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Short communication

EFFECT OF YEAST SUPPLEMENTATION ON GROWTH AND PRODUCTION PERFORMANCE IN BEETAL GOATS

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Eighteen lactating Beetal goats of the almost same age, body weight, and parity were selected and divided into three groups (A, B and C) of six animals each. All the animals were given *ad libitum* fodder supplemented with 500g concentrate per animal. The animals of group C were treated as the control group, while those of A and B were supplemented with live yeast (*Saccharomyces cerevisiae)* @ 1.5 and 3 gm/day per animal, respectively up to 45 days. Results showed that dry matter intake, weight gain (kg), milk yield (kg), milk fat, milk protein, lactose, ash, and total solid% were ascertained better in group B followed by A and C. Findings of the present study suggest that the use of yeast @ 3gm/day can improve the milk yield and its composition in Beetal goats.

Keywords: Beetal goats, yeast, weight gain, milk yield, milk composition.

INTRODUCTION

Pakistan is ranked as the 4th largest country in the world for the goat population and fourth-largest for goat milk production in the world (FAOSTAT, 2017). There are about 34 goat breeds in Pakistan (Isani and Baloch, 1996) with a total population of 76.1 million heads (Anonymous, 2019). In spite of the universal importance of goat farming, there are no such reports on goats as compared to sheep and cattle (Morand-Fehr *et al.,* 2002). As per the latest statistics from the Ministry of Finance in Pakistan, small ruminants have produced 980 and 732 thousand tones milk and meat respectively (Anonymous, 2019). In order to fulfill the ever-increasing milk and meat demands of the human population, it is necessary to give attention to small ruminants especially goats. From a health point of view, goat milk consumption has gained an upper edge for humans afflicted with peptic ulcers, allergy and various gastrointestinal disorders which usually develop due to intolerance to cow milk (Haenlein, 2004). Goats can live on available shrubs and trees in an unfavorable and harsh environment. They eat less, need small area and produce sufficient milk for a normal family. Their market demand is constant, therefore, a source of quick cash (Ali, 2006). These facts favor goats to be reared as a dairy animal. Goats have significant importance to alleviate poverty especially in developing countries, where the majority of the goat population is found with rural people having low economic status.

Yeast is a non-hormonal growth promotor that shows a positive response on milk yield and composition in dairy animals (Sune, 1998; Garg *et al.,* 2000). The effects of yeast supplementation on feed intake, milk production, and ruminal parameters are, however, variable and seem to be influenced by factors related with the animal's physiological state, days in milk and species to the diet type, percentage of concentrate and mode of distribution and also to the yeast strain, dose and mode of distribution (Sauvant *et al.,* 2004).

Beetal goats are famous for their milk production, hence called a poor man's cow (Qudus *et al.,* 2013). They are scattered throughout the country but mostly present in central districts of Punjab province and are mainly kept for milk and meat. Being one of the most important and famous local breed of goat in Pakistan, less work has been done to study the effect of yeast on growth, milk yield and its composition in this breed. Therefore, the present study was aimed to evaluate the effect of yeast on growth, dry matter intake, milk yield and its composition in Beetal goats.

MATERIALS AND METHODS

Site of study and animals selection: Eighteen lactating Beetal goats having the almost same age, body weight, and parity were selected from the existing stock of Small Ruminants Training and Research Center (SRT & RC), UVAS Ravi Campus, Pattoki, Punjab, Pakistan. The animals were divided into three (A, B, C) groups of six animals each.

***Diets and feeding schedule*:** The does in group C were taken as a control group and subjected to routine feeding, while those of groups A and B were supplemented with *Saccharomyces cerevisiae* @ 1.5 and 3 gm/day per animal respectively up to 45 days. This yeast is being marketed by Alltech company with trade name "Yea Sacc". All animals were kept under the same management conditions during the course of research. Chaffed green fodder was offered *ad libitum* and concentrate ration was fed after milking in the morning and evening @ 500 gm/day per animal. The goats were shifted on concentrate ration during the adaptation period (15 days) before the experiment. The composition of concentrate ration includes; crude protein (CP) 14.5%, total digestible nutrients (TDN) 65% and metabolizable energy (ME) 2600 Mcal/kg. Feed was offered twice daily *ad libitum* in separate mangers to each animal.

***Data recording*:** All the feed offered to each goat per day was measured on a dry matter basis in kg. The does were weighed at the start of the experiment and later on a weekly basis till the end of the experiment. The milk yield was recorded daily (morning and evening) from beginning to the end of the experiment. To study the milk composition, samples were collected individually in plastic vials fortnightly from all the goats and stored at 4°C. The samples were analyzed using Lactoscan for milk fat, milk protein, lactose, ash, and total solid %.

***Statistical analysis*:** The data thus obtained was statistically analyzed under completely randomized design through one-way analysis of variance. The difference among treatments means was compared through the least significance difference (Steel *et al.,* 1997).

RESULTS

***Dry matter intake (DMI) and weight gain*:** The results showed that the maximum DMI was obtained from group B followed by group A and C. Mean values regarding dry matter intake were significantly ($P<0.01$) different between the treated groups (A & B) and group C (Table 1), however non-significant ($P> 0.05$) difference was observed between group C and A. Maximum weight gain was observed in group B followed by group A and C. Mean values regarding weight gain were significant ($P<0.01$) between group A, B, and C.

***Milk production*:** Maximum milk production was found in group B followed by group A and C. All treatments were found significantly ($P<0.05$) different from each other (Table 1).

***Milk composition*:** Among all groups, the results of milk fat differed significantly ($P<0.01$) from each other however group B showed maximum milk fat percentage followed by group A and C (Table 1). Similar to milk fat, milk protein was also noted high in group B ($P<0.01$) goats provided with 3gm/day of *Saccharomyces cerevisiae* in their feed, followed by A and group C. The results of milk lactose were high in group B followed by group A and C (Table 1). The results regarding milk ash showed that maximum percentage was found in group B followed by group A and C. The results of milk total solids (TS) showed that the high percentage was in group B followed by group A and C.

DISCUSSION

Goat's diet supplemented with live yeast culture of *Saccharomyces cerevisiae* had positive and significant ($P<0.05$) effect on the dry matter intake and weight gain. The findings of Haddad and Goussous (2005) are close in line with our studies as they conducted the growth study to evaluate the effect of supplementing *Saccharomyces cerevisiae* on the growth performance of fattening Awassi sheep. Their results demonstrate that 3 g/d of yeast culture supplementation to finishing Awassi lambs fed high energy diets improves weight gain, average daily gain as well as feed to gain ratio.

Table 1. Mean and standard error values of studied parameters on three different treatments.

Parameter	Treatments		
	Group C (Control)	Group A (Yeast 1.5 gm)	Group B (Yeast 3 gm)
Dry Matter Intake (kg)	$1.21^{a} \pm 0.008$	$1.21^{a} \pm 0.010$	$1.23^{b} \pm 0.010$
Weight Gain (kg)	$0.21^{c} \pm 0.010$	$0.28^{b} \pm 0.030$	$0.44^{a} \pm 0.010$
Milk Yield (litter)	$0.64^{a} \pm 0.060$	$0.86^{b} \pm 0.060$	$1.02^{c} \pm 0.140$
Milk Fat %	$4.31^{a} \pm 0.004$	$4.44^{b} \pm 0.010$	$4.59^{c} \pm 0.040$
Milk Protein %	$3.11^{a} \pm 0.010$	$3.27^{b} \pm 0.010$	$3.28^{c} \pm 0.003$
Milk Lactose %	$3.60^{a} \pm 0.010$	$3.64^{b} \pm 0.006$	$3.65^{c} \pm 0.006$
Milk Ash %	$0.51^{a} \pm 0.000$	$0.53^{b} \pm 0.004$	$0.54^{c} \pm 0.010$
Total Solid	$11.55^{a} \pm 0.010$	$11.89^{b} \pm 0.010$	$12.07^{c} \pm 0.005$

Means having different superscripts in a row are significantly different ($P<0.05$).

Similarly, Spruzs and Selegovska (2003) conducted research in one of the biggest organic goat farms of Lativa to study the effect of yeast culture (*Saccharomyces cerevisiae)* on the feed intake. Similar to our findings, they also concluded that adding of yeast culture to feed ration helped to increase feed intake, and led to better utilization of feed protein and energy. These findings are also in agreement with Robinson and Garrett (1999) and Lehloenya *et al.* (2008) regarding cows. However, results of the present study are not in line with Hadjipanayiotou *et al*. (1997), who evaluated the effect of yeast culture live weight changes in 48 suckling Damascus goats and 48 non-suckling Chios ewes and reported that there were no differences in mean group live weight between animals; Macedo *et al.* (2006) evaluated the effect of yeast culture supplementation on live weight, average daily gain, dry matter intake and feed conversion of fattened lambs. They reported no differences between yeast culture supplementation and control group on body weight, dry matter intake, average daily gain and feed conversion; Erdman and Sharma (1989) observed the effect of yeast culture and sodium bicarbonate and they reported that yeast culture and sodium bicarbonate did not significantly affect the dry matter intake in cows; Soder and Holden (1999) studied the dry matter intake of cows fed yeast prepartum and postpartum. They observed that yeast cultures with or without enzyme had no direct effects on prepartum or postpartum dry matter intake.

Inclusion of live yeast culture of *Saccharomyces cerevisiae* in the diets of goats had a positive effect on milk yield and its composition. The difference among groups was found significant ($P<0.01$) in the current study. These findings are in agreement with Stella *et al.* (2007) who studied the effects of live *Saccharomyces cerevisiae* supplementation to the 72 Saanen dairy goats in their early lactation and concluded that inclusion of yeast culture in goats feed has beneficial effects on the milk production especially during early lactation and therefore can be recommended to use under field conditions. Similarly, the findings are in agreement with Reklewska *et al.* (2000), Spruzs and Selegovska (2003) and Abd El-Ghani (2004) regarding goats, Robinson and Garrett (1999) and Alshaikh *et al.* (2002) regarding cows. In contrast, the findings differ with the results of Hadjipanayiotou *et al.* (1997), who evaluated the effect of yeast culture on milk yield in 48 suckling Damascus goats and 48 non-suckling Chios ewes and reported that there were no differences in mean group milk yield between animals. Our results also differ with Petrera *et al.* (2009), who evaluated the effect of dietary selenium yeast on milk production in lactating goats and reported that Se-yeast had no effect on milk yield and milk composition. Our research findings also differ with the results of Erdman and Sharma (1989), who observed the effect of yeast culture and sodium bicarbonate on milk yield and milk composition in dairy cows and they reported that yeast culture and sodium bicarbonate had no significant effect on milk yield and even milk composition. Arambel *et al.* (1990) also reported non-significant findings while studying the effect of yeast culture on nutrient digestibility and milk yield response in early- to mid-lactation dairy cows. The variances in results might be due to species difference.

***Conclusion*:** On the basis of present findings, it is concluded that yeast culture is efficacious to increase weight gain, milk yield, milk composition and dry matter intake without any adverse effects on lactating does. There was a significant difference between 1.5 and 3 gm of yeast culture treated goats. So, 3 mg/ day per animal is the optimum dose to increase weight gain, milk yield, milk composition and dry matter intake in goats without any adverse effect on milk composition.

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