Nutrient Intake and Utilization in Jalauni Lambs Fed *Azolla* Meal Supplemented Diet

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Introduction

Azolla is an important aquatic fungi due to the occurrence of both photosynthesis and nitrogen fixation in the leaves and also because of its profuse growth habbit, it appears as a potential source of protein, minerals and vitamins for livestock feeding. Keeping in view of the increasing cost and heavy deficit of concentrate ingredients in the country, an attempt was made to replace mustard cake protein @25% and 50% levels with *Azolla* (*Microphylla*) meal protein in the ration of sheep to investigate the effect of supplementation of azolla meal on nutrient intake and utilization in growing Jalauni lambs fed green chaffed MP Chari based rations.

Materials and Method

Azolla (*Microphylla*) was grown under sanitized condition at IGFRI, Jhansi and meal was then prepared from the harvested material after drying in the sun. Eighteen *Jalauni* lambs (n=18) were divided in to three groups of 6 animals in each group. In control group (T1) the animals were fed *ad lib* green chaff of M P Chari with concentrate mixture as per requirement whereas in the T2 and T3 the crude protein of mustard cake was replaced @ 25% and 50% with azolla meal protein in the concentrate mixture, respectively. All the animals received isonitrogeneous diets. After one month of the experimental feeding, a digestion cum metabolism trial was conducted for 7 days. Dry matter in feed and faeces was determined. Feed and faeces samples were analyzed for CP, EE and total ash contents (AOAC 2005) and fiber fractions (Van Soest *et al*., 1991). The data was subjected to analysis of variance for statistical significance among the treatment means (Snedecor and Cochran, 1969).

Results and Discussion

Average DMI was 3.90, 3.77 and 3.49% of the live weight in T1, T2 and T3 groups, respectively and the differences were non significant among the groups (Table 1). The non-significantly decreasing trend in DM intake with incorporation of azolla meal might be due to lesser bulk density of Azolla meal as compared to mustard cake. The values on DM intake indicated that the incorporation of Azolla meal has no adverse effect on voluntary feed intake of experimental lambs (Wadhwani *et al*., 2010). The digestibility of DM and OM were comparable in T1 (61.43 and 64.98%) and T2 (59.91 and 62.97%), however, it was significantly ($P<0.05$) lower in T3 (51.57 and 56.51%). CP digestibility was reduced significantly with the gradual inclusion of azolla meal in T2 and T3, respectively. NDF and ADF digestibility was similar in T1 and T2, however, fiber digestibility was affected in T3. Although the nitrogen intake was similar in three experimental groups (16.58 *vs*16.02 *vs*14.71), the excretion of N through faeces was higher in T3. N retention as percent N intake was comparable in T1 (48.65) and T2 (40.32), however, significantly lower in T3 (28.21). DCP intake (g/d) although affected with the gradual inclusion of azolla meal in T2 and T3, however, TDN intake (g/d) was comparable amongst the experimental groups. Nutrient contents (%) in terms of DCP and TDN in T1 (7.91 and 61.18) and T2 (7.23 and 58.20) were comparable whereas it was affected significantly ($P<.05$) in T3 (5.63 and 52.55). Similarly, Ghodake *et al*., (2012) recorded lower digestibility values with increasing levels of inclusion of azolla meal in kid ration. Thus it can be interpreted from the results that azolla meal could be used as a replacer of mustard cake at the level of 25% on crude protein basis whereas 50% replacement of mustard cake with azolla meal in the ration of *Jalauni* lambs may affect the nutrient utilization significantly.

Table 1: Nutrient intake and utilization in Jalauni lambs fed Azolla meal supplemented diet

Parameters	T_1	T_2	T_3	SEM	P value
Body weight (kg)	22.13	22.09	22.95	-	-
DMI%BW	3.90	3.77	3.49	0.16	0.247
DMI(g/kg $W^{0.75}$)	84.32	81.46	76.21	2.88	0.186
TDNI (g/d)	524	482	419	25.76	0.052

DCPI(g/d)	67.79[b]	59.73[b]	44.56[a]	1.96	0.000
Digestibility coefficients (%)					
DM	61.43[b]	59.91[b]	51.57[a]	1.32	0.001
OM	64.98[b]	62.97[b]	56.51[a]	1.06	0.000
CP	65.42[c]	59.63[b]	48.82[a]	1.72	0.000
NDF	50.91[b]	52.48[b]	44.20[a]	1.72	0.005
ADF	51.50[b]	48.59[b]	41.50[a]	1.93	0.004
EE	66.21	64.74	62.82	0.83	0.052
NFE	68.26[b]	66.08[b]	58.54[a]	1.32	0.001
Nitrogen retention					
N intake (g/d)	16.58	16.02	14.71	0.59	0.127
Fecal N (g/d)	5.73[a]	6.46[a]	7.58[b]	0.40	0.011
Urinary N (g/d)	2.78	3.12	3.01	0.44	0.864
N balance (g/d)	8.07[c]	6.44[b]	4.12[a]	0.46	0.001
N retention as % N intake	48.65[b]	40.32[b]	28.21[a]	3.00	0.003
N retention as % N absorbed	74.38	67.78	57.36	4.91	0.098
Nutrient content (%)					
DCP(g/100g diet)	7.91[b]	7.23[b]	5.63[a]	0.23	0.000
TDN(g/100g diet)	61.18[b]	58.20[b]	52.55[a]	1.17	0.002

Means with different superscripts in a row differ significantly ($P<0.05$)

Conclusion

It can be concluded that azolla meal made from *Microphylla* species of azolla may be incorporated @ 25% as an optimal level to replace mustard cake protein in the diet of *Jalauni* lambs so that nutrient utilization and physical performances will not be affected.

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