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Impact of Yeast Supplement to the Rations Contained Different Levels of Barley Grain in Milk Production and Components of Awassi Ewes

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ABSTRACT

Background: Sheep milk production after weaning is produced for a limited period of 80-100 days, it is used for cheeses manufacturing, especially in the Mediterranean region due to its high content of total solids and it preferred in human nutrition because it is rich in unsaturated fatty acids, protein, nucleotides and nucleosides, this earns therapeutic functions especially cancer prevention. On the other hand, reducing the cost of feeding is important in reducing production costs.

Methods: Eighteen Awassi ewes in late lactation were used in this experiment, aged 3-5 years, average body weight 55.27 kg. Ewes were divided randomly into three groups and fed periodically on experimental rations in cross over design (3×3) each period lasted 17 days, first ration was control, second ration was similar to control and fed with addition 10 g/ ewe of Saccharomyces Cerevisiae, while in the third ration barley grain decreased to 35% and fed with added yeast. Ewes were milked on two consecutive days at the end of each experimental period and components were analysis using a milk scan analyzer.

Result: Results were indicated that rations had no significant effect in milk yield and components. Also serum blood parameters of glucose, urea, cholesterol and total protein were not affected significantly.

Key words: Barley level, Ewes, Milk yield, Yeast.

INTRODUCTION

In recent years there has been a great trend of nutritionists to use many of nutritional supplements such as medical plants, plant extracts and probiotics in animal nutrition and study their effects on performance. *Saccharomyces cerevisiae* is one of the microbial additives used as a probiotic and its effect in rumen fermentation has been studied for a long period, these studies were concluded that yeast can increase rumen pH value when animals fed with high grain diet due to utilization of lactic acid stimulate protozoa and cellulosic bacterial growth (Jinturkar *et al*. 2009, Miao *et al*., 2013) also it was found improved in dry matter digestibility and animal production (Chaucheeryras *et al*., 1995, Mruthunjaya *et al*., 2010, Mousa *et al*., 2012 and Ossita *et al*., 2019).

Moreover feeding concentrate feeds high in the grain is important to provide adequate energy requirements especially in the first stage of lactation, but may be cause a decline in milk production in late stage of lactation due to derived energy utilization toward body fat deposition as a result to decrease somatotropin secretion (Bovera *et al*., 2003), some studies were assumed that elevate fiber content in the rations content from forages or non-forages fiber sources had positive role in improvement of milk yield in late lactation (Bocquier and Caja, 2001).

The objective of this study was to evaluate the effect of yeast supplement in feed efficiency, milk yield and components in Awassi ewes are fed two levels of barley grain at the late period of lactation.

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MATERIALS AND METHODS

This study was conducted in the animal field at Department of Agriculture Research, Nineveh Research Department, Ministry of Agriculture, Iraq. Using eighteen Awassi ewes after weaning were used aged 3-5 years, average body weight 55.27 kg, at the period February-2019 to May-2019. Ewes were allocated randomly according to body weight and milk production into three groups and fed periodically to experimental rations in simple transit design, 1st ration was control contain 62.5% barley grain, 2nd ration was similar to the first ration the ewes were dosage with 10 g of yeast (*Saccharomyces cerevisiae*) per ewe daily after dissolve in warm water, while 3rd ration contain 35% of barley grain in addition to dosage with yeast (Table 1). Ewes were fed with

Table 1: Components and chemical composition of rations.

Components %	High barley (control)	Hugh barley + yeast	Low barley + yeast
Barley grain	62.5	62.5	35
Wheat bran	21	21	49
Soybean meal	6.5	6.5	6.35
Wheat straw	8.5	8.5	8.5
Urea	0.5	0.5	0.15
Nacl	0.5	0.5	0.5
Limeston	0.5	0.5	0.5
Chemical composition %			
Dry matter	91.42		91.44
Organic matter	94.64		94.34
Crud protein	14.12		14.46
Ether extract	2.3		2.59
Metabolism energy Mj/kg	10.24		9.99

Chemical composition determined according AOAC, (2000), with except energy value were calculated from chemical analysis of Iraqi feedstuff (Al-khawaja *et al*., 1978).

restricted amount 1.25 kg per ewe daily in three times according to feeding system used in animal research department first at (8:00 am), second (12:00 am) and third (4:00 pm).

Milk yield was measured for two consecutive days at the end of each period 17 days of the three study periods, milk samples were analyzed to determine milk components using European Eko-milk analyzer.

Blood samples were taken from Jugular vein morning after 2hr of feeding and centrifuged for serum separation (3000 r/ hr.) for 15 minute and kept under freezing (-20 C°), then analyzed for glucose, urea, total protein and cholesterol using commercial agent French Biolabo analysis kits.

Statistical analysis was done using randomized complete design (CRD) with general linear model (SAS, 2002) by computer and the differences between means was determined by Duncan test (1955).

RESULTS AND DISCUSSION

Table 2 showed that dry matter, protein and energy intake were close between treatments, efficiency of protein and energy utilization improved by 7.57% and 4.48% in T2 when ewes ingested with yeast and fed high barley ration as compared with control T1, while in T3 the improvement in energy utilization increased to 15.15% when ewes fed low barley ration with yeast as compared with T1, this enhance in protein and energy utilization may be due to improvement in dry matter digestibility and increase rumen ammonia utilization as a result of improvement of rumen environment and microbial growth when ewes supplemented with yeast (Habeeb *et al*., 2017 and Mohammed *et al*., 2018).

Table 2: Effect of barley level and yeast supplement in feed utilization.

Traits	T1	T2	T3
Dry matter intake kg/day	1.143	1.143	1.143
Protein intake kg/day	0.161	0.161	0.165
Energy intake M j /day	11.70	11.70	11.41
Protein utilization %	12.81	13.78	12.91
Energy utilization %	79.09	82.63	91.07

Protein utilization= (protein secreted in milk g/day ÷ Protein intake g/ day) × 100. Energy utilization = [energy secreted in milk ÷ (energy intake - maintenance)] × 100 (Kumer *et al*., 2005).

Results in (Table 3) were indicated no significant differences between treatments in milk yield 554, 575 and 557 g / day respectively, lacking response in milk yield may explain that ewes had requirements of nutrients and the improvement in energy utilization may reflected in increase body weight, this results agreed with the data of (Kattab *et al*., 2010, Mousa *et al*., 2012, Al-Ibrahim *et al*., 2012 and Szues *et al*., 2013) they did not found significant effects of yeast supplementation to the rations in ewes milk yield, while others found significant effect of yeast in milk yield (Masek *et al*., 2008, Ramsing, 2011, De Ondraza *et al*., 2011 and Fortina *et al*., 2011) , on other hand (Mikolyunas *et al*., 2008 and Dosky *et al*., 2011) observed an increase in milk yield of ewes fed high barley grain, while (Bovera *et al*., 2003 and Kohestani *et al*., 2011) indicate that lowering barley grain intake led to increase milk production of ewes (Susin, 1995) was reported a significant increase in milk protein, while fat decreased with increase barley grain intake. However no differences were reported in milk components in ewes fed different levels of barley grain (Bovera *et al*., 2003 and Aljwari, 2013).

Table 4 revealed that barley grain and yeast supplement had no significant effect in serum glucose, urea, cholesterol and total protein concentrations, this results were agreed with (Al-Ibrahim, 2012, Helal and Abdelrahman 2010, Hristov *et al*., 2010 and Yalcin *et al*., 2011). Moreover (Dosky, 2012) indicated that total protein increased and cholesterol decreased in ewes fed with yeast supplement (Bruno *et al*., 2009 and Delozal, 2011) found a significant decrease in urea while glucose increased with yeast additive to ewes ration. Therefore (Kohestani *et al*., 2011, Ranathunga *et al*., 2010

Table 3: Effect barley level and yeast supplement in milk yield and composition.

Traits	T1	T2	T3
Milk yield g/day	554±47.13	575±48.06	557±37.96
Lactose %	5.71±0.06	5.80±0.06	5.75±0.07
Lactose g/day	31.75±2.84	34.13±2.96	33.87±2.63
Fat %	7.52±0.52	7.91±0.38	7.61±0.23
Fat g/day	42.95±4.65	46.77±5.71	42.51±3.28
Protein %	3.84±0.06	3.91±0.05	3.92±0.06
Protein g/day	21.10±1.59	22.86±2.03	21.76±1.39
Solid non fat	10.46±0.11	10.58±0.12	10.56±0.12
Milk energy kcal/kg	1072±22.60	1182±35.51	1082±23.03

Milk energy kcal/kg = 251.7 + 89.6 × (fat%) + 37.8 × (protein %), pulina *et al.* (1989).

Table 4: Effect of barley grain and yeast supplement in some blood parameters.

Traits	T1	T2	T3
Glucose mg/dl	53.57±3.64	54.15±1.46	49.06±3.16
Urea mg/dl	24.95±3.13	28.11±2.45	22.39±2.94
Cholesterol mg/dl	117±10.10	110±10.96	117±8.79
Total protein g/dl	7.20±0.46	7.83±0.24	7.71±0.33

and Al-Jwari, 2013) were observed no effects of grain levels in blood parameters, otherwise, (Ametaj *et al*., 2009) was obtained a significant increase in glucose concentration with increase barley grain in cattle diets.

CONCLUSION

Reducing barley grain ewes rations at 3rd stage of lactation had no effect in milk yield and its components, this economically important as a result to lowered production cost. Also addition of yeast in the low barley grain diet (high fiber) enhance energy utilization.

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