



Research Article

EFFECT OF PROBIOTIC, PREBIOTIC AND SYNBIOtic SUPPLEMENTATION ON BODY WEIGHT GAIN IN NELLORE BROWN LAMBS

SAIKUMAR G.¹, KRISHNA MURTHY A.*², AHLAWAT N.³ AND DHANALAKSHMI G.⁴

¹Department of Animal Nutrition, Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad, 211007, India

²Scientist, Animal Husbandry, ICAR-Krishi Vigyan Kendra, Yagantipalle, Banaganapalli, 518124, Andhra Pradesh, India

³Professor & Head, Department of Animal Nutrition, Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad, 211007, India

⁴Senior Scientist & Head, ICAR-Krishi Vigyan Kendra, Yagantipalle, Banaganapalli, 518124, Andhra Pradesh, India

*Corresponding Author: Email - atturikrishna80@gmail.com

Received: November 03, 2022; Revised: November 26, 2022; Accepted: November 27, 2022; Published: November 30, 2022

Abstract: Small ruminants play an important role in providing sustainable income to the small and marginal farmers in India. Supplementation of microbial cultures in the feeding of small ruminants has significant effect in their performance. Supplementation of feed additives like probiotics and prebiotics can reduce the usage of antibiotics in sheep production. Keeping this in view an experiment was conducted at Institutional Farm, Krishi Vigyan Kendra, Banaganapalle to study the effect of probiotics (*S.cereviceae* and *L.Sporengens*) and Mannan oligosaccharahides (MOS) as prebiotics and combination of both probiotic and prebiotic as synbiotic supplementation on body weight gain in Nellore Brown lambs. Initial body weight of 11.59±0.04kg, 12.17±0.071kg, 12.50±0.33kg, 11.90±0.03kg respectively in Control, T₁, T₂ and T₃ groups. The final body weight after 10th week of experimentation were as 19.36±0.35kg, 21.68±0.29kg, 24.74±0.12kg, 22.26±0.14kg in Control, T₁, T₂ and T₃ groups respectively. Among all four groups T₂ group recorded significantly higher (p<0.05) weekly body weight during experimentation period. Similarly average daily weight gain in different treatment groups were recorded as 110.99±5.23, 135.85±4.66, 156.71±17.32 and 148.09±3.87grams/day in Control, T₁, T₂ and T₃ groups respectively. Significant and higher daily gain was observed in T₂. The results of the experiment clearly indicate that, supplementation of probiotic, prebiotic and combination of both have significant effect on average daily weight gain in Nellore brown lambs.

Keywords: Daily weight gain in lambs, Probiotic, Prebiotic, Synbiotic, Nellore brown lambs

Citation: Saikumar G., et al., (2022) Effect of Probiotic, Prebiotic and Synbiotic Supplementation on Body Weight Gain in Nellore Brown Lambs. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 14, Issue 11, pp.- 11829-11830.

Copyright: Copyright©2022 Saikumar G., et al., This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Academic Editor / Reviewer: Dmello Basil Rudolph, Dr Nishant Patel

Introduction

Small ruminants play an important role in providing sustainable income to the small and marginal farmers and contribute greatly to the agrarian economy. In recent days, microbial cultures are supplementing to the ruminants with an objective to reduce the usage of antibiotics. Supplementation of probiotics in animal feed alters the rumen microflora and improves the gut health thereby improves performance and digestibility [1,2]. Similarly, Mannan oligosaccharahides (MOS) has been found as one of the potential alternatives to the antibiotic growth promoters in commercial poultry [3]. Since literature is not available on effect of synbiotic supplementation of *S. Cerviceae*, *L. Sporengenes* and MOS in lambs, the present study "Effect of dietary supplementation of probiotic, prebiotic and symbiotic supplementation on body weight gain in Nellore Brown lambs" was conducted with the objective to study the effect of probiotic, prebiotic and synbiotic supplementation on growth rate (grams/day) in Nellore brown lambs [4].

Material and methods

The study was conducted at Institutional Sheep Farm, SHE&CS Krishi Vigyan Kendra, Yagantipalle village, Banaganapalle mandal, Nandyal Dist, AP. Seventy-two post weaned lambs of Nellore Brown breed have selected for the study. The lambs were divided into 12 groups consisting of six lambs. Four treatments were imposed consisting of three replications in completely randomized design.

Treatments

Control: Basal Feed

T₁: Basal Feed + Probiotic (*S.cerevisae* + *L.Sporenegeenes*) @ 1g/lamb/day

T₂: Basal Feed + Pre Biotic (Mannan oligosaccharide) @ 1g/lamb/day

T₃: Basal Feed + Synbiotic (probiotics@0.5g/lamb/day + Prebiotics @ 0.5g/lamb / day)

Data on weekly body weight was collected using platform weighing balance and calculated growth rate. The data was statistically analyzed for significance with t-test and ANOVA using SPSS software.

Results

The data on weekly body weights of lambs under different treatments were given in Table1. Initial body weight in Control (T₀), T₁, T₂, and T₃ are 11.59±0.04kg, 12.17±0.071kg, 12.50±0.32kg and 11.90±0.03kg respectively. The final body weight after 10th week of experimentation in Control (T₀), T₁, T₂, and T₃ were recorded as 19.36±0.351kg, 21.68±0.286kg, 24.74±0.118kg and 22.26±0.139kg. Among all four groups T₂ group recorded significantly higher (p<0.05) weekly body weight during experimentation period followed by T₃ group and T₁. However, body weight after 1st week was found non significant. The data revealed that supplementation of prebiotic, probiotic and synbiotic had significant effect on weekly body weights in lambs compared to control group. From the data it is also observed that significant increase in weekly body weights from 1st week to 10th week on supplementation of Prebiotics, Probiotics and Synbiotics along with basal feed in post weaned lambs compared to control.

The data on body weight gain (grams/day) in Nellore brown lambs under different treatments is given in [Table-2]. From the data it was observed that, among all the treatment groups significant growth rate was observed during 1st week, 2nd week,

5th week, 8th week, 9th week and 10th week and the data on daily growth rate during 2nd week 4th week 6th week and 7th week was found non-significant.

The daily body weight gain in lambs ranges from 88.49±11.44 to 138.57±7.20, 111.66±6.21 to 156.35±3.35, 141.98±26.39 to 210.95±11.75 and 124.20±5.89 to 164.20±1.83 grams/day in Control (T₀), T₁, T₂, and T₃ respectively. Significantly highest daily growth rate in T₁ group was observed during 9th week 156.35±3.35g and lowest growth rate recorded during 2nd week 111.66±6.21g. Significantly highest daily growth rate in T₂ group was observed during 9th week 210.95±11.75g and lowest daily growth rate in 2nd week 141.98±26.39g. Significantly highest growth rate was observed during 9th week 164.20±1.83g and lowest value recorded during 4th week 124.20±5.89g.

The results are in accordance with Tripathi and Karim (2010), Soren *et al* (2012), Hussain (2014), Parthasarathy *et al* (2017) [5], Hussain (2018) [6] and Bhatt and Sahoo (2018) [7] reported significant effect of probiotic on daily weight gain in lambs. Similarly, the results in T₂ are in accordance with Zheng *et al* (2021) [8] observed higher daily growth rate on supplantation in prebiotic (MOS), however Bhatt *et al* (2016) have reported non-significant effect of probiotic on daily growth rate in lambs is in contrary to the result of the present study.

Table-1 Weekly body weight (kg) of lambs during experimentation under different treatments

WEEKS	T ₀	T ₁	T ₂	T ₃
Initial	11.59±0.04 ^c	12.17±0.071 ^{ab}	12.50±0.325 ^a	11.90±0.03 ^{bc}
Week1	12.21±0.089	12.99±0.096	13.58±0.392	12.83±0.027
Week2	12.91±0.125 ^c	13.78±0.115 ^b	14.58±0.208 ^a	13.85±0.059 ^b
Week3	13.63±0.192 ^c	14.83±0.087 ^b	15.73±0.21 ^a	14.9±0.115 ^b
Week4	14.32±0.232 ^c	15.71±0.163 ^b	16.91±0.182 ^a	15.77±0.115 ^b
Week5	15.02±0.31 ^c	16.72±0.171 ^b	18.12±0.229 ^a	16.80±0.052 ^b
Week6	15.76±0.277 ^c	17.65±0.211 ^b	19.33±0.11 ^b	17.89±0.11 ^b
Week7	16.59±0.297 ^c	18.55±0.25 ^b	20.57±0.199 ^a	18.96±0.22 ^b
Week8	17.45±0.339 ^c	19.55±0.296 ^b	21.90±0.214 ^b	20.10±0.19 ^a
Week9	18.39±0.341 ^c	20.65±0.272 ^b	23.38±0.135 ^a	21.25±0.178 ^b
Week10	19.36±0.351 ^c	21.68±0.286 ^b	24.74±0.118 ^a	22.26±0.139 ^b

Table-2 Average daily weight gain (grams/day) of lambs during experimentation under different treatments

WEEKS	T ₀	T ₁	T ₂	T ₃
Week1	88.49±11.44 ^c	117.7±5.20 ^{bc}	153.81±11.07 ^a	133.81±9.16 ^{ab}
Week2	100.32±5.05	111.66±6.21	141.98±26.39	145.40±11.36
Week3	102.70±10.52 ^b	151.11±17.60 ^a	165.32±9.23 ^a	149.60±9.08 ^a
Week4	98.97±7.89	125.71±11.46	167.54±8.33	124.20±5.89
Week5	99.84±10.66 ^b	143.73±6.26 ^a	173.49±8.37 ^a	147.14±9.33 ^a
Week6	105.95±10.96	132.22±7.22	172.62±21.43	156.11±10.06
Week7	118.81±7.01	129.92±12.23	177.22±14.53	153.17±15.29
Week8	122.14±6.21 ^c	143.02±6.59 ^{bc}	190.64±8.31 ^a	162.30±4.26 ^b
Week9	134.13±2.19 ^c	156.35±3.35 ^{bc}	210.95±11.75 ^a	164.20±1.83 ^b
Week10	138.57±7.20 ^b	147.06±6.27 ^b	193.57±8.96 ^a	144.92±7.61 ^b
Mean	110.99±5.23	135.85±4.66	156.71±17.32	148.09±3.87

Conclusion

The experiment on supplementation of Probiotic, Prebiotic and combination of both Symbiotic (Probiotic + Prebiotic) in the diet of Nellore brown lambs was resulted in significant effect on body weight gain (grams/day). It was observed on supplementation of Prebiotic (T₂), followed by Synbiotic (T₃) and Probiotic (T₁) supplementation with basal diet compared to Control (T₀).

Application of research: Research shows that, supplementation of probiotic, prebiotic and combination of both have significant effect on average daily weight gain in Nellore brown lambs.

Research Category: Animal Nutrition

Acknowledgement / Funding: Authors are thankful to Sri. Pendekanti Balaji, Secretary, SHE&CS, ICAR-Krishi Vigyan Kendra, Yagantipalle, Banaganapalli, 518124, Andhra Pradesh, India and Department of Animal Nutrition, Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad, 211007, India

****Research Guide or Chairperson of research:** Dr Neeraj Ahlawat

University: Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad, 211007, India

Research project name or number: MVSc Thesis

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Institutional Sheep Farm, ICAR-Krishi Vigyan Kendra, Yagantipalle, Banaganapalli, 518124

Cultivar / Variety / Breed name: Nellore Brown Lambs

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

References

- [1] Tripathi M.K. and Karim S.A. (2010) *Animal Feed Science and Technology*, 155, 163–171.
- [2] Hany Hillal, Gamal El-Sayaad and Mohamed Abdella (2011) *Archiv Tierzucht*, 54(6), 607-617.
- [3] Muhammad S., Fawwad A., Muhammad A.A., Mohamed E. Abd El-Hack, Mohamed E., Bhutto Z.A. and Moshaveri A. (2017) *J. World Poult. Res.*, 7(3), 94-103.
- [4] Obeidat B.S., Mahmoud K.Z., Obeidat M.D., Ata M., Kridli R.T., Haddad S.G., Titi H.H., Jawasreh K.I., Altamimi H.J., Subih H.S., Hatamleh S.M., Ishmaies M.A.A., Affan R.A. (2018) *Veterinary World*, 11(7), 1015-1020.
- [5] Parthasarathi T., Chandra Sarat A., Mahendra, Ramana, D.B.V. (2017) *Journal of animal Research*, V7(6), 1009-1017.
- [6] Hussein A.F. (2014) *Journal of Experimental Biology and Agricultural Sciences*, 2, 597-607.
- [7] Bhatt R.S., Tripathi M.K., Verma D.L. and Karim S.A. (2009) *Journal of Animal Physiology and Animal Nutrition*, 93(5), 568-576.
- [8] Zheng C., Zhou J., Zeng Y., Liu T. (2021) *Zoological Science*, 9, e11631.