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INFLUENCE OF LIVE YEAST FEED ADDITIVES ON PRODUCTIVE PERFORMANCE OF GROWING RAHMANY LAMBS.

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ABSTRACT

This study was carried out to evaluate the effects of adding two levels of Rumi live yeast (RLY), which is a commercial probiotic containing yeast on productive performance of Rahmany lambs. Twenty-one Rahmany lambs after weaning at three months of age with an average live body weight of 19.33±0.2 Kg were assigned to three groups according to live body weight (7 lambs each). They were randomly assigned to the three experimental diets. The control group was fed 35% corn silage and 65% concentrate feed mixture on DM basis, without Rumi live yeast addition (R1, control). The other two groups were fed the same control ration along with 3 and 5g RLY/ head/day (R2 and R3, respectively). Addition of RLY significantly (P<0.05) increased average daily gain, all nutrients digestibility, digestibility of cell wall constituents (NDF, ADF, cellulose, hemicellulose) and improved feeding values (TDN and DCP%) and feed conversion. Blood constituents were generally normal in all experimental groups, however, blood plasma total protein, albumin and globulin were significantly (P<0.05) higher for animals fed 3 or 5gm RLY additives rations. Feed conversion efficiency was significantly (P<0.05) improved for lambs fed rations contained 3 or 5g RLY and the effect on daily gain was more pronounced with increasing the levels of RLY compared with the control ration. Results of growth performance showed that there were improvements with respect to total body gain and average daily gain in groups R2 and R3. Also, the best feed and relative economic efficiency were achieved by group fed 5g/h/d yeast followed by group fed 3 g/h/d yeast and the lowest was recorded with control ration. It was concluded that adding 3 or 5g of RLY to rations of growing Rahmany lambs improved their performance, digestibility, average daily gain and feed conversion and the best results were achieved with 5g/h/d supplementation level of RLY.

Keywords: Rahmany lambs, yeast, digestibility coefficients, weight gain, feed intake, feed conversion.

INTRODUCTION

Increasing consumer concern over the safety of chemical growth promoters as a result of recent research trials has lead to a renewed interest in yeast cultures as feed additives direct feed microbial (DFM). Production positive responses have been reported with both lactating and growing ruminants (Williams and Newbold, 1990, Gabr *et al*., 2004 and Mehrez *et al*., 2004). The mechanism by which yeast or yeast culture act to enhance animal's productivity was unclear until recently. Specific yeast strains of *Saccharomyces cerevisiae* were found to be active in the rumen (Chaucheyras-Durand and Fonty, *2002). Girard et al. (1993) reported that* *strains of yeast differed in their ability to increase the number* of viable ruminal bacteria *in vitro* and *in vivo*. Yeast cultures are able to stimulate specific bacterial populations in the rumen leading to increased fiber digestion and lactate utilization. The use of yeast culture as a dietary supplement has been suggested as a useful tool to stabilize ruminal fermentation (Williams *et al.*, 1991). Yeast culture products contain *Saccharomyces cerevisiae* fermentation metabolites (i.e., B vitamins, amino acids, organic acids) that work as stimulatory nutrients to specific fiber-digesting organisms (Wiedmeier *et al.*, 1987). Direct fed microbes are feed additives that function as modifiers of rumen fermentation. The most important direct fed microbes used in ruminant nutrition are different strains of yeast (Chiquette, 1995). Probiotics could regulate and improve the balance of the microbial environment of the intestine, decrease digestive disturbances, inhibit of pathogenic intestinal microorganisms especially *Escherichia coli* (Salem *et al*., 2000). Production responses to yeast are usually related to stimulation of cellulolytic and lactate-utilization bacteria in the rumen, increases fiber digestion and flow rate of microbial protein from the rumen (Newbold *et al*., 1996). Galip (2006) reported that the addition of yeast would play an important role in rams fed diets high in forage than in those consumed high concentrate diets. Kung and Muck (1997) reported that yeasts were essentially washed out of ruminal continuous fermenters. The debate on the need for LYC with beneficial properties will continue, unless more definitive studies addressing this issue are conducted. The goal of many of these research activities has been to define the application and production strategies that can optimize animal responses to LYC supplements. Continuous research with LYC supplements has clearly established scientifically proven strategies for modifying and optimizing microbial activities in the gastrointestinal ecosystem and techniques for improving performance and health of ruminants (Denev *et al.*, 2007). The main objective of this study was to investigate the effects of adding 3 or 5g as two levels of Rumi live yeast (RLY) to rations on digestibility coefficients, rumen liquor, blood parameters and productive performance of Rahmany lambs and its economical efficiency.

MATERIALS AND METHODS

The experimental work of this study was carried out at El–Serw Experimental Station, Animal Production Research Institute, Agriculture Research Center. Twenty-one Rahmany lambs after weaning at three months of age with an average live body weight 19.33±0.2 kg were assigned to three groups according to live body weight (7 lambs for each). They were assigned at random to the three experimental diets. The control group was fed 35% corn silage (CS) and 65% concentrate feed mixture (CFM), on DM basis without additives (R1, control). The other two groups were fed the same control ration along with 3 or 5g RLY/head/day (R2 and R3 rations, respectively), which their chemical composition is presented in Table (1). Animals were fed according to NRC (1985) recommendations. The animals were fed the three respective rations in two meals/day (8 a.m. and 3 p.m.).

Table (1): Determined Chemical composition of ingredients used to formulate the tested rations and their calculated composition (% on DM basis).

Item	Corn silage (CS)	Concentrate feed mixture (CFM)
DM	30.2	91.20
OM	88.26	87.50
CP	7.96	16.10
CF	26.83	14.01
EE	2.12	4.29
NFE	51.35	53.1
Ash	11.74	12.50
NDF	49.65	39.00
ADF	31.42	23.00
ADL	6.75	6.30
Cellulose	24.67	16.70
Hemicellulose	18.23	16.00

Calculated chemical composition of the experimental rations on DM basis, %:

Item	R1	R2	R3
DM	65.4	65.00	65.12
OM	87.83	87.93	87.85
CP	12.70	12.60	12.62
CF	19.40	19.50	19.52
EE	3.37	3.36	3.36
NFE	52.36	52.47	52.35
NDF	43.48	43.56	43.55
ADF	26.55	26.60	26.60
ADL	6.49	6.50	6.49
Cellulose	20.06	20.10	20.11
Hemicellulose	16.93	16.96	16.95

*** Concentrate feed mixture (CFM) consisted of: 35% ground yellow corn, 25% undecorticated cotton seed meal, 5% soybean meal, 15% wheat bran, 12% rice bran, 5% cane molasses, 2% lime stone and 1% common salt.**

The lambs were weighed biweekly in the morning before feeding, through six months as fattening period. Animals of each treatment were fed in group feeding, while daily dose of feed additives RLY 3 and 5 g/h/d were given to animals via mouth for each lamb in the tested rations according to the recommendation of the company (Multi Vita, Egypt) in the morning feeding. Fresh water was available all time.

At the end of the experimental period, nutrients digestibility coefficients were estimated by acid insoluble ash (AIA) technique according to Van Keulen and Young (1977) using three rams for each ration. The fecal samples were collected twice daily during 10 days from all groups. Feces samples of each ram were mixed well and kept in the refrigerator for chemical analysis, samples of feed and feces were analyzed according to A.O.A.C. (1995). Fiber fractions, neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL), were determined according to Van Soest (1982). Hemi-cellulose and cellulose were calculated by differences between NDF and ADF, ADL orderly. At the end of the experiment trials, rumen fluid samples were taken from three lambs of each group using stomach tube before feeding and 3 and 6 hrs post-feeding). The samples were filtered through 3 layers of gauze. The Ruminal pH values were measured immediately by pH meter (Orion Research, model 201/digital pH meter). Ammonia nitrogen (NH_3-N) concentration was measured according to Conway and O'Mally (1957). Total VFA's concentration was determined by the steam distillation method according to Abou-Akkada and Osman (1967). Protozoa counts were determined according to Difco (1984) and microbial protein was measured by sodium tangistate methods according to Shultz and Shultz (1970). Blood samples were drawn from the jugular vein from three lambs of each group at 4 hours after morning feeding and centrifuged for 20 min at 3000 r.p.m. The supernatant was frozen and stored at -20^{o}C for subsequent analysis. Plasma total protein was determined according to (Armstrong and Carr 1964); albumin according to (Doumas *et al.,* 1971); GOT and GPT according to (Reitman and Frankel, 1957); creatinine according to (Folin, 1994) and urea according to (Siest *et al.,* 1981). Economic efficiency was calculated as total output / total input according to the local prices.

Collected data of nutrients digestibilities, rumen fermentation, blood parameters and growth performance were subjected to statistical analysis using one-way-analysis of variance according to Snedecor and Cochran (1980) uses the following mathematical model:

$$Y_{ij} = \mu + T_i + e_{ij}$$

Where: Y_{ij} is the parameter under analysis, μ is the overall mean, T_i is the effect due to treatment and e_{ij} is the experimental error. The general linear model of SAS (2001) program was used in processing measured parameters. The difference between means was statistically measured for significance at ($P<0.05$) according to Duncan's test (1955).

RESULTS AND DISCUSSION

Digestibility coefficients and nutritive value:

All nutrients, NDF, ADF, cellulose and hemicellulose digestibility coefficients of experimental rations for lambs fed R3 (Rumi Live Yeast, RLY 5gm/head/day) as shown in Table (2) were significantly ($P<0.05$) higher compared with animals those fed the other diets. The same trend was observed for TDN and DCP% values. No significant difference was found between R2 and R3 rations in digestibility of ADL, but it was significantly higher than that of the control ration. The higher nutritive values results observed with R3 and R2 rations might be attributed to better digestibility results of most nutrients recorded by those groups compared with the control. Hanafy (1997) stated that NDF digestibility increased ($P<0.05$) by steers fed yeast culture diet compared with those fed control diet. Addition of *Saccharomyces cerevisiae* cultures to ruminant diets has improved fiber digestibility and stimulated cellulolytic bacteria. The present results agreed with those obtained by Gomma *et al.* (2003), Abdel-Azeem *et al.* (2004) Gabr *et al*. (2004) and Abdelmawla *et al.* (2007)

Chandemana and Offer (1990) reported a possible explanation for the improvement of nutrient digestibility, as NDF digestibility, that yeast (*S. cerevisiae*) supplied stimulatory growth factors such as the B vitamins and/or iso-fatty acids to rumen cellulolytic microbes by improving the buffering of the rumen liquor or by removing competitive substrate substances derived from monosaccharide degradation especially starch.

El-Waziry and Ibrahim (2007) reported that digestibility's of DM, OM, NDF and ADF were increased (P<0.05) when the additives level of *Saccharomyces cerevisiae* of yeast (SC) was 22.5g whereas 11.25g had no effect by sheep. Degradation rate of NDF and ADF was enhanced by supplementing sheep feed with 11.25 and 22.5 g/h/d (P<0.05) by the addition of SC at both levels of additives. Dry yeast cultures (*Saccharomyces cerevisiae*) was noted to improve the digestibility of dry matter, crud protein and hemicellulose by increasing the rumen bacterial number and outflow rate of microbial nitrogen post ruminally (Wiedmeier *et al.,* 1987; El-Waziry *et al.,* 2000; El-Talty *et al.,* 2001 and Marghany *et al.,* 2005).

Table (2): Digestibility coefficients and nutritive values of the experimental rations.

Item	Experimental rations		
	R1	R2	R3
DM	71.51^{c}±0.39	72.10^{b}±0.47	74.73^{a}±0.50
OM	70.90^{c}±0.20	72.36^{b}±0.61	75.93^{a}±0.76
CP	65.00^{c}±0.41	71.50^{b}±0.55	76.26^{a}±0.61
CF	60.73^{c}±0.31	64.53^{b}±0.24	67.96^{a}±0.38
EE	72.36^{c}±0.49	75.26^{b}±0.39	77.26^{a}±0.33
NFE	66.7^{c}±0.74	71.83^{b}±0.78	74.66^{a}±0.32
NDF	43.37^{c}±0.81	53.60^{b}±0.68	57.24^{a}±0.48
ADF	30.61^{c}±0.16	36.18^{b}±1.47	44.58^{a}±0.69
ADL	16.73^{b}±0.93	21.61^{a}±0.50	23.79^{a}±0.95
Cellulose	42.75^{c}±1.17	51.05^{b}±0.20	55.65^{a}±0.45
Hemicellulose	58.75^{c}±0.31	63.39^{b}±0.61	66.56^{a}±0.20
TDN	61.19^{c}±0.58	63.16^{b}±0.20	65.57^{a}±0.36
DCP	7.61^{c}±0.05	8.56^{b}±0.09	10.09^{a}±0.40

$^{a, b,}$ and ^{c}: Means within the same row with different superscripts differ (P<0.05).

Rumen liquor parameters:

Data of rumen fermentation parameters at zero, 3 and 6 hrs post-feeding are given in Table (3). Adding 3 or 5g RLY/head/day significantly decreased pH but increased the concentrations of NH_3-N and VFA. The addition of 5g RLY/head/day had significantly more effects than 3 g RLY/head/day. In general, it could be shown that the ruminal pH values were significantly (P<0.05) lower by lambs fed additives (3 or 5g RLY) than control ration at all the sampling times. Ruminal acidity was more significantly decreased (P<0.05) with increasing RLY additives level. These results are in agreement with those reported by Khattab *et al.* (2003) who found that addition of Yea-Sacc and Lacto-Sacc to lamb rations led to lower ruminal pH at different times after feeding compared with the control ration. However, data of Sohn and Song (1996) and Sharma *et al.* (1998) were in disagreement with these results. They found a significant increase in ruminal pH with yeast supplemented rations. Ruminal ammonia-N concentrations were significantly ($P<0.05$) increased by 3 or 5g RLY additives, however the values were higher with rations contained 3 and 5g RLY at 3 and 6 hrs post-feeding than the control ration. These results are in agreement with those reported by Hanafy (1997) who indicated that, addition of yeast culture tended to cause higher NH_3-N in sheep. Total volatile fatty acids concentration was significantly ($P<0.05$) higher with additives of 3 or 5g RLY than control ration. Meanwhile, TVFA's concentration was significantly ($P<0.05$) influenced by RLY level, since the highest values were recorded with the highest additive level (5g of RLY). Allam *et al.* (2006) reported that the TVFA'S concentration in the rumen is governed by several factors such as DM digestibility, rate of absorption, rumen pH, transportation of the digesta from the rumen to other parts of the digestive tract and the microbial population in the rumen and their activities. Dawson *et al*. (1990) found that the higher concentration of TVFA's produced in rumen of calves given Lacto-Sacc may be related to the beneficial effect of LS on the microbial fermentation and to the increase in number of total anaerobic and cellulolytic bacteria with dietary addition of yeast culture. However, Newbold *et al.* (1995) found that the degradation of hay in the rumen of sheep fed mixed forage; concentrate diets were not influenced by yeast additives over 72 hrs of the incubation period. Further, Kholif and Khorshed (2006) found no modification in NH_3-N concentration by the addition of yeast.

Table (3): Effect of dietary treatments on some fermentation parameters in the rumen of lambs.

Item	Time after feeding (hrs)	Experimental ration		
		R1	R2	R3
pH	0	6.61^a±0.02	6.50^b±0.03	6.40^c±0.04
	3	6.45^a±0.05	6.24^b±0.02	6.10^c±0.02
	6	6.58^a±0.03	6.46^b±0.02	6.32^c±0.01
NH_3-N (mg/100ml)	0	14.31^c±0.15	16.41^b±0.03	18.91^a±0.05
	3	23.23^c±0.24	26.93^b±0.02	28.11^a±0.32
	6	18.3^c±0.27	20.75^b±0.18	23.46^a±1.20
TVFA's (meq./100ml)	0	8.00^c±0.06	9.12^b±0.36	10.75^a±0.23
	3	10.04^c±0.21	12.66^b±0.09	13.74^a±0.24
	6	8.04^c±0.04	10.40^b±0.15	11.41^a±0.28

$^{a, b}$ and ^{c}: Means within the same row with different superscripts differ ($P<0.05$).

Patra (2012) reported that rumen fermentation characteristics such as increased total volatile fatty acids, stabilization of rumen pH and decreased lactate concentration might be observed due to yeast additives. The peak NH_3-N concentration was reached at 3 hrs post- feeding owing to the degradation of protein and hydrolysis of NPN substances (Reddy *et al.*, 1989). On the other had, Newbold *et al.* (1990) found that addition of yeast culture to sheep diets has been associated with decreased NH_3-N concentration in the rumen. They related the effect of yeast on NH_3-N concentration to the more utilization of the dietary energy and positive fermentation in the rumen.

Protozoa counts and microbial protein:

Results of ruminal protozoa count and microbial protein are illustrated in Table (4). The protozoa number was significantly (P<0.05) increased with R3 followed by R2 rations compared to control ration (R1). Dawson *et al.* (1990) reported that the addition of yeast culture (10g/h) to cow rations had no effect on ruminal protozoa count. Adding bacteria to the diet tended to decrease (P<0.05) protozoa numbers, which is considered undesirable in term of preventing acidosis because ruminal protozoa play a critical role in utilization of lactic acid in the rumen (Newbold *et al.*, 1987). In addition, protozoa contribute to recycling of nitrogen in the rumen and decreasing the protozoal numbers is expected to decrease efficiency of protein utilization (Jouany, 1996). In this respect, Williams and Newbold (1990) mentioned that live yeast additives can increase ruminal TVFA's, microbial protein synthesis and can shift fermentation towards propionate production due to feeding sheep on supplemented diets. The moderate level of ruminal ammonia-N for sheep fed unsupplemented or RLY supplemented diets might indicate that the additive was effective in increasing N uptake by ruminal microbes. Crosby (1995) found significant effect of yeast culture dosage (3g/day) on protozoa population in sheep fed corn stover diet. On the other hand, Mikulec *et al*. (2010) reported that the addition of *Saccharomyces cerevisiae* cultures to lambs rations did not increase the number of rumen aerobic and anaerobic bacteria.

Table (4): Protozoa counts and microbial protein concentrations in the rumen of lambs fed the experimental rations.

Item	Experimental rations		
	R1	R2	R3
Protozoa counts ($x10^6$ /100ml)	131.0^c±2.08	145.0^b±1.73	161.66^a±3.7
Microbial protein (g/100ml)	0.40^c±0.09	0.50^b±0.08	0.68^a±0.27

$^{a, b}$ and ^{c}: Means within the same row with different superscripts differ (P<0.05).

Blood parameters:

Data of some blood serum parameters are presented in Table (5). Statistical evaluation showed that group fed R3 recorded higher (P<0.05) values of total protein, albumin and globulin compared with those fed R2 and R1 respectively. No significant difference effects were noticed for lambs fed either levels of RLY on creatinine and liver transaminases activity (GOT and GPT). These results may be supported by the finding that rumen ammonia nitrogen concentrations were higher (P<0.05) in treated rations with yeast as compared with control (Table 3). These results are in agreement with those reported by Hafez *et al.* (2011) and Abdel-Khalek *et al*. (2000) who found that significant (P<0.05) increases in plasma total protein and albumin concentrations for animals fed Lacto-Sacc compared with control ration. Also, Williams and Newbold (1990) mentioned that live yeast additives can increase blood plasma albumin and globulins possibly because of the higher nitrogen utilization of animals fed supplemented diets. In the same time, no other changes were noticed for blood metabolites or liver and kidney function indicators due to feeding sheep on supplemented diets. El-Badawi *et al*. (1998) showed that the total protein content in blood serum was stable when the animals were fed diets supplemented with yeast culture. Similar results were reported by El-Ashry *et al*. (2002) who found that plasma total protein and globulin concentrations tended to increase, while plasma urea tended to decrease as a result of yeast supplementation. Live dried baker's yeast addition tended to increase plasma albumin while plasma creatinine, total cholesterol and calcium concentrations decreased. They added that GPT activity of plasma was not affected by the treatments, but GOT activity and phosphorus level tended to decrease with live dried baker's yeast addition. In general, all studied blood parameters were within the normal ranges of healthy sheep (Kaneko, 1989).

Table (5): Blood parameters by lambs fed experimental rations.

Item	Experimental rations		
	R1	R2	R3
Total protein (g/dl)	6.34^{c}±0.23	7.69^{b}±0.90	7.97^{a}±0.29
Albumin (g/dl)	3.08^{c}±0.17	3.42^{b}±0.67	3.60^{a}±0.17
Globulin (g/dl)	3.26^{c}±0.71	4.27^{b}±1.40	4.37^{a}±0.78
Cereatinine (mg/dl)	1.38^{a} ±0.10	1.40^{a} ±0.02	1.42^{a} ±0.02
GOT (U/ml)	12.50^{a} ±0.50	11.60^{a} ±0.67	11.40^{a} ±0.67
GPT (U/ml)	17.90^{a} ±0.33	17.20^{a} ±3.37	18.60^{a} ±1.67
Urea (mg/dl)	48.30^{a} ±4.10	49.50^{a} ±3.46	48.80^{a} ±0.86

$^{a,\ b}$ **and** ^{c}**: Means within the same row with different superscripts differ (P<0.05).**

Growth performance:

Data in Table (6) showed that the final body weight, total body weight gain and average daily gain of lambs fed R3 were the highest followed by those fed R2 which were significantly (P<0.05) higher than R1. In addition, the average daily feed intake linearly increased as the level of yeast increased per animal per day. The feed conversion recorded by groups fed 3 or 5g RYL was better than the control group because of those groups recorded higher values of daily gain. This may be due to high DMI and digestibility of various nutrients. Also, the total feed intake (g) showed the same trend as that of daily body gain. In fattening lambs, the addition of RYL has shown a positive effect in several studies by improving feed efficiency, average daily gain and weight gain (Williams *et al.*, 1987). Rodriguez *et al*. (1991) showed that Holstein cows fed on 60:40 forage concentrate ratio with 10g /head/day yeast culture supplementation grew better than those without yeast culture additives. Salem *et al*. (2000) showed that average daily fed was improved by yeast culture additives with growing crossbreed lambs with or without 3 g/h/d yeast culture for three months. Hanafy (1997) stated that DM intake tended to be higher by steers fed yeast culture diet compared with those fed control diet. Abd El-Khalek *et al*. (2000) showed that calves supplemented with 5 g/h/d lacto-sacc in the diet during suckling period had significantly (P<0.05) higher live body weight and daily weight gain than the control. Khattab *et al*. (2003) used thirty male lambs (¼ Romanove and ¾ Rahmany) of 19.93 kg average body weight were randomly allotted to six similar groups, five animals each, to study the effect of two levels of energy with Yea-sacc or Lacto-sacc compared to a control group on average daily body gain. The first group (T1) was fed a basal diet covering 100 % of energy requirements, the second group (T2) was fed as T1 plus 3 g/head/day Yea-sacc, third group was fed as T1 plus 3 g/head/day Lacto-sacc, the fourth group (T4) was fed the basal diet (120 energy), the fifth group (T5) was fed as T4 plus 3 g/head/day Yea-sacc and the sixth group (T6) was fed T4 plus 3 g/head/day Lacto-sacc. They found that the average daily body gain was improved (P<0.05) for T2 and T3 when compared with the other groups. Mohamed (2012) reported that additional of yeast (*Saccharomyces cerevisiae*) improved live weight gain, feed conversion ratio and some blood parameters by lambs.

Table (6): Feed intake, feed conversion and feed economical efficiency by lambs fed the experimental rations.

Item	Experimental rations		
	R1	R2	R3
No. of animals	7	7	7
Initial weight (kg)	19.18±0.24	19.73±0.30	19.11±0.42
Final weight (kg)	43.86^{c}±0.37	47.33^{b}±0.50	49.36^{a}±0.85
Total weight gain (kg)	24.68^{c}±0.47	27.60^{b}±0.56	30.25^{a}±0.72
Average daily gain (ADG), g	146.90^{c}±2.84	164.28^{b}±3.38	180.05^{a}±4.32
Dry matter intake (g/day)			
CFM	670	710	750
CS	490	533	560
Total DMI, g/day	1160	1243	1310
Feed conversion (g DMI/g gain)	7.89^{a} ± 0.73	7.56^{b} ± 0.79	7.27^{c} ± 0.64
Av. Feed cost (LE/h/d)	1.195	1.311	1.415
Av. revenue of daily gain (LE)	3.67	4.10	4.50
Net feed revenue (LE)	2.470	2.789	3.085
Economic feed efficiency (%)	206.60	212.73	218.02
Relative economic efficiency (%)	100	110.29	113.03

$^{a, b}$ and ^{c}: Means within the same row with different superscripts differ (P<0.05).
- Price of ton CFM = 1600 LE, Price of 1 ton corn silage 250LE , Price of kg yeast 15 L.E. and market price of 1 kg live body weight = 25 LE at the time of experimentation.

The present results are in agreement with Khattab *et al.* (1997), El-Ashry *et al.* (2001), Khalifa *et al.* (2001) and Mehrez *et al*., (2004) who reported that yeast culture additives increased average daily gain and the improvement in daily gain may be due to its effect on microbial efficiency and organic matter digestibility. Drennan (1990) found that some improvements in feed conversion accompanied by higher DMI when bulls were fed on grass silage-based diet containing yeast culture. Hafez *et al*. (2011) reported that feeding goats with ration supplemented with yeast increased total DM intake compared with control one. Also, animals fed tested rations (containing yeast culture) appeared to improve total and daily gains (about 33.67%) as compared to control group. In contrary, Mikulec *et al.* (2010) reported that supplementing lamb ration with *Saccharomyces cerevisiae* cultures recorded no effect on body weight, weight gain and feed conversion ratio. They also concluded that 0.5 g/day and 1 g/day of live yeast cells supplementation to finishing lambs fed hay and high energy concentrate does not improve growth performance.

Economical study:

The results of economical evaluation are shown in Table (6).The average feed cost/kg weight gain of the control treatment (R1) showed the lowest values (1.195 L.E.) because of their low feed intake. Although the highest average cost of feed/kg weight gain (1.415 LE) was observed with lambs fed ration contained high level of RLY (R3) but best relative economical efficiency was detected with (R3) being 113.03% when compared with the control group (100%) because of their higher growth rate.

CONCLUSSION

It could be concluded that addition of Rumi live yeast (RLY) proved to be effective in terms of beneficial effects on growth performance, digestibility coefficients, blood parameters and economical efficiency of growing Rahmany lambs, especially with the level of 5g RLY/head/day.

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تأثير إضافة الخميرة الحية على الأداء الإنتاجي للحملان الرحمانى النامية

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تهدف هذه الدراسة الى تقييم تأثير إضافة مستويين من الخميرة الحية Rumi live yeast (RLY) على الاداء الانتاجى للاغنام الرحمانى. استخدم في الدراسة عدد واحد وعشرون رأس من الأغنام الرحمانى بمتوسط وزن ١٩.٣٣ ± ٢.٠كجم (٧ حيوانات لكل مجموعة) لمدة ١٦٨ يوما. قسمت الحيوانات إلى ثلاث مجموعات متساوية حيث غذيت الحيوانات على العلائق التجريبية التالية: المجموعة الاولى غذيت على ٣٥% سيلاج ذرة بالإضافة الى ٦٥% علف مركز بدون اضافة الخميرة وكانت المجموعة الثانية والثالثة مثل المجموعة الاولى ولكن باضافة ٣جم خميرة/رأس /يوم أو ٥جم خميرة/رأس/يوم على التوالى.

واوضحت النتائج ما يلى:

إرتفاع معامل هضم المادة الجافة والعضوية والبروتين الخام والألياف الخام والدهن والكربوهيدرات الذائبة معنوياً (P<0.05) للعلائق المضاف إليها (RLY) مقارنة بالعليقة الضابطة، وكانت القيم تتزايد بزيادة نسبة الإضافة. ارتفعت القيمة الغذائية كوحدات كلية مهضوم وكوحدات بروتين مهضوم للعلائق المحتوية على ٥ و٣ جم (RLY) على التوالي بالنسبة للعليقة الضابطة. كان هناك فروق معنوية بين المجموعتين الاولى والثانية فى قيم الـ pH ، NH_3-N وقيم الـ TVFA'S وبين المجموعة الضابطة. بينت اختبارات مكونات الدم إرتفاع (P<0.05) نسبة البروتين الكلي وكذلك الألبيومين والجلوبيولين للحيوانات المغذاة على نسب مختلفة من الـ(RLY) مقارنة بالمجموعة الضابطة. بينما لم تسجل أي فروق معنوية لقياسات الدم الأخرى بين المجموعات. كان معدل الزيادة الوزنية اليومية مرتفع معنوياً (P<0.05) للأغنام المغذاة على العلائق المحتوية على (RLY) بالنسبة لعلائق المقارنة ، حيث ارتفع معدل الزيادة الوزنية لاضافة ٥جم/رأس/يوم (١٨٠.٠٥جم) تبعه معدل الزيادة الوزنية اليومية لاضافة ٣/جم/راس/يوم (١٦٤.٢٨جم) ثم العليقة الضابطة (١٤٦.٩٠ حم). حققت المجموعة المغداه على ٥ جرام خميرة أافضل كفاءة إقتصادية (٢١٨.٠٢%) تلاها على الترتيب المجموعة المغذاه على ٣جرام خميرة (٢١٢.٧٣%) وجاءت المجموعة الضابطة فى الترتيب الاخير (٢٠٦.٠٦%).

يستنتج من النتائج السابقة أن إضافة (RLY) المختبر كان له تأثير معنوي على تحسن الإستفادة الغذائية من الأعلاف التقليدية في علائق الأغنام الرحماتى المحلية النامية و معاملات الهضم و معدل الزيادة الوزنية اليومية ومعامل التحويل الغذائي و الكفاءة الإقتصادية وكانت أفضل نسب إضافة بمعدل ٥جم/راس/يوم.

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