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Nutritional evaluation of Themeda (*Themeda mooneyi*) grass in Konkan Kanyal Goats

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Abstract

Themeda (*Themeda mooneyi*) grass, harvested at mature stage, was fed to 4 Konkan Kanyal male goats (4-7 month 15.07 kg BW) for 28 days to assess the nutrient utilization and nutritive value. Themeda grass contained 23.73 dry matter (DM), 91.60 organic matter (OM), 6.83 crude protein (CP), 2.20 ether extract (EE), 8.40 total ash (TA), 4.20 acid insoluble ash (AIA), 48.57 nitrogen free extract (NFE), 72.30 neutral detergent fibre (NDF), 53.47 acid detergent fibre (ADF), 16.35 acid detergent lignin (ADL), 38.40% cellulose, 18.83 hemicellulose, 3.30 lignin, 1.63 tannin, 0.49 Ca and 0.32% P in DM basis. The digestibility of DM, OM, CP, EE, CF, NFE, NDF, ADF, ADL, cellulose, hemicellulose and lignin were 56.54, 57.23, 57.83, 57.33, 55.99, 55.78, 47.70, 46.28, 47.38, 44.70, 47.17 and 48.09%, respectively. Themeda grass contains 3.91% digestible crude protein (DCP) and 52.63% total digestible protein (TDN). Retention of nitrogen, calcium and phosphorus were 3.12, 1.47 and 0.79 g/day, respectively. The present investigation demonstrated that Themeda grass is a good fodder for growing males without any deleterious effect on health and production.

Keywords: Chemical composition, digestibility, nutritive value, *Themeda mooneyi* grass

1. Introduction

Themeda grass (*Themeda mooneyi*) is a tufted perennial grass that is growing up to 0.75 m tall and 0.5 m across having leaves 10 to 50 cm long and 2 to 5 mm wide, green to grey in colour drying after to it turns orange brown in summer. It produces distinct large red-brown spikelets, which occur on branched stems. Spikelets have long distinguishing spathes at their base and bare florets with black awns 4 to 7 cm long, which remain with the seed when it falls. It is abundantly available grass of Konkan region throughout the year, particularly during summer when there is a scarcity of green fodder and thus a valuable grazing species and good quality fodder for animals. Extensive system of rearing is still, the most prevailing practice for goat and there is an acute shortage of grazing and browsing resources in many parts of developing world [1]. The information on utilization of Themeda grass by goats is limited. Therefore, the present investigation was undertaken to determine the nutritive value of Themeda grass in goats.

2. Method and Material

The present study was conducted at Livestock Instructional Unit of Department of Animal Husbandry and Dairy Science, Dr. B.S. Konkan Krishi Vidyapeeth Dapoli, Maharashtra. The experiment was carried out from 6th October, 2015 to 02nd November, 2015. Four healthy Konkan Kanyal bucks of (15.07±0.24 live weight) were housed in a clean and well ventilated byre. Themeda grass were fed *ad libitum* and clean drinking water was offered twice a day. The representative samples of grass offered and left over were collected and quantified during the experimental period (21 days). Thereafter, a 7-day metabolic trial was conducted using metabolic cage (1×1×1m) to assess the nutritive value of Themeda grass. The faeces and urine from each experimental buck were collected separately daily were processed for chemical analysis. Samples of grass and faeces were analysed for proximate principles, tannin, calcium, and phosphorus [2] and cell constituents [3]. Urine samples were also analysed for nitrogen [2].

3. Results and Discussion

Themeda grass contained 22.73% dry matter (DM) and the DM of grass had 91.60 organic matter (OM), 6.83 crude protein (CP), 2.20 ether extract (EE), 34.00 crude fiber (CF), 48.57 nitrogen free extract (NFE), 8.40 total ash, 4.20 acid insoluble ash (AIA), 72.30 neutral

detergent fibre (NDF), 53.47 acid detergent fiber (ADF), 16.35 acid detergent lignin (ADL), 38.40 cellulose, 18.83 hemicellulose, 3.30 lignin, 0.49 calcium, 0.32 phosphorous and 1.63% Tannin (Table 1). Chemical composition Themeda grass is rich in CF and low in CP.

Table 1: Dry matter and nutrients intake, chemical composition, and nutritive value of *Themeda grass* in goats

Ingredient	Per cent
<i>Proximate analysis</i>	
Organic matter (OM)	91.60
Dry matter (DM)	22.73
Crude protein (CP)	6.83
Ether extract (EE)	2.20
Crude fibre (CF)	34.00
Nitrogen free extract (NFE)	48.57
Total ash	8.40
Acid insoluble acid (AIA)	4.20
Tannin	1.63
<i>Cell constitution</i>	
Neutral detergent fibre (NDF)	72.30
Acid detergent fibre (ADF)	53.47
Acid detergent lignin (ADL)	16.35
Cellulose	38.40
Hemicellulose	18.83
Lignin	3.30
<i>Minerals</i>	
Calcium (Ca)	0.49
Phosphorus (P)	0.32

Table 2: Dry matter intake (DMI), nutrient digestibility and nutritive value of *Themeda grass* in Konkan Kanyal goats.

Parameters	Mean±SE
<i>Body weight gain</i>	
Average body weight (kg)	15.07±0.24
Final body weight (kg)	16.81±0.28
Average gain in body weight (g/day)	61.97±1.74
<i>Dry matter intake (DMI)</i>	
Total DMI g/day	568.25±8.15
DMI kg/100 kg BW	3.77±0.07
DMI g/kg W ^{0.75}	74.38±1.47
<i>Nutrient digestibility (%)</i>	
Organic matter	57.23±0.52
Dry matter	56.54±0.44
Crude protein	57.83±0.21
Ether extract	57.33±0.17
Crude fibre	55.99±0.35
NFE	55.78±0.21
NDF	47.70±0.46
ADF	46.28±1.04
ADL	47.38±0.33
Cellulose	44.70±0.66
Hemicellulose	47.17±0.72
Lignin	48.09±0.43
<i>Nutritive value (%)</i>	
Digestible crude protein (DCP)	3.91±0.01
Total digestible nutrients (TDN)	52.63±0.09
Nutritive ratio	1: 12.46

The digestibility (%) of DM, OM, CP, EE, CF, NFE, NDF, ADF, ADL, cellulose, hemicellulose and lignin were 56.54±0.44, 57.23±0.52, 57.83±0.21, 57.33±0.17, 55.99±0.35, 55.78±0.21, 47.70±0.46, 46.28±1.04, 47.38±0.33, 44.70±0.66, 47.17±0.72 and 48.09±0.43 per cent, respectively. However, lower values for digestibility of DM (48.55±3.59%) were reported in guinea grass by [4] OM (47.81±0.73%) in Dinanath grass by [5] CP (43.21±2.79) and EE (55.19±3.95%) also in

Guinea grass [4], CF (48.93±1.99%) in Stylo hay [6], NFE (52.80±2.34%) in Bancharigrass [5].

The digestible crude protein (DCP) and total digestible protein (TDN) values of Themeda grass were 3.91% and 52.63%, respectively. DCP of Themeda grass was higher than reported by [7, 8, 9] in Posari, Jackfruit and Shivan, respectively. However, lower values reported by [10] and [4] in Jungle rice grass (2.51±0.43%) and Guinea grass (1.58±0.10%), respectively. In case of TDN higher value of TDN was reported by [11] in Oat fodder (62.66±0.28%) for rams than present findings. Whereas, lower value of TDN was reported by [10] in Jungle rice grass (47.70±1.16%). Hence, results of present study similar with [12] and [5] in Sola grass and Banchari grass for sheep, respectively. Daily feed intakes of DCP and TDN by goats were 22.21±0.03 g/day and 300.46±3.78 g/day, respectively. Higher values of DCP and TDN were reported by [7] in Posari grass as 58.86±3.26 and 384.96±19.37 g/day in goat, respectively. The DM, DCP and TDN intakes of Themeda grass by goats were adequate to meet the requirements for growth and maintenance as indicated by increase in body weight (61.97±1.74g/day.)

Intake, outgo and balance of N, Ca and P are presented by Table 3. Higher digestibility of feed was reflected in the positive balance of nutrients and retention of N, Ca and P were 3.12±0.06, 1.47±0.05 and 0.79±0.02 g/day, respectively. Ca and P requirements [13] for maintenance of goat (15 kg) are 1.1 and 0.7 g/day. For minerals the major path of excretion was faeces (Table 3), which was in agreement with the published results [14, 7]

Table 3: Daily intake, outgo and balances of nitrogen, calcium and phosphorus in Konkan Kanyal goats fed on Themeda grass.

Parameter	Nitrogen balance(g/day)	Calcium balance (g/day)	Phosphorus balance(g/day)
Intake	6.21±0.09	2.79±0.03	1.82±0.02
<i>Excretion</i>			
In faeces	2.62±0.04	0.96±0.2	0.81±0.01
In urine	0.47±0.01	0.37±0.01	0.24±0.01
Total Excretion	3.09±0.04	1.32±0.02	1.03±0.01
Retention (g/day)	3.12±0.06	1.47±0.05	0.79±0.02
Retention g/kg W ^{0.75}	0.46±0.02	0.19±0.006	0.11±0.004
Retention (%)	50.23±0.44	52.50±1.15	43.50±1.05

4. Conclusion

It was concluded that Themeda grass can be fed alone to goat only for maintenance but also for growth. The grass contained 3.91±0.01% DCP, 52.63±0.09% TDN and nutritive ratio (1:12.46) considered as good source of protein and energy. Themeda (*Themeda mooneyi*) grass is palatable and could be used for during summer session.

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