

## Research Article

# Effect of Supplementing Rice Bran and Wheat Bran with Probiotics on Growth Performance of Khari Kids

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### Abstract

An experiment was conducted in IAAS, Livestock Farm, Rampur Chitwan, Nepal in order to assess the growth performance of kids feeding diets supplemented with probiotics. The experiment was laid out in Randomized Complete Block Design (RCBD) with four replications and five feeding supplemented diets with probiotics treatments. Parameters studied were live weight gain, body measurements and economic analysis. The result of this study showed the highest cumulative mean live weight (13.24 kg) in the treatment group feeding mixture of rice bran and wheat bran with probiotics. Fortnightly and daily body weight gains were also highest in the treatment group having mixture of rice bran and wheat bran with probiotics. The highest (11.74cm) overall mean monthly heart girth was observed in the treatment group feeding mixture of rice bran and wheat bran with probiotics. The mean monthly cumulative neck girth, body length and wither height of kids did not differ significant ( $p>0.05$ ) among treatments. However, the highest overall mean monthly cumulative neck girth (6.71cm), wither height (10.14cm) and body length (14.62cm) was observed in probiotics supplemented treatment groups. Highest (1.61) benefit cost ratio was obtained from goats reared on feeding mixture of rice bran and wheat bran with Probiotics and lowest (1.008) in wheat bran without probiotics. The result of the study thus suggests that feeding of rice bran and wheat bran with probiotics is beneficial in terms of growth rate and cost of production.

**Keyword:** Probiotics; rice bran; wheat bran; growth rate; khari kids

### Introduction

It is believed that goat was the earliest ruminant to be domesticated by man (Zeuner, 1963) and has the widest ecological range among the domesticated animals (Epstein, 1997). Goat enterprise is suitable for the landless, marginal and small farmers including women and children. Goat meat is very popular and is preferred to other meat in Nepal (Dhakal, 1985). Rice bran is outer coarse coat (pericarp) of

grain separated during processing and is a good source of B-vitamins, protein and amino acids and fairly palatable to farm animals. It contains 14-18% oils, 11% cp, 10-15% CF, 2600kcal ME/kg. Similarly, Wheat bran is excellent feed for goat. It is quite palatable and has laxative properties. It contains 13% CP and 12% CF. The phosphorus content is very high and calcium is low in wheat bran. Probiotics have been shown to have many functions, including protecting

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young animals against enteropathic disorders and increasing feed conversion efficiency and weight gain in growing animals (Windschitl, 1991). Certain probiotics have beneficial effects in the rumen, including the prevention of rumen acidosis (Ghorbani *et al.*, 2002). Beneficial effects of these probiotics are well reported when these are administered in adequate amount (FAO/WHO, 2002; Senok *et al.*, 2005; Todorov *et al.*, 2007).

Nutrition is the most important factor influencing high production of goat under controlled management condition (Devendra, 1984). The productivity of farm animals is comparatively low mainly due to the shortage of feedstuffs to satisfy the nutriment requirements in Nepalese context. Farmers are less aware about goat's diet with respect to energy, protein, vitamins and mineral requirement. They keep goats just on the basis of seasonal fodder and available forest resources. Considering the above problems an experiment was conducted to assess the growth performance of kids fed diets supplemented with probiotics.

## Materials and Methods

An experiment was conducted in Institute of Agriculture and Animal Science (IAAS), Livestock Farm, Rampur Chitwan, Nepal. The experiment was laid out in Randomized Complete Block Design (RCBD) with four replications and five treatments namely: rice bran without probiotics, wheat bran without probiotics, rice bran with probiotics, wheat bran with probiotics, rice bran and wheat bran with probiotics. All treatment kids were given six hour grazing for additional nutritional requirement. Twenty 3-4 months age Khari goat kids including both sexes were selected for the study from IAAS farm. All the kids were vaccinated (PPR), drenched and dipped against internal and external parasites prior to partitioning them into experimental groups.

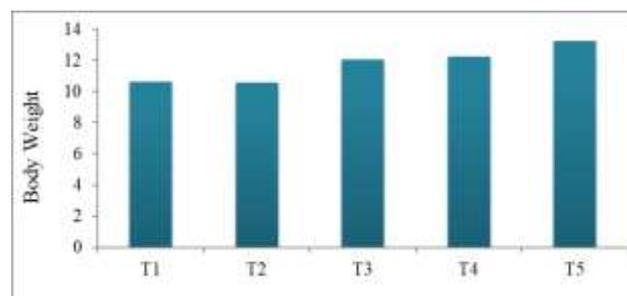
Two local feed ingredients viz. rice bran and wheat bran were collected and properly fortified with probiotics (*probenz premix*), common salt and mineral mixture as mentioned in the experimental design. *Agrimim forte* (mineral) and common salt @ 1 kg and 2 kg per quintal each were mixed in concentrate ration. Both concentrate ration

was fed @ 50 gm/kid/day for first month and then 50 gm was added each month so that on 4<sup>th</sup> month each kid was get 200 gm/day. Concentrate ration was fed to the kids according to feeding schedule both in the morning and evening by dividing the allowance in two equal parts. Kids were allowed in grazing for 6 hours from 10 am to 4 pm. Body weight, Average daily weight gain, Total weight gain, Body measurement: Heart girth, body length, neck girth and wither height were taken for further study and analysis. Economical analysis and nutrient analysis was also done during the research period. Statistical analysis was done by using M-STAT soft ware program.

## Results and Discussion

### Mean Cumulative Body Weight

The mean fortnightly body weight (kg) of Khari kids fed probiotics supplemented diet is presented in Table 1. The mean body weight of kids in first fortnight was observed non-significant ( $p>0.05$ ). Accordingly, the mean body weight of kids in second fortnight was observed significantly different ( $P<0.01$ ) having higher body weight (8.29 kg) in the treatment group having mixture of wheat bran and rice bran with probiotics and lower body weight (7.55kg) was observed in the treatment group having rice bran without probiotics. Similar result was also observed in other fortnight.



**Fig. 1:** Mean 8<sup>th</sup> fortnightly adjusted cumulative live weight (kg) of kids fed probiotics supplemented diet

Similar result was reported by Weidmeire *et al.* (1989) as daily weight gains of beef cows and calves maintained on poor quality pasture were increased from 0.57 to 0.80 kg /day by supplementation with *Aspergillus oryzae*.

**Table 1:** Mean fortnightly adjusted cumulative live weight (kg) of kids fed probiotics supplemented diet

Treatments	Periods in fortnight and body weight in kg							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
Rice bran without probiotics	7.04	7.55 <sup>c</sup>	8.26 <sup>c</sup>	8.77 <sup>c</sup>	9.22 <sup>b</sup>	9.72 <sup>b</sup>	10.15 <sup>b</sup>	10.64 <sup>c</sup>
Wheat bran without probiotics	7.04	7.82 <sup>bc</sup>	8.46 <sup>b</sup>	8.90 <sup>bc</sup>	9.25 <sup>b</sup>	9.72 <sup>b</sup>	10.09 <sup>b</sup>	10.57 <sup>c</sup>
Rice bran with probiotics	7.07	7.70 <sup>c</sup>	8.52 <sup>bc</sup>	9.25 <sup>abc</sup>	9.93 <sup>ab</sup>	10.60 <sup>ab</sup>	11.32 <sup>a</sup>	12.04 <sup>b</sup>
Wheat bran with probiotics	7.23	8.05 <sup>ab</sup>	8.76 <sup>ab</sup>	9.44 <sup>ab</sup>	10.08 <sup>a</sup>	10.69 <sup>a</sup>	11.37 <sup>a</sup>	12.23 <sup>ab</sup>
Rice bran and wheat bran with probiotics	7.29	8.29 <sup>a</sup>	8.97 <sup>a</sup>	9.84 <sup>a</sup>	10.52 <sup>a</sup>	11.31 <sup>a</sup>	12.15 <sup>a</sup>	13.24 <sup>a</sup>

\*Means in column followed by same superscript is not significantly different ( $p>0.05$ )

### Mean Daily Body Weight Gain

The mean daily weight gain of kids in first fortnight was observed non-significant ( $p>0.05$ ). Accordingly, the mean daily weight gain of kids in second fortnight was observed significantly different ( $P<0.01$ ) having higher daily weight gain (66.91) gm in the treatment group having mixture of wheat bran and rice bran with probiotics and lower daily weight gain (34.15gm) was observed in the treatment group rice bran without probiotics. The mean daily weight gain of kids in third fortnight was observed non-significant ( $p>0.05$ ). Similar result was also observed in 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> fortnight. However, there was significant difference between probiotics supplemented diet and without probiotics supplement diet in 7<sup>th</sup> and 8<sup>th</sup> fortnight. As well as there was significant difference ( $P<0.01$ ) in overall weight gain between probiotics supplemented diet and without probiotics supplement diet having higher daily body weight gain (55.99 gm) in the treatment group having wheat bran and rice bran with probiotics and lower daily weight gain (33.75gm) in the treatment group wheat bran without probiotics.

The result showed that the weight gain of the Khari kids were found highest in the treatment group fed with probiotics supplemented diet. This increase in weight gain might be due to better utilization of nutrients where probiotics were supplemented in the diet.

It was concluded that supplementation of microbial feed additives in diet of kids had positive influence on growth rate (Singh *et al.*, 2015). Similar observation has been reported by Yadav and Khan (2011) and Chopade *et al.*, (2010).

### Mean Monthly Measurement of Heart Girth

Mean monthly heart girth (cm) of Khari kids fed probiotics supplemented diet is presented in the Table 2. The mean monthly cumulative heart girth of kids in first month was observed non-significant ( $p>0.05$ ). But the mean monthly cumulative heart girth of kids in second month was observed significantly different ( $P<0.01$ ) having higher

monthly cumulative heart girth (48.61cm) in the treatment group mixture of rice bran and wheat bran with probiotics and lower monthly cumulative heart girth (46.53cm) was observed in the treatment group wheat bran without probiotics. Similar result was observed in 3<sup>rd</sup> and 4<sup>th</sup> month and overall gain.

Findings of this study is also supported by Badi *et al.* (2002) who reported that heart girth is the best parameter of estimating body weight. Nigm *et al.* (1995) also reported that heart girth tended to be the best predictor of body weight.

### Mean Monthly Measurement of Body Length

The mean monthly cumulative body length of kids in first month was observed non significant ( $p>0.05$ ). Similar result was found in 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> month. But the highest overall mean monthly body length (14.624cm) was observed in the treatment group feeding with mixture of rice bran and wheat bran with probiotics and lowest overall mean monthly body length (10.95cm) was observed in the treatment group fed with rice bran without probiotics.

### Mean Monthly Measurement of Wither Height

The mean monthly cumulative withers height of kids in first month was observed non significant ( $p>0.05$ ). Similar result was found in 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> month. But the highest overall mean monthly wither height (10.14cm) was observed in the treatment group feeding with mixture of wheat bran and probiotics and lowest overall mean monthly wither height (6.83cm) was observed in the treatment group fed with wheat bran without probiotics.

### Mean Monthly Measurement of Neck Girth

The mean monthly cumulative neck girth of kids in first month was observed non-significant ( $p>0.05$ ). Similar result was found in 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> month. However, the highest overall mean monthly neck girth (6.71cm) was observed in the treatment group feeding with wheat bran and probiotics and lowest overall mean monthly neck girth (4.83cm) was observed in the treatment group fed with rice bran without probiotics.

**Table 2:** Mean monthly heart girth (cm) of Khari kids fed probiotics supplemented diet at livestock farm IAAS

Treatments	Periods in month and heart girth measurement in cm				
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	Gain
Rice bran without probiotics	45.37	46.90 <sup>c</sup>	47.85 <sup>c</sup>	50.56 <sup>c</sup>	6.96 <sup>c</sup>
Wheat bran without probiotics	45.31	46.53 <sup>c</sup>	47.59 <sup>c</sup>	50.39 <sup>c</sup>	6.79 <sup>c</sup>
Rice bran with probiotics	45.56	47.28 <sup>bc</sup>	49.34 <sup>b</sup>	52.64 <sup>b</sup>	9.04 <sup>b</sup>
Wheat bran with probiotics	45.87	47.90 <sup>ab</sup>	50.10 <sup>b</sup>	53.31 <sup>b</sup>	9.71 <sup>b</sup>
Rice bran & wheat bran with probiotics	46.10	48.61 <sup>a</sup>	51.35 <sup>a</sup>	55.34 <sup>a</sup>	11.74 <sup>a</sup>

\*Means in column followed by same superscript is not significantly different ( $p>0.05$ )

### Economic Analysis

The total expenditure was observed highest (Rs. 865.00) in probiotics supplemented treatment groups (rice bran with probiotics, wheat bran with probiotics and mixture of rice bran and wheat bran with probiotics) and lowest (Rs. 855.00) in without probiotics supplemented treatment groups (rice bran without probiotics and wheat bran without probiotics). Net income was observed highest (Rs. 531.00) in the treatment group having rice bran and wheat bran with probiotics and lowest (Rs. 7.00) in the treatment group having wheat bran without probiotics. The B: C ratio was observed highest (1.61) in the treatment group having rice bran and wheat bran with probiotics and lowest (1.008) in treatment wheat bran without probiotics. Similar result was reported by Singh *et al.* (2015).

### Conclusion

Supplementary feeding of probiotics with rice bran and wheat bran resulted higher live weight gain, body measurements and economic analysis in goats kids. Hence, the probiotics is beneficial to mix in goats kids fed to gain higher productivity.

### References

- Badi AMI, Fissehay N and Rattan PJS (2002) Estimation of live body weight in Eritrean goat from heart girth and height at wither. *Indian Journal of Animal Science* **72**: 893-895.
- Chopade SR, Kalnade VH, Shelke SK, and Dandage SD (2010) Growth performance and economics of urea treated soybean straw based pelleted complete ration in kids. *Indian Journal of Animal Nutrition* **27**: 138-141.
- Devendra C (1980) Potential of sheep and goat in less developed countries. *Journal of Animal Science* **51**: 461- 473. DOI: [10.2527/jas1980.512461x](https://doi.org/10.2527/jas1980.512461x)
- Dhakal IP, Nepali DB, Kharel M, Tiwari K R (1985) Performance study of Chitwan local goat and Kathmandu Kage goat at Livestock Farm Rampur Chitwan. *Journal of the Institute of Agriculture and Animal Sciences* **6**:161-172.
- Epstein H (1997) The origin of domestic animals of Africa. African Publishing Corporation, New York, London and munich Pp. 19.
- FAO/WHO (2002) Report of a joint FAO/WHO expertconsultation on guidelines for the evaluation of probiotics in food. London, Ontario, Canada: World Health Organization and Food Agriculture Organization of the United Nations.
- Ghorbani GR, Morgavi DP, Beauchemin KA, Leedle JAZ (2002) Effects of bacterial direct-fed microbials on ruminal fermentation, blood variables, and the microbial populations of feedlot cattle. *Journal Animal Science* **80**: 1977–1986. DOI: [10.2527/2002.8071977x](https://doi.org/10.2527/2002.8071977x)
- Nigm AA, Abdalla OM, Aboul-Ela MB, Kamel HM and Ahmed MA (1995) Meat characteristics of sheep and goat breeds commonly consumed in UAE. 2. Use of body dimensions for predicting body and carcass weights. *Emirates Journal of Food and Agriculture* **7**: 39-54. DOI: [10.9755/ejfa.v7i1.5353](https://doi.org/10.9755/ejfa.v7i1.5353)
- Senok AC, Ismaeel AY, Botta GA (2005) Probiotics: facts and myths. *Clinical Microbiology and Infection* **11**: 958–966. DOI: [10.1111/j.1469-0691.2005.01228.x](https://doi.org/10.1111/j.1469-0691.2005.01228.x)
- Singh B, Jingar SC, Navab S, Kumar A, Bugaliya HL (2015) Effect of dietary supplementation of probiotics on juvenile growth and economics of goat production. *Journal of Bio Innovation* **4**: 44-48.
- Todorov N, Krachunov I, Alexandrov A, Djuvinov D (2007) Guide on Animal Nutrition. Matkom, Sofia, Egypt.
- Weidmeier RD, Arambel MJ, Walters JL (1987) Effect of yeast culture and *Aspergillus oryzae* fermentation extract on ruminal characteristics and nutrient digestibility. *Journal of Dairy Science* **70**: 2063-2071. DOI: [10.3168/jds.S0022-0302\(87\)80254-0](https://doi.org/10.3168/jds.S0022-0302(87)80254-0)
- Windschitl PM (1991) Lactational performance of high producing dairy cows fed diets containing salmon meal and urea. *Journal of Dairy Science* **74**: 3475-3485. DOI: [10.3168/jds.S0022-0302\(91\)78538-X](https://doi.org/10.3168/jds.S0022-0302(91)78538-X)
- Yadav CM and Khan PM (2011) Effect of grazing supplementary feeding on growth of growing goats under field condition. *Indian Journal of Small Ruminants* **17**: 103-104.
- Zenuer FE (1963) A history of domesticated animals, In Goat Production (Gall C eds.). Academic press London.