



Probiotic Ameliorate Gut Health and Growth Performance in Marwari Goat kids: A Substitute of Antibiotics

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Abstract: Goat husbandry plays a vital role in providing household nutritional security, increased income and employment in rural transformation. In order to assess the influence of on-farm supplementary feeding of commercial probiotic on growth in growing kids has been evaluated. Twenty (3 months old) weaned kids of Marwari breeds were randomly divided into two groups of 10 each. One group served as control while the other as experimental group was fed probiotic @ 5 g kid⁻¹d⁻¹ for 90 days. Animals of both groups grazed on community pasture land. The results showed that probiotic supplemented experimental group gained significantly higher ($P < 0.05$) body weight and improved average daily body weight gain by 18.55 g more than control group. The study further indicated that diarrhoea and respiratory disorders occurred less frequently experimental group compared to control group animals. Conducting farmer's participatory trial on farmer's flock can prove to be a very effective approach for creating awareness and acceptance of technology.

Key words: Kids, probiotic and growth.

Animal husbandry is one of the rapidly growing agriculture sectors. Generally, 75% of rural and 25% of urban population depends on livestock for their nutrition (Grace, 2012). In Rajasthan frequent draught, extreme events triggered by climatic change may pose serious threat to survival of living being (Patidar *et al.*, 2014). Goats serve as vital companions for pastoral communities, providing milk, meat, and fiber in an arid environment in arid Rajasthan. Their adaptability to harsh conditions makes them essential for sustaining livelihoods and ensuring food security in this challenging landscape.

Goat farming is being practiced in India since long (Lavania *et al.*, 2014). In the arid region, goats are reared mainly on community property resources (CPR) and stubble grazing on cropped land after harvesting of crops. Majority of goat farmers do not supplement concentrate to their animals due to economic reasons and/or lack of awareness of the benefits of supplementation. Limited concentrate supplementation, in addition to free grazing on range land, is known to improve the growth performance of Sirohi kids (Chaudhary *et al.*, 2000). Higher body weight and feed conversion ratio (FCR) are

Table 1. Supplementary feeding impact of probiotic in body weight, disease incidence and B:C ratio in kids

Parameters	Particulars	Body weight of Experimental group (n=10)	Body weight Control group (n=10)
Average fortnight body weight of kids (kg)	Initial body weight at 90 d (kg)	10.07 ± 0.51	10.05 ± 0.51
	105 days	11.68±0.45	10.65± 0.39
	120 days	12.02± 0.56	11.86± 0.62
	135 days	13.65±0.36	12.72± 0.71
	150 days	15.44±0.28	13.87± 0.58
	165 d group	16.87±0.62	14.56± 0.82
	Final body weight at 180 d*	18.10 ± 0.47	15.67± 0.76
Average final body weight gain (kg) *		8.03±0.71	5.78±0.62
Average Daily weight gain (ADG) *		89.88±0.62	71.33±0.71
Cost of concentrate mixture including probiotic supplementation (Rs.)		2703/00	2570/00
Income of live weight of kid @ Rs. 100/kg		8030/00	5780/00
Net Profit (Rs.)		5327/00	3210/00
B:C ratio		1:1.97	1:1.24

*Significantly higher ($P<0.05$).

important economic traits in small ruminant. Now a day's many growth promoters in the form of probiotics are available in market. Probiotics are defined as living microbial supplements that advantageously influence the host through improving its intestinal microbial composition (Majidi-Mosleh *et al.*, 2017). The use of probiotics prevents pathogenic colonization of the digestive tract, stimulate development of the immune system and its response and counteract negative effect of such illness (Rosmini *et al.*, 2004). Probiotics are living microorganisms providing beneficial effects for the host when administrated in adequate amounts (FAO/WHO, 2001). The present study was conducted under the on-farm trial (OFT) to assess growth performance through supplementary feeding of probiotic

Materials and Methods

A field trial was conducted on farmer's goat flock maintained on natural range land of Manai village, Tinwari block in Jodhpur district during 2020-2022. Twenty graded Marwari kids, aged three months, weigh 10.07 ± 0.51 kg each were randomly assigned to two groups designated as control (Group-1) and experimental (Group-2) of ten animals each. Kids in both groups were grazed for eight hours approximately per day. The vegetative cover of range land was dominated by *Cyodon dactylon*, *Cenchrus bibrurus* grasses, *Zizyphus nummularia*, *Calotropis*, sp., *Procera* sp., shrubs and fodder

trees *Acacia nilotica* and *Prosopis cineraria*. The kids of both the groups were offered 250-300 g balance concentrate ration. The ration contained DCP 14% and TDN 65%. Concentrate mixture was fortified with mineral mixture @ 2% and salt 1%. Animals in experimental group were also fed multistrem probiotic preparation @ $5 \text{ g kid}^{-1} \text{ d}^{-1}$ (CFD). Each 250 g probiotic contained *Saccharomyces cerevisiae* (0.37×10^6) and *Lactobacillus sporogenes* (12500×10^6 colony forming unit). Prior to commencement of the experiment all the animals were dewormed on the day one with Albendazole @ 7.5 mg kg^{-1} body weight.

Results and Discussion

The body weight of both group of kids as recorded on 105,120,135,150,165 and 180 days is presented in Table 1. Analysis of data revealed that 30 days after starting the feeding of probiotics the live weight of animals was higher than in control. After 90 days of trial the kids in probiotic supplemented experimental group achieved significantly higher ($P<0.01$) body weight gain which might be due to the optimum pH, stabilization for optimum activity of micro flora, degrading crude fiber and finally better assimilation of digested nutrients and utilization by the experimental group animals. Better performance was reported in terms of growth and FCR in Osmanabadi kids supplementation probiotic (*Aspergillus oryzae* and *Lactobacillus*) @ 1 g per kg with concentrate

feed (Panwar *et al.*, 2023). Multi strain probiotic when supplemented in diet 5g d⁻¹ improved overall average daily weight gain (ADG) in experimental group 89.88 g than 71.33 g in control group animals.

Kids receiving probiotic supplement had only 5% mortality as against 12% in control. Probiotic supplementation also reduced incidence of respiratory and gastrointestinal disorder in growing kids.

The disease management in small ruminant

Majority of goat farmers adopt the indigenous ethano-veterinary practice for curing the common ailment of gastro-intestinal problem (Singh *et al.*, 2014). Diet supplemented with probiotic successfully combated these disorders, as none of the animal in the experimental group witnessed any untoward clinical sign of respiratory and gastro intestinal tract problem. The use of probiotic prevents the imbalance in the intestinal tract and avoids occurrence of diarrhea. Probiotics can eliminate the pathogenic microorganisms from the GIT and change the host's microbial population density in the intestinal tract. Probiotics subsequently establish a better suited microbial population through a transformation in the equilibrium of beneficial and noxious microorganisms (Mountzouris *et al.*, 2009). Similar observations were also reported by Singh *et al.* (1998) who reported improvement in body weight by 570 g in 3-4 months old Marwari kids fed 2.5 g yeast bolus daily for a period of 3 months than kids in control group. Deka and Kayastha (2011) also observed significant higher body weight gain in Jamunapari kids feed with probiotic. Apas *et al.* (2010) observed 9% higher body weight (9%) in goat feed probiotic combination of *Lactobacillus reuteri*, *Lactobacillus alimentarius*, *Enterococcus faecium* and *Bifidobacterium bifidum* in comparison to control. The trial demonstrated that an extra investment of Rs 133/- by adding probiotic helped an additional body weight gain of 2.25 kg/kid. The return from the additional mean live weight gain 2.25 kg in probiotic supplemented kids yielded an additional net income of Rs. 2250 in 90 days feeding (Pawar *et al.*, 2023).

Conclusion

It can be concluded that there are many positive benefits of using probiotics in animal

feeding. Probiotics seems to improve gut microbiota composition, immune response, nutrient digestibility and absorption, animal growth. This indicates that supplementation of probiotics may be an economic after weaning for reducing the weaning stress in kids that helps in higher daily weight gain and further it can also be advocated under adverse condition such as drought and famine, which are common phenomenon in arid region of Rajasthan. Conducting farmer's participatory trial on farmer's flock can prove to be a very effective approach for creating awareness and acceptance of technology.

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Conflict of interest

All authors declare no conflict of interest.

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