INFLUENCE OF FEEDING GREEN RICEBEAN (*VIGNA UMBELLATA*, THUMB) ON GROWTH AND FEED CONVERSION EFFICIENCY IN MEAT RABBITS IN THE EASTERN HIMALAYAN REGION OF INDIA

GUPTA H.K., YADAV B.P.S., GUPTA J.J., BUJARBARUAH K.M.

ICAR Research Complex For North Eastern Hill Region, Barapani, Meghalaya - 793 103, India

Abstract - In Eastern Himalayan Region of India development of forage based rabbit feeding systems is of immense value because of paucity of commercial feed pellets which when available are very expensive. Ricebean (*Vigna umbellata*) is high yielding (300 MT/ha), protein rich (15-23%) and highly palatable fodder for rabbits. Experiments were conducted on three groups of 5 rabbits each in an eight week growth cum metabolism trial. The rabbits were fed sole diet of commercial pellets (T-1), 75% DM through pellets with *ad libitum* green ricebean (T-2) and 50% DM through pellets with *ad libitum* ricebean (T-3). The rabbit in T-2 and T-3 consumed 25.89 ± 0.19 and 43.75 ± 0.03 % of total DM intake through ricebean. The average daily gain (ADG) was 18.39 ± 0.79, 20.55 ± 1.28 and 18.36 ± 0.95 g in T-1, T-2 and T-3 groups respectively. The average daily DM intake in all the groups was similar and was 57.10 ± 1.53, 58.31 ± 1.37 and 58.94 ± 0.68 g per kg metabolic body weight. The feed DM intake per kg gain was 3.55 ± 0.15, 3.42 ± 0.16 and 3.72 ± 0.17 kg and was similar in all the groups. The digestibility of DM, CP, EE, and NFE was quite high in all the groups but that of CF was significantly higher ($P < 0.01$) in T-2 and T-3 (32.76 ± 5.44 and 40.00 ± 2.34 %) as compared to T-1 (16.03 ± 2.00 %) indicating that CF of ricebean was utilized better. The balance of N was also significantly higher ($P < 0.01$) in T-2 and T-3 (1.84 ± 0.25 and 1.88 ± 0.16 g/d) as compared to T-1 (0.95 ± 0.26 g/d). The study revealed that 50% commercial feed pellets can be replaced by green ricebean fodder with no adverse effects on growth rate and feed conversion efficiency.

INTRODUCTION

In India, Eastern Himalayan region is characterised by high rainfall during prolonged monsoon months and relatively dry winter. The majority of population in this region lives in hilly areas and depends mainly on agriculture. The livestock which forms subsidiary but vital source of income includes cattle, goat, pig and poultry. The climatic conditions of hills of North Eastern Hill Region are quite suitable for commercial rabbit production. However, good quality complete feed pellets generally used in commercial rabbit units are very expensive and not easily available. Ricebean (*Vigna umbellata*) is a native of South East Asia. In India its distribution is, mainly confined to North Eastern hills, Western and Eastern Ghats in Peninsular India and often in the hill tracts (OHWE, 1965). It is a rich source of protein, the fodder yield is upto 300 MT/ha under rainfed conditions (CHANDEL *et al.*, 1988). It is recognised as an excellent legume fodder crop because it keeps green for a long period and supplies green fodder during scarcity period. It is being used in the multistoried silvi-horti systems as alternatives to shifting cultivation in North Eastern Hill Region (DHYANI and CHAUHAN, 1995). Rabbits convert available protein in cellulose rich fodder into meat (LEBAS *et al.*, 1986). The proteins contained in ricebean fodder are digested well (GUPTA *et al.*, 1992) and ration containing 25% ricebean meal were utilised as efficiently as rations containing Stylosenthus, a traditional fodder legume (GUPTA *et al.*, 1993). These qualities coupled with prolific nature of rabbits and climatic conditions of North Eastern Hills could possibly make ricebean a choice feed material for meat rabbits. In the present investigation studies were conducted to develop feeding systems with an aim to utilise ricebean as a major component of the ration for growing rabbits.

MATERIALS AND METHODS

Fifteen 42 days old New Zealand White rabbits were used in the eight week growth cum metabolic study. The rabbits were taken from the Animal Production Division of the Institute and randomly alloted to three groups of five rabbits each. The rabbits were housed individually in metal cages with facilities for feeding, watering and excreta collection in a well ventilated shed. The rabbits were fed as per NRC (1966). The rabbits of one group were fed commercially available rabbits feed pellets only (Control, T-1). The rabbits of second groups were fed 75% dry matter (DM) through commercial pellets and balance DM through *ad libitum* green ricebean (T-2), in

the third group the rabbits received 50% DM through commercial pellets and balanced DM through *ad libitum* green ricebean (T-3). The feed pellets were offered at 9.00 AM and green ricebean was offered at 12.00 Noon. Fresh drinking water was kept in the cages and changed twice daily. Daily DM intake through feed pellets and ricebean was recorded. The weekly records of body weights were also maintained. The nutrient digestibility was studied in a 5 day metabolism trial on three rabbits from each group in the last week of study. The samples of feed and faeces were analysed for proximate constituents (AOAC, 1984) and urine was analysed for N by microkjeldahl's method. The data was analysed as per SNEDECOR and COCHRAN (1968).

RESULTS AND DISCUSSION

The data on composition of feed pellets, ricebean fodder offered and fodder residue are presented in Table 1. The commercial pellets contained lower crude fibre (CF) and higher crude protein (CP) as compared to recommended levels for growth (NRC, 1977). The rabbits preferred soft leafy portion and left the harder stem resulting in higher CF and lower CP value of the fodder residue. The average daily gain (ADG) was similar in all the three groups though in T-2 it was slightly higher than the other groups and was similar to earlier reports (GUPTA, 1992). DE BLAS *et al.* (1981) reported higher gains with increase in fibre in the diet at 16 to 18% CP level. Similarly the total DM and daily DM intake in T-2 were non significantly higher than in control and T-3 group. The DM intake per kg metabolic body size was similar in all the groups indicating that ricebean fodder at both the levels did not adversely affect the DM intake in rabbits throughout the experimental period (Table 2). The actual consumption of DM through ricebean fodder as percentage of total DM intake in T-2 and T-3 was 25.89 ± 0.19 and 43.75 ± 0.30 which resulted in concomitant reduction in commercial feed pellet consumption. The DM intake per kg live weight gain ranged from 3.42 ± 0.16 to 3.72 ± 0.17 kg and was similar in all the groups. The feed : gain ratio was similar to the earlier reports (SANCHEZ *et al.*, 1984; SAHU and PRASAD, 1990).

Table 1 : Proximate composition of feed pellets and ricebean fodder fed to rabbits (% on DM basis)

Proximate constituent	Feed pellets	Ricebean (offered)	Ricebean (Residuce)
Dry matter	95.52	13.79	22.15
Crude protein	21.80	22.69	18.38
Crude fibre	7.79	30.24	35.87
Ether extract	2.84	2.24	1.50
Nitrogen free extract	59.52	34.28	31.75
Total ash	8.55	10.55	12.50

Table 2 : Growth rate and feed conversion efficiency of rabbits in different treatment groups

Parameter	Treatment group			
	T-1	T-2	T-3	CD
Initial body weight (g)	675 ± 44	700 ± 40	691.67 ± 44	NS
Final body weight (g)	1705 ± 64	1851 ± 69	1720 ± 68	NS
Average daily gain (g)	18.39 ± 0.79	20.55 ± 1.28	18.36 ± 0.95	NS
Total DM intake (g)	3631 ± 99	3907 ± 54	3790 ± 91	NS
Average daily DM intake (g)	64.84 ± 1.76	69.77 ± 0.95	67.88 ± 1.63	NS
Average daily DM intake/kg B. Wt.	54.78 ± 1.85	54.96 ± 1.68	56.36 ± 1.17	NS
Average daily DM intake/kg $W^{0.75}$	57.10 ± 1.53	58.31 ± 1.37	58.94 ± 0.68	NS
Total feed pellets intake (g)	3631 ± 78	2896 ± 40	2113 ± 53	
Total ricebean intake (g)	-	1012 ± 11	1677 ± 38	
Ricebean intake as % of total DMI	-	25.89 ± 0.19	43.75 ± 0.30	
DMI per kg gain (kg)	3.55 ± 0.15	3.42 ± 0.16	3.72 ± 0.17	NS

The data on digestibility of nutrients (Table 3) revealed that the DM, CP, EE and NFE were digested equally well in all the groups of rabbits. The digestibility of CF in rabbits fed commercial feed pellets was, however, significantly lower ($P < 0.01$) than the rabbits fed pellets with ricebean fodder indicating that cellulosic material of ricebean was better digested in the GI tract of rabbits. Similar DM intake and growth rate but higher CF digestibility in ricebean fed rabbits of T-2 and T-3 indicated that fibre fermentation in the hindgut (MARTY and VERNAY, 1984) was possibly able to supply nearly as much energy as was supplied by pelleted feed. The data on N balance revealed that animals receiving ricebean fodder were in significantly higher ($P < 0.01$) N balance than the rabbits fed pelleted feed. Similarly the percentage of absorbed N retained in the body was significantly ($P < 0.01$) lower in rabbits fed pelleted feed compared to ricebean fed groups. As the CP digestibility of ricebean, when fed as sole feed, was reported to quite high in rabbits (GUPTA *et al.*, 1992) it appears that ricebean could probably supply the total requirement of proteins in growing rabbits. From the results of the present investigation it is evident that ricebean fodder can safely replace 50% of the commercial feed pellets which will substantially reduce the cost of feeding and have immense financial implications in commercial meat rabbit production. If commercial rabbit farming in North eastern India has to survive we need to undertake further studies to examine the possibilities of rearing meat rabbit on higher levels or sole feeding of ricebean fodder with or without additional supplements.

Table 3 : Digestibility coefficients and balance of N in different treatment groups of rabbits

Parameter	Treatment group			
	T-1	T-2	T-3	CD
Dry matter	69.96 ± 1.75	67.51 ± 1.74	67.72 ± 1.01	NS
Crude protein	74.39 ± 0.85	76.81 ± 3.25	72.41 ± 1.59	NS
Crude fibre**	16.03^{a} ± 2.00	32.76^{b} ± 5.44	40.08^{b} ± 2.34	15.43
Ether extract	65.51 ± 1.32	67.73 ± 8.35	60.27 ± 2.83	NS
Nitrogen free extract	79.26 ± 1.85	75.87 ± 2.07	78.24 ± 0.39	NS
N balance (g/d)**	0.95^{a} ± 0.26	1.84^{b} ± 0.25	1.88^{b} ± 0.16	0.47
% of absorbed N retained	43.11^{a} ± 5.40	57.86^{b} ± 3.34	55.98^{b} ± 3.26	10.86

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