

# VOLUNTARY INTAKE, DIGESTIBILITY AND NUTRITIVE VALUE OF COASTAL BERMUDA GRASS (*CYNODON DACTYLON*) EMPLOYED AS SOLE FEED FOR RABBITS

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**SUMMARY :** Nutritional evaluation of Coastal Bermuda grass as a sole feed was undertaken in adult male NZW rabbits. There was a constant decrease (- 18g/day) in body weight of rabbits during the three weeks experimental period. Daily DM intake was very low (31g). Digestibility of all the nutrients especially that of crude protein (CP) and structural carbohydrates was low : DM 52.6 %, CP 48.9 % and crude

fibres 26.4 %. For rabbits, digestible CP content was 5.7g in 100g of DM of Coastal Bermuda grass, and calculated DE content was 2.11 Mcal/kg DM. The results of the study indicate that Coastal Bermuda grass had very poor nutritive value for adult rabbits and could not supply adequate nutrients even for maintenance.

**RESUME :** Ingestibilité, digestibilité et valeur nutritive du gros chiendent (*Cynodon dactylon*) utilisé comme seul aliment pour le lapin.

L'évaluation nutritionnelle du gros chiendent a été faite avec des lapins NZW adultes mâles. Durant la période expérimentale de 3 semaines le poids vif des animaux a diminué constamment (- 18g/jour). La matière sèche ingérée par jour était très faible (31g). La digestibilité de tous les éléments nutritifs, en particulier celle des protéines et des

carbohydrates structuraux, était très faible : MS 52,6 %, protéines 48,9 % et cellulose brute 26,4 %. Pour le lapin, la teneur en protéines digestibles de *C. dactylon* est de 5.7 g/100g de MS. Sa teneur en énergie digestible calculée est de 2110 kcal/kg MS. Les résultats de cette étude indiquent que le *Cynodon dactylon* a une très faible valeur nutritive pour des lapins adultes et ne peut pas fournir les éléments nutritifs nécessaires à la couverture de leurs besoins d'entretien.

## INTRODUCTION

Coastal Bermuda grass (*Cynodon dactylon*) locally known as Hariyali or Dub grass is a common grazing pasture available in India and tropics. Nutritive value of this grass is known for ruminants. Few reports (BORGMAN and MITCHELL, 1966 ; CHAMPE and MAURICE, 1983) are also available indicating poor utilization of Coastal Bermuda grass by growing rabbits. However, DANIELS *et al.* (1985) reported similar growth and dry matter intake by rabbits fed diets containing either lucerne or Coastal Bermuda grass.

Although information is available on poor utilization of Coastal Bermuda grass by young rabbits, the literature is scanty about its utilization as sole feed in adult rabbits. Moreover certain reports (EVANS and JEBELIAN 1982 ; DESHMUKH, 1989) indicated that the fiber may be more efficiently utilized by adult rabbits than young ones.

Thus the present investigation was undertaken for nutritional evaluation of Coastal Bermuda grass as a sole feed for adult rabbits

## MATERIALS AND METHODS

Ten adult NZW male rabbits of about 1.51 ± 0.06kg average body weight (local strain) were housed individually in metallic cages having arrangements for separate feeding, watering and feces collection. Fresh unchaffed Coastal Bermuda grass was offered during a feeding trial of 21 days including a faecal collection period the last 4 days for. The animals were weighed weekly. The representative samples of grass offered, residue left and feces were analysed for proximate principles (AOAC, 1985) and detergent fibers (GOERING and VAN SOEST, 1970).

**Table 1 : Chemical composition and digestibility of nutrients of Bermuda grass.**

Nutrients	Chemical composition		Digestibility coefficients		
	Offered	Residue	Range	Means	± SE
Dry Matter	-	-	49.41 - 57.65	52.60	1.41
Crude Protein	11.67	8.41	42.30 - 55.16	48.91	2.52
Ether extract	2.69	2.89	20.95 - 59.95	43.43	7.25
Crude fibre	26.21	27.62	21.33 - 35.86	26.35	0.69
Nitrogen free extract	46.33	48.09	64.93 - 76.19	70.40	1.96
Total ash	13.00	12.99	-	-	-
Acid detergent fibre	48.00	48.22	40.21 - 52.65	47.24	2.02
Neutral detergent fibre	65.56	65.49	48.42 - 56.75	53.65	1.59
Hemicellulose*	17.56	17.27	58.17 - 83.00	70.66	4.51
Cell contents*	34.44	34.51	42.12 - 61.12	50.73	3.11

\* Determined by difference

## RESULTS AND DISCUSSION

The over all results indicated poor utilization of Coastal Bermuda grass by the experimental rabbits. There was constant fall in body weight from  $1.51 \pm 0.06\text{kg}$  to  $1.44 \pm 0.06\text{kg}$ ,  $1.19 \pm 0.08\text{kg}$  and  $1.12 \pm 0.10\text{kg}$  respectively, during first, second and third week of experiment. This decrease in body weight of rabbits indicated that Coastal Bermuda grass could not supply sufficient nutrients even for maintenance. The loss of weight per day ranged between 9 to 25g with an average of  $18.2 \pm 2.6\text{g}$ .

The similarity in chemical composition of grass offered and residue left (Table 1) indicated uniform intake of fodder. The digestibility of different nutrients (Table 1) indicated unsatisfactory utilization of grass by the rabbits. Digestibility of proteins was very low (48.9 %). The digestibility of crude fibre was low and, except hemicellulose, the cell wall constituents of the grass were poorly digestible. This was due to higher

proportion of indigestible tissue in the cells of this grass as has been already reported by CHEEKE (1987). Moreover, cell contents could show only 50 % digestibility. This may be due to inability of enzymes secreted by the rabbit or caecal microbes to invade the complex carbohydrates of cell wall and to reach the inner cell contents.

The grass had very poor palatability for rabbits as indicated by very low voluntary dry matter intake (Table 2). The daily DM intake in this experiment was only  $30.92 \pm 0.04\text{g}$  which was about one third of 97.8g daily DM intake reported by DANIELS *et al.* (1985). However, these workers fed Coastal Bermuda grass as part of ration and not as a sole feed. Dry matter intake remained very low even after expressing it in relative terms such as % of body weight and % per kg  $W^{0.75}$ . The lower DM intake resulted in lower intake of other nutrients such as crude proteins. The intake of DM, digestible crude protein (DCP) and energy was much lower than the recommended requirements (CHEEKE, 1987 ; DESHMUKH *et al.*, 1990).

**Table 2 : Body weights plane of nutrition and nutritive value of Bermuda grass during digestion trial.**

Particulars	Range	Mean	± S.E.
Body weight (kg)	0.81 - 1.34	1.15	0.09
Metabolic body size (kg $W^{0.75}$ )	0.85 - 1.24	1.11	0.07
Dry matter intake (g/day)	18.06 - 60.10	30.92	8.04
Dry matter intake per 100g body weight (g)	1.75 - 4.48	2.75	0.46
Dry matter intake per kg $W^{0.75}$	18.14 - 48.46	28.73	5.28
Crude protein intake (g/d)	3.08 - 7.59	4.62	0.81
Digestible Crude Protein intake (g/d)	1.70 - 3.35	2.20	0.30
<i>Nutritive value (% dry matter) :</i>			
Digestible crude protein	4.93 - 6.43	5.70	0.29
Digestible energy (Mcal/kg)*	1.88 - 2.31	2.11	-

\* Calculated as per FEKETE ( 1985)

$h = 10$   
 IW 1.51  
 FW 1.12  
 $\Delta$  - 18.810g/day  
 DM 31

In 100g of DM, Coastal Bermuda grass contained 5.7g DCP and the calculated digestible energy (DE) content was 2.11Mcal/kg DM. Though DE content of Coastal Bermuda grass is comparable to any maintenance type of fodder, due to very low voluntary DM intake the DCP and energy consumed were inadequate even for maintenance of adult rabbits.

The presence of some toxic compounds in Coastal Bermuda grass may be considered to explain this bad nutritive value, as it was by CHEEKE (1983, 1987). But the good result obtained by DANIELS *et al.* (1985) don't support this idea. So, the very low daily DM intake may be related to the too low protein/energy ratio observed, and/or probably to an aminoacid imbalance (FISHMAN and EVANS, 1978 ; SACHDEV and BHATIA, 1979). These hypotheses are supported by the better results observed when Coastal Bermuda grass is included in a balanced diet (DANIELS *et al.*, 1985)

In any way, the low value of Bermuda grass was evident from constant loss in body weights of rabbits. Very poor growth and death of growing rabbits with increasing levels of Bermuda grass has been reported by BORGMAN and MITCHELL (1966). This investigation confirms their study indicating that the Coastal Bermuda grass, when used as a single feed, has a very poor nutritive value not only for young growing rabbits but also for adults. Thus it may be concluded that Coastal Bermuda grass can not be used as sole ration for rabbits.

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