collected into heparinized tubes. Plasma samples were separated by centrifugation of blood at 3000 rpm for 10 min. and were kept at -20^{0}C until assayed.

Biochemical parameters

All biochemical parameters were determined using commercially available kits, which rely on colorimetric procedures. Plasma levels of total calcium and triglycerides were determined using Stanbio kits. Plasma values of inorganic phosphorus were determined using Quimica Clinica Aplicada kits. Plasma total protein and cholesterol were determined using Bio-Merieux kits.

Carcass characteristics

Six birds (three males and three females) were randomly taken from each experimental group at 13 wks of age for carcass characteristics. Weights of live body, feather, heart, liver, spleen, gizzard, abdominal fat, testes, ovary, and oviduct were recorded to the nearest gram.

Economic efficiency

At the end of this work, the economical efficiency of the experimental diets were, calculated from the input-output analysis based upon the differences in both growth rate and feeding cost as described by Bayoumi (1980).

Statistical analysis

Body weights were statistically analyzed using the analysis of covariance. Body weights at three weeks of age were used as a covariate. The analysis of covariance was performed according to Steel and Torrie, (1980) using the GLM procedure available in SAS software (SAS, 1988). Weight gain, feed consumption, feed conversion efficiency, blood parameters and slaughter test data were statistically analyzed using one-way analysis of variance. Differences among treatments means were detected using Duncan's Multiple-Range Test (Duncan, 1955),

RESULTS AND DISCUSSION

Body weight

The effects of dietary YS on average body weights of Fayoumi chicks are represented in Table (2). The analysis of covariance indicated significant increase in average body weights of Fayoumi chicks received diet, supplemented with one g of YS/kg diet as compared to the zero or two g YS/kg diet. This increase in body weights started at the 3rd week of age and continued until the end of the study (13 weeks of age). No significant difference was detected in body weight between the control and group received 2g YS/kg diet (expect for the 3rd and the 5th week of age). The observed increase in body weight in the

present study as response of feeding yeast is in agreement with that reported by Bradley *et al.* (1994). They observed increased bird weights at 7, 14, and 21 d of age for male poults fed diets containing Saccharomyces cerevisiae var. boulardii at 0.01, 0.02, and 0.06% of the diet. In addition, Stanley *et al.* (2004) reported that yeast culture residue could be used to control intestinal coli forms and to enhance growth of broiler chicks reared on recycled litter.

Body weight gain

Average biweekly body weight gain was increased ($P<0.05$) by feeding the diet containing 1g YS/kg diet as compared to the other treatments (Table 3). However, no significant difference of body weigh gain between the supplemented levels of YS during the 9^{th} and 11^{th} weeks of age was observed. No significant differences among experimental diets concerning body gain from the period of 11^{th} and 13^{th} weeks were detected. The overall means of body weight gain of Fayoumi chicks, which received 1gYS/kg diet, were significantly higher than control. Similar results were observed by Onifade *et al.* (1999). They reported that supplemented broiler diets with Saccharomyces cerevisiae increased body weight and body weight gain.

The observed increase in body weight gain in the present study in response to feeding YS could be explained by the results of Glade and Sist, (1988) and Pagan, (1989). They reported that yeast culture had a significant effect on digestive processes in nonruminant animals by enhancing fiber digestion and mineral availability. In addition, there is evidence that some live yeast cells can pass through the acidic environments in the stomach and remain active in the lower digestive tract (Newbold *et al.*, 1990). The use of strains that can remain active in the small intestine, large intestine, and the cecum may improve the efficacy of yeast culture supplements for monogastric animals. With the advent of new techniques for DNA fingerprinting, individual strains can now be documented and protected.

Feed consumption and feed conversion efficiency (FCE)

Biweekly, cumulative feed consumption and FCE are summarized in Table (3). Chicks received diets supplemented with YS showed significant reduction in the total amount of consumed feed as compared to the control. Feed consumption was significantly lower as a result of supplementing 2 g YS/kg diet than other treatments. On the contrary Onifade *et al.* (1999) reported that supplemented broiler diets with Saccharomyces cerevisiae increased feed intake.

The overall means of FCE indicated that inclusion of YS in the Fayoumi diets improved significantly the conversion of feed to body weight gain. About 11.25% improvement of FCE over control was observed in chicks received dietary either level of YS. Madrigal *et al.* (1993) found increased feed utilization in male broiler chicks fed mash diets containing from 50 to 200 g yeast/ton from 1 to 49 day of age. On the other hand, Day *et al.* (1987) reported that the supplementation of Saccharomyces cerevisiae increased the activities of several enzymes and that increased feed utilization, Moreover, Haddadin *et al.* (1996) found that the supplementation of Lactobacillus acidophilus improved feed conversion of layers by 14.8%.

It can be concluded that supplementing diets with Yea-Sacc^{1026} enhanced growth and improved feed conversion efficiency of Fayoumi chicks reared during summer.

Blood biochemical parameters

The effects of dietary YS on blood parameters of Fayoumi chicks are shown in Table (4). Plasma total protein, glucose, calcium, and inorganic phosphorus were not significantly altered by feeding diets supplemented with YS. El-Ghamry *et al.* (2002) reported similar data as a result of inclusion yeast culture in broiler diets.

Significant ($P<0.05$) decreases in average plasma triglycerides and cholesterol levels were detected in Fayoumi chicks received dietary YS. Both males and females fed diets supplemented with YS showed low plasma levels of triglycerides and cholesterol compared to the control. However, males treated with YS tended to show insignificant reduction in plasma cholesterol levels. No significant difference was found between the used two levels of YS concerning plasma triglycerides and cholesterol. The observed hypo-cholsterolemia and hypo-lipemia in YS treated chicks are in agreement with what was reported by Abdel Azeem (2002). It has been suggested that feeding probiotics may reduce plasma level of cholesterol through assimilation or cholesterol uptake by lactobacillus cells (Gilliland *et al.*, 1985; Buck and Gilliland, 1994) or to the coprecipitation of cholesterol with deconjugated bile salts (Klaver and Van der Meer, 1993). Same mechanisms might be exerted by Saccaromyces cerevisiae to reduce plasma level of cholesterol.

In the present study, treated Fayoumi chicks with Yea-Sacc^{1026} had no adverse effect on blood biochemical profile. This finding as long as the improvement of productive performance which was reflected by increasing body weight gain and improving feed efficiency indicate the beneficial role of yeast during hot summer.

Carcass characteristic

The effects of dietary YS on the carcass characteristic are presented in Table (5). Males

received YS in their diets showed significant ($P<0.05$) increase in their eviscerated carcass percentage as compared to the control. No significant difference between the two levels of YS was observed. However, males fed on 1g YS/kg diet tended to have higher eviscerated carcass percentage. The average percentage of heart weight of Fayoumi chicks fed 2g YS/kg diet showed significant increase compared to the other treatments. Concerning the percentage weight of feather, liver, gizzard, abdominal fat, and gonadal organs, the analysis of variance indicated no significant differences among dietary treatments were detected.

Significant increase of spleen weight percentage in chicks received diet supplemented with 1g YS/kg was observed. Significant difference in spleen weights percentages of female chicks fed on YS diets as compared to the control. It has been suggested that feeding probiotic to rats might act directly on the intestinal mucosa (Corthier *et al.*, 1992) or it stimulates the immune system to increase the intestinal secretion of secretory Ig A and the secretory component of the I g in mouse (Buts *et al*, 1990). The fact that the relative weight of spleen was increased by YS treatment with 1g YS/kg might indicate a positive immunological role of Saccharomyces cerevisiae in chicken.

Economic efficiency

The analysis of the economic efficiency of the dietary treatments is shown in Table (6). Feeding diets supplemented with YS resulted in improvement of economic efficiency. About 16.18% and 10.53% increase in economic efficiency was observed in chicks received diets supplemented with 1g and 2gYS, respectively. Therefore, it is recommended to use YS in Fayoumi diets in order to maximize the economic efficiency as compared to the control.

Data from the present study indicated that diets supplemented with Yea-Sacc^{1026} improve body weight gain, feed conversion efficiency and economic efficiency in Fayoumi chicks reared during hot summer. Therefore, it is recommended to use YS at level 1g/kg diet under such conditions.

Table (1): Composition and chemical analysis of the experimental diets fed during starting and growing periods.

Ingredients (%)	Starter ration (0-3 wks)	Grower ration (3 –13 wks)
Ground yellow corn	59.79	65.85
Soybean meal (44%)	30.47	19.00
Corn gluten	5.50	4.70
Wheat bran	0.44	6.80
Dicalcium phosphate	1.69	1.80
Limestone	1.43	1.18
Sodium chloride	0.25	0.25
Vit. and Min. premix*	0.25	0.25
DL-Methionine	0.12	0.08
L- lysine	0.06	0.09
Total	**100.00**	**100.00**
Calculated values		
ME (kcal/kg diet)	2900	2900
Crude protein %	22.00	18.00
C/P ratio	131.82	161.11
Calcium %	1.00	0.89
Available phosphorus. %	0.44	0.44
Lysine %	1.09	0.84
Methionine %	0.50	0.40
TSAA %**	0.92	0.73
Chemical analysis (%)		
Dry matter	87.60	87.33
Crude protein	22.10	18.08
Crude fat	2.50	2.60
Crude fiber	3.55	3.50
Ash	5.85	5.50
Price of ton diet (LE), 1999	**871.32**	**782.26**

*Each2.5 kg of vitamin and minerals mixture contain: 12,000,000 IU vitamin A; 2,000,000 IU D3; 10g E; 1g K3; 1g B1; 5g B2; 1,500 mg B6; 10 mg B12 ; 10g pantothenic acid; 20g Nicotinic acid. 1g Folic acid; 50 mg Biotin; 500g choline chloride, 4g Copper, 300 mg Iodine; 30g Iron; 60g Manganese; 50g Zinc, and 100 mg Selenium.

**TSAA : Total sulfur amino acids

Table (2): Effect of supplementing Yea-Sacc in diets on live body weights of growing male and female Fayoumi chicks, g (mean ± SE).

Weeks	Sex	Dietary YS levels		
		Zero (control)	1g YS/ kg diet	2g YS/ kg diet
3rd week	Male	200.95±5.07^{b}	215.65±5.16^{a}	195.00±4.17^{b}
	Female	189.20±3.30^{a}	195.42±6.46^{a}	180.35±4.02^{b}
	Average	195.08±3.10^{b}	205.54±4.54^{a}	187.68±2.78^{c}
5th week	Male	403.79±8.41^{b}	429.10±8.59^{a}	390.90±6.04^{c}
	Female	353.45±6.65^{b}	368.25±12.15^{a}	347.00±6.80^{b}
	Average	378.62±6.66^{b}	398.68±8.71^{a}	368.95±5.70^{c}
7th week	Male	613.89±10.90^{b}	664.05±11.33^{a}	608.45±9.53^{b}
	Female	525.10±8.65^{b}	554.17±16.26^{a}	511.85±12.52^{b}
	Average	569.50±9.92^{b}	609.11±13.25^{a}	560.15±10.96^{b}
9th week	Male	840.16±14.86^{b}	891.50±14.99^{a}	825.55±13.91^{b}
	Female	708.25±11.10^{b}	746.75±20.55^{a}	689.20±13.19^{c}
	Average	774.21±14.03^{b}	819.13±17.34^{a}	757.38±14.45^{b}
11th week	Male	1043.74±18.84^{b}	1125.40±14.92^{a}	1044.85±17.98^{b}
	Female	863.74±14.06^{b}	902.08±25.44^{a}	856.80±15.78^{b}
	Average	953.74±18.80^{b}	1013.74±23.42^{a}	950.83±19.13^{b}
13td week	Male	1201.4725.80^{b}	1309.70±16.00^{a}	1237.90±19.93^{b}
	Female	977.76±18.23^{b}	1026.83±28.51^{a}	968.05±16.57^{b}
	Average	1089.62±25.43^{b}	1168.27±28.48^{a}	1102.98±25.11^{b}

a - c Means within the same row having different superscripts are significantly different ($p<0.05$)

Table (3): Means of weight gain (WG) g, feed consumption (FC) g. and feed conversion efficiency (FCE) for the experimental chicks (mean ± SE).

Weeks	Items	Dietary YS levels		
		Zero (control)	1g YS/kg diet	2g YS/kg diet
3-5 wks	W G	183.54±2.87^{b}	193.14±6.56^{a}	181.27±7.23^{b}
	FC	539.71±19.71^{a}	525.21±28.21^{ab}	500.61±22.22^{b}
	FCE	2.94±0.06^{a}	2.72±0.03^{b}	2.76±0.04^{b}
5-7 wks	W G	190.88±6.04^{b}	210.43±1.10^{a}	191.20±7.76^{b}
	FC	709.32±9.32^{a}	655.23±19.36^{b}	612.01±17.75^{c}
	FCE	3.72±0.07^{a}	3.11±0.10^{b}	3.20±0.03^{b}
7-9 wks	W G	204.71±2.17^{b}	210.02±9.44^{a}	197.23±18.02^{b}
	FC	739.74±13.49^{a}	702.21±22.61^{b}	647.54±29.28^{c}
	FCE	3.61±0.03^{a}	3.34±0.03^{b}	3.28±0.16^{b}
9-11 wks	W G	179.53±8.18^{b}	194.61±4.32^{a}	193.45±5.4^{a}
	FC	751.42±21.02^{a}	683.19±39.46^{b}	677.49±16.43^{b}
	FCE	4.19±0.11^{a}	3.51±0.12^{b}	3.50±0.08^{b}
11-13 wks	W G	135.88±8.00^{a}	154.53±17.06^{a}	152.15±16.70^{a}
	FC	835.41±43.74^{a}	852.65±19.52^{a}	808.74±45.44^{a}
	FCE	6.15±0.02^{a}	5.52±0.11^{b}	5.32±0.27^{b}
3-13 wks	W G	894.54±3.27^{b}	962.73±28.28^{a}	915.30±49.36^{ab}
	FC	3575.60±19.80^{a}	3418.49±39.16^{b}	3246.39±48.26^{c}
	FCE	4.00±0.01^{a}	3.55±0.03^{b}	3.55±0.08^{b}

a - c Means within the same row having different superscripts are significantly different ($p< 0.05$)

Table (4): Effect of dietary Yea-Sacc on some blood parameters (mean ± SE).

Items	Sex	Dietary YS levels		
		Zero (control)	1g YS/ kg diet	2g YS/kg diet
Total protein (g/dl)	Male	4.52±0.50[a]	4.25±0.21[a]	4.74±0.64[a]
	Female	4.40±0.09[a]	3.83±0.90[a]	4.27±0.80[a]
	Average	4.46±0.17[a]	4.04±0.13[a]	4.51±0.20[a]
Glucose (mg/dl)	Male	215.36±25.50[a]	228.69±12.88[a]	226.32±17.79[a]
	Female	225.87±8.84[a]	221.99±9.08[a]	238.30±18.25[a]
	Average	220.44±10.94[a]	225.34±7.51[a]	232.31±12.56[a]
Triglycerides (mg/dl)	Male	72.58±3.07[a]	56.25±2.82[b]	66.78±13.62[b]
	Female	101.30±32.51[a]	74.09±14.14[b]	68.19±8.13[b]
	Average	86.94±18.95[a]	65.17±7.42[b]	67.49±6.60[b]
Calcium (mg/dl)	Male	8.06±0.68[a]	7.15±0.64[ab]	6.12±0.91[b]
	Female	7.28±0.37[a]	6.42±0.94[a]	7.06±0.50[a]
	Average	7.67±0.36[a]	6.79±0.55[a]	6.59±0.40[a]
Inorganic phosphorus (mg/dl)	Male	21.29±2.87[a]	19.69±2.77[a]	17.37±3.10[a]
	Female	18.67±4.35[a]	19.34±1.61[a]	23.84±5.08[a]
	Average	19.98±1.40[a]	19.52±1.42[a]	20.61±3.49[a]
Cholesterol (mg/dl)	Male	156.24±16.74[a]	144.34±11.30[a]	150.97±13.86[a]
	Female	147.56±3.96[a]	129.27±15.13[b]	118.48±13.47[b]
	Average	151.90±6.10[a]	136.81±8.52[b]	134.73±10.99[b]

a - b Means within the same row having different superscripts are significantly different (P< 0.05)

Table (5): Effect of supplemented diets with YS on carcass characteristic of male and female growing Fayoumi chicks (mean ± SE)

Level of YS	Sex	Fea-ther %	Heart %	Liver %	Spleen %	Gizz-ard %	fat %	Evisce-rated carcass %	Tes-tes %	Ovary %	Ovid-uct %
Zero (control)	M	10.02 ± 0.48	0.46 ± 0.01	1.89 ± 0.16[b]	0.25 ± 0.03[b]	2.10 ± 0.29	0.76 ± 0.25[b]	67.69 ± 1.42[b]	0.69 ± 0.19[a]	--	--
	F	9.08 ± 0.56	0.40 ± 0.02	2.13 ± 0.13[a]	0.21 ±0.16[c]	3.35 ±0.19	1.52 ±0.52[a]	66.53 ±1.37[b]	--	0.059 ± 0.01[a]	0.061 ± 0.02[a]
	Av.	9.55 ± 0.35[a]	0.43 ± 0.01[b]	2.01 ± 0.11[ab]	0.23 ± 0.02[bc]	2.73 ± 0.32[a]	1.14 ± 0.35[ab]	67.11 ± 0.64[b]	--	--	--
1g/kgdiet	M	9.17 ± 1.16	0.48 ± 0.02	1.84 ± 0.15[b]	0.30 ± 0.02[a]	2.45 ± 0.07	0.73 ± 0.21[b]	70.05 ± 0.23[a]	0.71 ± 0.11[a]	--	--
	F	9.14 ± 1.14	0.39 ± 0.05	2.18 ± 0.15[a]	0.28 ± 0.01[a]	3.27 ± 0.28	1.44 ± 0.03[a]	68.05 ± 1.98[ab]	--	0.061 ± 0.01[a]	0.060 ± 0.03[a]
	Av.	9.16 ± 0.73[a]	0.44 ± 0.03[b]	2.01 ± 0.12[ab]	0.29 ± 0.01[a]	2.86 ± 0.22[a]	1.11 ± 0.24[ab]	69.05 ± 0.64[a]	--	--	--
2g/kg diet	M	8.56 ± 0.84	0.51 ±0.03	1.83 ± 0.05[b]	0.23 ± 0.02[bc]	2.42 ± 0.10	0.55 ± 0.15[b]	69.51 ± 1.92 [a]	0.70 ± 0.15[a]	-	-
	F	11.11 ± 1.29	0.51 ± 0.01	2.15[a] ± 0.14	0.26 ±0.01[b]	3.16 ± 0.34	1.69 ±0.09[a]	66..67 ±1.68[b]	-	0.062 ± 0.01[a]	0.058 ± 0.04[a]
	Av.	9.83 ± 0.89[a]	0.51 ± 0.01[a]	1.99 ± 0.10[ab]	0.25 ± 0.01[b]	2.79 ± .28[a]	1.12 ± 0.34 [ab]	68.09 ± 1.11[ab]	--	--	--

Means within a column with no common superscript are significantly different (P < 0.01)

Table (6): Input-output analysis and economical efficiency of different dietary treatments.

Item	Dietary YS levels		
	Zero (control)	1g YS/ kg diet[1]	2 g YS/ kg diet
Average feed consumed (kg)	3.575	3.418	3.246
Price/kg feed consumed (PT) [2]	78.226	80.226	82.226
Total feed cost (PT)	279.658	274.212	266.906
Average live weight (kg)	1.090	1.168	1.103
Price/kg live weight (PT) [3]	600.00	600.00	600.00
Total revenue (PT)	654.00	700.80	661.80
Net revenue (PT)	374.342	426.588	394.894
Economic efficiency (EE)[4]	1.339	1.556	1.480
Relative economic efficiency[5]	100.00	116.18	110.53

1 Price 1g Yea Sacc = 2 PT
2 Total price of feed consumed 3-13wks/feed consumed.
3 According to the local market price at the experimental time (1999).
4 Net revenue per unit food cost.
5 Assuming that the relative E.E. of control diet equals 100.

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الملخص العربي

تأثير إضافة الخميرة (*Saccaromyces cerevisiae*) إلى عليقه الكتاكيت الفيومي على النمو وبعض قياسات الدم في فصل الصيف

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أجريت هذه التجربة لدراسة تأثير إضافة مستويات من الخميرة (صفر و١ و٢ جرام خميرة/كجم عليقة) إلى علائق الكتاكيت الفيومي على النمو وبعض قياسات الدم وصفات الذبيحة والكفاءة الاقتصادية للعلائق. تم أجراء التجربة باستخدام ١٥٠ كتكوت فيومي عمر ٣ أسابيع قسمت عشوائيا إلى ٣ مجاميع تجريبية كانت المجموعة الأولى منها كنترول و المجموعة الثانية والثالثة غذيت علي العليقة الكنترول مضافا إليها أحد مستويات الخميرة التالية ١ و ٢ جرام خميرة/كجم عليقه علي التوالي.واستمرت التجربة لمدة ١٠ أسابيع وكانت نتائج التجربة ما يلي:-

١ - أوضحت النتائج زيادة معنوية في وزن الجسم بالنسبة للكتاكيت المغذاة علي عليقة مضاف أليها الخميرة بمستوي ١ جرام/كجم عليقه بالمقارنة بالمجاميع التجريبية الأخرى.

٢ - كان هناك تحسن معنوي في الزيادة المكتسبة في وزن الجسم طول فترة التجربة بالنسبة للكتاكيت المغذاة علي عليقة مضاف أليها الخميرة بمستوي ١ جرام / كجم عليقه بالمقارنة بالكنترول.

٣ - كان هناك انخفاض معنوي في كمية الغذاء المستهلك طول فترة التجربة بالنسبة للكتاكيت المغذاة علي عليقة مضاف أليها الخميرة بمستوي ١ و٢جرام/ كجم عليقه بالمقارنة بالكنترول.وكان الانخفاض المعنوي أقل للكتاكيت المغذاة علي عليقة مضاف أليها الخميرة بمستوي ٢جرام/كجم عليقه بالمقارنة بالمجاميع التجريبية الأخرى.

٤ - حدث تحسن معنوي في كفاءة تحويل الغذاء طول فترة التجربة بالنسبة للكتاكيت المغذاة علي عليقة مضاف أليها الخميرة بمستوي ١ و٢جرام / كجم عليقه علي التوالي بالمقارنة بالمجموعة الكنترول و كان التحسن بنسبة ١١,٢٥% في كل من المستويين.

٥ – لم يكن هناك اختلافات معنوية في بروتين البلازما الكلي والجلوكوز والكالسيوم والفسفور العضوي نتيجة التغذية علي علائق مضاف أليها الخميرة بالمقارنة بالكنترول. بينما حدث انخفاض معنوي في جليسريدات البلازما الثلاثية والكولسترول نتيجة التغذية على علائق مضاف أليها الخميرة بالمقارنة بالكنترول.

٦ - أوضحت نتائج صفات الذبيحة عدم وجود اختلافات معنوية في الوزن النسبي للريش والكبد و القونصة ودهن البطن والأعضاء التناسلية بالنسبة للكتاكيت المغذاة علي عليقة مضاف أليها الخميرة بمستوي ١ و٢جرام / كجم عليقه علي التوالي بالمقارنة بالكنترول.كما وجدت زيادة معنوية في نسبة التصافي للذكور المغذاة على علائق تحتوى على الخميرة. كما وجدت زيادة معنوية في الوزن النسبي للطحال في الطيور المغذاة على عليقه مضاف إليها الخميرة بمعدل ١جرام / كجم عليقة.

٧- أوضحت نتائج الدراسة الإقتصاديه أن إضافة الخميرة إلى العليقة الكنترول أدى إلى تحسين الكفاءة الإقتصادية في المجاميع المغذاة علي عليقة مضاف أليها الخميرة بمستوي ١ و٢جرام / كجم عليقه و كان التحسن بنسبة ١٦,١٨ و١٠,٥٣ % على التوالي بالمقارنة بالكنترول.

يتضح من هذه الدراسة أن إضافة الخميرة إلى العلائق أدت إلى زيادة معنوية في معدل النمو و كفاءة التحويل الغذائية و تحسين الكفاءة الإقتصادية للكتاكيت الفيومى المرباة أثناء الصيف الحار، لذا ينصح باستخدام الخميرة بمعدل ١ جرام/كجم عليقه في مثل هذه الظروف.