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## RESEARCH ARTICLE

### EFFECT OF FEEDING OSMANABADI KIDS WITH PARTIALLY REPLACED AZOLLA SUPPLEMENTED WITH PANCHAGAVYA AND PROBIOTIC ON GROWTH PERFORMANCE

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#### ABSTRACT

In India, goat farming is one aspect which helps in providing self-sufficiency and returns to the goat owners within the capacity of low-income groups. This paper has examined the prospects of supplementing Azolla on the growth performance of Osmanabadi kids along with supplementation of panchagavya and probiotic. This type of study has not been conducted earlier. 24 Osmanabadi kids were divided into 4 groups. The control T0 fed with conventional diet. The treatment groups T1, T2 and T3 with 15% replacement of concentrate with Azolla meal. Supplementation of 2gm Probiotic and 15ml Panchagavya was given in T2 and T3 respectively. The wilted Azolla used for trials had CP (22.40%), CF (13.50%), EE (3.40%), NFE (40%) and Total Ash (15.30%) and 90.80% DM. The weekly body weights of the kids by the end of trial was T0 (12.28±1.17), T1 (12.85±0.76), T2 (13.48±0.54) and T3 (13.12±0.24). T2 (11.69±0.52) exhibited higher average body weight followed by T3 (11.55±0.32) and T1 (11.48±0.82) with the control T0 (11.16±1.15) being the lowest. The body weight gain of kids was significantly ( $P<0.05$ ) higher in T2 (0.26±0.00) as compared to T3(0.23±0.01) and T1(0.22±0.00) and lowest in T0(0.17±0.44). This study indicates that the supplementation of either commercial probiotics or panchagavya along with incorporation of 15% Azolla in kids ration is helpful to attain higher body weight gain.

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#### INTRODUCTION

In India, goat farming for their small size, increased production and relatively low individual price within the capacity of low-income groups have always helped in providing self-sufficiency and returns to the goat owners. The Osmanabadi, an Indian goat breed native to Osmanabad district of Maharashtra, has great demand in the market for their meat. Osmanabadi goat is called as farmer's true breed because of its profits in less time and without expending too much for feeding. The breed is gaining popularity in the nearby states of Karnataka, Andhra Pradesh, Telangana and Gujarat by the commercial meat goat producers. Azolla (*Azolla pinnata*) a free floating water fern contains high level of nitrogen and can be used as a protein source in animal feed. Azolla can supply about 25-30 kg of nitrogen per hectare (Pillai et al., 2002). Azolla contains 28% crude protein and can be used as a protein supplement in ruminants (Ahirwar et al., 2009).

Due to its ease of cultivation, high productivity and good nutritive value, Azolla is used as a beneficial fodder supplement by various researchers (Singh, 1978; Prabina, 2010). Nowadays, probiotics are widely being used as feed supplements in livestock animals and have been defined as non-pathogenic microorganisms with an objective to improve the production performance and disease prevention through maintenance of a healthy gastrointestinal environment and improved intestinal function (Chaucheyras-Durand, 2008; Mountzouris et al., 2009).

Panchagavya (Panch-five; Gavya- cow products); a term describing five major substances obtained from cow that include cow's dung, urine, milk, ghee, and curd (Natarajan, 2003). Fermented panchgavya (at 30 days of age) is useful as a growth promoter as it contains better proposition of chemical as well as microbial composition (Mathivanan, 2006; Mathivanan, 2012). With this background the thought to study the effect of this growth promoter with protein enriched feed on the performance of growing kids was planned.

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Treatment Groups	Ration						
	Green Fodder (g)	Dry Roughage (g)	Concentrate		Azolla15% (g)	Probiotic (g)	Panchagavya (ml)
			Required(g)	Fed(g)			
T <sub>0</sub>	120	120	160	160	-	-	-
T <sub>1</sub>	120	120	160	136	24	-	-
T <sub>2</sub>	121	121	161	137	24	2	-
T <sub>3</sub>	121	121	161	137	24	-	15

**Table 1. Proximate analysis of the feed ingredients**

Sr. No.	Proximate Principles (%)	Feed Ingredients				
		Azolla	Concentrate Mix		Gram Straw	Para grass
1	CP	22.40%	20.56%	1.75%	3.85%	
2	CF	13.50%	12.92%	59.00%	36.04%	
3	EE	3.40%	5.76%	1.30%	1.80%	
4	NFE	40.00%	57.79%	29.45%	52.71%	
5	DM	90.80%	91.42%	95.84%	23.50%	
6	Total Ash	15.30%	7.80%	8.50%	5.60%	

**Table 2. Mean ± SE of body weight of kids on weekly basis (Kg)**

Groups	WEEKS														Treatment average
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	
T <sub>0</sub>	10.02	10.27	10.38	10.53	10.58	10.82	11.02	11.27	11.40	11.62	11.80	12.00	12.18	12.28	11.16 <sup>NS</sup>
	±1.16	±1.17	±1.17	±1.14	±1.15	±1.14	±1.15	±1.15	±1.12	±1.11	±1.12	±1.16	±1.17	±1.17	±1.15
T <sub>1</sub>	10.02	10.23	10.48	10.70	10.97	11.18	11.40	11.58	11.83	12.10	12.23	12.47	12.68	12.85	11.48 <sup>NS</sup>
	±0.82	±0.80	±0.83	±0.80	±0.80	±0.87	±0.89	±0.84	±0.84	±0.79	±0.79	±0.79	±0.79	±0.76	±0.82
T <sub>2</sub>	10.08	10.30	10.55	10.82	11.10	11.33	11.57	11.78	12.02	12.28	12.53	12.82	13.05	13.48	11.69 <sup>NS</sup>
	±0.51	±0.52	±0.53	±0.54	±0.50	±0.49	±0.49	±0.47	±0.51	±0.53	±0.53	±0.53	±0.55	±0.54	±0.52
T <sub>3</sub>	10.10	10.30	10.53	10.77	10.95	11.12	11.35	11.60	11.88	12.15	12.37	12.6	12.88	13.12	11.55 <sup>NS</sup>
	±0.38	±0.37	±0.36	±0.35	±0.35	±0.32	±0.32	±0.32	±0.33	±0.32	±0.30	±0.26	±0.26	±0.24	±0.32
Weekly Average	10.05	10.27	10.48	10.70	10.90	11.11	11.33	11.56	11.78	12.03	12.23	12.49	12.69	12.93	11.47
	±0.01	±0.01	±0.03	±0.05	±0.09	±0.09	±0.09	±0.09	±0.11	±0.12	±0.13	±0.13	±0.16	±0.21	±0.09

**Table 3. Mean ± SE of weekly body weight gain of kids (Kg)**

Groups	WEEKS														Treatment Average
	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV		
T <sub>0</sub>	0.25	0.12	0.15	0.05	0.23	0.20	0.25	0.13	0.21	0.18	0.20	0.18	0.10	0.17 <sup>c</sup>	
	±0.05	±0.04	±0.05	±0.08	±0.04	±0.02	±0.02	±0.04	±0.03	±0.04	±0.05	±0.03	±0.00	±0.44	
T <sub>1</sub>	0.22	0.25	0.22	0.27	0.22	0.22	0.18	0.25	0.27	0.13	0.23	0.22	0.17	0.22 <sup>bc</sup>	
	±0.21	±0.02	±0.02	±0.01	±0.05	±0.02	±0.05	±0.01	±0.05	±0.001	±0.005	±0.01	±0.02	±0.00	
T <sub>2</sub>	0.22	0.25	0.27	0.28	0.23	0.23	0.22	0.23	0.27	0.25	0.28	0.23	0.43	0.26 <sup>a</sup>	
	±0.01	±0.01	±0.003	±0.03	±0.002	±0.001	±0.01	±0.02	±0.02	±0.004	±0.004	±0.02	±0.01	±0.00	
T <sub>3</sub>	0.20	0.23	0.23	0.18	0.17	0.23	0.25	0.28	0.27	0.22	0.23	0.28	0.23	0.23 <sup>b</sup>	
	±0.01	±0.004	±0.01	±0.02	±0.02	±0.003	±0.003	±0.002	±0.006	±0.01	±0.04	±0.004	±0.01	±0.01	
Weeks Average	0.22	0.21	0.21	0.19	0.21	0.22	0.30	0.22	0.25	0.19	0.23	0.22	0.23	0.23	
	±0.01	±0.03	±0.02	±0.05	±0.01	±0.007	±0.08	±0.03	±0.01	±0.02	±0.01	±0.02	±0.07	±0.05	

## MATERIALS AND METHODS

The following experiment was conducted at goat unit of Cattle Breeding Farm, Telankhedi, Nagpur and Department of Livestock Production and Management, Nagpur Veterinary College, Nagpur, on 24 Osmanabadi kids aged around 3-4 months divided into 4 groups for 90 days period starting from April to July 2019. The Azolla was cultivated in the ground level ponds, FRP tanks and underground pits, harvested on 8<sup>th</sup> day and was thoroughly washed thrice under running tap water to get rid of cow dung smell. Harvested Azolla contained 8% dry matter<sup>10</sup>. It was dried in shed to drain out water at maximum possible level. The treatment groups were fed 15% replacement of Azolla meal in concentrates i.e. (24gm).

All kids were maintained under standard management conditions. Water was provided ad libitum. The control group (T0) was given 60:40 (green+dry): Concentrates, while the experimental groups were given 60:40 (greens+dry): 34Concentrate+6(Azolla) to (T1), (T2) and (T3) with supplementation of probiotic and panchagavya to (T2) and (T3) respectively. The live body weight of each experimental kid was recorded at weekly intervals in kilograms using a digital weighing machine of capacity 75kg. During weighing, the kid was allowed to stand quietly with little stress on the platform of the digital scale. The constant weight reading was then considered for the recording. Prior to the start of the experimental trials, the Proximal Principles (i.e. CP, CF, NFE, EE, Ash) of all feed ingredients was analyzed as per (AOAC, 1995) with the use of standard kel plus protein estimation, Sox plus Ether estimation, Fibra plus CF estimation; (pelican equipments) in the Department of Animal Nutrition, Nagpur Veterinary College, Nagpur. The dry matter percentage was determined as per recommendations of BIS, IS: 7874(part-I)-1975. By accurately weighing 20 gm of Azolla, feed and fodder into an aluminum dish and maintaining overnight at 90<sup>o</sup>C-100<sup>o</sup>C in the hot air oven. For appropriate reading the sample was weighed at 30 minutes intervals till constant reading. The data was statistically analyzed by CRD as per (Snedecor, 1994).

**Table 4. Analysis of variance for body weight and body weight gain of Osmanabadi kids**

Source of variation	Body Weight		Body Weight Gain	
	Df	MSS	Df	MSS
Treatment	3	4.376 <sup>NS</sup>	3	0.103 *
Error	332	3.823	308	0.015
Total	335		311	
			CD(0.01)=0.050	
			CD(0.05)=0.038	

## RESULTS AND DISCUSSION

**Proximate Composition:** The results obtained in the table 1 depicts that the Azolla is having a good CP (22.40%), CF(13.50%), EE (3.40%), NFE (40%) and Total Ash(15.30%). The wilted Azolla used in the experiment as a feeding material and as the replaced source of protein against the conventional concentrate mix has 90.80% DM. The concentrate mix used in this experiment has CP (20.56%), CF (12.92%), EE (5.76%), NFE (57.79%) and Total Ash (7.80%). CP content of Azolla and concentrate mix was higher as compared to (Sushir and Chahande, 2015) stating Azolla (20.78%) and goat pallet as a concentrate with CP (18.30%) and (Toradmal, 2017) reporting Azolla (24.18%) and concentrate (18.21%).

However, the EE, NFE and DM in Azolla were lower than that of the concentrate mix and similar lower values were found in (Basak, 2002; Parthasarathy, 2001). Thus, indicating Azolla to be a reasonably good source of energy and a high source of protein to Osmanabadi goat kids (Kumar *et al.*, 2015; Basak *et al.*, 2002; Rawat *et al.*, 2015; Anitha, 2016) who studied the chemical composition of sun-dried Azolla and mentioned the DM content of Azolla was comparatively less but suggested to be used as a supplement to meet the DM requirements in livestock feeds.

**Body weight:** At commencement the body weight of the goat kids under trial were nearly similar. By the end of the experiment there was change noticed in the body weight of the kids. The respective body weights of kids by the end were T0 (12.28±1.17), T1 (12.85±0.76), T2 (13.48±0.54) and T3 (13.12±0.24). The results clearly shows that the kids under the probiotic supplemented group along with Azolla incorporated feed T2 (11.69±0.52) exhibited higher average body weight followed by the panchagavya supplemented group T3 (11.55±0.32) and only Azolla fed group T1 (11.48±0.82) with the control group T0 (11.16±1.15) being the lowest. In the previous studies conducted by (Akade, 2016; Sihag, 2016; Tamang, 1992; Sushir and Chahande, 2015; Basak *et al.*, 2002; Ghodake *et al.*, 2012) have also found that the goat kids under Azolla feeding were of higher weight as compared to their respective control groups. Table 2 Also revealed that when kids are supplied with probiotics on Azolla based diet showed higher body weight by the end of the experiment indicating that probiotic offers a beneficial effect on the stability and influence the intestinal ecosystem by improving the digestive and metabolic processes. This finding is in agreement with (Kochewad *et al.*, 2009; Mathivanan *et al.*, 2006; Priya *et al.*, 2016) who studied on panchagavya, revealed it to be used as an alternative growth promoter because of better body weight and weight gain also suggested Panchagavya can be used as probiotics supplement in animal feed for the maintenance of gut.

**Body weight gain:** The respective body weight gain of kids by the end were T0 (0.17±0.44), T1 (0.22±0.00), T2 (0.26±0.00) and T3 (0.23±0.01), as evident from table 3. The T2 group had higher body weight gain than T3 followed by T1 and T0 (Table 4). (Toradmal *et al.*, 2017; Sihag *et al.*, 2018) findings also showed improved body weight gain with incorporation of 15% Azolla. (Jinturkar, 2009) reported that mixture of probiotics 1g *Lactobacillus acidophilus* + 1g *Saccharomyces cerevisiac* per kg feed was found most effective in weight gain. Thus, concluding that the use of probiotics either single or in combination was useful to attain higher weight gain in goats. The analysis of variance was carried out to know the effect of treatment on the body weight and body weight gain of the kids. The results revealed that the body weight gain among the treatment groups were significantly different at (p<0.05) and body weight differed non-significantly.

## Conclusion

The result of the present study indicated that incorporation of either probiotic or panchagavya in the goat kids diet along with 15% Azolla replacement in concentrate leads to improvement in body weight numerically and body weight gain significantly. Hence, the panchgavya at par with the commercial probiotics enhances growth performance in growing kids might be due to improved nutrient digestibility and health.

## REFERENCES

- Ahirwar, M. K., V. Leela and V. Balakrishnan 2009. *In-vitro* fermentation pattern of *Azolla pinnata* as protein supplement in forage based diet for ruminants. *Indian Vet. J.*, 86(1): 60-62.
- Akade, J., A. S. Ingole, V. G. Atkare, R. Darade and Patil A. A. 2016. Effect of Azolla (*Azolla pinnata*) feeding on growth performance of Osmanabadi goat kids. *J. Soils and Crops*. 26 (1): 162-165 ref.12.
- Anitha, K. C., Y. B. Rajeshwari, S. B. Prasanna and J. Shilpa Shree 2016. Nutritive Evaluation of Azolla as Livestock Feed. *Journal of Experimental Biology and Agricultural Sciences*. 4(6): 670.674.
- AOAC, 1995. Official Methods of Analysis, 16<sup>th</sup> Edition. Association of Official Analytical Chemists, Washington DC, USA.
- Basak, B., M. A. H. Pramanik, M. S. Rahman, S. U. Tarafdar and B. C. Roy 2002. Azolla (*Azollapinnata*) as a feed ingredient in broiler ration. *Int. J. Poult. Sci.* 1(1):29-34.
- Chaucheyras-Durand, F., Walker, N. D. and Bach, A. 2008. Effects of active dry yeasts on the rumen microbial ecosystem: past, present and future. *Anim Feed Sci Techn* 145: 5-26.
- Ghodake, S. L. S., A. P. Fernandes, R. V. Darade and Zagade, B. G. 2012. Effect of different levels of Azolla meal on growth performance of Osmanabadi kids. *Research Journal of Animal Husbandry and Dairy Science*. 3(1): 13-16.
- Jinturkar, A. S., B. V. Gujar, D. S. Chauhan and R. A. Patil 2009. Effect of feeding probiotics on the growth performance and feed conversion efficiency in goat. *Indian J. Anim. Res.* 43(1): 49-52.
- Kochewad, S. A., J. M. Chahande, A. B. Kanduri, D. S. Deshmukh, S. A. Ali and Patil V. M. 2009. Effect of Probiotic supplementation on Growth parameters of Osmanabadi Kids. *Veterinary World*. 2(1): 29-30.
- Kumar, R., P. Tripathi, U. B. Chaudhary and Tripathi, M. K. 2015. Nutrient Composition, *In-vitro* Methane Production and Digestibility of Azolla (*AzollaMicrophylla*) with Rumen Liquor of Goat. *The Indian Journal of Small Ruminants*, 21(1): 126-128.
- Mathivanan, R and Edwin, S. C. 2012. Effects of alternatives to antibiotic growth promoters on intestinal content characteristics, intestinal morphology and gut flora in broilers. *Wudpecker Journal of Agricultural Research*, 1(7): 244-249.
- Mathivanan, R., S. C. Edwin, R. Amutha and K. Viswanathan 2006. Panchagavya and *Andrographispaniculata* as alternative to antibiotic growth promoter on broiler production and carcass characteristics, *Int J Poultry Science*, 5: 1144-1150.
- Mountzouris, K. C., Balaskas, C., Xanthakos, I., Tzivinikou, A., Fegeros, K 2009. Effects of a multi-species probiotic on biomarkers of competitive exclusion efficacy in broilers challenged with *Salmonella enteritidis*. *Br Poult Sci* 50: 467-478.
- Natarajan, K. 2003. Panchagavya: A Manual. Other IndiaPress. Mapusa 403507, Goa, India.
- Parthasarathy, R., R. Kadirvel and Kathaperumal V. 2001. Chemical evaluation of Azolla as poultry feed ingredient. *Cheiron*. 30(1&2):35-37.
- Pillai, P. K., S. Premalatha and S. Rajamony 2002. Azolla - A sustainable feed substitute for livestock. *Leisa India Magazine*, 4: 15-17.
- Prabina, B. J and K. Kumar 2010. Dried Azolla as a nutritionally rich cost effective and immuno-modulatory feed supplement for broilers. *The Asian Journal of Animal Science* 5: 20-22.
- Priya, J., K. Revathi, M. Babu and Shamsudeen, P. 2016. Isolation and *In Vitro* Antibacterial Activity of Lactic Acid Bacteria Isolated From Fermented Panchagavya. *World Journal of Pharmaceutical and Life Sciences*. 2 (3):215-228.
- Rawat, N., K. Kumari, F. Singh and Gilhare V. R. 2015. Effect of Azolla-supplemented feeding on milk production of cattle and production performance of broilers. *Applied Biological Research*. 17(2): 214-218.
- Sihag, S., Z. S. Sihag, S. Kumar and N. Singh 2018. Effect of feeding Azolla (*Azolla pinnata*) based total mixed ration on growth performance and nutrients utilization in goats. *Forage Res.* 43 (4):314-318.
- Singh, P. K and B. P. R. Subudhi 1978. Utilization of Azolla in poultry feed. *Indian Farming*. 27: 37-39.
- Snedecor, G. W., and Cochran, W. G 1994. Statistical methods, 8th Edition. Affiliated East-West press, Iowa state University Press.
- Sujatha, T., D. Udhayakumari, A. Kundu, S. Jeyakumar, Jai Sundar and Kundu M. S. 2013. Utilization of raw azolla as a natural feed additive for sustainable production in Nicobari fowl. *Animal Science Reporter*, 7(4):146-152.
- Sushir, U. S. and Chahande, J. M. 2015. Effect of Azolla meal supplementation on health status and economics in Osmanabadi does. Unpublished MVS thesis to MAFSU, Nagpur.
- Tamang, Y., G. Samanta, N. Chakraborty and Mandal, L. 1992. Nutritive value of Azolla (*Azolla pinnata*) and its potentiality of feeding in goats. *Env. and Eco.*10(2):455-456.
- Toradmal, S. D., R. R. Shelke, P. A. Kahate and Bidwe, K. U. 2017. Studies on supplementation of green Azolla (*Azolla pinnata*) on growth performance of Osmanabadi goat kids. *The Asian J. Animal Sci.*, 12(2): 124-128.

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