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SUPPLEMENTING LIVE DRIED YEAST (*Saccharomyces cerevisiae)* TO DIETS VARYING IN ROUGHAGE: CONCENTRATE RATIO:
1- DIGESTIBILTY COEFFICIENTS, FEEDING VALUES AND FERMENTATION IN THE RUMEN OF ZARAIBI GOAT BUCKS

Mehrez, A. Z.[1]; A. A. Gabr[1] ; M. Y. El-Ayek[1] ; M. E. Ahmed[2] and Alaa M. Gad[1]

[1]- Anim. Prod. Dept., Fac. Of Agric., Mansoura Univ., Egypt.

[2]- Anim. Res. Inst., Agric. Res. Center, Min. of Agric., Egypt.

ABSTRACT

This study was conducted to investigate the effect of live dried yeast (Rumi-Yeast, RY) (*Saccharomyces cerevisiae)* supplementation*,* which is a commercial probiotic containing yeast, on digestion coefficients, feeding values and some rumen parameters of Zaraibi goats diets at two roughage (corn silage, CS): concentrate (concentrate feed mixture, CFM) ratios (70: 30 and 30: 70%) i.e. high roughage (HR) and high CFM (HC). Both diets were either used with RY (3 g/h/d) or without RY addition. Twelve mature Zaraibi bucks with an average live body weight of 60±0.4 kg were selected randomly from station herd and divided into four equal groups according to their body weight (3 bucks in each). Four experimental diets were formulated as follows: Diet 1: 70% CFM + 30% CS with RY, Diet 2: 70% CFM + 30% CS without RY, Diet 3: 30% CFM + 70% CS with RY and Diet 4: 30% CFM + 70% CS without RY.

The main results showed that addition of RY significantly ($p<0.05$) enhanced all nutrients digestibility coefficients, as well as digestibility of cell wall constituents (NDF, ADF, ADL, cellulose, hemicelluloses). Live dried yeast addition improved nutritive values as total digestible nutrients (TDN) and digestible crude protein (DCP %). Rumen parameters (pH values, TVFA'S and ammonia-N concentrations) were improved with HC diets compared with HR ones. In conclusion, live dried yeast (Rumi-Yeast) addition to diets of Zaraibi goats diets improved most of the tested parameters mentioned before and has a higher influence when included with HC than with HR diets under field condition.

Keywords: Zaraibi goats, live yeast culture, roughage: concentrate ratio, digestibility coefficients, rumen parameters.

INTRODUCTION

Dietary addition of *Saccharomyces cerevisiae* has been widely used in ruminant nutrition to manipulate rumen fermentation, feed utilization and improve animal performance. Several studies (Haddad and Goussous, 2005a&b and Fadel Elseed and Abusamra, 2007) have shown that yeast culture and live yeast supplementation increased feed intake (Haddad and Goussous, 2005 a&b and Fadel Elseed and Abusamra, 2007), (Kim *et al.* 2006) increased in some nutrients digestibility, (Miller *et al.*, 2002 and Lila *et al.*, 2004), improved patterns of fermentation in the rumen (Kim *et al.* 2006).

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increased digestibility of some nutrients (Miller *et al*., 2002 and Lila *et al*., 2004), ~~enhancement of~~ the activity of different ruminal bacteria~~,~~ (Dolezal *et al*., 2005), increased ~~in~~ concentration of VFA~~,~~ especially ~~(Nursoy and Baytok, 2003), increased~~ acetic acid and decreased the ruminal ammonia production (Nursoy and Baytok, 2003). However, performance results of ruminants fed yeast culture and live yeast have been multiple due to many factors such as differences in strain, yeast dose, the viability of yeast cells, diet composition, forage to concentrate ratio, type of forage fed, feeding strategy, the physiological status of the animal and stage of lactation (Maseki *et al.,* 2008; Chaucheyras-Durand *et al*., 2008; Inal *et al.,* 2010 and Yalçın *et. al.,* 2011).

Rumi yeast (RY) comprises of a very large amount of commercial living yeast cells of *Saccharomyces cerevisiae* with a huge fermentative capacity, mixed with buffer and palatability factors. The RY is characterized by stabilizing rumen pH and oxygen consumption, stimulation of fiber digestion and stimulation of development of the rumen microflora.

The ratio of roughage to concentrates is one of the major dietary important factors in diet formulation. It influences feed intake which is reflected on rumen digesta kinetics and consequently rumen environment.

This study was designed to investigate the effect of adding Rumi yeast (RY) in Zaraibi goat's diets at two roughage: concentrate ratios on nutrient digestibilities, feeding values and some rumen parameters.

MATERIALS AND METHODS

The experimental work of this study was carried out at El–Serw Experimental Station, Animal Production Research Institute, Agriculture Research Center and Animal Production Department, Faculty of Agriculture, Mansoura University. Two diets containing two ratios (30: 70) and (70: 30) of roughage (corn silage, CS) and concentrate (concentrate feed mixture, CFM) i.e. high roughage (HR) and high CFM (HC), respectively with or without Rumi-Yeast (RY) addition were evaluated. The level of 3 g RY /head/day was chosen as recommended dose suggested by the producing company (Multi Vita, Egypt) for small dairy ruminants rations, since this level was economical in feeding practices. The tested diets were formulated as follows: Diet 1: 70% CFM + 30% CS with RY (HC), Diet 2: 70% CFM + 30% CS without RY (HC), Diet 3: 30% CFM + 70% CS with RY (HR) and Diet 4: 30% CFM + 70% CS without RY (HR).i.e 2×2 factorial design. The composition and the chemical analysis of the ingredients and tested diets are shown in Tables 1 and 2. The amount of yeast culture was mixed with the mash portion of CFM prior to feeding which was completely consumed. Goats were fed according to NRC (1981) recommendations. Average daily total dry matter intake was 920 (632 CFM + 288 CS g / head) and 937 (262 CFM + 675 CS g / head) for HC and HR diets, respectively which was very closed to the planned ratios and the level of feeding was kept constant either with or without RY supplemented diets. The animals were fed the four respective diets in two meals/day (8 a.m. and 3 p.m.). Fresh water was available all time.

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Four digestion trials were carried out to determine the digestibility coefficients and feeding values of the tested diets. Twelve mature Zaraibi bucks with an average live body weight of 60±0.4 kg were divided into four groups, (3 bucks each). The animals of each group were kept in a separate shaded pen. Digestion coefficients of the tested diets were determined using acid insoluble ash (AIA) technique according to Van Keulen and Young (1977). Fecal samples were collected from the rectum twice daily for 10 days from all groups. Feces samples (10% of fresh feces) of each buck were mixed well and kept in the refrigerator for chemical analysis. Samples of feed and feces were analyzed for CP, CF, EE and ash 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 (1981). Hemicellulose and cellulose were calculated by the differences between NDF and ADF, and between ADF and ADL, respectively. The gross energy of the tested diets was calculated according to MAFF (1975) equation:

GE (MJ/kg DM) = 0.0226 CP + 0.0407 EE + 0.0192 CF + 0.0177NFE

Where: CP, EE, CF and NFE were expressed as g/kg DM.

At the end of the trials, rumen fluid samples were taken from all bucks of each group at two consecutive days using stomach tube before feeding and at 3 and 6 hrs post-feeding. The rumen samples were filtered through 3 layers of gauze. The Ruminal pH values were measured immediately by portable battery operated pH meter (Orion Research, model 201/digital pH meter). Ruminal ammonia nitrogen (NH_3-N) concentration was measured according to Conway and O'Malley (1957). Total VFA's concentration was determined by the steam distillation method according to Abou-Akkada and El-Shazly (1964). Fresh drinking water was available at all times.

Collected data of nutrients digestibilities and feeding values were subjected to statistical analysis using two-way analysis of variance (2X2 factorial) according to (SAS 2004) using the following mathematical model:

$Y_{ijk} = \mu + P_i + S_j + PS_{ij} + e_{ijk}$

Where Y_{ijk} = observed traits, µ = overall mean, P_i = experimental diet 1- 4 (1 = diet 1, 2 = diet 2, 3 = diet 3, 4 = diet 4), S_j = supplement (supplemented with and supplemented without), PS_{ij} =interaction treatment x supplement, e_{ijk}=Random error.

The data of rumen parameters were subjected to 2 × 2 × 3 factorial analysis of variance according to the following model:

$Y_{ijk} = \mu + P_i + S_j + T_k + PS_{ij} + PT_{ik} + ST_{jk} + PST_{ijk} + e_{ijk}$

Where Y_{ijk} = observed traits, µ =overall mean, P_i =experimental diet 1- 4 (1 = diet 1, 2 = diet 2, 3 = diet 3, 4 = diet 4), S_j = supplement (supplemented with and supplemented without), T_k = time of sampling, PS_{ij} =interaction treatment x supplement, PT_{ik}= interaction treatment × time, ST_{JK} = interaction supplement × time, PST_{ijk} = interaction treatment x supplement × time and e_{ijk}=Random error.

Means were compared according to Duncan's Multiple Range Test at 0.05 level (Duncan, 1955).

RESULTS AND DISCUSSION

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Chemical composition of experimental diets:

Chemical composition of the feedstuffs and the calculated chemical composition of the experimental diets are presented in Tables 1 and 2. Values of nutrient contents of tested corn silage (CS) were nearly similar to those obtained by El-Ashry *et al.* (2003) and Aboul-Fotouh *et al.* (2011). In addition, Abou Ammou *et al.* (2011) and El-Badawi *et al.* (2011) reported similar composition for concentrate feed mixture (CFM). The calculated chemical composition of formulated diets showed that HR diet and HC diet are nearly similar in OM, EE, ash contents and gross energy concentration. However, HC diet had higher DM and CP than HR diet by about 41.41and 17.19%, respectively. In contrary, CF content of HR diet was practically higher than that of HC diet by about 27.51%. Also, combining these two ingredients in formulating the two experimental diets decreased NDF, ADF and cellulose contents with HC diet compared to the HR one (Table 2) as a result of increasing CS or decreasing CFM proportions in tested diets.

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Table 1. Proximate analysis (%) of the feed ingredients used in formulating the tested diets.

Item	DM	Chemical analysis (%) on DM basis						
		OM	CP	CF	EE	NFE	Ash	GE (MJ/kgDM)
Corn silage (CS)	35.2	86.76	9.59	23.56	2.01	51.6	13.24	17.02
CFM	90.00	91.3	14.2	12.7	3.00	61.4	8.7	18.30
Calculated chemical composition of tested diets,%								
HC diet	72.82	89.87	12.75	16.10	2.69	58.33	10.13	17.90
HR diet	50.88	88.03	10.88	20.52	2.29	54.34	11.97	17.38

HC: high CFM HR : high CS.

*** Concentrate feed mixture (CFM) consisted of: 20% ground yellow corn, 24% undecorticated cotton seed meal, 10% soybean meal, 25% wheat bran, 14% rice bran, 5% cane molasses, 2% lime stone and 1% common salt.**

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Table 2. Fiber fractions (%) of the feed ingredients used in formulating the tested diets.

Item	Fibre fractions (%) on DM basis				
	NDF	ADF	Hemi.	Cellulose	ADL
Corn silage (CS)	50.5	31.5	19.00	24.65	6.85
Concentrate feed mixture (CFM)	40.30	15.8	24.5	10.20	5.60
Calculated fibre fractions of the formulated diets, %					
High concentrate diet (HC)	43.50	20.72	22.78	14.73	5.99
High roughage diet (HR)	47.65	27.11	20.54	20.62	6.49

HC high CFM, HR high CS

Effect of C:R ratio and RY supplementation (RYS) on nutrients digestibility and feeding values:

As shown in Tables 3 and 4, the digestibility coefficients of all nutrients, NDF, ADF, ADL, cellulose and hemicellulose of HC diet ~~digestibility~~ were significantly (P<0.05) higher than the coefficient HR diet. These results agreed with those obtained by Fouad (2001) with cows and Mehrez *et al.* (2001) and Al-Dabeeb and Ahmed (2002) with sheep.

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The same trend was observed for TDN and DCP% values~~, it was clear that the~~ as a reflection of the increase in digestibility coefficients. Addition of high level of CFM caused an increase (P<0.05) in TDN and DCP values compared with the lower level, being 68.24 and 9.90 % and 66.19 and 9.58%, respectively for HC and HR diet, respectively. These results are in agreement with those obtained by Mehrez *et al.* (2001) and Fouad (2001) who found that the improvement in the nutritive values of the high CFM diet was associated with higher nutrients digestibility coefficients compared with HR one.

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Table 3. Mean effect of R:C ratio and RY supplementation on digestion coefficients and feeding values of the tested diets.

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Item	C:R ratio			RY supplementation		
	HC	HR	±SE	+	-	±SE
	Digestibility coefficients%					
DM	72.93	71.98	0.39	73.05	71.87	0.39
OM	74.90[a]	73.43[b]	0.32	74.80 [a]	73.53 [b]	0.31
CP	76.53[a]	73.12[b]	0.38	75.88 [a]	73.77 [b]	0.38
CF	66.33[a]	63.28[b]	0.26	65.77 [a]	63.85 b	0.26
EE	80.33[a]	76.32[b]	0.41	79.48 [a]	77.17 [b]	0.41
NFE	71.88[a]	68.65[b]	0.30	71.22 [a]	69.32 [b]	0.30
	Nutritive values (on DM basis)					
TDN%	67.23 [a]	61.99 [b]	0.15	65.52 [a]	63.70 [b]	0.15
DCP%	9.75 [a]	7. 95 [b]	0.04	8.98 [a]	8.73 [b]	0.04

HC: high CFM , HR high CS, (+) : with RYS,(-) : without RYS.
[a] and [b] , means in the same row with different superscripts differ significantly (P<0.05).

Table 4. Mean effect of R:C ratio and RY supplementation on digestion coefficients of the fiber fractions of the tested diets.

Digestibility coefficients%	C:R ratio			RY supplementation		
	HC	HR	±SE	+	-	±SE
NDF	48.32[a]	44.45[b]	0.35	47.80 [a]	44.97 [b]	0.35
ADF	34.40[a]	30.88[b]	0.35	34.02 [a]	31.27 [b]	0.35
Hemicellulose	60.88[a]	55.33[b]	0.34	60.48 [a]	55.73 [b]	0.34
Cellulose	43.95[a]	39.17[b]	0.38	43.23 [a]	39.88 [b]	0.38
ADL	21.95[a]	18.85[b]	0.36	21.35 [a]	19.27 [b]	0.36

HC :high CFM, HR: high CS,(+) with RYS, (-) without RYS
[a] and [b] : means in the same row with different superscripts differ significantly (P<0.05)

The results in Table (3) showed that the digestibility coefficients of OM, CP, CF, EE and NFE were significantly higher (P<0.05) with RY supplemented (RYS) diet than unsupplemented one (USRY). The obtained results match with those of Paryad and Rashidi (2009), Mousa *et al.* (2012) and Mehrez *et al.* (2013) who found that lambs fed diets supplemented with RLY had higher nutrients digestibility than unsupplemented ones .

As shown in Table (4) the addition of Rumi yeast (*Saccharomyces cerevisiae)* to Zaraibi goats diets had significantly (P<0.05) improved all fiber fractions digestibility. Similar results were reported by Gabr *et al*. (2004) and Abdelmawla *et al.* (2007). The improvement in fiber digestibility may also be due to stimulation of cellulolytic bacteria activity.

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Regarding the effect of RYS on the feeding values of the tested diets, it was clear that the TDN% was higher (P<0.05) by about 2.28% with RYS diet than USRY one (Table 3). The DCP% was significantly (P<0.05) enhanced by the addition of Rumi yeast culture. These results are in agreement with the those obtained by Komonna (2007) and Helal and Abdel-Rahman (2010) and Mehrez *et al.* (2013) who reported that the values of TDN and DCP% were significantly (P<0.05) improved when supplementing diets with yeast culture and commercial probiotic.

In this respect, Willimas *et al.* (1991) indicated that a primary benefit of yeast culture is its ability to alter conditions detrimental to cellulolysis, suggesting that yeast culture has minimal influence on concentrate diet digestibility, but may alleviate negative associative effects between concentrates and forages.

Effect of C:R ratio, RYS and sampling time on some rumen fluid parameters:

The values of ruminal pH, NH_3-N and total volatile fatty acids (TVFA's) concentrations at zero, 3 and 6 hrs post-feeding are illustrated in Table (5) and Figs. 1, 2 and 3, respectively. Ruminal pH value is one of the most important factors, which affect microbial fermentation in the rumen and influence its functions. As shown in Table (5) and (Fig.1), ruminal pH values were significantly (P<0.05) influenced by R:C diet, RYS and sampling time. Generally, the highest values were recorded before feeding, while the lowest values were obtained at 3 hours post-feeding, then pH values tended to increase with time advancement. These results are in agreement with those reported by Abd El-Ghani (2004) who reported that addition of yeast culture (YC) to Zaraibi goats rations caused higher (P<0.05) ruminal pH at 3 hrs post-feeding compared with the control ration. Similar results were obtained by Gabr *et al.* (2004) with sheep, Bacha *et al.* (2007) and Guedes *et al.* (2008) for dairy cows. Abd El-Ghani (2004), Guedes *et al.* (2008) and Mardiati *et al.* (2010) reported increases in ruminal pH related to low concentrations of lactic acid in the rumen because *Sacharomyces cerevisiae* can stimulate the growth of lactic acid bacteria. Such confliction in the results concerning the effect of RYS on ruminal pH could be due to many factors such as the level of YC supplementation (Ebrahim, 2004 and Abdel-Latif, 2005), variation in plans of nutrition, frequency of feeding, animal species and age (Abdel-Khalek *et al.,* 2000), roughage to concentrate ratio (Kholif and Khorshed , 2006), sampling time and different management conditions. These results are in agreement with those reported by Gabr *et al.* (2004) and Elmekass *et al.* (2007)) who concluded that as the proportion of CFM increased in the diets of ruminants, ruminal pH values tended to be decreased. This could be explained by the increasing readily available carbohydrates to be fermented in the rumen (Maklad and Mohamed, 2000).

Table 5. Mean effect of R: C ratio, RY supplementation and sampling times on some rumen liquor parameters of bucks fed the experimental diets.

Item	R: C ratio			RY supplementation			Sampling time (hrs)			
	HC	HR	±SE	+	-	±SE	0	3	6	±SE

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pH values	6.56[b]	6.71[a]	0.01	6.67[a]	6.60[b]	0.01	6.86[a]	6.47[c]	6.57[b]	0.01
NH_3-N, mg/100 ml R.L.	19.84[a]	18.16[b]	0.08	19.35[a]	18.65[b]	0.08	16.07[c]	21.69[a]	19.24[b]	0.10
Total VFA's, meq/100 ml R.L.	10.39[a]	9.65[b]	0.04	10.31[a]	9.73[b]	0.04	8.38[c]	11.66[a]	10.03[b]	0.05

a, b and c : means in the same row with different superscripts differ significantly (P<0.05)

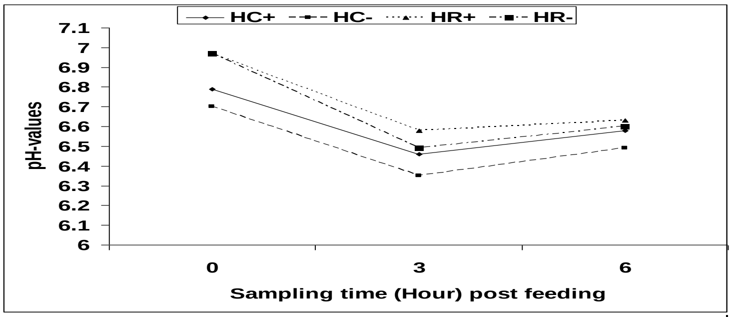

Fig (1): Interaction of R : C ratio, RYS and sampling time on ruminal pH values with bucks.

Data in Table (5) and Fig. (2) also illustrated that ruminal ammonia-N concentration of bucks were significantly (P<0.05) affected by R:C ratio , RY supplementation and sampling time. In general, NH_3-N concentration was the highest (19.84 mg/100 ml RL) with bucks fed HC diet, while the lowest concentration (18.16 mg/100 ml RL) was recorded with those fed HR one.

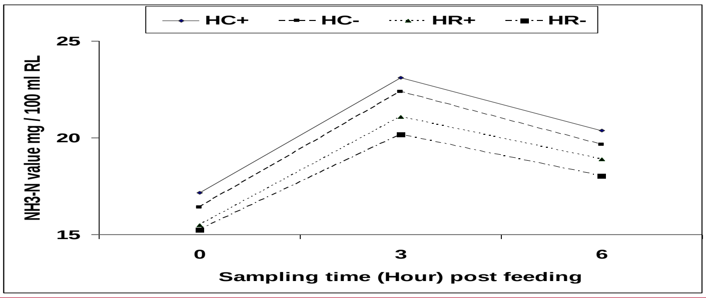

Fig (2): Interactionof R : C ratio, RYS and sampling time on ruminal NH_3-N concentration with bucks.

Regarding the effect of sampling time, the lowest value was recorded before feeding (16.07 mg/100 ml RL), while, the highest NH_3-N concentration (21.69 mg/100 ml RL) was obtained at 3 hours post-feeding. These results are in agreement with those reported by Gabr *et al.* (2004), Elmekass *et al.* (2005) and Elmekass *et al.*, (2007) who demonstrated that the assessment of

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Formatted: Font: Not Bold, Complex Script Font: Not Bold optimal NH_3 concentration for maximal rate of fermentation is considered extremely variable because of the diurnal variation associated with feeding time as well as dietary source and level of energy to be fermented in the rumen. It increases with increasing level of concentrate in the diet. The highest concentration (19.84 mg/100 ml RL) was noticed with bucks fed RYS compared to the bucks fed USRY diet (18.16 mg/100 ml RL). Similar results ~~have been~~were reported by Dolezal *et al*. (2005) for Holstein dairy cows, Fadel Elseed and Abusamara (2007) with Nubian goat's kids. They reported that YC supplementation tended to ~~have~~ cause greater ruminal ammonia concentrations than unsupplemented (USRY) groups. There are several factors influencing the ammonia concentration in the rumen (Dolezal *et al*. 2005 and Inal *et al*., 2010): firstly: the composition of animal diet; since diets containing a high proportion of concentrates (above 70%) leads to lower protein synthesis in the rumen, while it increases the ammonia concentration. Secondly: the animal physical condition; animals with acute rumen acidosis, the ammonia concentration is increased (Dolezal *et al*., 2005). Finally: the rumen microbial population; when microbial population increases, the microbial ammonia incorporation increase so decrease ammonia production in the rumen (Chaucheyras-Durand *et al.,* 2005, Moallem *et al.,* 2009 and Mardiati *et al.,* 2010).

Results in Table (5) and Fig. 3, cleared that the average ruminal VFA's concentrations were significantly ($P<0.05$) affected by R:C ratio and sampling time. The VFA's concentration was the highest (10.39 meq/100 ml RL) with bucks fed HC diet, while the lowest concentration (9.65 meq/100 ml RL) was recorded with bucks fed HR diet. Similar results have been given by Gabr *et al.* (2004) who reported that feeding higher concentrate levels increased concentration of VFA's and decreased acetate level in sheep fed low roughage diet. In the present study, the RY addition had significant ($P<0.05$) effect on ruminal total VFA concentration.

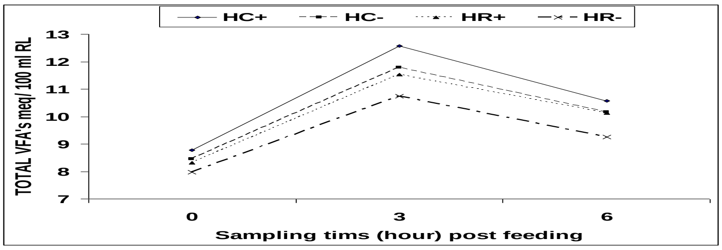

Fig (3): Interaction of R : C ratio, RYS and sampling time on ruminal TVA's concentration with bucks.

Regarding the effect of sampling time, the data in Table (5) revealed that VFA's concentration was low before feeding (8.37 meq/100 ml RL on average), and peaked after 3 hours post-feeding (11.65 meq/100 ml RL).The increase in VFA concentration at 3 hours post-feeding could be associated with decrease in ruminal pH value (Table 5), since these two parameters are metabolically correlated. The results obtained herein came in line with those obtained by Abd El-Ghani (2004), Bagheri *et al.* (2009) and Mardiati *et al*. (2010). In general, they found that rumi yeast culture supplementation had significantly increased ruminal pH, ruminal NH_3-N concentration and ruminal total VFA concentration. However, there are many factors that could influenced by yeast supplementation and affect the VFA concentration in the rumen being the qualitative and quantitiave composition of the diet (Dolezal *et al.*, 2005), activities of microbes in the rumen since *S.Cerevisiae* produces growth factors for microbial growth in the form of organic acids, vitamin B and amino acids that can stimulate rumen microbial growth and activity, as well as (Mardiati *et al.,* 2010), differences between animals and saliva that affects these values (Abd El-Ghani, 2004) and 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 (Allam *et al.,* 2006) .

CONCLUSSION

It could be concluded that addition of Rumi yeast (RY) at 3 g/d/h to Zaraibi bucks diets was proven to be effective in terms of beneficial effects on digestibility coefficients, feeding value and on ruminal microbial activities and fermentation stability and has higher influence when included with high concentrate diet than high roughage – based diet.

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تأثير إضافة الخميرة الحية الجافة إلى علائق مختلفة فى نسبة المركز : الخشن 1 : معاملات الهضم و القيم الغذائية و بعض قياسات سائل الكرش لذكور الماعز الزرايبى

أحمد زكى محرز [1] – أحمد عبد الرازق جبر [1] – محمود يوسف العايق [1] – محمد إبراهيم أحمد [2] – آلاء محمد جاد[1]

[1] قسم إنتاج الحيوان - كلية الزراعة – جامعة المنصورة- المنصورة – مصر.

[2] معهد بحوث الانتاج الحيوانى – مركز البحوث الزراعية- الدقى – الجيزة – مصر.

أجريت هذه الدراسة بهدف بحث تاثير إضافة الخميرة الحية الجافة و كذلك نسبة العلف المركز :الخشن (مخلوط العلف المركز :سيلاج الذرة) فى علائق الماعز الزرايبى على معاملات الهضم والقيمة الغذائية و كذلك بعض قياسات دلائل التخمر فى الكرش .و استخدم في هذه الدراسة عدد 12 رأس من التيوس الزاريبى تامة النمو بمتوسط وزن 60 ± 0.4كجم و قسمت إلى 4 مجموعات تجريبية متساوية (3 حيوانات لكل مجموعة). غذيت الحيوانات على العلائق التجريبية التالية: عليقة 1 : إحتوت على 70% مخلوط علف مركز + 30% سيلاج ذرة + إضافة الخميرة (3جم خميرة /راس /يوم)، عليقة 2 : 70% مخلوط علف مركز + 30% سيلاج ذرة + بدون إضافة الخميرة ، عليقة 3 : 30% مخلوط علف مركز + 70% سيلاج ذرة + إضافة الخميرة ، عليقة 4 : 30% مخلوط علف مركز + 70% سيلاج ذرة + بدون إضافة الخميرة.

واوضحت النتائج ما يلى:

إرتفاع معامل هضم المادة العضوية والبروتين الخام والألياف الخام والدهن والكربوهيدرات الذائبة و مكونات الجدر الخلوى معنويا وبالتالى إرتفعت القيمة الغذائية كمركبات كلية مهضومة و كوحدات بروتين مهضوم و ارتفعت قياسات الكرش فى صورة تركيز الأحماض الدهنية الطيارة و تركيز الأمونيا وسائل الكرش مع العليقة العالية فى نسبة المركز مقارنة بالعليقة العالية فى نسبة الخشن. و كان لإضافة الخميرة تأثير إيجابى و مفيد على القياسات السابقة مقارنة بالعليقة غير المضاف إليها الخميرة و كان هذا التأثير أكثر و ضوحا مع العلائق المرتفعة فى نسبة المركز عن تلك المرتفعة فى نسبة المواد الخشنة

يستنتج من النتائج السابقة أن إضافة الخميرة الحية الجافة المختبرة (RY) بمستوى 3 جم/راس /اليوم كان له تأثير معنوى على تحسين الإستفادة الغذائية من الأعلاف التقليدية فى علائق الماعز الزاريبى المحلية و معاملات الهضم و كان هذا التأثير أكثر و ضوحا مع المستوى العالى من المركز (70%) مقارنة بالمستوى العلى من سيلاج الذرة (70%)

قام بتحكيم البحث

أ.د / محمد محمد الشناوى	**كلية الزراعة – جامعة المنصورة**
أ.د / محمد حلمى ياقوت	**مركز البحوث الزراعية**

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