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NUTRITIVE VALUE OF LEGUMINOUS ROUGHAGES FOR RABBIT FEEDING

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ABSTRACT

Experiment was conducted on 72 soviet chinchilla male rabbits (Age 45d; Weight 863±59.3g) for period of 42 days to evaluate the nutritional value of roughages viz. stylosanthes, rice bean fodder, groundnut straw and soybean pods. The roughages were incorporated in mash at two levels (10 and 20%) except soybean, which was used only at 5 and 10% level. These mash test diets were manually pelleted in meat mincer at 50±5% moisture and oven dried. Test diets were isonitrogenous (20% protein) at par with control commercial pellet. Maximum growth and best feed conversion ratio was obtained on control diet which, was similar on diets containing rice bean fodder and groundnut straw meal at 10% level. Similar type of trends was noticed for protein and fibre digestibility. The results indicate that groundnut straw and rice bean fodder meals can be incorporated up to 10% on DM basis in grower rabbit's ration.

INTRODUCTION

The fibre component is very important in rabbit nutrition not only for prevention of enteritis and hairball formation in the stomach but also for optimum growth. They are well adapted to the use of low energy diets (De Blas *et al.* 1999). Thereby rabbits have advantages amongst non-ruminant to efficiently convert roughages with high fibre content to meat. Secondly, the northeastern hills of India are having great resources and potential of good quality leguminous roughage. A study also revealed that stylosanthes and rice bean fodder meal can be fed to adult soviet chinchilla rabbits without showing any adverse effects on nutrient utilization (Gupta *et al.* 1993). Therefore, an attempt was made to study the growth performance and nutrient digestibility on these roughages in grower soviet chinchilla rabbits.

MATERIALS AND METHODS

The rice bean *(Vigna umbellata)* and stylosanthes *(Stylosanthes hamata)* fodder and groundnut *(Arachis hypogaea)* straw and soybean *(Glycine max Merr.)* pods were taken as

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fibre source on the basis of local importance. These fibre sources were powdered into meal and analysed for proximate principles (Table I) as per AOAC, 1980. The stylosanthes (ST), rice bean (RB) and groundnut straw (GN) fibre were incorporated at 10 and 20% levels in rabbit ration and designated as D_2, D_3, D_4, D_5, D_6 and D_7 respectively. The soybean pod (SP) was incorporated at 5 and 10% levels and designated as D_8 and D_9 respectively. All mash diets were made isonitrogenous as recommended by NRC, 1966. The physical and chemical composition of diets is presented in Table 2. These mash diets were pelleted manually with the help of meat mincer at 50% moisture level. The pellets were oven dried at 60°C temperature. The prepared test diets were fed to rabbits and it compared against control commercial pellet diet (D_1).

A total 72 male soviet chinchilla rabbits of 45 days old, weighing 863±59.3g were taken for 42 days feeding trial. The rabbits were distributed in single iron cages having the facility of individual feeding, watering and faeces collection. The feeding and watering was done twice a day at morning and evening hours. Experiment was laid out in randomized block design. Initial and final body weights and cumulative feed intake of individual rabbits were recorded. However, average growth rate (g/d), feed intake (g/d) and feed conversion ratio (FCR) were calculated. At last, a digestion trial was conducted for the period of 3 days. The feed consumed and faeces voided in 3 days were recorded. The protein and fibre contents were analysed in feed and faeces and finally digestibility of nutrient was calculated. The data was analysed for test of significance by the procedure of Snedecore and Cochran, (1981).

RESULTS AND DISCUSSION

The fibre sources included in the test diets were containing good amount of protein (Table 1) and it varied from 13.79 to 22.46 per cent. The fibre content was neither low nor high except soybean pod. The soybean pod contains 40.25% fibre, which limit its maximum 10% level of inclusion in the diet. The growth performance and nutrient digestibility in rabbits fed different fibre sources are presented in Table 3. Maximum average growth rate (g/d) was obtained on control group (16.44±0.25) that was similar on diets containing RB and GN fibre at 10% level. The feeding of other fibre sources was exhibited poor growth rate. Moreover, the growth rate was decreased as the level of fibre increased in the diet. In the dietary treatments, the fibre content was varied from 6.80 to 12.27%, which was not too high. In contrary to this, Remois *et al.* 2000 reported beneficial effect of more dietary fibre (14.8%) in term of growth performance. However, poor performance on high fibre diets in present study could be explained due to more particle size of fibre components. Maximum feed consumption (g/d) was recorded on control (70.37±1.74) and it did not differ significantly ($P>0.05$) with diets containing GN and SP at 10 and 5% level respectively. In general, feed intake was less on test diets and it was probably due to low density of feed prepared by meat mincer as compared to commercial pellet. The FCR was obtained similar to control diet on feed containing RB, GN and ST fibre at 10% level.

The digestibility co-efficient of protein in diets containing RB at 1 0 and 20%, GN at 1 0% and SP at 5% level were comparable with control group. Similarly, fibre digestibility was not significant in rabbits fed either control diet or diets containing ST and RB at 10% level and SP at 5 and 10% level respectively. The digestibility of protein and fibre was reduced as the fibre content increased in the diets. This less digestibility of protein and fibre was possibly due to lower dry matter intake on high fibre diets. However, Lebas and Laplace, (1977) explained low

digestibility of nutrient on high fibre diets due to an acceleration of digestive transit. The results indicate that groundnut straw and rice bean fodder meals can be incorporated up to 1 0% on DM basis in grower rabbit's ration.

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Table 1. Chemical composition and availability of roughages

Particulars	Leguminous roughages			
	Stylosanthes fodder meal	Rice bean fodder meal	Groundnut straw meal	Soybean pod meal*
Chemical composition (g/l00g DM)				
Crude protein	16.38	16.57	13.79	22.46
Crude fibre	27.45	28.26	22.49	40.25
Ether extract	1.08	1.39	0.67	1.18
Total ash	10.44	12.01	9.25	5.57
Availability				
Periods	Aug.-Nov.	Aug.-Nov.	Oct.-Nov.	Oct. - Nov.
DM yield(t/h)	8.80	13.00	1.34	4.22
Stem leaf ratio	1.63	0.67	2.57	1.38

*Stem pod ratio

Table 2. Composition of experimental diets

Composition	Experimental diets								
(Kg/100 kg	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9
Maize	40	41	33	41	33	50	46	50	50
Rice polish	10	15	15	15	15	12	5	12	5
Wheat bran	16	-	-	-	-	-	-	-	-
Groundnut cake	20	20	18	20	18	14	15	19	21
Soya meal	5	5	5	5	5	5	5	5	5
Fish meal	4	4	4	4	4	4	4	4	4
Molasses	2	2	2	2	2	2	2	2	2
Salt	1	1	1	1	1	1	1	1	1
Fibre sources*	1	10	20	10	20	10	20	5	10
Additives**	2	2	2	2	2	2	2	2	2
Analysis (g/100 DM)									
Crude protein	20.48	20.73	20.65	19.79	19.94	19.71	19.78	20.24	20.15
Crude fibre	6.80	7.59	10.27	8.18	12.27	8.61	10.65	7.83	9.34
Ether extract	3.14	4.14	3.78	4.09	3.94	3.42	3.01	3.27	3.40
Total ash	8.88	10.5	10.56	10.28	10.13	10.04	10.83	9.60	12.63

**D2 and D3, Stylosanthes fodder meal; D4 and D5, Rice bean fodder meal
D6 and D7, Groundnut straw meal; D8 and Dg: Soybean pod meal

*Mineral mixture, 1.700 ; Agrimin, 0.250 and Briplex, 0.050; In Kg.

Table3. Growth performance and nutrient digestibility in rabbits

	Performance			Digestibility (%)	
Diets ±SE	Growth rate (g/d)	Feed intake (g/d)	FCR	Protein	Fibre
D_1	16.44^{d} ±0.25	70.37^{c} ±1.74	4.28^{a} ±0.04	81.77^{de} ±1.13	37.35^{d} ±1.93
D_2	11.92^{abc} ±0.91	57.01^{c} ±3.87	4.78^{ab} ±0.17	78.02^{bc} ±1.68	33.59^{cd} ±1.22
D_3	10.46^{a} ±1.16	56.95^{a} ±2.17	5.44^{b} ±0.53	73.38^{a} ±0.77	31.85^{bc} ±1.75
D_4	13.84^{cd} ±0.77	55.49^{a} ±3.89	4.01^{a} ±0.18	83.58^{e} ±0.54	33.19^{bcd} ±0.95
D_5	10.61^{a} ±0.86	61.43^{ab} ±3.32	5.79^{b} ±0.20	82.10^{de} ±1.39	30.69^{bc} ±1.62
D_6	13.65^{bc} ±1.01	65.03^{bc} ±3.03	4.76^{ab} ±0.21	81.19^{de} ±1.04	27.91^{ab} ±1.30
D_7	10.29^{a} ±0.77	58.47^{ab} ±1.79	5.68^{b} ±0.35	74.72^{a} ±0.79	23.38^{a} ±1.79
D_8	11.16^{ab} ±1.25	62.95^{abc} ±1.98	5.64^{b} ±0.42	79.33^{cd} ±0.72	37.91^{d} ±1.70
D_9	9.89^{a} ±0.92	57.40^{ab} ±1.17	5.80^{b} ±0.64	74.88^{ab} ±0.70	35.21^{cd} ±3.10
LSD±	2.60	7.95	1.09	3.15	5.34

* Value with different superscripts in a column differs significantly ($P<0.05$)