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Short Communication

Effect of Probiotic Supplementation on Growth Performance of Crossbred Calves in an organized Cattle Farm

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Abstract | The study was undertaken to know the effect of probiotic supplementation on growth and health of Holstein Friesian crossbred calves in an organized cattle farm. Sixteen numbers of two weeks old female calves were randomly divided into 2 groups of 8 each. Both groups were maintained under same managemental conditions and fed similarly except the treatment group was supplemented with *Saccharomyces cerevisiae*[1026] @ 2 g/ head/day (1×10^{10}cfu) for 16 weeks. The average daily dry matter intake and body measurements were higher ($P<0.05$ or $P<0.0$) in treatment group as compared to control group. The average daily weight gain was significantly higher ($P<0.01$) in treatment group (560.27±8.56 g) as compared to control group (512.28±6.52 g). However, feeding of probiotics is more beneficial in pre-ruminant stages of crossbred calves.

Keywords | *Saccharomyces cerevisiae*, Growth performance, Crossbred calves, Probiotics

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INTRODUCTION

Calf management is one of the most important activities in dairy farm which requires a great deal of skilled application and constant attention since they form the future dairy herd of the farm. In pre-ruminant phase, the young calves are highly susceptible to enteric bacterial imbalance, leading to inefficient digestion and absorption of nutrients and gastrointestinal infections resulting in poor growth and high mortality and, about 30% mortality is recorded due to gastrointestinal infection. To overcome these implications, diets have been supplemented with various antibiotics. Antibiotics act as growth promoters by reducing the pathogenic bacteria and modifying the microflora in the gut of the animal (Radostits et al., 1994). However, the antibiotics diminish not only the activities of the pathogenic flora, but also that of the protective flora. Constant use of antibiotics is not recommended, as they may lead to antibiotic resistance. Probiotics, on the other hand, not only compete and suppress 'unhealthy fermentation' in the intestine, but also exert a number of other beneficial healthy effects of their own and found to be helpful in establishing the protective flora in the calves (Chandra et al., 2009).

A wide variety of probiotics to manipulate rumen activity is available on the market. For more than ten years yeast cultures have been used as alternatives to antimicrobial additives in ruminant diets, and have shown to affect the rumen in several ways. Yeast cultures were found to modify rumen fermentation by increasing the number of ruminal bacteria and to stimulate animal growth when fed to lactating and growing ruminants (Gurugula et al., 2003). The present study was undertaken to assess the effect of probiotics supplementation on growth performance in crossbred female calves.

Table 2: Growth performance and body measurements of crossbred calves

Parameter[1]		Control (n = 8)	Treatment (n = 8)	*P*-Value
Growth Performance				
Initial body weight, kg		27.25 ± 0.37	27.38 ± 0.53	0.037^{NS}
Final body weight, kg		84.63 ± 0.53	90.12 ± 0.67	41.57**
Body weight gain, kg		57.38 ± 0.73	62.75 ± 0.96	19.88**
Average daily gain, g		512.28 ± 6.52	560.27 ± 8.56	19.88**
Average daily DM intake, g		822.81 ± 9.24	856.27 ± 10.56	23.86**
Feed conversion efficiency, DM intake/wt gain		1.62 ± 0.24	1.48 ± 0.18	1.137*
Body Measurements				
Body length, cm	Initial	60.88 ± 0.55	60.75 ± 0.53	0.027^{NS}
	Final	78.88 ± 0.30	82.88 ± 0.52	45.367**
	Difference	18.00 ± 0.57	22.13 ± 0.64	23.32**
Height at withers, cm	Initial	66.12 ± 0.44	66.50 ± 0.42	0.377^{NS}
	Final	85.63 ± 0.42	89.38 ± 0.38	44.366**
	Difference	19.50 ± 0.38	22.88 ± 0.58	23.735**
Chest girth, cm	Initial	66.88 ± 0.48	66.50 ± 0.42	0.344^{NS}
	Final	95.63 ± 0.32	99.50 ± 0.50	42.308**
	Difference	28.75 ± 0.53	33.00 ± 0.78	20.434**
Paunch girth, cm	Initial	60.88 ± 0.40	61.63 ± 0.53	1.273^{NS}
	Final	90.13 ± 0.61	92.50 ± 0.33	11.753**
	Difference	29.25 ± 0.86	30.87 ± 0.67	2.228^{NS}

[1] All results have presented as Mean ± SEM; *Significant (P<0.05), **Significant (P<0.01), NS – Non-Significant

MATERIALS AND METHODS

Sixteen numbers of two weeks old Holstein Friesian crossbred female calves were selected and randomly divided into 2 groups comprising 8 calves each in an organized cattle farm, Dindigul District, Tamil Nadu. The animals were housed in a well-ventilated pen in an open asbestos sheeted shed with pucca floor, having arrangement for group feeding. Calves were maintained as per standard feeding schedule (Table 1) and provided with freshwater free choice throughout a day during experimental period. The concentrate mixture contained (kg/100 kg) groundnut cake 15;soybean meal 10; maize 32; rice bran 15; oiled rice bran 15; rapeseed cake 10; mineral mixture 2; and common salt 1. Both the groups were maintained similarly except the calves in the experimental group were given a daily dose of probiotics of *Saccharomyces cerevisiae*^{1026} @ 2 g/ head/day (1×10^{10} cfu) for 16 weeks with whole milk or concentrate in the morning (0800 h). The body weight and body measurements such as body length, height at withers, heart girth and paunch girth were recorded initially and subsequently at fortnightly intervals before feeding and watering. The residual feed was collected on the subsequent morning to calculate the actual amount of feed consumed. The average daily gain, daily feed intake and feed conversion ratio were calculated. The data collected on various parameters were statistically analysed (Snedecor and Cochran 1985) using SPSS software for windows.

Table 1: Feeding schedule of calves

Age	Whole Milk	Concentrate (g)	Roughage
0–4	1/10th of body weight	100	Ad lib
5-8	1/15th of body weight	200	Ad lib
9-12	1/20th of body weight	400	Ad lib
13-16	-	800	Ad lib

RESULTS AND DISCUSSIONS

The growth performance of crossbred calves is presented in Table 2. The final body weight was significantly (P<0.01) higher in calves fed with diets containing probiotics compared to control. The result of the present study was in accordance with Jaybal et al. (2008) and Whitley et al. (2009) those who stated that nutrient digestibility of feed was increased with adding of probiotics. The average daily weight gains were significantly (P<0.01) higher in treatment group (560.27±8.56) as compared to control group (512.28±6.52). This might be due to fact that probiotic control the metabolic activity of gut microflora which leads to better digestion and absorption of nutrients. Improvement of absorption of nutrients in the lower intestine has

been suggested by Haverevol et al. (1988) and evidence of beneficial effects during the early stage of life in calves supplemented with probiotics has also been reported (Chandra et al., 2009).

The average daily dry matter intake (g) during experimental period was significantly (P<0.01) higher in treatment group as compared to control group. The dry matter intake per kg weight gain was significantly (P<0.05) lower in treatment group. The result of the present study was in accordance with Khuntia and Chaudhary (2002) and Prahalada et al. (2001) those who reported that the feed conversion efficiency was significantly higher in probiotic supplemented group as compared to control group. Increased average daily gain with low dry matter intake in treatment group was suggestive of better feed utilization resulting in decreasing cost per kg live weight gain.

The final body measurements of the calves in probiotic supplemented group were significantly (P<0.01) higher as compared to control group. Lesmeister et al. (2004) also reported similar findings in calves. Increased growth in calves receiving probiotics may be the result of additional energy and nutrients available for skeletal deposition due to the observed increase in dry matter intake for probiotic supplemented group (Van Soest, 1994).

The above findings showed that calves supplemented with probiotics performed well over control group. Hence it may be concluded that the feeding of probiotics is more beneficial in pre-ruminant stages of calves.

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CONFLICT OF INTEREST

There is no conflict of interest.

AUTHORS CONTRIBUTION

All the authors have contributed in terms of giving their technical knowledge to frame the article.

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