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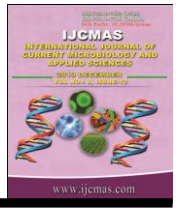

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Effect of Probiotics (*Saccharomyces cerevisiae*) Supplementation on Growth Performance of Growing Barbari and Sirohi Goats

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A B S T R A C T

The study was conducted to evaluate the influence of probiotic supplementation on body weight, body weight gain, body length, Sirohi and Barbari kids just after weaning at the age of 2-3 month of either sex were selected and distributed randomly i.e. Twenty four (24) Sirohi and Twenty four (24) Barbari male and female kids were randomly selected from the Institute's flock for the study. Average body weight (kg) of Barbari kids at the end of experiment was14.38 ±0.24,15.25 ±0.23,15.81 ±0.26, 16.15 ±0.19 and Sirohi kids was 15.00 ±0.24,15.87 ±0.23,16.42 ± 0.26,16.77 ±0.91 in T_i, T_2,T_3 and T_4 groups respectively. The overall body weight gain (kg) during experimental period of Barbari kids was 0.55 ±0.01, 0.72 ±0.03,0.76 ±0.03 and 0.82±0.03kg and of Barbari kids was 0.55 ±0.01, 0.55± 0.02, 0.76±0.03 and 0.82±0.03 for T_1, T_2, T_3 and T_4 group respectively. At the end of experiment average body length (cm) in Barbari kids were recorded as 57.58 ±0.25, 60.20 ±0.53, 60.26 ±0.31and 59.40 ±0.59 and in Sirohi kids were recorded as 59.04 ±0.25, 61.66 ±0.53, 61.66 ±0.53 and 60.86 ±0.59for T_1, T_2, T_3 and T_4 group of respectively.

Introduction

Probiotics are non-pathogenic microbes which occur in nature and the gastrointestinal tract of ruminant animals, where they pose a positive effect on the physiology of the host (Dunne *et al.,* 1999). Probiotics improve microbial ecosystem (Sandine, 1979; Musa *et al.*, 2009), nutrient synthesis and their bio-availability resulting in better growth performance in farm animals (Oyetayo and Oyetayo, 2005). In addition to these probiotics also improve nutrient absorption (Teeler and Vanabelle, 1991), reduce the incidence of intestinal infection (Casas and Dobrogosz, 2000) and restore the gut micro flora in case of diarrhoea

(Musa *et al.,* 2009). Known to increase ruminal pH (Umberger and Notter, 1989), total volatile fatty acids (VFAs) and ruminal biomass (Newbolt *et al.,* 1996) and thus influence the cellulolytic activity and microbial protein synthesis and fiber degradation (Martin and Nisbet, 1990; Yoon and Stern, 1996). It is also considered that they compete with other pathogenic micro-organisms for the provision of nutrients and other growth factors (Rolfe, 2000). They enhance immunity (Aattouri *et al.,* 2001) by promoting the antibodies, IgA and cytokines production (Trebichavsky and Splichal, 2006). A positive impact of probiotics supplementation on nutrient intake, weight gain and feed conversion ratio (FCR) in ruminants has been reported by many workers (Chiofalo *et al.,* 2004; Antunovic *et al.,* 2006; Whitley *et al.,* 2009). It is further stated that probiotics can stimulate specific groups of beneficial bacteria in the rumen, and has provided mechanistic models that can explain their effects on animal performance (Dutta *et al.,* 2009).

Materials and Methods

Sirohi and Barbari kids just after weaning at the age of 2-3 month of either sex were selected and distributed randomly in different groups. i.e. Twenty four (24) Sirohi and Twenty four (24) Barbari male and female kids were randomly selected from the Institute's flock for the study. Every care was taken while selecting the animals, so that they had equal body weight and almost same age. These animals were randomly distributed into four different groups (6 kids in each group), i.e.,Treatment - 1 (Control) (T_1), Treatment-2 (T_2), Treatment-3 (T_3)and Treatment-4 (T_4).

Body weight (BW) at monthly interval

The body weight of Barbari and Sirohi kids were recorded at the onset of the experiment and then at monthly interval till the end of the experiment and are presented in Table 1 and figure 1. It was calculated by dividing body weight by total number of days.

Table revealed that average body weight (kg) of Barbari kids at the start of experiment were 8.58 ±0.34, 8.51 ± 0.34, 8.66 ± 0.29,8.54 ± 0.21and Sirohi kids were 9.41 ± 0.34,9.34 ± 0.34, 9.43 ± 0.29, 9.37 ± 0.21 in T_1, T_2,T_3 and T_4 groups respectively.

Average body weight (kg) of Barbari kidsat the end of experiment were 14.38 ±0.24,15.25 ±0.23,15.81 ±0.26, 16.15 ±0.19 and Sirohi kids were15.00 ±0.24,15.87 ±0.23,16.42 ± 0.26,16.77 ±0.91 in Ti, T_2,$T_3$and T_4 group respectively.

Statistical analysis revealed that the mean body weight of $T_3$and T_4 group was differed significantly ($P<0.05$) from T_1group and no significant difference was observed between T_1 and T_2 group of Barbari and Sirohi kids. Highest value of body weight was observed in T_4group and lowest value was observed in T_1group at monthly interval in both the breeds.

Average monthly body weight gain

The average monthly body weight gain (kg/animal) of Barbari and Sirohi kids in different groups are presented in Table 2 and figure 2. Total weight gain (TWG, kg) was calculated as the difference between final and initial weights. Growth performance indices were calculated as follows: Growth rate (%) = (Final weight – initial weight) / (initial weight)*100

The mean body weight gain (kg/animal) of Barbari kids after one month of experiment was 0.38 ±0.01, 0.36 ±0.08, 0.44 ±0.01,0.44 ±0.01andin Sirohi kids were 0.37 ±0.02, 0.36 ±0.08and 0.44 ±0.01, 0.44 ±0.01for T_1, T_2, T_3 and T_4 group respectively.

Body length

The average body length (cm) of Barbari and Sirohi kids in different groups are presented in Table 3 and figure 3. The average body length (cm) at the start of the experiment was observed as 36.49± 0.47, 37.26± 0.54,37.36± 0.51and 37.54± 0.56 in Barbari kids and 37.80± 0.47, 38.57 ±0.54, 38.67± 0.51and 38.85 ±0.56in Sirohi kids for T_1, T_2, T_3 and T_4 group respectively.

At the end of the experiment average body length (cm)in Barbari kids were recorded as 57.58 ±0.25, 60.20 ±0.53, 60.26 ±0.31and 59.40 ±0.59 and in Sirohi kids were recorded as 59.04 ±0.25, 61.66 ±0.53, 61.66 ±0.53 and 60.86 ±0.59for T_1, T_2, T_3 and T_4 group respectively.

Statistical analysis revealed no significant difference in average body length of Barbari and Sirohi kids between different treatment groups.

Results and Discussion

Body weight (BW) at monthly interval

Average body weight (kg) of Barbari kidsat the end of experiment were 14.38 ±0.24,15.25 ±0.23,15.81 ±0.26, 16.15 ±0.19 and Sirohi kids were15.00 ±0.24,15.87 ±0.23,16.42 ± 0.26,16.77 ±0.91 in Ti, T_2, T_3 and T_4 group respectively.

Statistical analysis revealed that the mean body weight of $T_3$and T_4 group was differed significantly ($P<0.05$) from T_1group and no significant difference was observed between T_1 and T_2 group of Barbari and Sirohi kids. Highest value of body weight was observed in T_4group and lowest value was observed in T_1group at monthly interval in both the breeds

Average monthly body weight gain

The overall body weight gain (kg) during experimental period of Barbari kids was 0.55 ±0.01, 0.72 ±0.03,0.76 ±0.03 and 0.82±0.03kg and of Sirohi kids was 0.55 ±0.01, 0.55± 0.02, 0.76±0.03 and 0.82±0.03 for T_1, T_2, T_3 and T_4 group respectively.

Statistical analysis revealed that the mean body weight gain of T_2 and T_4 group in Barbari and Sirohi kids was differed significantly ($P<0.05$) from T_1 and non significant difference was observed between T_2 and T_3 groups. Highest value of body weight gain was observed in T_4 group and lowest value was observed in T_1 group at monthly interval in both the breeds (Table 4).

Table.1 Animal distribution and Diet

Groups	No. of animals	Feeding with 5-6 hours grazing
(Control) T_1	6 barbari + 6 sirohi kidsof3-4 months of age	Grazing+ concentrate feeding (@100 g/day/kid)
T_2	6 barbari + 6 sirohiof3-4 months of age	T_1 +*S. cerevisiae*(@ 2g/animal /day)
T_3	6 barbari + 6 sirohi kids of3-4 months of age	T_1+ @50gextra concentrate feeding
T_4	6 barbari + 6 sirohiof3-4 months of age	T_1+50g extra concentrate feeding +*S. cerevisiae*(@ 2g/animal /day).

Table.2 Average monthly Body weight (kg) of Barbari and Sirohi Goat

Months/ Breeds	T_1		T_2		T_3		T_4	
	Barbari	**Sirohi**	**Barbari**	**Sirohi**	**Barbari**	**Sirohi**	**Barbari**	**Sirohi**
Initial	8.58^{a} ±0.34	9.41^{a} ± 0.34	8.51^{ab} ± 0.34	9.34^{ab} ± 0.34	8.66^{b} ± 0.29	9.43^{b} ± 0.29	8.54^{b} ± 0.21	9.37^{b} ± 0.21
1	9.34^{a} ±0.23	9.96^{a} ±0.23	9.55^{ab} ±0.22	10.17^{ab} ± 0.22	9.62^{b} ±0.22	10.24^{b} ± 0.22	9.56^{b} ±0.17	10.18^{b} ± 0.17
2	10.13^{a} ±0.23	10.75^{a} ±0.23	10.33^{ab} ±0.21	10.95^{ab} ±0.21	10.63^{b} ±0.22	11.25^{b} ±0.22	10.62^{b} ±0.16	11.24^{b} ±0.16
3	10.90^{a}±0.23	11.52^{a} ± 0.23	11.27^{ab}±0.21	11.89^{ab} ±0.21	11.63^{b} ±0.21	12.25^{b} ± 0.21	11.63^{b} ±0.15	12.25^{b} ±0.15
4	11.73 $\pm0.24^{a}$	12.35^{a} ±0.24	12.16^{ab} ±0.21	12.76^{ab} ±0.21	12.53^{b} ±0.22	13.15^{b} ±0.22	12.59^{b} ±0.16	13.21^{b} ±0.16
5	12.51^{a} ±0.24	13.15^{a} ±0.24	13.00^{ab} ±0.21	13.62^{ab} ±0.21	13.40^{b} ±0.23	14.02^{b} ±0.23	13.52^{b} ±0.15	14.14^{b} ±0.15
6	13.32^{a} ±0.24	13.94^{a} ±0.24	13.96^{ab} ±0.21	14.58^{ab} ±0.21	14.42^{b} ±0.24	15.04^{b} ± 0.24	14.64^{b} ±0.17	15.26^{b} ±0.71
7	14.38^{a} ±0.24	15.00^{a} ±0.24	15.25^{ab}±0.23	15.87^{ab} ±0.23	15.81^{b} ±0.26	16.42^{b} ± 0.26	16.15^{b} ±0.19	16.77^{b} ±0.91

Table.3 Average monthly body weight gain (kg/animal) of Barbari and Sirohi goat

Months/ Breeds	T_1		T_2		T_3		T_4	
	Barbari	Sirohi	Barbari	Sirohi	Barbari	Sirohi	Barbari	Sirohi
Initial	-	-	-	-	-	-	-	-
1	0.38^{a} ±0.01	0.37^{a} ±0.02	0.36^{b} ±0.08	0.36^{b} ±0.08	0.44^{bc} ±0.01	0.44^{bc} ±0.01	0.44^{c} ±0.01	0.44^{c} ±0.01
2	0.39^{a} ±0.02	0.38^{a} ±0.01	0.42^{b} ±0.01	0.42^{b} ±0.01	0.44^{bc} ±0.01	0.44^{bc} ±0.01	0.48^{c} ±0.02	0.48^{c} ± 0.02
3	0.40^{a} ±0.01	0.39^{a} ±0.02	0.43^{b} ±0.01	0.43^{b} ±0.01	0.49^{bc} ±0.02	0.49^{bc} ±0.02	0.50^{c} ±0.17	0.50^{c} ± 0.17
4	0.41^{a} ±0.01	0.40^{a} ±0.01	0.48^{b} ±0.01	0.43^{b} ±0.02	0.51^{bc} ±0.01	0.51^{bc} ±0.01	0.53^{c} ±0.01	0.53^{c} ± 0.01
5	0.43^{a} ±0.02	0.41^{a} ±0.01	0.51^{b} ±0.02	0.48^{b} ±0.01	0.54^{bc} ±0.02	0.53^{bc} ±0.01	0.62^{c} ±0.02	0.54^{c} ± 0.01
6	0.47^{a} ± 0.04	0.43^{a} ±0.02	0.66^{b} ±0.04	0.55^{b}±0.01	$0..63^{bc}$ ± 0.04	0.54^{bc} ±0.02	0.65^{c} ± 0.03	0.62^{c} ±0.02
7	0.55^{a} ±0.01	0.55^{a} ±0.01	0.72^{b}±0.03	0.55^{b} ± 0.02	0.76^{bc} ±0.03	0.76^{bc} ±0.03	0.82^{c} ±0.03	0.82^{c} ±0.03

* Group I (T_1) –Grazing + concentrate feeding (@100 g / day / kid), ** T_1 +*S. cerevisiae* (@ 2g / animal / day), *** T_1 + @ 50g extra concentrate feeding, **** T_1 + 50 g extra concentrate feeding +*S. cerevisiae* (@ 2g/animal /day). The values with different superscripts within a row (a, b and c) differ significantly ($P<0.05$).

Table.4 Average monthly body length (cm) of Barbari and Sirohi Kids

Months/ Breeds	T_1		T_2		T_3		T_4	
	Barbari	**Sirohi**	**Barbari**	**Sirohi**	**Barbari**	**Sirohi**	**Barbari**	**Sirohi**
Initial	36.49± 0.47	37.80± 0.47	37.26± 0.54	38.57 ±0.54	37.36± 0.51	38.67± 0.51	37.54± 0.56	38.85 ±0.56
1	40.08 ±0.48	41.38 ±0.48	41.00 ±0.95	42.30 ±0.95	41.63± 0.81	42.93 ±0.81	41.50 ±0.50	42.80 ±0.50
2	43.67 ±0.46	45.00 ±0.46	44.79 ±0.89	46.12 ±0.89	45.79 ±0.70	47.12 ±0.70	45.15 ±0.63	46.48 ±0.63
3	46.96 ±0.32	48.25 ±0.32	48.43 ±0.79	49.72 ±0.79	49.59 ±0.55	50.88 ±0.55	48.76 ±0.80	50.05 ±0.80
4	50.13 ±0.13	51.43 ±0.13	52.00 ±0.87	53.30 ±0.87	52.97 ±0.63	54.27 ±0.63	52.22 ±1.06	53.52 ±1.06
5	53.33 ±0.19	54.67 ±0.19	55.61 ±0.78	56.95 ±0.78	56.48 ±0.57	57.82 ±0.57	55.59 ±0.78	56.93 ±0.78
6	56.62 ±0.25	57.90 ±0.25	59.24 ±0.53	60.52 ±0.53	59.30 ±0.31	60.52 ±0.58	58.44 ±0.59	59.72 ±0.59
7	57.58 ±0.25	59.04 ±0.25	60.20 ±0.53	61.66 ±0.53	60.26 ±0.31	61.66 ±0.53	59.40 ±0.59	60.86 ±0.59

Fig.1 Average monthly Body weight (kg) of Barbari and Sirohi Goat

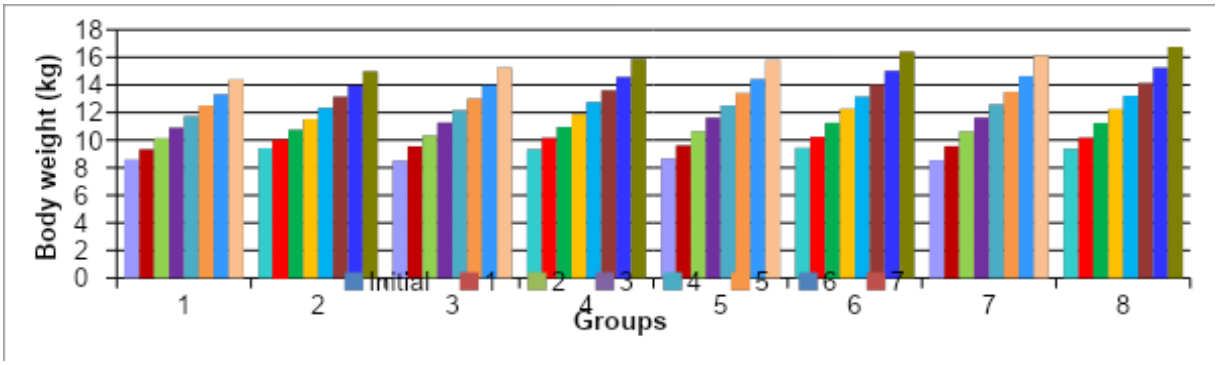


Fig.2 Average monthly body weight gain (kg/animal) of Barbari and Sirohi goat

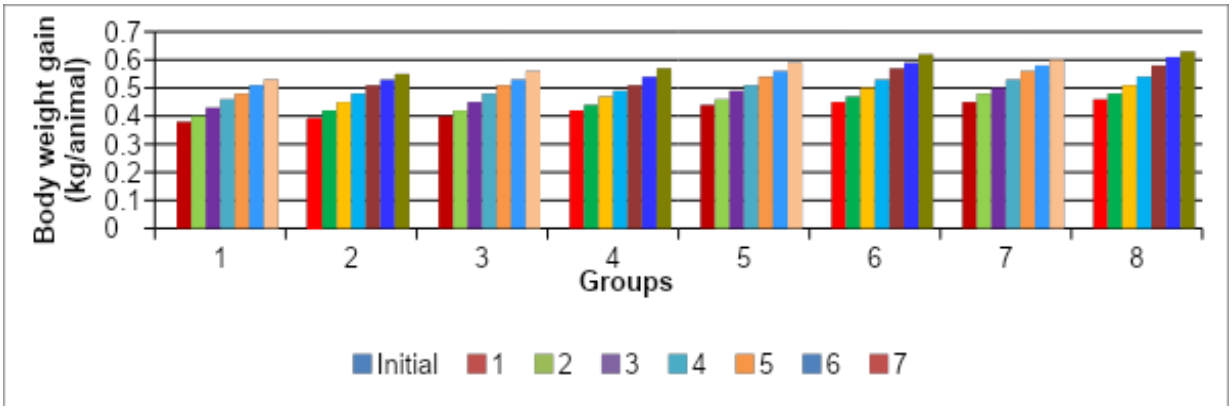
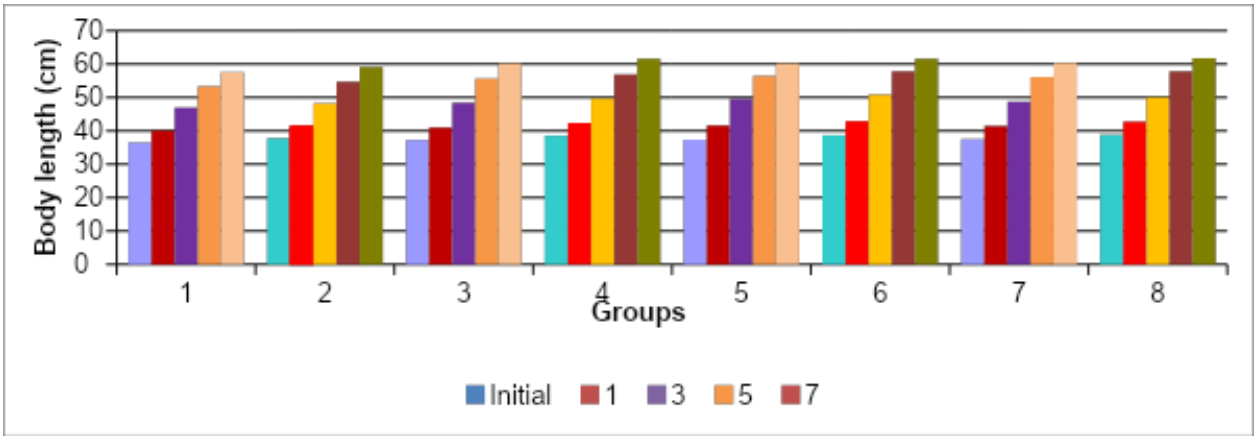


Fig.3 Average monthly body length (cm) of Barbari and Sirohi Kids



Average monthly body length (cm)

At the end of the experiment average body length (cm)in Barbari kids were recorded as 57.58 ±0.25, 60.20 ±0.53, 60.26 ±0.31and 59.40 ±0.59 and in Sirohi kids were recorded as 59.04 ±0.25, 61.66 ±0.53, 61.66 ±0.53 and 60.86 ±0.59 for T_1, T_2, T_3 and T_4 group respectively.

Statistical analysis revealed no significant difference in average body length of Barbari and Sirohi kids between different treatment groups.

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