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INFLUENCE OF SUPPLEMENTING LIVE YEAST TO RATIONS VARYIED IN ROUGHAGE TO CONCENTRATE RATIO ON PRODUCTIVE PERFORMANCE OF LACTATING ZARAIBI GOATS.

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ABSTRACT

This study was conducted to evaluate changes in productive performance, in terms of milk yield and its composition, of lactating goats, resulted of feeding two rations differ in R : C ratio, and supplemented with or without Rumi yeast (RY) supplementation. Twenty-four lactating goats, in their 2nd -3rd season of lactation, with an average age of 24-30 months, and average body weight 35.83±0. 5 kg were distributed according to their live body weight and milk production into four similar groups, (6 goats each). The experiment lasted for 120 days after the does weaned their offspring.

The first two groups, low roughage, were fed 30% (CS) and 70% (CFM). R1 group supplemented with 3g RYS/head/day, while R2 was without RY. The other two groups, high roughage, fed 70% CS and 30% CFM, R3 with 3g RY/head/day and R4 without RY.

The obtained results showed that daily milk and fat corrected milk (4% FCM) yields were significantly (P<0.05) increased with R1 and R2 (high concentrate, HC) than those of R3 and R4 (high roughage, HR). Meanwhile, milk yield was significantly (P<0.05) higher with groups supplemented with RY than unsupplemented ones. Averages of DM, TDN and DCP intakes were the highest with R1, compared with the other tested rations. The groups fed HC rations with or without RY had higher conversion rate of feed to milk (0.70 and 0.60 kg milk yield/kg DMI, for R1 and R2, respectively) compared to those fed HR rations, with or without RY. The best feed conversion efficiency values expressed as (kg DCP/ kg milk) were recorded with R1 and R3, being 6.77 and 6.41 kg DCP/kg milk, respectively. Economic feed efficiency (EFE) was the best for goats fed HR supplemented with RY (R2) (165.67%). The results of blood parameters showed that groups fed R2 and R4 (URY) recorded significantly (P<0.05) higher values of total protein, albumin and globulin, compared with those fed R1 and R3 (rations with RY). Yeast supplementation slightly increased glucose, cholesterol, triglyceride and urea concentrations in blood plasma of goats.

It could be concluded that supplementation of Rumi live yeast (RLY) at the level of 3g head/day to rations of lactating goats either with HC or HR markedly improve milk yield, milk composition and feed conversion to milk efficiency. The goats fed HR supplemented with RY (R3) had better economic feed efficiency (EFE) than those fed other tested rations. No interactions between yeast supplementation and dietary roughage: concentrate ratio were recorded.

***Keywords**: Lactating goats, yeast supplementation, milk production, milk composition and milk feed efficiency and blood parameters.*

INTRODUCTION

During the last few decades and due to the global pressure the needs to icreasing animal production and more intensification for livestock production systems are becoming urgently needed to secure the huge food demand for such highly growing world's population (**Ebehag *et al.*, 2016**). Increasing consumers concern about the safety of chemical growth promoters as a results of recent research trials has led to a renewed interest in yeast

cultures as feed additives (**Mehrez *et al.*, 2013a**). A positive production responses have been reported with both lactating and growing ruminants (**Mehrez *et al.*, 2004 and Mehrez *et al.*, 2013 a &b**). Microbial products containing *Saccharomyces cervisiae* vary widely in efficiency due to many factors such as difference in strain, yeast cells, diet composition, forage to concentrate ratio, type of forage fed, feeding strategy, the physiological status of the animal and stage of lactation.

In recent years, (**Inal *et al.*, 2010**) with increasing consumer's concern about safety quality of animal products and also environmental issues, the current concern of using "natural" feed additives is not only to increase productivity, but also to diminish the risk of animal digestive transfer of potential human pathogens, decrease the antibiotic load and the risk of antibiotic resistance genes transfer and limit excretion of pollutants (**Chaucheyras-Durand *et al.*, 2008**).Yeast culture, as one of natural additives where it is a non-hormonal growth promoter has shown beneficial effects when supplemented to ruminant diets such as increasing voluntary feed intake, especially when expressed in term of dry matter intake, improvement in milk production (**Fadel Elseed and Abusamra, 2007**) and increases some nutrients digestibility (**Marden *et al.*, 2008).** 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 RYS is characterized by stabilizing rumen pH and oxygen consumption, stimulation of fiber digestion and stimulation of development of the rumen micro flora.

The ratio of roughage to concentrate 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. Fermentation in the rumen influences feed utilization by ruminant farm animals, as it affects chewing, milk yield and milk composition. Several authors have shown a positive relationship between ratio of concentrate and DM feed intake, digestibility, metabolisable energy intake **(Steen and Kilpatrick, 2000)** and milk yield **(Mai 2010)**. However, high levels of concentrate in the diet resulted in decreasing milk fat content and increasing milk protein content (**Mai, 2010**).

Presently, research on goats is less developed than on cattle and sheep despite of the worldwide importance of goats as providers of meat and dairy products to small holders **(Capote *et al.*, 2004; Dubeuf *et al.*, 2004 and Morand-Fehr and Lebbie, 2004).** Therefore, the main objective of this study was to evaluate the effects of feeding rations containing two ratios of roughage (corn silage, CS): concentrate (concentrate feed mixture, CFM) (70: 30 and 30:70) i.e. high roughage (HR) and high CFM (HC) and two ratios of CFM (70 :30 and 30 :70) without or with rumi yeast (RY) supplementation on the productive performance of Zaraibi goats in terms of milk yield and composition as well as some blood parameters.

MATERIALS AND METHODS

The first part of the present study concerned with the effects of feeding the same tested rations on some fermentation parameters in the rumen, nutrients digestibility, feed intake and nutritional values (TDN and DCP%) have already been published by **Mehrez *et al.*(2013, b).**

The main objective of this study was to investigate the effects of adding Rumi yeast (RYS) to lactating Zaraibi goat's rations including two concentrate- roughage ratios on milk yield and composition and some blood parameters. The field experimental work of this study was carried out at El-Serw Experimental Research Station, Animal Production Research Institute, Agriculture Research Center. The laboratory chemical analyses performed at Animal Production Department, Faculty of Agriculture, Mansoura University.

Experimental design, animals and rations

Twenty-four lactating Zaraibi goats aged 24 - 30 months, weighed 35.83±0.5 kg and were in 2nd - 3rd season of lactation were selected from El-Serw Station herd. The selected goats were distributed according to

their live body weight and milk production into four equal groups (6 goats each). The animals of each group kept in a separate shaded pen. The experiment lasted for 120 days after weaning offspring. The animals fed for two weeks as a transitional period on the same experimental rations before the start of collecting results of the experimental work. Two experimental rations contained two roughage-concentrate ratios (30:70 and 70:30) without or with RY supplementation were tested. The first two groups fed 30% (CS) and 70% (CFM) with RY supplement (R1) or without (R2). The level of 3 g RY /head/day was chosen as recommended dose suggested by Multi Vita company for small dairy ruminants in rations of lactating goats. The other two groups fed 70% CS and 30% CFM with RY supplementation (R3) or without (R4), respectively using the same above level of RY. The tested rations were as follows:

Ration1 (R1) =70% CFM +30% CS with 3g RY

Ration2 (R2) =70% CFM +30% CS without RY
Ration 3 (RH) =30% CFM +70% CS with 3 g RY.

Ration 4 (R4) =30% CFM +70% CS without RY

The daily dose of RYS was daily drenched via the mouth. The four groups assigned at random to receive the four experimental rations. The determined chemical composition of tested ingredients as well as the calculated chemical composition of tested rations was previously publish in the first part of this study **(Mehrez *et al.*, 2013,b).**

Blood samples

Blood samples were taken in heparinzed tubes from the jugular vein of three female goats at 3 hrs post-feeding once monthly during the experimental period. Blood plasma samples were separated by centrifugation at 5000 r.p.m. for 15 minutes then frozen at -20˚C until analysis. Commercial Kits were used to determine total protein as described by the Buiret method according to **Henry** and **Todd (1974**). Albumin determined according to **Doumas *et al.* (1971**), globulin was calculated as the difference between total protein and albumin, urea (**Fawcett** and **Soctt, 1961**), glucose (**Tinder, 1969**) and Cholesterol (**Allian *et al.*, 1974)**. Alanine aminotransferase (ALT) (u/l) and aspartate aminotransferase (AST) (u/l) measured according to **Reitman and Frankel (1957**). Total lipids and Triglycerides measured according to **Zollner and Kirch (1962**) and (**Schalim *et al.*, 1975)**

Feeding trials:

Rations offered at equal portions twice daily at 8:00 am and 3:00 pm. Group feeding was applied. Offered amounts of roughage and concentrate were adjusted every two weeks according to the changes in live body weight and milk yield. Feed intake was recorded and feed conversion was calculated. The nutrient allowances recommended by **NRC (1981)** for goats were applied. The CFM contained 24% undecorticated cotton seed meal, 20% yellow corn, 10% soybean meal, 14% rice bran, 25% wheat bran, 3% molasses, 2.5% limestone and 1.5% salt. Water was always available for animals.

Milk samples:

The animals were hand milked twice daily at 7:00 am and 4:00 pm during the experimental period and daily milk recorded indvidually. Representative milk samples of about 0.5% of total milk produced were taken once every two weeks from all goats at the morning and evening milking . Milk samples were analyzed for total solids, ash, solids non-fat (SNF), lactose, protein and fat according to the analytical procedures of Ling **(1963)** using Milk-Scan apparatus.

Statistical analysis:

Data of milk yield and composition and blood parameters were subjected to statistical analysis using two-way analysis of variance according to **SAS (2004**) using the general linear mathematical model:

$$Yijk= \mu + Pi + Sj + PSij + eijk$$

Where Yijk = observed traits, μ = overall mean, Pi = experimental diet 1- 4 (1 = diet 1, 2 = diet 2, 3 = diet 3, 4 = diet 4), S_j = supplement

(supplemented with and supplemented without), PSij =interaction treatment x supplement, eijk=Random error. The difference between means was tested by Duncan' s Multiple Range Test (**Duncan, 1955**).

RESULTS AND DISCUSSION

Milk yield and composition:

The daily milk of lactating goats fed the experimental rations are presented in Table (1). The highest values of daily milk yield and fat corrected milk (4% FCM) yield were recorded with R1 and R2 which contained higher amount of concentrate, compared with R3 and R4 (high roughage). Similar results have been obtained by **Aguerre *et al.* (2011)** with dairy cows diet. The average daily milk and fat corrected milk yield was significantly higher with animals fed RYS rations than those fed (URY), either with HC or HR ones. In this respect, **Ebrahim (2004)** showed that daily milk yield was higher for goats fed diets supplemented with RY than those fed unsupplemented ones. The improvement in the milk yield due to RYS might be due to the improved protein status, improved intake of net energy of lactation or both. Similar trends have been reported by **Mousa *et al*. (2012)** who found that live dry yeast supplementation improved daily milk yield by 13.24 and 9.56% for 7.5 and 5 g/h live DY supplemented groups, respectively, compared with control group. This result could attribute to increasing nutrients digestibility of the experimental diets with DY addition and hence improved nutritive values of tested diets and productive performance in general.

Fat, protein, total solids (TS), solids non-fat (SNF), lactose and ash contents estimated biweekly are presented in Table (3)**.** All values of milk composition percentages (Fat, protein, total solids (TS), solids non-fat (SNF), lactose**)** were significantly ($P < 0.05$) higher with high CFM rations as well as RY supplemented (RYS) ones than with high roughage and unsupplemented rations**.** Similar results were obtained by **Wang *et al.* (2001)** who showed that milk fat content was increased for cows fed diets supplemented with yeast culture. In this respect, **Mousa *et al.* (2012)** reported that percentages of total solids were significantly ($P<0.05$) higher in live DY supplemented groups than unsupplemented one**s. Abd El-Ghani (2004)** found that the values of milk energy, protein, TS and SNF were significantly greater in YC supplemented groups than unsupplemented one, while the values of milk lactose and ash (%) were not affected with 3 or 6 g YC/day, compared to unsupplemented one.

Blood parameters:

The results of blood parameters for lactating goats fed the experimental rations are presented in Table (2). Statistical evaluation showed that group fed R1 and R3 (RY supplementation) recorded significantly higher ($P<0.05$) values of total protein, albumin and globulin compared with those fed R2 and R4 (URY). **Abu El-Ella and Kommonna (2013)** reported that RYS significantly ($P<0.05$) increased blood total protein and albumin concentration with goats. Also, **Mehrez *et al.* (2013, a)** found that RYS caused significant ($P<0.05$) increase of serum albumin and globulin levels, compared to the control lambs.

It was clear that, RYS slightly increased glucose concentration by about 2.55 and 2.60% for HC and HR, respectively, compared with the URY groups. **El-Shaer (2003)** found that RYS slightly increased glucose concentration of Rahmani lambs fed diets contained two roughage- concentrate ratios (33.4: 66.6 or 66.6: 33.4%). Blood plasma total lipids were significantly ($P<0.05$) increased by using RY, by about 12.13 and 14.42%, for R2 and R4 rations, respectively compared with the URY rations. **Abdel-Gawad *et al.* (2012)** and **Abu El-Ella and Kommonna (2013)** showed that the concentration of blood total lipids was significantly ($P<0.05$) increased by about 14.36% in group treated with YC (2.5g/h/d) as compared to the control one.

Table (1): Milk yields and milk composition for lactating goats fed the experimental rations.

Item	Experimental rations				±SE
	HC		HR		
	R1	R2	R3	R4	
Milk yield, kg/d	1.20 a	0.990 b	0.965 c	0.890 d	0.01
4% FCM, g/d*	1119.00 a	915.75 b	889.70 c	813.90 d	1.77
Milk composition %					
Fat	3.55a	3.50 b	3.48c	3.43 b	1.20
Protein	3.18 a	3.15 b	3.08c	3.06 d	9.79
Lactose	4.53 a	4.45 b	4.41c	4.39 d	2.01
Ash	0.73 b	0.72 c	0.75 a	0.72 c	0.01
Total solids	11.99 a	11.82 b	11.72c	11.60d	0.05
Solids not fat (SNF)	8.44 a	8.32 b	8.24 c	8.17 d	0.87
Yields, g/d					
Fat	42.60 a	34.65 b	33.58 c	30.53 d	0.08
Protein	38.16 a	31.19b	29.72 c	27.23 d	9.64
Lactose	54.36 a	44.06 b	42.56 c	39.07 d	2.01
Total solids	143.88 a	117.02 b	113.10 c	103.24 d	1.02
Solids not fat)	101.28 a	82.37 b	79.52 c	72.71 d	0.64
Ash	8.76 a	7.13 b	7.24 b	6.41 c	0.28

HC high CFM, HR high CS, **(+)** with RYS, (-) without RYS,
*FCM=M (0.4+0.15f) where M is weight of milk in kg and f is fat content of milk (Fehrand Sauvant, 1978).
a, b ,c and d: means in the same row with different superscripts differ significantly (P<0.05) .

The effect of RYS on cholesterol concentration showed that it was slightly increased (+3.6%) from 70.19 for unsupplemented HC to 72.72mg/100 ml for supplemented HC and from 69.19 to 72.32 for R3 and R4, respectively (Table 2). However, **Özsoy *et al.* (2013)** found that supplementing yeast culture to diets of goats had no significant effect on cholesterol concentration. Also, **Mehrez *et al.* (2004)** reported that feeding diets supplemented with yeast culture caused slight increase of cholesterol concentration, from 76.83 to 82.01 mg/100 ml for usupplemented and supplemented ration. Also, average blood triglyceride concentration was slightly increased for supplemented rations, by about 2.50% and 2.15 for R1 and R3, respectively, compared with the URY rations (R2 and R4). **Özsoy *et al.* (2013)** found that triglyceride concentration was not altered by yeast culture treatment for diet of goats. Similar trends obtained by **Baiomy (2011)** on dairy ewes. Concentration of urea in blood plasma of lactating goats of experimental groups fed dietary treatments had similar trend of that observed with blood cholesterol and triglyceride. Average blood urea concentration was slightly increased for RYS rations, by about 2.77 and 3.87% for R1 and R3, respectively, compared with the URY rations (R2 and R4). These results are in agreement with those reported by **Baiomy (2011)** on dairy

ewes. However, **Özsoy *et al.* (2013)** reported that value of serum urea was not significantly affected by RYS treatment of goats diets. Moreover, **Mehrez *et al.* (2013a)** found that RYS had no significant effect on serum urea concentration of lambs. The value of plasma ALT was not significantly (P<0.05) affected by RYS. **Özsoy *et al.* (2013)** reported that value of serum ALT was not significantly affected by yeast culture supplementation to goat's diet. Moreover, **Mehrez *et al.* (2013,a)** found that RYS had no significant effect on liver transaminases activity (ALT and AST) with lambs. The obtained values of AST were practically similar among dietary treatments for supplemented and unsupplemented RY groups. These results are in agreement with those reported by **Stella *et al.* (2007)** on dairy goats; **Mašek *et al.* (2008)** on dairy ewes; **Khattab *et al.* (2010)** on lactating buffaloes and **Yalcin *et al.* (2011**) on Holstein cows. They found that AST activity was not significantly affected by adding dietary YC. Generally, the obtained data showed that most plasma parameters were within the normal ranges as reported by **Ahmed *et al.* (2009), Soliman *et al.* (2010)** and **Sadek (2011)** with both goats and sheep. The obtained values of albumen, glucose, cholesterol are fall within the normal range given by **Plumb (1999),** being (2.4-4.4), (60-100) and (64.6-136.4) for albumen, glucose and cholesterol, respectively.

Table (2): Blood plasma parameters for lactating goats fed the experimental rations.

Item	Experimental rations				±SE
	HC		HR		
	R1	R2	R3	R4	
Total protein (g/dl)	**7.86 [a]**	**6.15 [b]**	**7.88 [a]**	**6.06 [c]**	**0.43**
Albumin(g/dl)	**3.99 [a]**	**3.34 [b]**	**3.98 [a]**	**3.25 [c]**	**0.22**
Globulin (g/dl)	**3.87 [a]**	**2.81 [b]**	**3.90 [a]**	**2.81 [b]**	**0.52**
Glucose (mg/dl)	**86.03**	**83.89**	**85.99**	**83.81**	**0.62**
Total lipids (mg/dl)	**370.42 [a]**	**330.35 [b]**	**324.73 [c]**	**283.81 [d]**	**1.83**
Cholesterol (mg/dl)	**72.72**	**70.19**	**72.32**	**69.19**	**2.33**
Triglyceride (mg/dl)	**60.66**	**59.18**	**58.44**	**57.20**	**2.23**
Urea (mg/dl)	**19.23**	**18.71**	**19.31**	**18.59**	**1.81**
ALT(U/L)	**57.52**	**56.11**	**58.20**	**56.75**	**0.42**
AST(U/L)	**65.91**	**66.10**	**65.82**	**66.32**	**0.72**

HC high CFM, HR high CS, with (+)RYS, without (-) RYS.

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

Feed intake, feed conversion and economic evaluation

Feed intake:

Results of dry matter intake (DMI), total digestible nutrients (TDN) and digestible crude protein (DCP) intakes from the experimental rations by tested groups are presented in Table (3). The obtained results showed that DMI from CFM recorded the highest value (1152.72 g/h/d) with R1 followed by R2 (1101.52 g/h/d) and R3 (575.84 g/h/d) while the lowest value was recorded with R4 (564.22 g/h/d). While, DMI from CS showed the highest value (1107.5 g/h/d) with R3 then R4 (1085.00 g/h/d) followed by R1 (568.12 g/h/d) and the lowest value was recorded with R2 (550.72 g/h/d). However, DMI was higher (1720.84 g/h/d) by 2.22, 4.15 and 4.34 % with R1 compared with R3 (1683.34 g/h/d), R2 (1652.24 g/h/d) and R4 (1649.22 g/h/d), respectively. These results are

in accordance with those obtained by **El-Ashry *et al.* (2003)** who found an increase in DMI by lambs fed diets containing 40% berseem hay and 60% concentrate feed mixture supplemented with 5 g *Saccharomyces cerivisiae* /head/day, compared with those fed unsupplemented diet. Also, **Abou'l Ella (2007)** reported that total DMI was increased with addition of dried yeast to lactating ewe's rations due to the enhanced intake which is most likely referred to improvement of the rate of breakdown of feedstuffs in the rumen. **Abd El-Ghani (2004)** recorded that DMI and TDNI increased with Zaraibi goats fed diets supplemented with 3 or 6 g/h/d of yeast culture of *S.cerevisiae*. Also,**Gaafar *et al.* (2009)** reported that DMI, TDNI and DCPI were significantly increased with lactating buffaloes fed ration contained 60% concentrate and 40% roughage with baker's yeast supplementation. Similar trends have been reported by **Arcos-Garc´ıa *et al.* (2000)** with Suffolk ewes; **El-Shaer (2003)** with growing lambs; **Stella *et al.* (2007)** with lactating goats and **Moallem *et al.* (2009)** with cows. In this respect, **Putnam and Schwab (1994)** and **Abd El-Ghani (2004)** reported that yeast culture supplementation stimulated rumen microbes, which improved fiber digestion and consequently increased intake.

Feed to Milk conversion efficiency (FMC):

The best feed conversion efficiency (FCE), (the lowest values) as Kg DM intake/kg milk was recorded with groups fed R1 then R2 followed by R3 and the lowest value with R4, being 1.43 , 1.66, 1.74 and 1.8 kg DM intake/ kg milk yield, respectively (Table, 3). Also, feed conversion value expressed as (kg TDN/ kg milk) was practically similar for HC rations either with or without RYS being lower than that of the HR rations R1 (0.96) then R2 (1.09) followed by R3 (1.11) and the worst value was recorded with R4 (1.14). The feed conversion values expressed as (kg DCP/ kg milk) recorded the best values being 1.4 and 1.46 kg/kg milk for R1 and R3, respectively. The obtained results are in line with those of **Ahmed *et al*. (2008)** who reported that feed conversion (based on DM) was better with Zaraibi goats fed yeast supplemented rations at 1g or 2g Lacture/h, compared with the control. Also, **Kholif and Khorshed (2006)** reported that feed conversion was significantly the highest with buffaloes fed yeast supplemented rations followed by selenized yeast supplemented ration and then the control. While, **Gaafar *et al.* (2009)** found that DM, TDN and DCP conversion was better with buffaloes fed ration contained 40% concentrate and 60% roughage with baker's yeast supplementation than un supplement one. However, **Santra and Karim (2009)** recorded that feed conversion efficiency was better with ruminant animals fed high concentrate diet than those fed low concentrate one. On the other hand, **Abd-El-Ghani (2004)** recorded that feed conversion expressed as DM and DCP kg/kg milk was unaffected by yeast culture supplementation to diets of Zaraibi goats. Also, **Ibrahim *et al*. (2004)** reported that feed conversion (kg DM/ kg milk) was insignificantly affected by lactating goats fed CS supplemented with bacteria or yeast.

Milk feed efficiency (MFE) calculated as total kg milk/kg DMI by lactating goats are shown in Table (3). Groups fed HC rations with or without RYS had higher milk feed efficiency (0.70 and 0.60 kg milk yield/kg DMI for R1 and R2, respectively) than those fed HR rations with or without RYS (0.57 and 0.54 kg milk yield/kg DMI for R3 and R4, respectively). Accordingly, milk feed efficiency as TDN, for animals received HC rations with or without RYS, was higher (1.037 and 0.91) for R1 and R2 than those fed HR ones (0.89 and 0.87) for R3 and R4, respectively. The change in feed milk efficiency was almost attributed to changes in milk yield during lactation period as well as feed intake of Zaraibi goats. The milk feed efficiency values expressed as (kg DCP/ kg milk) recorded the best values of 7.15 and 6.85 kg/kg milk for R1 and R3, respectively.

Impact of RYS on milk feed efficiency in the present results indicate marked improvement in milk feed efficiency of lactating goats fed supplemented rations either with HC or HR ones. This results agree with those obtained by **Abdel-Khalek (2003)** and **Schingoethe *et al*. (2004)**, who showed that

yeast culture can improve feed efficiency of dairy cows during midlactation. Also, **Abou Ella (2007)** reported that lactating ewes fed yeast supplemented rations showed higher feed efficiency expressed on production of fat corrected milk (FCM)/DMI (being 11.52%, compared with the control). However, **Yalcin *et al.*** (**2011**) reported that the values of feed efficiency were not affected with yeast culture supplementation. Other studies on lactating animals showed no beneficial effect for feed efficiency (**Bagheri*et al*., 2009, Moallen *et al*., 2009 and Khattab *et al*., 2010)** as a result of yeast culture supplementation

.**Table (3): Effects of feeding experimental rations on goats performance.**

Item	Experimental rations				±SE
	HC		HR		
	R1	R2	R3	R4	
DM intake (g/h/d)					
From CFM	**1152.72**	**1101.52**	**575.84**	**564.22**	
From CS	**568.12**	**550.72**	**1107.5**	**1085.00**	
Total DM intake	**1720.84**	**1652. 24**	**1683.34**	**1649.22**	
TDN intake g/h/d*	**1157**	**1083**	**1072.3**	**1022.4**	
DCP intake g/h/d	**167.8**	**148.5**	**140.9**	**131.2**	
Feed conversion efficiency					
Kg DM / Kg milk	**1.43**	**1.66**	**1.74**	**1.85**	
Kg TDN / Kg milk	**0.964**	**1.093**	**1.11**	**1.148**	
Kg DCP / Kg milk	**1.40**	**1.5**	**1.46**	**1.47**	
Feed efficiency					
Milk yield kg/ DMI	**0.70**	**0.60**	**0.57**	**0.54**	**0.05**
Milk yield kg/ TDN	**1.037**	**0.91**	**0.89**	**0.87**	**0.43**
Milk yield kg/ DCP	**7.15**	**6.73**	**6.85**	**6.78**	**0.22**

HC high CFM, HR high CS, **(+)**with RYS, (-) without RYS.

*Calculated based on the publish data given by Mehrez et al (2013b) for the same rations being, 66.49, 64.57, 64.24 and 63.46 % for TDN and 10.3,10.02, 9.03 and 8.80% for DCP for R1,R2,R3 and R4,respectively .

Economic feed efficiency:

Economic efficiency of lactating goats as affected by roughage: concentrate ratio and RYS are presented in Table (4). The average daily feed cost was tended to increase with increasing level of concentrate and decreasing level of roughages and supplementation with RY compared with USRY in lactating goat's rations. The results indicated that economic feed efficiency (EFE) was the best for goats fed HR supplemented with RY (R3) (165.67%) followed by those fed HR unsupplemented with RY (R4) (158.57%) followed by those fed HC supplemented with RY (R1) (138.33%) while the lowest daily feed cost was recorded with goats fed HC without RY (R2) (121.58%). Goats fed rations containing 70% roughage and 30% concentrate without RYS recorded the lowest feed cost while, goats fed rations containing 70% roughage and 30% concentrate with RYS recorded the highest EFE. These results are in agreement with those obtained by

Gaafar *et al.* (2009) who found that buffaloes fed rations containing 40% concentrate and 60% roughage with baker's yeast supplementation recorded the highest EFE (183%) then those fed ration containing 40% concentrate and 60% roughage without baker's yeast supplementation (166%), followed by those fed ration containing 60% concentrate and 40% roughage with baker's yeast supplementation (137%), while the lowest EFE was recorded with buffalo fed ration containing 60% concentrate and 40% roughage without baker's yeast supplementation (125%). Also**,** **Ibrahim *et al.* (2004)** reported that addition of yeast culture or different strains of bacteria to a corn silage ration of lactating goats led to higher economic efficiency than un supplemented ration.

CONCLUSION

It could conclude that supplementation of Rumi live yeast (RLY) at the level of 3g /head/day to lactating goats' rations at both roughage/concentrate (30:70 or 70:30%) had marked beneficial effects on milk yield, milk composition, milk feed efficiency as well as EFE .

Table (4): Economic feed efficiency of milk production of lactating goats fed different experimental rations.

Item	Experimental rations				±SE
	HC		HR		
	R1	R2	R3	R4	
Feed intake					
CFM as fed (kg/h/d)	**1.29**	**1.22**	**0.640**	**0.627**	
CS as fed (kg/h/d)	**1.61**	**1.56**	**3.15**	**3.08**	
RY (g/h/d)	**3**	**-**	**3**	**-**	
Average daily feed cost (L.E.)					
From CFM	**6.063**	**5.734**	**3.01**	**2.95**	
From CS	**0.805**	**0.78**	**1.58**	**1.54**	
From RY	**0.072**	**0.00**	**0.072**	**0.00**	
Total daily feed cost (L.E.)	**6.94**	**6.51**	**4.66**	**4.49**	
Average daily milk yield (kg)	**1.20** [a]	**0.990** [b]	**0.965** [c]	**0.890** [d]	**0.01**
Price of average daily milk yield (L.E.)	**9.6**	**7.92**	**7.72**	**7.12**	
Economic feed efficiency (%) *	**138.33**	**121.58**	**165.67**	**158.57**	

HC: high CFM, HR: high CS, **(+)** with RYS**, (-)**without RYS.

* Calculated based on the prevailing price of feed ingredients and milk being : concentrate feed mixture (CFM), corn silage (CS) and Rumi yeast (RY) were 1.45, 0.25 and 24 L.E./kg, respectively. price of one kg goats milk was 3.75 L.E.

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تأثير اضافة الخميرة الحية على الاداء الإنتاجي للماعز الحلاب التي تتغذي علي علائق متباينه في نسبة العلف الخشن إلي المركز

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تهدف هذه الدراسة إلى بحث تأثير تغذية الماعز الحلا ب على العلائق المحتوية على نسبتين من العلف المركز وسيلاج الأذرة مع إضافة أو بدون الخميرة الحية Rumi live yeast (RLY) وتأثير ذلك علي الأداء الإنتاجي وقياسات الدم والكرش ومحصول اللبن ومكوناته. لتحقيق هذا الهدف تم استخدام أربعة وعشرون عنزة قسمت بعد الولادة الى أربعة مجاميع متساوية بمتوسط وزن 38 كجم (6 حيوانات فى كل مجموعة) وغذيت علي العلائق الآتية:

الأولي 70%علف مركز +30% سيلاج الأذرة بالكيزان مع اضافة 3جم خميرة/يوم/حيوان.

الثانية 70%علف +30%سيلاج أذرة بالكيزان بدون اضافة الخميرة

الثالثة 30% علف مركز +70% سيلاج الأذرة بالكيزان مع إضافة 3جم خميرة/يوم/حيوان

الرابعة 30% علف مركز +70% سيلاج الأذرة بالكيزان بدون اضافة خميرة

واستمرت التجربة لمدة 120يوم وأظهرت النتائج ما يلى:

سجلت كلا من المجموعة الأولي التي غذيت على عليقة 70% علف مركز+30%سيلاج الأذرة بالكيزان مع اضافة 3 جم خميرة/رأس/يوم والمجموعة الثالثة التي غذيت على 30% علف مركز+70 %سيلاج الأذرة بالكيزان مع إضافة الخميرة أفضل النتائج بالنسبة لإنتاج اللبن ومكوناته من البروتين والدهن وعلي الجانب الأخر، سجلت المجموعة الثالثة أعلى كفاءة اقتصادية وبالنسبة لقياسات الدم سجلت المجاميع المضاف اليها الخميرة زيادة معنوية فى تركيز كل من البروتين الكلى و الألبيومين و الجلوبيولين و اللبيدات الكلية وأما بالنسبة للقياسات الأخرى فقد حدثت زيادة غير معنوية فى تركيز كل من الجلوكوز والجلسيريدات الثلاثية والكوليستيرول واليوريا بينما لم يتأثر تركيز أنزيمات الكبد (ALT and AST) بإضافة الخميرة.

يستخلص من هذا البحث أن إضافة الخميرة Rumi live yeast (RLY) بنسبة 3جم خميرة/رأس/يوم كان له تأثيراًمعنوياً على تحسين الإستفادة من الغذاء للماعز الحلابة كما زاد محصول اللبن ومكوناته مع العلائق ذات المحتوي العالي من المركز والمضاف اليها الخميرة وتم تحقيق أفضل كفاءة اقتصادية مع العلائق المحتوية على نسبة أعلى من سيلاج الأذرة بالكيزان و نسبة أقل من العلف المركز مع عدم وجود تداخل بين تأثيرى إضافة الخميرة ونسبة العلف الخشن إلي المركز في الغذاء.