RESPONSE OF GROWING RABBITS TO DIETS CONTAINING DIFFERENT SOURCES OF YEAST.

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SUMMARY

Forty five male New Zealand White rabbits aged 3-4 weeks with an average body weight of 416g were divided into five experimental groups. The basal experimental diets were formulated and pelleted to cover the nutrient requirement of rabbits. In this study 140g active dried yeast/ 100 kg diet (DY), 140g selenium treated yeast/ 100 kg diet (SY), 160g chromium treated yeast/ 100 kg diet (CY) and 70g selenium treated yeast + 80g chromium treated yeast / 100 kg diet (SCY) in addition to the control diet were used. The experimental diets were iso-caloric (Av. 2475 kcal DE/kg diet and iso-nitrogenous (Av. 16% CP). The results revealed that nutrients digestibility coefficients (OM,CF and NFE) were significant improved by using selenium active dried yeast compared to control group. Using different sources of active dried yeast gave significant improve of CF digestibility and insignificant increase of daily feed consumption, average daily gain and feed conversion ratio compared with either those fed control diet. Carcass weight and dressing percentages were not significantly differing among all the experimental groups. The results showed that active dried yeast supplemented with selenium and chromium to diets had a positive effect on the relative economic efficiency than other treatments. In general, the results of this study showed that active dried yeast can be used profitable in rabbit diets without any adverse effect on nutrient digestibilities, growth performance, carcass weight or dressing percentages.

Keywords: *active dried yeast, selenium treated yeast, chromium treated yeast, rabbits, performance, digestion coefficients, carcass characteristics, economic evaluation.*

INTRODUCTION

Recently, active live yeast has been successfully examined as satisfactory alternative to antibiotics feed additives due to its antagonistic effect harmful pathogenic bacteria (Line- Eric *et al.*, 1998). El-Ashry *et al.* (2001) noted that yeast are know as rich sources of vitamins, enzymes, nutrients and other important factors which make them attractive as a basic nutrient source of vitamins, enzymes and other.

It has been reported that some minerals supplement such as chromium can be included into diet to prevent the negative effect of environment stress (Fekete and Kellems, 2007). Chromium (Cr) is a trace element that appears to be an essential micro nutrient for animals and humans. The primary role of Cr in metabolism is to potentiate the action of insulin through its presence in an organometalic molecule, called the glucose tolerance factor (Sahin *et al.*, 2003). Moreover, chromium deficiency can disrupt the carbohydrate and protein metabolism, reduce the insulin sensitivity in peripheral tissues and also impair the growth rate (Sahin *et al.*, 2003). Dietary chromium supplementation was found to accelerate body growth and to increase lean body mass in humans experimental animals and domestic livestock (Hasten *et al.*, 1997).

Dietary chromium supplementation was reported to have a positive effect on the growth rate and feed efficiency in growing poultry (Lien *et al.*, 1999).

Selenium, is an essential micro element for animal and human diets. It was identified as a part of cellular glutathione peroxidase, which provided evidence for selenium involvement in other metabolic processes (Heider and Bock, 1993). Its deficiency in nutrition may causes decreases the productivity of domesticated animals (Foster and Sumer, 1997). Recently, researchers found evidence for selenium as a cancer-protective agent (IP and Lisk, 1994). There fore, selenium must be provided to human and animals as a part of nutritional intake. El-Batal and Fadel (2002) produced an edible food yeast (*S. Cerevisiae*) having high levels of organically bound intracellular selenium in an assimilable non-toxic from, which is useful as a dietary supplement.

So, the main objectives of the present study was to evaluate the effect of different types of yeast supplements in the diets of growing rabbits on feed utilization, growth performance and economic efficiency.

MATERIALS AND METHODS

The present study was carried out at agriculture experiment station, rabbit research unit at El-Nubaria which belonging to the Animal Production Department, National Research Centre, Dokki, Giza, Egypt, to evaluate the effect of different types of yeast supplements in the diet of growing rabbits on feed utilization and growth performance. A total of 45 male New Zealand White rabbits aged 3-4 weeks with an average body weight of 416 ± 4.4 g, were divided into five equal groups. The basal experimental diets were formulated and pelleted (4mm) to cover the nutrient requirements of rabbits according to (NRC, 1977). Composition and chemical analysis of the experimental diets are presented in Table (1). The

Table (1): Composition and chemical analysis of the experimental diets

	Experimental diets				
Item	Control	DY	SY	CY	SCY
1- Composition					
Yellow corn	32.00	32.00	32.00	32.00	32.00
Barley grain	6.00	6.00	6.00	6.00	6.00
Wheat bran	15.00	15.00	15.00	15.00	15.00
Soybean meal	10.50	10.50	10.50	10.50	10.50
Alfalfa hay	35.00	35.00	35.00	35.00	35.00
Sodium chloride	0.50	0.50	0.50	0.50	0.50
Vit. & Min. mixture*	0.30	0.30	0.30	0.30	0.30
DL-Methionine	0.30	0.30	0.30	0.30	0.30
Anti fungal agent	0.40	0.26	0.26	0.24	0.25
Active dried yeast	---	0.14	---	---	---
Selenium treated yeast	---	---	0.14	---	0.07
Chromium treated yeast	---	---	---	0.16	0.08
Price, L.E/Ton	1801	1794	1797	1798	1798
2- Chemical analysis					
Dry matter	91.79	91.21	91.25	91.76	91.78
Chemical composition on DM basis					
Organic matter	90.09	89.80	89.94	89.91	90.55
Crude protein	16.04	16.11	16.00	16.02	16.05
Crude fiber	14.71	14.47	14.57	14.84	14.02
Ether extract	3.61	3.76	3.73	3.73	3.69
Nitrogen free extract	55.73	55.46	55.64	55.32	55.79
Ash	9.91	10.20	10.06	10.09	9.45
NDF*	38.59	38.43	38.50	38.67	38.14
DE (Kcal/kg DM) **	2469	2477	2474	2465	2491
NFC***	31.85	31.50	31.51	31.49	32.67

*DY: Active dried yeast, SY: Selenium treated yeast, CY: Chromium treated yeast, SCY: Selenium & Chromium treated yeast, * Vit. & Min. mixture: Each kilogram of Vit. & Min. mixture contains: 2000.000 IU Vit. A, 150.000 IU Vita. D, 8.33 g Vit. E, 0.33 g Vit. K, 0.33 g Vit. B_1, 1.0 g Vit. B_2, 0.33g Vit. B_6, 8.33 g Vit.B_5, 1.7 mg Vit. B_{12}, 3.33 g Pantothenic acid, 33 mg Biotin, 0.83g Folic acid, 200 g Choline chloride, 11.7 g Zn, 12.5 g Fe, 16.6 mg Se, 16.6 mg Co, 66.7 g Mg and 5 g M, NDF*: Neutral detergent fiber was calculated according to Cheek (1987) using the following equation: NDF = 28.924 + 0.657 (CF%).*

*DE**: Digestible energy fiber was calculated according to Cheek (1987) using the following equation: DE kcal / kg DM = 4.36 – 0.049 (NDF%). NFC***: Non fibrous carbohydrates was fiber was calculated according to Calsamiglia et al. (1995) using the following equation: NFC = 100 – {CP + EE + Ash + NDF}.*

feeding period was extended for 56 days, and the experimental diets contained 0% yeast (Control), 140 g active dried yeast/100 kg diet (DY),140 g selenium treated yeast/100 kg diet (SY), 160 g chromium treated yeast/ 100 kg diet (CY) and (70 g selenium treated yeast + 80 g chromium treated yeast)/ 100 kg diet (SCY). Rabbits individually housed in galvanized wire cages (30 x 35 x 40 cm) stainless steel nipples for drinking and feeders allowing to record individual feed intake for each rabbit. Feed and water were offered *ad-libitum*. Rabbits of all groups were kept under the same managerial conditions and were individually weighed, and feed consumption was individually recorded biweekly during the experimental period. At the middle of the experimental period all rabbits from each group were used in digestibility trials over period of 7 days to determine the nutrient digestibility coefficients and nutritive values of the tested diets. Composite samples of feces were dried, ground and stored for later chemical analysis. At the end of the experimental period, three representative rabbits from each treatment were randomly chosen and fasted for 12 hours before slaughtering according to Blasco *et al.* (1993) to determine the carcass measurement. Edible offal's (Giblets) included (heart, lungs, liver, testes, spleen, kidneys) were removed and individually weighed. Digestive tract was separated into stomach, small and large intestine, where full and empty weights were recorded. Weights of carcass, giblets and external offal's were calculated as percentages of body weight at slaughtering (SW). Hot carcass was weighed and divided into fore, middle and hind parts. The 9,10 and 11^{th} ribs were frozen in polyethylene bags for later chemical analyses. The best ribs of samples were dried at 60 C° for 24 hrs. The air-dried samples were analyzed for DM, EE, and Ash according to the A.O.A.C. (2000) methods, while CP percentage was determined by difference as recommended by O'Mary *et al.* (1979).

Chemical analysis of experimental rations and feces samples were analyzed according to A.O.A.C (2000) methods. Neutral detergent fiber (NDF) was calculated according to Cheek (1987) using the following equation: NDF = 28.924 + 0.657 (CF%). Digestible energy (DE) was calculated according to Cheek (1987) as following: DE (MJ/ kg DM) = 4.36 – 0.049 (NDF%). Non fibrous carbohydrates (NFC), calculated according to Calsamiglia *et al.* (1995) using the following equation: NFC = 100 – {CP + EE + Ash + NDF}. Economic efficiency of experimental diets was calculated according to the local market price of ingredients and rabbit live body weight as following: Net revenue = total revenue – total feed cost. Feed cost / kg LBW (LE) = Feed intake * price kg / live weight. Collected data were subjected to statistical analysis as one way analysis of variance using the general linear model procedure of SPSS (1998). Duncan's Multiple Range Test (1955) was used to separate means when the dietary treatment effect was significant.

RESULTS AND DISCUSSION

Nutrient digestibility coefficients and nutritive values:

Digestibility coefficients of nutrients and nutritive values of the experimental diets are presented in Table (2). The results indicated that there were significant improvements of OM, CF and NFE digestibilities by using selenium active dried yeast; while EE digestibility was significantly decreased, on the other hand, CP digestibility insignificant increased compared to control group. Nutritive values (TDN and DCP) gave the best values with active dried yeast followed by selenium treated dried active yeast. However, there were no significant differences for DM and CP digestibilities. The effect of different sources of active dried yeasts except selenium treated yeast failed to be significant on nutrients digestibility In total, there is no evidence for an improvement on nutrients digestibility coefficient through additional active dried yeast, chromium or selenium + chromium to yeast. Similar results obtained by El-Ashry *et al.* (2003) when they added 5g *saccharomyces cereivisiae* /head/day to the control ration, digestibility coefficient of nutrients, total digestible nutrient (TDN) and digestible crude protein (DCP) did not differ for sheep fed yeast ration compared to those fed control. However, Abdel-Azeem *et al.* (2004) found that with basal diet supplemented with 1.5g yeast or 3g yeast/ kg diet of rabbits, digestibility coefficient of nutrients and nutritive values were the highest in the group fed the basal diet plus 1.5g yeast. While, control groups as well as the group with 3g yeast recorded the same digestibility coefficient and values of TDN and DCP. However, Ghaudhary *et al.* (1995) found that yeast administration to rabbit diets of different fiber content had no effect on digestibility coefficient of nutrients. Omer *et al.* (2010) noted that addition 0.5% active dried yeast to rabbit's diet improved DM, OM, CP, CF and NFE digetibilities compared to the control diet, while TDN% insignificant (P>0.05) improvement.

Table (2): Digestibilities coefficient and nutritive values of the experimental diets

Item	Experimental diets					SEM
	Control	DY	SY	CY	SCY	
Digestibility:						
DM	77.63	76.82	80.61	75.81	78.73	1.09
OM	67.27[b]	70.50[ab]	74.04[a]	69.65[ab]	70.32[ab]	0.83
CP	74.15	76.89	78.19	73.77	75.64	0.72
CF	23.53[b]	30.60[a]	33.70[a]	28.73[a]	26.64[a]	2.60
EE	85.77[a]	84.06[ab]	72.28[b]	78.29[ab]	82.27[ab]	1.96
NFE	75.62[b]	79.62[ab]	80.97[a]	76.27[b]	76.20[b]	0.76
Nutritive values:						
TDN	64.46[b]	70.15[a]	69.96[a]	66.27[ab]	67.48[ab]	0.77
DCP	11.89	12.39	12.51	11.82	12.14	0.12

a and b: Means in the same row having different super scripts differ significantly (P<0.5).
DY: Active dried yeast, SY: Selenium treated yeast, CY: Chromium treated yeast, SCY: Selenium & Chromium treated yeast

Growth performance:

The data presented in Table (3) showed that using different sources of active dried yeast (except SCY) gave insignificant increase of daily feed consumption, average daily gain and feed conversion compared with either those fed control group. It is interesting to notice that, the mortality rate during all the experimental groups was within the normal range among treatments. These results agree with the findings of Juniper *et al.* (2008) who reported that there were no adverse effects on animal health, performance and voluntary feed intake with the administration of at least 10 times. The European Union maximum, or approximately 20 times the us food and drug administration permitted concentration of dietary selenium in the form of selenium enriched yeast dried from a specific strain of *saccharomyces cereivisiae* CNCM1-3060. Similar results obtained with Dokovpilova *et al.* (2007) who noted that, no effect of selenium yeast on growth and feed conversion with rabbits fed selenium yeast. However, Dominguez-Vara *et al.* (2009) found that daily weight gain, total weight gain, feed intake and feed conversion were not affected by selenium yeast supplementation in lamb rations. On the other hand, Lambertini *et al.* (2000) reported that chromium yeast supplementation did not induce any significant differences in daily weight gain and feed to gain ratio on the rabbits performance. Similar results were obtained by Gang *et al.* (2008) who reported

Table (3): Growth performance of the experimental groups

Item	Experimental diets					SEM
	Control	DY	SY	CY	SCY	
Initial weight, g	422	413	411	413	418	4.40
Final weight, g	2453	2424	2447	2436	2436	48.9
Body weight gain, g	2031	2011	2036	2023	2018	6.2
Duration period, days			56 days			
Average daily gain, g	36.3	35.9	36.4	36.1	36.0	0.11
Feed intake:						
Daily feed intake, g (as it is)	109	117	111	111	101	5.51
Dry matter intake (DMI), g	100	107	101	102	92.7	5.04
Total digestible nutrient intake (TDN), g	64.5	72.0	70.7	67.6	62.6	3.39
Crude protein intake (CPI), g	16.0	17.2	16.2	16.3	14.9	0.81
Digestible crude protein intake (DCPI), g	11.9	13.3	12.6	12.1	11.3	0.61
Digestible energy intake (DEI), kcal	247	265	250	251	231	12.4
Feed conversion (g. intake/ g. gain) of						
DM	2.75	2.98	2.77	2.83	2.58	0.14
TDN	1.78	2.01	1.94	1.87	1.74	0.09
CP	0.44	0.48	0.45	0.45	0.41	0.02
DCP	0.33	0.37	0.35	0.34	0.31	0.02
DE	6.8	7.38	6.87	6.95	6.42	0.38

DY: Active dried yeast, SY: Selenium treated yeast, CY: Chromium treated yeast, SCY: Selenium & Chromium treated yeast that chromium yeast had limited effects on growth rate in lambs. Omer *et al.* (2010) reported that addition 0.5% active dried yeast to rabbit's diet insignificantly (P>0.05) increased final weight, body weight gain and average daily gain compared to the control diet. However, daily feed intake insignificantly (P>0.05) decreased, while feed conversion (g. intake/ g. gain) significantly (P<0.05) improved.

Carcass characteristics:

Dressing percentages, carcass cuts and chemical analysis of the 9,10 an 11 th ribs:

Slaughter weight, digestive tract (full and empty), empty body weight, edible offals, carcass weight (g) and dressing percentages were not significantly differing among all the experimental groups (Table 4).

Table (4): Effect of experimental diets on dressing percentages, carcass cuts and chemical analysis of the 9,10 an 11 th ribs

Item	Experimental diets					
	Control	DY	SY	CY	SCY	SEM
Slaughter weight (SW), g	2473	2453	2480	2453	2453	7.00
Digestive tract, g						
Full	376	331	354	354	370	29.11
Empty	145	129	134	140	152	3.91
Content	231	202	220	214	218	9.26
Empty body weight (EBW), g	2242	2251	2260	2239	2235	9.80
Edible offal's, g (Giblets)	127	124	133	114	137	4.28
Carcass weight	1221	1161	1192	1175	1140	14.22
Carcass weight*	1348	1285	1325	1289	1277	13.98
Dressing percentages (DP)%						
DP 1	49.37	47.33	48.06	47.90	46.47	0.56
DP 2	54.46	51.58	52.74	52.48	51.01	0.54
DP 3	60.12	57.09	58.63	57.57	57.14	0.53
Carcass cuts						
Carcass weight (CW), g	1221	1161	1192	1175	1140	14.22
Fore part						
Weight, g	423	410	423	410	397	5.30
% of CW	34.6	35.3	35.5	34.9	34.8	0.19
Middle part						
Weight, g	271a	231b	239b	238b	230b	5.11
% of CW	22.2a	19.9b	20.1b	20.3b	20.2b	0.29
Hind part						
Weight, g	527	520	530	527	513	5.99
% of CW	43.2b	44.8a	44.4a	44.8a	45.0a	0.24
Chemical analysis of the 9,10 and 11 th ribs						
Dry matter	29.54	29.51	33.02	32.86	31.53	0.97
Chemical composition on DM basis						
CP	62.12	65.56	60.04	57.28	57.96	1.78
EE	28.30	24.53	32.79	34.77	34.37	1.86
Ash	9.58a	9.91a	7.17b	7.95b	7.67b	0.35

* *Carcass weight: included edible offal's (Liver, heart, kidneys, lungs, spleen and testes).*
DP 1 : Dressing percentages calculated as (carcass weight / slaughter weight).
DP 2 : Dressing percentages calculated as (carcass weight / empty body weight).
DP 3 : Dressing percentages calculated as (carcass weight + edible offal's / empty body weight)
EBW: Empty body weight = Slaughter weight – digestive tract content..
a, and b: Means in the same row within each treatment having different super scripts differ significantly (P<0.5).

Carcass cuts as fore part were not affected by the different experimental diets. However, middle part was significantly lower in rabbits fed diet supplemented with different sources of yeast as compared to those fed control diet. On the other hand, hind part was significantly higher in rabbits fed diets supplemented with different sources of yeast as compared to those fed control diet. Omer *et al.* (2010) found that dressing percentages was not affected by addition 0.5% active dried yeast to rabbit's diet compared to control diet.

Chemical analysis of the 9, 10 and 11[th] ribs showed that DM, CP and EE were insignificant differences among treatments, but ash was significantly decreased with SY, CY and SCY than control diets. Similar results were observed by Barbosa *et al.* (2007) who found that, the effect of dry yeast (*saccharomyces cereivisiae*) on the quality of rabbit carcass, rabbit meat composition, carcass weight, skin weight, head weight, thigh weight, loin weight, thorax weight and palettes were not significant (P>0.05).

Table (5): Effect of experimental diets on external, internal offal's (Giblets) and digestive tract measurements

Item		Experimental diets					
		Control	DY	SY	CY	SCY	SEM
Slaughter weight (SW), g		2473	2453	2480	2453	2453	7.00
External offal's:							
	weight, g	668	642	632	642	650	6.09
	% of SW	27.0a	26.1ab	25.5b	26.1ab	26.5ab	0.21
Internal offal's(Giblets):							
Liver	weight, g	75.0	74.0	80.0	67.0	85.0	3.96
	% of SW	3.04	3.01	3.22	2.72	3.47	0.16
Heart	weight, g	8.33	9.67	9.67	9.33	8.33	0.38
	% of SW	0.34	0.40	0.39	0.38	0.34	0.02
Lungs	weight, g	14.67	12.00	13.67	11.00	14.33	0.61
	% of SW	0.59	0.49	0.55	0.45	0.58	0.02
Kidneys	weight, g	18.33	18.67	19.33	16.00	17.00	0.62
	% of SW	0.74	0.76	0.78	0.65	0.69	0.03
Spleen	weight, g	1.33	1.33	1.33	1.00	1.67	0.13
	% of SW	0.05	0.05	0.05	0.04	0.07	0.01
Tests	weight, g	9.33	8.67	8.67	9.67	10.33	0.30
	% of SW	0.38	0.36	0.35	0.39	0.42	0.01
Total	weight, g	127.0	124.0	133.0	114.0	137.0	4.28
	% of SW	5.14	5.06	5.36	4.65	5.58	0.17
Digestive tract measurements							
Stomach:							
Full	weight, g	106	99	104	101	114	4.46
	% of SW	4.29	4.02	4.21	4.13	4.66	0.18
Empty	weight, g	26	25	27	27	30	0.95
	% of SW	1.07	1.01	1.08	1.09	1.24	0.04
Content	weight, g	80	74	77	74	84	3.70
	% of SW	3.22	3.01	3.13	3.04	3.42	0.15
Small intestine:							
Full	weight, g	99	91	84	83	91	3.09
	% of SW	4.00	3.71	3.37	3.39	3.72	0.12
Empty	weight, g	64	64	61	55	73	2.85
	% of SW	2.58	2.59	2.45	2.24	2.96	0.12
Content	weight, g	35a	27ab	23b	28ab	18b	2.03
	% of SW	1.42a	1.12ab	0.92b	1.15ab	0.76b	0.08
Large intestine:							
Full	weight, g	171	141	166	170	165	8.14
	% of SW	6.89	5.75	6.68	6.92	6.71	0.33
Empty	weight, g	55	40	46	58	49	2.76
	% of SW	2.22ab	1.64b	1.86ab	2.37a	2.01ab	0.11
Content	weight, g	116	101	120	112	116	6.61
	% of SW	4.67	4.11	4.82	4.55	4.70	0.26
Digestive tract:							
Full	weight, g	376	331	354	354	370	11.45
	% of SW	15.18	13.48	14.27	14.43	15.1	0.46
Empty	weight, g	145	129	134	140	152	3.91
	% of SW	5.86	5.24	5.38	5.71	6.21	0.16
Content	weight, g	231	202	220	214	218	9.26
	% of SW	9.32	8.24	8.89	8.72	8.89	0.37

External offal's: included (Head, fur, legs and ears),.a, and b: Means in the same row having different superscripts differ significantly (P<0.5).

External, internal offal's (Giblets) and digestive tract measurements:

Data published in Table (5) showed that, neither active dried yeast nor selenium, chromium or combination of selenium and chromium addition to rabbit diets had any effect on either external, internal offal's and digestive tract of the experimental groups. These results are in agreement with those obtained by Radwan *et al.* (1996), Ali (1999), El-Adawy *et al.* (2000) who reported that probiotics addition to growing rabbit diets had no significant effect on carcass, giblets and dressing percentages. However, this result is in contrast with that obtained by Aziza and Gomaa (2002) and Gomaa *et al.* (2003) who conducted that feeding diet contained yeast culture increased significantly the dressed weight, dressing percentage and edible parts. However, Abdel-Azeem *et al.* (2004) found that rabbits fed diets either with or without addition of *yea-sacc* (0.00%. 0.20% or 0.30%) had no effect on either carcass traits or digestive tract measurements. Dokoupilova *et al.* (2007) found that no effect for selenium on growth, feed conversion and dressing percentages with rabbits fed selenium yeast; while, Lambertini *et al.* (2000) found that chromium yeast supplementation did not induce any significant differences in daily weight gain, feed to gain ratio , hot carcass weight, dressing percentages, kidney deposit, scapular fat deposit, or left hind leg percentage and meat/ bone ratio. No differences in chromium level were observed for *longissimus dorsi* pH and color. Lambertini *et al.* (2004) observed no positive effects on the rabbit growth performance, carcass and meat quality and did not increase the chromium content of meat for human consumption when chromium yeast supplementation were used. Omer *et al.* (2010) found that addition 0.5% active dried yeast to rabbit's diet had no significant effect on digestive tract measurements.

Economical evaluation:

Data in Table (6) showed that total feed cost was lower for selenium + chromium treated yeast than other treatments. This may be due to lower total feed intake for selenium + Chromium treated yeast than other treatments. This observation confirmed with those obtained by Tag El-Din *et al.* (1999) and Gomaa *et al.* (2003) who reported that yeast culture improved economic efficiency. Net revenue were better for selenium + chromium treated yeast followed by the control diet, selenium treated yeast, chromium yeast and dried yeast. This may be due to dietary chromium and selenium trace elements that appears to be an essential micro nutrient for animals. Its deficiency in nutrition may causes decreases the productivity of domesticated animals. Similar results were obtained by (Foster and Sumer, 1997). Relative economic efficiency and feed cost kg/LBW were also better for selenium + chromium treated yeast followed by other treatments.

Table (6): Economic studies

Item	Experimental diets					SEM
	Control	DY	SY	CY	SCY	
Total feed intake, kg	6.104	6.552	6.216	6.216	5.656	---
Total feed cost, LE	10.99	11.75	11.17	11.18	10.17	---
Managements/ Rabbit, LE [1]	4	4	4	4	4	---
Total cost, LE [2]	26.99	27.75	27.17	27.18	26.17	---
Total revenue, LE [3]	49.06	48.48	48.94	48.72	48.72	---
Net revenue, LE	22.07	20.73	21.77	21.54	22.55	---
Relative economic efficiency (%)[4]	100	93.9	98.6	97.6	102.2	---
Feed cost/ kg LBW, (LE) [5]	4.48	4.85	4.56	4.59	4.17	---

DY: Active dried yeast, SY: Selenium treated yeast, CY: Chromium treated yeast, SCY: Selenium & Chromium treated yeast

1- Include medication, vaccines, sanitation and workers.

2- Include the feed cost + cost of experimental rabbits which was LE 12/ rabbit + managements.

*3- Body weight * price of one kg at selling which was LE 20 at the time of the experiment.*

4- Assuming that the relative economic efficiency of control diet equal 100.

*5- Feed cost / kg LBW (LE) = Feed intake * price kg / live weight*

CONCLUSION

Generally, it could be recommended to use the combination of selenium and chromium treated yeast in the growing rabbit diets to get the best relative economic efficiency values without any harmful effects on growing rabbit performance.

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استجابة الأرانب النامية للعلائق المحتوية على مصادر مختلفة من الخميرة

فؤاد أحمد فريد على ، رشدى إبراهيم القاضى ، حامد عبدالعزيز على عمر ، شوقى أحمد محمد إبراهيم ، سوسن منصور أحمد

قسم الإنتاج الحيوانى- المركز القومى للبحوث- الدقى- الجيزة- مصر.

تم إجراء هذه الدراسة بمزرعة إنتاج الأرانب بمحطة التجارب بالنوبارية التابعة للمركز القومى للبحوث وتم إجراء التحليلات المعملية بقسم الإنتاج الحيوانى- المركز القومى للبحوث- دقى جيزة- مصر. أستخدم فى هذه الدراسة خمسة وأربعون ذكر أرانب نيوزيلندى أبيض متوسط وزن415 جم ومتوسط عمر 3-4 أسابيع قسمت إلى خمسة مجاميع تجريبية متساوية تحتوى كل مجموعة تسعة حيوانات بهدف دراسة تأثير المصادر المختلفة من الخميرة على أداء الأرانب النامية وتم تكوين خمسة علائق تجريبية كما يلى:

العليقة الأولى : عليقة المقارنة ولم تحتوى على خميرة.

العليقة الثانية : تحتوى على خميرة جافة نشطة (140 جم/ 100 كجم عليقة).

العليقة الثالثة : تحتوى على خميرة معاملة بالسيلينيوم (140 جم/100 كجم عليقة).

العليقة الرابعة : تحتوى على خميرة معاملة بالكروميوم (160 جم/ 100 كجم عليقة).

العليقة الخامسة: تحتوى على خميرة معاملة بالسيلينيوم + خميرة معاملة بالكروميوم (70 جم خميرة معاملة بالسيلينيوم + 80 جم معاملة بالكروميوم/100 كجم عليقة)

واستمرت تجربة التغذية لمدة 8 أسبوع (56 يوم) وغذيت المجاميع التجريبية طبقاً للمقررات الغذائية لـ (1977) . وأظهرت النتائج ما يلى:

لم يكن للعلائق التجريبية تأثير معنوى على معاملات الهضم لكلا منّ معامل هضم كلا من المادة الجافة والبروتين الخام. إضافة الخميرة المعاملة بالسيلينيوم أظهرت تحسن معنوى فى معامل هضم المادة العضوية والألياف الخام والكربوهيدرات الذائبة مقارنة بعليقة الكنترول فى حين انخفض معنوياً معامل هضم مستخلص الأيثر. كما أدى إضافة الخميرة الجافة أو المعاملة بالسيلينيوم أو الكروميوم أو مخلوطهما إلى تحسن معنوى فى معامل هضم الألياف مقارنة بالعليقة الكنترول.

وأدت أيضا المعاملات الغذائية إلى تحسن فى القيم الغذائية لكلا من المركبات المهضومة الكلية Total digestible nutrient (TDN) و البروتين المهضوم Digestible crude protein (DCP).

ولم يكن للمعاملات الغذائية تأثير معنوى على معدل أداء الحيوانات والوزن النهائى ومعدل الزيادة الكلية ومعدل النمو اليومى.

لم يكن للمعاملات الغذائية تأثير معنوى على قياسات الذبيحة المختلفة (وزن الذبح ، وزن القناة الهضمية ممتلئة أو فارغة ، وزن الجسم الفارغ ، الأجزاء المأكولة ، وزن الذبيحة ، نسبة التصافى).

أدى استخدام الخميرة النشطة الجافة المعاملة بالسلينيوم والكروميوم إلى تحسين الكفاءة الاقتصادية مقارنة بالمعاملات الأخرى.

من خلال النتائج المتحصل عليها فى هذه الدراسة يمكن الإشارة على أنه يمكن استخدام الخميرة النشطة الجافة فى علائق الأرانب عند المستويات المقررة فى هذه الدراسة دون حدوث تأثير سلبى على معاملات الهضم أو أداء الحيوانات أو وزن الذبيحة أو نسبة التصافى.