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Effect of synbiotic on performance and haematology of Murrah buffalo calves

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Abstract
The goal of the current research project was to examine how synbiotics affected the blood haematology and performance of Murrah buffalo calves. A total of 12 Murrah buffalo calves of either sex, with identical body weights at the age of 15 days, were chosen at random and randomized divided into 2 groups, with 6 animals in each group. Basal ration was given to Group T_1 (Control). group T_2 (Synbiotic) that is treatment group was fed basal ration with Probiotic (*Saccharomyces cerevisiae*) @ 2 g/animal/day and Prebiotic (*Mannan oligosaccharide*) @ 2 g/animal/day. The duration of experiment was 3 months. Overall body weight was in the treatment group that is significantly higher ($p<0.05$) in comparison to control group. 12.17% higher average body weight gain showed in treat group. Although the treatment group had higher DM intake and feed efficiency, there was no statistically significant difference. In compared to the control group, no apparent distinction in blood hemology was seen in the treatment group. In comparison to the treatment group, the control group's fecal score was greater.

Keywords: Prebiotic, probiotic, *Mannan oligosaccharide*, murrah buffalo calves, *Saccharomyces cerevisiae*, synbiotic

Introduction
The dairy calves are crucial to the herd's future. The preservation of a high-quality gene pool and the viability of the farming business depend on proper calf care. According to Lucas *et al*. (2007) [15], the intestinal microbiota of calves is extraordinarily unstable during the first month of life and more prone to the spread of pathogenic microorganisms that frequently cause gastrointestinal diseases, particularly diarrhoea, which lowers digestibility and minimizes nutrient absorption while also having an adverse effect on the health of the calf, To encourage the growth of calves, its prevention is important. Synbiotics are a probiotic and prebiotic mixture that complement one another's functions. Prebiotics (*Mannan oligosaccharide*) are non-digestible carbohydrates that are not metabolized in the small intestine and fermented in the large intestine, according to Patel *et al*. (2020) [7]. Probiotics (*Saccharomyces cerevisiae*) are the microorganism that contributes to the intestinal microbial balance. The term "synbiotic" is inappropriate for items in which a prebiotic component favours a probiotic bacteria specifically because the word "synbiotic" indicates synergy. The primary objective of that kind of combination is to improve the probiotic microorganisms' potential in gastrointestinal survival. Probiotics improve gastrointestinal homeostasis, whereas prebiotics give probiotic microorganism's energy and nutrients. Synbiotics are more beneficial than probiotics and prebiotics alone, according to Shim (2005) [19]. Antibiotic resistance has led to widespread criticism of the use of probiotics, prebiotics, and synbiotics as growth promoters. These alternatives to antibiotics include probiotics, prebiotics, and synbiotics. The aforementioned information will be taken into consideration while an experiment is carried out to study the effects of supplementing synbiotic in Murrah buffalo calves.

Materials and Methods
The Livestock Farm, Adhartal, Department of Livestock Production and Management, College of Veterinary Science, and A.H., N.D.V.S.U., Jabalpur (M.P.) are where the current experiment on buffalo calves was carried out. Twelve buffalo calves aged 15 days were chosen for the experiment and randomly split into two groups, each with six calves, as shown in the Table. 1. A calf shed with good ventilation served as the calves' housing. The entire experimental animal was given individual calf enclosures with feeding boxes. All of the test animals received diets recommended by ICAR (2013) [11].

Two milk feedings each day, at 6.30 am and 5.00 pm, were the standard procedure. Up until the age of three months, milk that had been combined with probiotic and prebiotic supplements was administered to the calves every morning. All animal groups received the same amounts of green fodder and calf starter from the treatment and control groups. Water was available to the animals without restriction day and night. According to the formulation presented by Mishra and Singh (1993) [16], calf starter was made with maize, ground nut cake (GNC), wheat bran, fish meal, mineral mixture, common salt, vitamins (A, B2, & D3), and 22% crude protein. On a weekly basis, all calves' body weights were measured using an electronic platform weighing balance in the morning before feeding. A measured quantity feed offered and left over was used for monitoring daily feed consumption. In order to aid in the assessment of the calf's health state and the management of diarrhea, fecal consistency was subjectively rated each morning prior to feeding. Daily assignments and records of fecal scores were made using the following system: 1 = dry, hard, 2 = soft, formed, 3 = like pudding, 4 = mixture of liquid and some particles, and 5 = liquid Bartlett and others (2006) [3]. If the scour score was greater than three, a scour day was considered. Indicating that soft feces did not represent diarrhea and was not of infectious origin, calves did not exhibit raised body temperatures during days of soft feces (scour score around 3). They also remained attentive and hungry. By shaving hair, using sterile gauze and spirits, and trimming hair, the blood collection site was made aseptic. Before meal at 8 am, 5 ml of blood was aseptically drawn from the jugular vein using a disposable syringe and an 18 gauge hypodermic needle. After collection, the blood was transferred to an EDTA-coated tube. After that, a box containing ice packs was used to transfer the blood samples directly to the lab. With the exception of DLC, all observations were carried out using the auto analyser. 1). Total erythrocyte count (million/µl), 2). Total leucocyte count (thousand/µl) 3). Haemoglobin concentration (g/dl) 4). Packed cell volume (%). 5). Differential leucocyte count (%).

Table 1: Grouping of the animal and their treatment

Groups	Number of calves	Treatment
Control (C)	6	Basal diet
Treatment (T)	6	Basal diet+ Probiotic (*Saccharomyces cerevisiae*) @ 2 g per calf/day + Prebiotic (*Mannan oligosaccharide*) @ 2 g per calf/day

Results and Discussion

1. Body weight

The mean initial body weight (kg) in C and T were observed as 33.33±3.16 and 34.52±0.33 respectively which defines that initial body weights were almost similar in all the four groups. The mean values for body weight (kg) at the end of the experiment in group C and T were 51.56±4.08 and 63.50±1.15 respectively. Overall weight changes at the end of experiment in different treatment groups were significantly differ ($p<0.05$) in between the groups. Overall daily gain were 0.21±0.02 and 0.33±0.01 kg, respectively in C and T groups. Statistical analysis revealed that there was significant difference ($p<0.05$) in between all the groups. Highest gain was found in treatment group as compared to control group. Better growth performance was due to better intestinal micro-flora balance in case of probiotic group and in prebiotic group MOS work as feed for the micro-flora which may leads enhance the growth of the micro-flora, but in case of synbiotic probiotic and prebiotic work together and perform better than the individual. The present study was in agreement with Dawson (1990) [6] reported that yeast culture increase feed efficiency and weight gain, increasing microbial growth in the rumen and enhances microbial protein synthesis. Heinrichs *et al.* (2003) [10] reported that feeding of antibiotics or MOS has no significant effect on average body weight and average daily gain. Ningal (2008) [17] fed varying combination of Napier grass and Rensoni with and without yeast supplementation in the concentrates to buffalo calves and reported that final weight, average daily gain was significantly higher ($p<0.05$) in the calves fed yeast. Abdel-Raheem *et al*. (2012) [1] they reported better performance in probiotic and synbiotic group with improved final body weight, body weight gain than prebiotic and control group. Chandra *et al*. (2012) [4] employed yeast in the diet of 24 crossbred female cow calves and examined the biometric performance. They reported that the body weight, body length, heart girth, abdominal girth, and height at wither significantly increased (p0.01) in contrast to the control group. In their 2016 study, Sharma *et al*. examined the impact of probiotic (*Saccharomyces cerevisiae*) @ 15 g/calf/day on pre-ruminant buffalo calves' growth performance and found that probiotic feeding increased (p0.05) the growth rate of Murrah buffalo calves.

Faecal Score

The average faecal score during 1st month in diarrhoea suffered calves in control group and treatment group were 4.37±0.05 and 4.00±0.0 respectively. Faecal score was higher in group control group in comparison to synbiotic supplemented group. Occurrence of diarrhoea in T group was lowest as compare to control group. Kawakami *et al.* (2010) [12] observed yeast feeding improve gut microbial flora and reduce the diarrhoea. According to Fouladgar *et al*. (2016) [20], kefir feeding during the first two weeks of life improved faecal scores and decreased days with diarrhoea. Other microorganisms' ability to proliferate is inhibited by the metabolic products and antibiotic substances produced by probiotics. Spinler *et al.* (2008) [21]. In comparison to the control calves, the calves supplemented with MOS (4 g/d) had a lower faecal score, according to Ghosh and Mehla (2012) [9]. The pH decreases as a result of the creation of some metabolites, such as lactic acid, which is crucial in halting the growth of harmful bacteria and enhancing the faecal score.

Haematological parameters

The mean values of haemoglobin (g/dl) initially in C and T groups were 13.10±0.67 and 13.44±0.87 respectively. At the end of experiment mean values of haemoglobin (g/dl) in C and T groups were 14.83±0.30 and 14.73±0.45 respectively. In terms of statistics, there was no discernible difference in the haemoglobin values in the various groups at various times. According to Kim *et al*. (2011) [13], probiotic supplementation in Holstein calves had no effect on the haemoglobin level. The total erythrocyte count (106/l), total leucocyte count (103/l), and pack cell volume (%) of the various groups at various times did not differ significantly statistically.

According to Adams *et al*. (2008) [22], probiotic supplementation has no impact on TEC. Probiotic supplementation has a substantial impact on total erythrocyte count, according to Guzanfar *et al*. (2015) [8]. According to Dar *et al*. (2017) [5], feeding probiotic, prebiotic, and synbiotics to cross-bred calves had no effect on the TEC. According to Agazzi *et al*. (2014) [2], adding probiotic supplements had little impact on the TLC of growing pigs. Both the probiotic supplemented group and the antibiotic supplemented group had no discernible impact on the PCV value in Holstein calves, according to Kim *et al*. (2011) [13].

Conclusion

Supplementing a young calf with a probiotic and prebiotic mixture is advantageous. Synbiotic treatment beneficial to increase daily DM intake, feed efficiency, average daily gain, and body weight in Murrah buffalo calves. It came out that the faecal score of the treatment group was lower than that of the control group, indicating that synbiotic supplementation reduces the incidence of diarrhoea. Cell-mediated immune responses and blood haematological indicators were unaffected by the differed treatment groups.

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