EFFECT OF AMINO YEAST ADDITION ON GROWTH PERFORMANCE, DIGESTION, CARCASS TRAITS AND ECONOMICAL EFFICIENCY OF GROWING RABBIT.

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SUMMARY

This work was carried out to evaluate the effects of Amino Yeast (commercial probiotics contained yeast plus some amino acids) on growing rabbit performance. Forty weaned New Zealand White (NZW) male rabbits with average body weight of 710 ± 20 g were randomly assigned to 4 groups (10 animals in each). The control group fed basal diet; the 2nd, 3rd and 4th groups fed basal diet supplemented with 0.25, 0.5 and 0.75% amino- yeast, respectively. Addition of amino-yeast significantly (P≤0.05) increased daily body weight gain, carcass traits, feed conversion and digestibility of each of dry matter, organic matter, crude fiber and total digestible nutrients (TDN %). Also, economic efficiency improved by 0.25, 0.5 or 0.75% amino-yeast addition, which were 131, 115 and 117 % for addition compared to 100 % of control. It could be concluded that adding 0.25 % amino-yeast to diets of growing rabbit improve its performance, carcass traits and economical efficiency.

Keywords: *rabbit; yeast; weight gain; feed intake; feed conversion; carcass traits.*

INTRODUCTION

Enhance feed conversion and protect rabbits against pathogens through ways other than using antibiotics as feed additives are required (Abdelmawla *et al.*, 2007). Yeasts are known as rich sources of vitamins, enzymes and other important nutrients and cofactors which make them attractive as digestive enhancers as a basic source of nutrients (Ismail *et al.*, 2004). The cell wall of yeasts such as *Saccharomyces cerevisiae* contains probiotics (mannanoligosaccharides and fructo-oligosaccharides). These compositions are the principle functional components of this culture used as probiotics (Miles and Bootwella, 1991). Yeast inhibit harmful bacteria by altering intestinal pH, increase nutrient digestion, absorption, feed conversion efficiency. immunity and stimulate animal growth (Makled, 1991, Santin *et al.*, 2001; Gomma *et al.*, 2003 and Resta and Barrett, 2003). The present work was carried out to evaluate the effect of amino-yeast (commercial probiotics contained yeast plus some amino acids) on growing rabbit performance.

MATERIALS AND METHODS

The experimental work was carried out at the Rabbit Research Farm, Faculty of Agriculture, Zagazig University, Egypt, during 2010. Forty weanling New Zealand White (NZW) male rabbits with average body weight of 710 ± 20 g were randomly assigned to 4 groups (10 animals in each). The control group fed basal diet, while the 2nd, 3rd and 4th groups fed basal diet supplemented with 0.25, 0.5 and 0.75% amino -yeast (as addition), respectively for 6 weeks. Amino-yeast produced by Pure Farm, Egypt. Each one kg of Amino Yeast contains 400 g mannanoilgosaccharides, 44.5 g Beta glucan, 150 mg rhammose, 300 mg xylose, 10.11 g DL methionine, 2.60 g lysine and 25 g colin chloride.

The formulation and chemical composition of the basal diet are shown in Table (1). Daily fresh water was available all time. At the last week of the trial, feed intake and feces excreted of 4 rabbits from each

treatment were recorded daily for digestibility trials. Proximate chemical analysis of feed and feces were determined according to A.O.A.C. (1990).

Table (1): Formulation and chemical composition (%) of basal diet.

Ingredients	%
Yellow corn	17.00
Clover hay	35.00
Wheat bran	20.00
Barley	10.00
Soybean meal	13.00
Molasses	3.00
Sodium chloride	0.20
Methionine	0.20
Vitamin and minerals	0.30
Bone meal	1.00
Limestone	0.30
Chemical composition (DM)	
OM	89.90
CP	16.80
CF	16.30
EE	2.30
NFE	54.50
Ash	10.10

Animals were housed in individual cages under the same managerial, hygienic and environmental conditions allover the experimental period. Live body weight was recorded for each rabbit individually every two weeks to calculate the daily weight gain. At the end of the experimental period, four male rabbits from each treatment group were randomly taken and fastened for 12 hrs with free water supply then slaughtered. The carcass traits were determined.

Data of each trial were statistically analyzed by the General Linear Model using SAS® Software Statistical Analysis (SAS, 1996). Differences among means were tested by Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Growth performance:

Amino-yeast significantly ($P<0.05$) improved daily body weight gain (Table 2). The average increase in daily body weight gain were 122, 109 and 111% by 0.25, 0.50 and 0.75 % as a result of amino-yeast addition levels, respectively compared with the control group (100%). The best values of body gain was recorded by adding 0.25% amino-yeast. These results agreed with those obtained by Onifade *et al.* (1999) and Abdelmawla *et al.* (2007) who reported that addition 0.2 and 0.3% of yeast significantly ($P\leq0.05$) increased body weight gain of rabbits by 122 and 119%, respectively in comparison with control (100%). Also, these results are in harmony with those reported by Hammad and Gomaa (2001) and Gomma *et al.*, (2003).

Feed intake did not significantly change due to levels of amino-yeast (Table 2). These results are in accordance with those obtained by Onifade and Babatunde (1996) and Flemming *et al.* (2004), who reported that feed intake of broilers did not affected by supplementation of dried yeast or mannanoligosaccharides of yeasts. Onifade *et al.* (1999) reported that yeast addition significantly ($P\leq0.05$) increased feed intake of rabbits. On the other hand, Abdel-Azeem *et al.* (2004) found that rabbits fed diets supplemented with yeast culture significantly ($P\leq0.05$) recorded the lowest feed intake and feed conversion ratio compared with the control group.

Feed conversion had the same trend of daily body weight gain. The best values of feed conversion were obtained by adding 0.25% amino-yeast, these results may be due to improving the digestibility of nutrients (Table, 3) and absorption.

Table (2): Effect of amino-yeast addition on body weight, daily body weight gain, feed intake and conversion and economical efficiency.

Item	Amino Yeast levels			
	Control 0.0%	0.25%	0.5%	0.75 %
Live body weight (g):				
Initial	712.50 ± 21	715.00 ± 14	719.17 ± 11	705.00 ± 24
2 weeks	1216.64 ± 31	1335.06 ± 67	1262.51 ± 38	1285.02 ± 29
4 weeks	1603.32^{b} ± 27	1776.06^{a} ± 55	1673.41^{ab} ± 43	1720.00^{ab} ± 50
6 weeks	1957.10^{b} ± 23	2227.28^{a} ± 64	2079.97^{ab} ± 39	2089.04^{ab} ± 54
Daily body gain (g):				
2 weeks	36.01^{b} ± 2.52	44.29^{a} ± 1.12	38.81^{ab} ± 1.49	41.43^{ab} ± 1.87
4 weeks	27.62 ± 2.75	31.50 ± 2.09	29.35 ± 1.08	31.07 ± 2.54
6 weeks	25.27^{b} ± 1.09	32.23^{a} ± 1.42	29.04^{ab} ± 1.05	26.36^{b} ± 1.59
Average	29.63^{b} ± 1.65	36.07^{a} ± 1.66	32.40^{ab} ± 1.28	32.95^{ab} ± 1.89
Feed intake (g):				
2 weeks	76.79^{b} ± 2.57	87.29^{a} ± 1.99	81.26^{ab} ± 2.91	78.45^{b} ± 1.82
4 weeks	113.80 ± 5.11	113.43 ± 4.27	107.14 ± 6.01	110.12 ± 3.95
6 weeks	111.75 ± 7.67	108.14 ± 3.81	103.45 ± 4.61	105.16 ± 6.47
Average	100.78 ± 5.09	102.95 ± 3.33	97.29 ± 3.76	97.91 ± 4.16
Feed conversion (feed/gain):				
2 weeks	2.20 ± 0.13	2.06 ± 0.11	2.12 ± 0.09	1.90 ± 0.06
4 weeks	4.71^{a} ± 0.22	3.68^{b} ± 0.27	3.65^{b} ± 0.15	3.65^{b} ± 0.29
6 weeks	4.56^{a} ± 0.46	3.56^{b} ± 0.15	3.61^{b} ± 0.26	4.06^{ab} ± 0.21
Average	3.82^{a} ± 0.32	3.10^{b} ± 0.21	3.13^{b} ± 0.20	3.20^{b} ± 0.25
Economical efficiency:				
Total gain (g)	1244.46	1514.94	1360.80	1383.90
Total feed intake (kg)	4.23	4.32	4.09	4.11
Feed cost (LE)*	8.46	8.71	8.30	8.40
Gain price (LE)**	24.89	30.30	27.22	27.68
Profit above feed cost***	16.43	21.59	18.92	19.28
Relative profit (%) ****	100	131	115	117

a. b,... Means in the same row bearing different letters differ significantly (P<0.05).

**= total feed intake x price (price of 1 kg control diet was 2 pound (price 2010). One kg of amino yeast coasted 6 pound. The price of one kg diet plus 0.25, 0.5 or 0.75% Amino Yeast were 2.015, 2.03 and 2.045, respectively.*

= total gain x 20 (one kg 20 pound).* *= gain price – feed cost*

*****= relative profit for treatment/ net revenue of control x 100.*

Digestibility and nutritive values:

Addition of amino-yeast significantly (P <0.05) increased dry matter, organic matter, crude fiber digestibilities and total digestible nutrients (TDN), however, it insignificantly increase in crude protein and nitrogen free extract as shown in Table (3). The best results of digestibility and nutritive values were observed by adding 0.25% amino-yeast to the diet. The present results agreed with those obtained by Abdelmawla *et al.* (2007), Gomma *et al.* (2003) and Abdel-Azeem *et al.* (2004), who reported that addition of yeast to rabbit diets increased digestibilities of all nutrient and nutritive values (TDN and DCP %). The obtained improvement in rabbit performance as a result of amino-yeast addition may be attributed to its ability to induce the microbial equilibrium of the gut by its ability to bind the fimbria of pathogenic bacteria and inhibiting its colonization in the gastrointestinal tract (pathogenic microorganisms decrease nutrient absorption, increase the rate of passage of the digesta and interfere with intestinal cell wall turnover rate and the thickness of the intestinal mucosa), enhancing the growth of desirable gastrointestinal microbes of the host animal and improvement of the integrity of the intestinal mucosa, thereby increasing the absorption and utilization of the dietary nutrients and stimulating animal performance and immunity (Fuller, 1988 and Bradley and Savag, 1994).

Carcass traits:

Addition 0.25 and 0.5% amino-yeast increased (P<0.05) the dressing percentage and edible organs (front, medium and hind limb) (Table, 4) than the control group. These results agreed with those obtained

by Abdelmawla *et al.* (2007), who reported that yeast culture increased (P<0.05) the dressing percentage of growing rabbits.

Table (3): Effect of amino-yeast addition on digestibility and nutritive values of nutrients.

Nutrient	Amino Yeast levels			
	Control 0.0%	0.25%	0.5%	0.75 %
Digestibility (%):				
DM	$63.56^{c} \pm 0.55$	$66.67^{a} \pm 0.63$	$65.37^{ab} \pm 0.22$	$64.30^{bc} \pm 0.61$
OM	$65.24^{b} \pm 0.49$	$67.53^{a} \pm 0.64$	$65.87^{b} \pm 0.62$	$64.97^{b} \pm 0.63$
CP	66.85 ± 0.59	68.98 ± 0.30	68.22 ± 0.64	66.68 ± 1.44
CF	$32.47^{b} \pm 0.98$	$35.31^{a} \pm 0.72$	$35.50^{a} \pm 0.35$	$34.97^{a} \pm 0.43$
EE	89.09 ± 0.51	88.70 ± 0.25	88.33 ± 1.02	87.67 ± 0.63
NFE	78.73 ± 0.52	80.46 ± 0.24	79.77 ± 0.52	79.38 ± 0.86
Nutritive values (%):				
TDN	$64.04^{b} \pm 0.39$	$65.91^{a} \pm 0.27$	$65.29^{ab} \pm 0.40$	$64.71^{ab} \pm 0.65$
DCP	11.23 ± 0.10	11.59 ± 0.10	11.46 ± 0.21	11.20 ± 0.24

a, b.... Means in the same row bearing different letters differ significantly (P<0.05).

Table (4): Effect of amino-yeast addition on carcass traits.

Organs	Amino Yeast levels			
	Control 0.0%	0.25%	0.5%	0.75 %
Dressing %	$51.54^{b} \pm 0.35$	$56.63^{a} \pm 0.50$	$54.93^{a} \pm 0.31$	$56.50^{a} \pm 0.45$
Head	$6.47^{ab} \pm 0.11$	$6.08^{b} \pm 0.002$	$6.50^{a} \pm 0.06$	$6.18^{ab} \pm 0.11$
Front limb	17.25 ± 0.34	18.70 ± 0.19	19.23 ± 0.13	19.86 ± 0.78
Medium limb	11.15 ± 0.29	13.10 ± 0.64	12.61 ± 0.25	12.84 ± 0.33
Hind limb	$19.81^{b} \pm 0.20$	$21.72^{a} \pm 0.13$	$19.86^{b} \pm 0.36$	$20.23^{b} \pm 0.02$
Liver*	$3.33^{ab} \pm 0.25$	$3.11^{b} \pm 0.13$	$3.43^{ab} \pm 0.30$	3.57a ± 0.08
Kidneys*	$0.70^{ab} \pm 0.03$	$0.65^{ab} \pm 0.07$	$0.74^{a} \pm 0.06$	$0.63^{b} \pm 0.06$
Lungs*	0.77 ± 0.22	0.55 ± 0.02	0.60 ± 0.05	0.65 ± 0.08
Hearts*	0.38 ± 0.02	0.38 ± 0.06	0.39 ± 0.05	0.37 ± 0.07
Testis*	0.19 ± 0.05	0.26 ± 0.05	0.24 ± 0.02	0.28 ± 0.05

a, b.... Means in the same row bearing different letters differ significantly (P<0.05).

**= % of live body weight*

Economical efficiency:

The economical efficiency results indicated that addition of amino-yeast improved the economical efficiency (Table, 2). The economical efficiency 131, 115 and 117 % for 0.25, 0.5 and 0.75 amino-yeast addition in compared to 100 % of control. These results agreed with Abdelmawla *et al.* (2007), who reported that the economical efficiency were 149.90, 150.50 and 133.20% for rabbits fed 0.1, 0.2 and 0.3% yeast culture, respectively, in compared with the control (100%).

Based on the results of this work, it is recommended to add 0.25 % amino-yeast to the growing rabbit diets to improve rabbit performance, carcass traits and economical efficiency.

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تأثير اضافة الأمينويست على النمو و الهضم و قياسات الذبيحة والكفاءة الاقتصادية للأرانب النامية

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تم اجراء هذا البحث لدراسة تأثير الأمينويست (دافع نمو يحتوى على الخميرة بالاضافة لبعض الأحماض الأمينية) على أداء الأرانب النامية. استخدم 40 ذكر نيوزيلندى مفطوم (متوسط الوزن عند البداية 710 ± 20 جم) تم توزيعها على 4 مجموعات (10 حيوانات فى المعاملة). تغذت مجموعة الكونترول على العليقة القاعدية بينما تغذت المجموعات من 2-4 على العليقة القاعدية مضاف لها 0.25 ، 0.50 ، 0.75 % أمينويست على التوالى.

اضافة الأمينويست زادت معنويا معدل النمو اليومى ، قياسات الذبيحة ، كفاءة التحويل الغذائى ، معاملات هضم كل من المادة الجافة ، المادة العضوية ، الألياف الخام وكذلك مجموع المركبات الغذائية المهضومة (TDN). تحسنت الكفاءة الاقتصادية أيضا باضافة 0.25 ، 0.50 ، 0.75 % أمينويست حيث كان الربح 131 ، 115 و 117% على التوالى مقارنة ب 100% للكنترول.

الاستنتاج هو ان اضافة 0.25% أمينويست لعليقة الأرانب النامية يحسن أدائها ، خصائص الذبيحة والكفاءة الاقتصادية.