

Effect of Probiotic Supplementation on Milk Yield in Lactating Holstein Fresien Cross Bred Cows

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Abstract— On farm trial was conducted on 20 lactating crossbred cows were randomly divided into two groups on the basis of milk yield (10 to 13 kg/day) and day of calving less than 60 days to see the effect of supplement probiotic on milk yield for continuous three year (2014 to 2017). Cross bred cows were fed concentrate, green and dry fodder and wheat straw in control groups and addition of 20 grams of Probiotic was given in treatment group. Experimental feeding was continued up to 90 days. The average milk production and fat percentage was significantly higher in treatment group. Milk production efficiency was also significantly higher in probiotic supplemented in comparison to control group. It was concluded that probiotic supplementation @ 20 gram per day per animal in cows significantly increase the milk production over the control group.

Keywords— *probiotic, cows, milk production.*

I. INTRODUCTION

Probiotics are defined as “live microorganisms that may beneficially affect the host upon ingestion by improving the balance of the intestinal micro flora” (Fuller, 1989). The concept of microbial manipulation in the gastro-intestinal tract was first appreciated by Metchnikoff who viewed the consumption of yoghurt by Bulgarian peasants as conferring a long span of life. In dairy farming, feed is the most important factor which accounts for about 60-70% of the total cost of rearing. In order to get maximum profitability, the feed must be balanced nutritionally and also be economical. The economy of feed is not only determined by the apparent cost per kg of feed but also by the cost of feed required to produce a kg of milk.

Therefore, in order to achieve maximum profitability in dairy farming there is need to adopt the scientific feeding strategies for dairy animals. Probiotics like yeast culture to improve livestock productivity, and the underlying mechanisms for such improvement, have attracted increasing attention during recent years. Yeast cells are known to be a rich source of vitamins, enzymes and yeast is also observed to stimulate cellulolytic bacteria in the rumen, increase fiber digestion

and flow of microbial protein from the rumen. Hence, yeast culture supplementation has been shown to improve the growth rate and feed conversion efficiency. However, the effect of dietary yeast supplementation on milk yield and milk composition is varied. In some studies, yeast culture supplementation was shown to increase milk production and milk fat percentage (Ayadet *et al.*, 2013).

Probiotics have been observed to improve the performance of crossbred cows by increasing the count of favorable micro-flora present in the rumen and by improving feed utilization by animal, respectively. Keeping this view in mind, the present investigation was proposed to explore the possible feed additive probiotic-yeast culture, which will be more beneficial and economic in order to produce profitable performance of crossbred cows. Therefore, present experiment was planned to study the effect of supplementation of probiotic on the performance of lactating crossbred cows.

II. MATERIAL AND METHODS

Twenty lactating crossbred cows were selected from villages of Mehsana District with average milk yield of 10 to 12 kg and lactation stage below sixty days. The study was conducted during winter month of November to January for 90 days after the adoption period of two weeks for consecutive three years (2014-2017). The control animal had concentrate, green and dry fodder and wheat straw whereas experimental group fed additional 20 grams probiotic (Gausac- product from Indian Immunological Limited). The animals were kept in well-ventilated byres with access to fresh water and having separate mangers for fodder and concentrate. The animals were milked twice a day morning and evening and the concentrate (Total quantity divided into

two parts) was given as each milking time. Probiotic was added and mixed in concentrate uniformly in morning and fed individually to each animal. Milk sample from each animal in both groups were collected daily and analyzed for milk production at their village cooperative dairy regularly for 90 days. All the periodicals data with regards to milk yield were statistically analyzed by paired ‘t’ test with Systat 7.0 (1997).

III. RESULT AND DISCUSSION

Feeding of probiotic resulted in significant ($P < 0.05$) increase in milk yield a (Table 1). Milk yield increased by 7.6 % in probiotic fed group over the control group.

Table 1. Milk production performance in cows.

Year	Particulars	Control	Treatment group	Significance
2014-15				
	Average milk yield per animal	8.90 ± 0.92	9.50 ± 1.06	< 0.05
2015-16				
	Average milk yield per animal	9.10 ± 0.49	9.80 ± 0.69	< 0.05
2016-17				
	Average milk yield per animal	9.30 ± 0.42	10.10 ± 0.48	< 0.05
Pooled of three years	Average milk yield per animal	9.10 ± 0.61	9.80 ± 0.74	< 0.05

Values in rows are significance at $P < 0.05$

Hossain et al. (2014) reported significant ($P < 0.05$) improvement in milk yield after supplementing probiotics (0.3 litre/ day/ cow). Vibhute et al. (2011) noticed improvement in milk yield of cows after supplementation of yeast culture. Wohlt et al. (1998) also noticed significant improvement in milk yield in Holstein Friesian cows supplemented with 10 and 20 g yeast culture per day. Similar results were also observed by Williams et al. (1991), Wohlt et al. (1991), Piva et al. (1993), Dutta et al. (2008), Yalcin et al. (2011), Bruno et al. (2009) reported that Cows fed yeast culture produced 1.2 kg/d more milk. Jacqueline et al. (1988) and Ware et al. (1988) reported increased milk yield (1.8 kg/day) when feeding cows *Lactobacillus acidophilus* (2 x 10⁹ cells/day) compared with the control group. Gomez-Basauri et al. (2001) observed an increase in milk production (0.73 kg/day) when feeding cows a mixture of *L.*

acidophilus, *L. casei* and *Enterococcus faecium*. More recently, Stein et al. (2006) reported an 8.5% increase in 4% fat corrected milk in cows receiving 6 x 10¹⁰ *Propionibacterium*/day from 2 weeks pre-partum to 30 weeks post-partum. More recent studies have looked at the combination of yeasts and bacteria. The results of the present trial are in accordance with the above findings.

IV. CONCLUSION

On Farm Test result showed that supplementation of probiotic to high yielding crossbred cows is beneficial in terms of increasing milk yield. Further research is necessary to find out the supplemental effect of the probiotic on dairy animals fed various types of basal rations at different productive levels and stage of lactation.

REFERENCES

- [1] Ayad, M.A., B. Benallou, M. S. Saim, M. A Smadi and T. Meziane (2013) Impact of feeding yeast culture on milk yield, milk components and blood components in algerian dairy herds. *J. Vet. Sci. Tech* **4**: 135.
- [2] Bruno RGS, Rutigliano HM, CerriRL, Robinson PH and Santos JEP (2009).Effect of feeding *Saccharomyces cerevisiae* on performance of dairy cows during summer heat stress. *Animal and Feed ScienceTechnology*, 150:175-186.
- [3] Dutta TK and Kundu SS (2008). Response of mixed viable probiotics culture on milk production and nutrient availability in crossbred mid lactating cows. *Indian Journal of Animal Sciences*. 78 (5): 531-535.
- [4] Fuller R (1989).Probiotics in man and animals. *Journal of Applied Microbiology*, 66:365-378.
- [5] Gomez-Basauri J, de Ordanza MB and SicilianoJJ (2001). Intake and milk production of dairy cows fed lactic acid bacteria and manna oligosaccharide. *Journal of Dairy Science*, 84(Suppl.1): 283.
- [6] Hossain, F. M. A., M. M. Islam, A. Ara, N. Iliyas (2014) Supplementing probiotics (*saccharomyces cerevisiae*) in multiparous crossbred cows ration provoke milk yield and composition. *J. of Anim. and feed Res.* **4(2)**: 18-24.
- [7] Jacquette RD, Dennis RJ, Coalson JA, Ware DR, Manfredi ET and Read PL (1988). Effect of feeding viable *Lactobacillus acidophilus* (BT1386) on performance of lactating dairy cows. *Journal of Dairy Science*,71 (Suppl. 1): 219.
- [8] Piva G, Belladonna S, Fusconi G and Sicbaldi F (1993). Effects of yeast on dairy cow performance, ruminal fermentation, blood components and milk manufacturing properties. *Journal of Dairy Science*, 76: 2717-2722.
- [9] Stein DR, Allen DT, Perry EB, Bruner JC, Gates KW, Rehberger TG, Mertz K, Jones D and Spicer LJ (2006).Effects of feeding propionibacteria to dairy cows on milk yield, milk components and reproduction. *Journal of Dairy Science*, 89(1): 111-125.
- [10] Systat (1997).Users manual and reference manual for systat V 7.0 for windows. SPSS Inc, Chicago, IL.
- [11] Vibhute, V. M., R. R. Shelke, S .D. Chavan and S. P. Nage (2011) Effect of probiotics supplementation on the performance of lactating crossbred cows. *Vet. World Vol.* 4(12): 557-561.
- [12] Ware DR, Read PL and Manfredi ET (1988). Lactation performance of two large dairy herds fed *Lactobacillus acidophilus* strain BT138 in a switchback experiment. *Journal of Dairy Science*, 71 (Suppl.1): 219.
- [13] WilliamsPE, Tait CA, Innes GM and Newbold CJ (1991). Effects of the inclusion of yeast culture (*Saccharomyces cerevisiae* plus growth medium) in the diet of dairy cows on milk yield and forage degradation and fermentation patterns in the rumen of steers. *Journal of Animal Science*, 69(7): 3016-3026.
- [14] Wohlt JE, Finkelstein AD and Chung CH (1991). Yeast culture to improve intake, nutrient digestibility, and performance by dairy cattle during early lactation. *Journal of Dairy Science*, 74 (4):1395-1400.
- [15] Wohlt, J. E., T. T. Corcione and P. K. Zajac (1998) Effect of yeast on feed intake and performance of cows fed diets based on corn silage during early lactation. *J. Dairy sci.* **81 (5)**: 1345-1352.
- [16] Yalcin S, Can P, Gurdal AO, Bagc B and Eltan O (2011). The nutritive value of live yeast culture (*saccharomyces cerevisiae*) and its effect on milk yield, milk composition and some blood parameters of dairy cows. *Asian-Aust. J. Anim. Sci.* Vol. 24(10): 1377-1385.