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Feeding Rations Containing Road Side Grass, Maize Silage or Water Hyacinth in Bull Calves

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Abstract: The experiment was conducted for a period of 90 days with 9 local growing male calves of 18-24 months of age and average live weight 68 kg to determine the effect of feeding complete ration with road side grass, maize (*Zea mays*) silage and water hyacinth (*Eichhornia crassipes*) on growth, digestibility of different nutrients, total digestible nutrients and feed efficiency. The animals were randomly divided into three groups, having three bull calves in each. The calves of group A were fed 40% rice straw, 60% road side grass and concentrate mixture. The calves of group B were fed 40% rice straw, 60% maize silage and concentrate mixture and the calves of group C were fed 40% rice straw, 60% water hyacinth and concentrate mixture. The concentrate mixture contained 27% wheat bran, 40% rice polish, 55 fish meal, 2% bone meal and 1% common salt. The concentrate mixture was provided in quantities to satisfy 1/3rd of DM requirement. The animals of maize silage group B showed best $P<0.01$) performance in weight gain (0.152 kg/d) followed by C (0.115 kg/d) and A (0.107 kg/d). Dry matter intake per day in group A, B and C were 2.31, 2.42 and 2.29 kg respectively. The amount of feed required per kg body weight gain ($P<0.01$) were lower in maize silage group B (16.61) followed by C (19.92) and A (21.74). A higher trend of digestibility of nutrients were observed in maize silage feeding group (B). So, the maize silage in combination with straw and concentrate mixture can be fed to growing animals for better performances. Fresh water hyacinth leaves can also be allowed to calves in combination with straw and concentrate, without any adverse effect on growth of animals.

Key words: Road side grass, maize silage, water hyacinth, bull calves, feeding

Introduction

There is a competition between human and animal to produce their food from cultivable land and only 0.05 % land of Bangladesh is used for fodder production (Anonymous, 1985). In this situation the improvement of fodder yield is difficult. So, the low nitrogen and mineral containing straw is the main roughage for ruminant animals and mainly the road-side-grasses are the chief green roughage for livestock (Akbar, 1991) provides an ideal nutritive and economic food for livestock (FAO, 1987), but amount is neglisable to raising the ruminants livestock.

Now a days, some unconventional feeds like water hyacinth (*Eichhornia crassipes*) attracted attention to use as cattle feed. It is a free floating aquatic weed containing bright green leaves on long steam. Its growth rate is very high and requires no extra land and labour for their cultivation and use. Its utilization in the ration of various classes of livestock has been reported (Khan *et al.*, 1981).

Maize (*Zea mays*) is another nutritious feed for ruminants have high protein efficiency ratio (PER), relatively high digestible energy (DE) and total digestible nutrient (Desai and Decore, 1984). Thus the maize silage can play an important role in supplying animal feed throughout the year if we concentrate our mind for their cultivation.

Considering the above facts, the study was conducted to investigate the effects of complete rations using road-side-grass, water hyacinth and maize silage on growth, digestibility and feed efficiency of bull calves.

Materials and Methods

The experiment was conducted for a period of 90 days with 9 growing bull calves of indigenous origin of about two years of age and body weight between 57-80 kg. Experimental layout is given in Table 1.

The calves were penned individually. All animals were subjected to same housing and managemental practices throughout the period. The animals were offered (at 8.00 a.m. and 5.00 p.m) complete feed at the rate of 3 kg DM/100 kg body weight per day as *ad libitum* basis. Feed supply, left over and faeces collected was recorded throughout the experimental period to calculate feed and nutrient intake and also digestibility of feed.

The chemical composition of feeds and faeces were determined by following the method (AOAC, 1980). The results of the experiment were analysed according to completely randomized design and the differences between two means were identified by Duncan's New Multiple Range Test (Steel and Torrie, 1980).

Results and Discussion

Chemical composition of feed ingredients: The chemical composition of feed ingredients and different rations are given in Table 2 and 3. In respect of crude protein (CP) and crude fibre (CF) content the water hyacinth is the best due to higher CP and lower CF value on DM basis. The maize silage have the second position in this respect. So, road-side-grass have the third position. In this situation a growth and digestibility trial conducted to compare the actual nutritive value of these three.

Performance of the animals: The highest daily dry matter consumption was observed (Table 4) by the animals of maize silage fed group B (2.4 kg), followed by the animals of road-side-grass A(2.31 kg) and water hyacinth offering group C (2.29 kg).

Crude protein intake per day was higher by the animals of group B (0.19 kg) followed by A (0.06 kg) and C (0.17 kg). Average metabolizable energy intake were 19.46, 19.26 and 19.71 MJ for the animals of group A, B and C respectively.

Table 1: Experimental layout

Group	No. Of Animal	Breed	Sex	Approximate Age	Experimental ration
A	3	Local	Male	24 months	Rice straw 40% + road sode Grass 60% + concentrate moisture
B	3	Local	Male	24 months	Rice straw 40% + maize silage 60% + concentrate mixture
C	3	Local	Male	24 months	Rice straw 40% + Hyacinth leaves 60% + concentrate mixture*.

*Composition of concentrate mixture =

Wheat bran	=	27parts
Rice polish	=	40
Til oil cake	=	25
Fish meal	=	5
Bone meal	=	2
Common salt	=	1
Total	=	100

The concentrate mixture was provided in quantities to satisfy 1/3rd of DM requirement.

Table 2: chemical composition (g/100 g) of feed ingredients

Ingredients	DM	OM	CP	EE	CF	NFE	Ash
Rice straw							
As feed	87.64	76.53	2.86	0.94	29.78	42.95	11.11
DM basis	100.00	87.32	3.26	1.07	33.98	49.01	12.68
Road side grass							
As feed	24.62	22.37	1.63	0.4	35.64	14.66	2.26
DM basis	100.00	90.81	6.621	1.74	22.90	59.55	9.19
Maize silage							
As fed	15.15	13.54	1.58	0.19	3.70	8.07	1.61
DM basis	100.00	89.34	10.46	1.20	24.40	53.28	10.66
Water hyacinth leaves							
As fed	13.59	12.17	2.01	0.32	2.52	7.31	1.42
DM basis	100.00	89.55	14.80	2.38	18.55	53.82	10.45
Concentrate mixture							
As fed	87.55	77.17	14.35	4.02	8.75	50.05	10.38
DM basis	100.00	88.14	16.39	4.59	9.99	57.17	11.86

Table 3: Chemical composition of different rations

	g/100 g DM						
Ration	DM	OM	CP	EE	CF	NFE	Ash
A	89.53	87.42	6.87	1.52	34.40	44.63	12.58
B	90.64	89.15	7.58	1.84	33.65	46.08	10.85
C	89.23	88.95	7.26	1.76	29.86	50.07	11.05

Table 4: Effect of feeding of different rations on performance of bull calves

Parameters	Treatments		
	A	B	C
Initial body weight (kg)	65.67	64.67	66.00
Final body weight (kg)	75.33	78.33	76.33
Weight gain/day (kg)	0.107a	0.152b	0.115a
DM intake/day (kg)	2.31	2.42	2.29
CP intake (kg)	0.16	0.19	0.17
ME intake (MJ)	19.46	19.26	17.91
Feed efficiency (kg feed/kg gain)	21.74b	16.61a	19.92ab

Values bearing different superscripts in a row differ significantly $P<0.01$. SEM- Standard error mean

Table 5: Co-efficient of digestibility (%) of different rations

Ration	DM	OM	CP	CF	EE	NFE
A	58.55	64.08	44.50	82.74	76.00	51.84
B	59.76	65.57	52.66	82.38	84.73	54.46
C	54.08	61.94	43.21	77.71	79.72	54.65

Maximum body weight gain ($P<0.01$) was observed in maize silage offering group B (0.152 kg/day). The amount of feed required per kg weight gain in group A, B and C were 21.74, 16.61 and 19.92 kg respectively. Highest ($P<0.01$) feed efficiency was shown in maize silage offering group B and lowest in group A which contains road-side-grass. So, the maize silage response better for feed and nutrient intake, live weight gain and feed efficiency and the water hyacinth have the second position in this respect.

Table 6: Digestible nutrients (%) of different rations

Ration	CP	CF	EE	NFE	TDN
A	3.06	29.02	2.48	23.31	57.34
B	3.99	27.72	3.51	25.10	60.31
C	3.14	23.21	3.12	27.36	56.83

Digestibility of different nutrients: Co-efficient of digestibility (COD) of DM (Table 5) of silage fed group B(59.76%) is better and followed by A (58.55%) and C (54.08%). Some scientists (Verma and Mojumdar, 1984; Reddy and Reddy, 1988) found lower value (56.9%) and Brosh *et al.* (1989) found higher (74.7%) than the present findings for maize silage offering sheep. Poddar et al. (1991) obtained 56.88% DM digestibility of complete ration with wilted water hyacinth in higher than the present findings but lower value (51.55) found by Biswas and Mandal (1987) for water hyacinth from this findings.

Organic matter digestibility of treatment B was 65.47% and for treatment A and C it was 64.08 and 61.94% respectively. Brosh et al. (1989) (76.3%) value for this parameter than all of this study.

The CP digestibility in calves of treatment A, B and C are 44.50, 52.66 and 43.21% respectively. Some scientists (Verma and Mojumder, 1984; Brosh *et al.*, 1989) found 58.24 to 64.35% CP digestibility of maize silage is higher than the present findings. Reddy and Reddy (1988) found lower (50.47%) value for CP digestibility of maize silage in sheep was 50.47%. Water hyacinth leaves containing ration C have lower CP digestibility than the findings (52.56 - 60.3%) of some scientists (Poddar *et al.*, 1991).

Crude fibre digestibility obtained in the present experiment are 82.74, 82.38 and 77.71% in treatment A, B and C respectively. Treatment A and B are almost same in COD of CF but C is lower than other two groups (A and B). Verma and Mojumder (1984) found 66.66% CF digestibility of maize silage which is lower than the present findings reflect in group B. The value obtained by Brosh *et al.* (1989) is lower (70.6%) than this findings.

Co-efficient of digestibility of ether extract of treatment B was higher (84.73%) than other treatments C (79.72%) and A (76.00%). Regarding this parameters the position of water hyacinth was second.

Treatment B and C were same in COD of NFE and treatment A were lower ($P<0.01$) than those (Table 5). The value for water hyacinth leaves containing ration C is lower (54.65% than the findings (65.88%) of Podder *et al.* (1991). Verma and Mojumder (1984) found 60.49% NFE digestibility of maize silage was higher than the present findings, as shown in treatment B.

The data obtained from three different treatment showed highest total digestible nutrients (TDN) in group B (60.31%), where rice straw and concentrate mixture was fed by mixing with maize silage. Verma and Mojumder (1984) found 55.46% TDN in ration contained maize silage is lower than the present findings. Reddy and Reddy (1988) obtained 55.10 and 58.33% TDN in sheep and goat respectively, using maize silage as sole ration. Their results are also lower than the present findings.

Ration B was best contain higher digestible CP and have higher TDN value. Ration C have the second position (Table 6). This situation concomitant with the weight gain and FCE of the animals.

The digestibility of different nutrients differ with the findings of others from the present findings is due to variation of host species and animal, feed quality, environment and other factors like these. So, our result is a comparative study between three grasses.

From the results stated above it may be concluded, that maize silage in combination with straw and concentrate mixture can be fed to growing animals for better performance. Fresh water hyacinth leaves can also be allowed to calves in combination with straw and concentrate, without any adverse effect on growth of animals.

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