Bangladesh Journal of Animal Science
Journal homepage: http://www.banglajol.info/index.php/BJAS

Effect of pellet and mash feeding on the performance of growing rabbit

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Abstract

The present study was undertaken to know the effect of pellet and mash feeding on nutrient digestibility, growth performance and carcass weight of growing rabbits. For this purpose fifteen crossbred New-Zealand white rabbit were selected for conducting the experiment. The Average ages of these experimental rabbits were 1.5 to 2.0 months. All the rabbits were housed in Quonset style cages. Animals were distributed to mash (T_1), pellet (T_2) and mixture of pellet and mash (T_3) groups equally with five animals in each group. All the animals were supplied *ad libitum* green grass. The experiment shows that highest body weight was found from pelleted group. Growth rate of different dietary treatment differ significantly ($p<0.05$). FCR of different dietary groups did not differ significantly. Carcass weight and dressing yield of rabbits did not differ significantly, but dressing yield was highest for pelleted group. So the study reveal that, feeding of pelleted diet resulted in higher growth rate, growth velocity, dressing yield, better feed conversion efficiency compared to mash and pellet with mash.

Key words: Rabbit, pellet, productive performance

 Bang. J. Anim. Sci. 2015. 44 (2): 100-105

Introduction

Rabbit (*Oryctolagus cuniculus*) is a small non-ruminant animal which may be recommended as an alternative source for meat production. Cattle rearing require more money and more space, but less money and/ or less space are involved in rabbit rearing. The domestic rabbit is considered as viable livestock species (Cheeke, 1979) and is raised for several purposes including meat and fur production, laboratory animals, for show and as pets (Cheek, 1986a). Rabbit have number of characteristics such as small body size, short generation interval (gestation length 28-32 days), high productive potential (4 or 5 litters per year with an average of 5.8 young per year), rapid growth rate and genetic diversity (Cheeke, 1986b). Ultimately rabbit is enabling to attract the attention of farmer as well as the private industry. The environments, climatic condition, religious issue, social status of Bangladesh are favorable to rabbit production and these are easy to handle and live on easily available grass. It is reared easily by village woman and children. Moreover, rabbit meat is high quality, because it is high protein content and low in fat and cholesterol (Jones, 1990, Handa *et al.,* 1995). Rabbit is a monogastric animal but can utilize cellulose content of feed for the presence of caecum with the enzyme of cellulose. Cheeke (1986a) indicated that rabbits are primarily herbivores and can be successfully raised on diets that are low in grain and high in roughage. The ability of rabbit to convert roughage into meat efficiently will be of great help for Bangladesh where animal feed shortage is an acute problem. It has been reported that growing rabbits can be maintained satisfactorily on diets consisting of 100-200g green roughage and 40-60g concentrate mixtures preferably in the form of pellet (Ranjhan 1980) for optimum production and about 4 months are required to produce 2 kg market rabbit under subsistence condition (NRC 1991). Howlider and Rose (1992) found that pelleting increased feed conversion by 5.9% for rabbit, less feed wastage is possible in pellet feeding comparing mash feeding. So pellet feeding to rabbit may cause similar effect as poultry which is also a monogastric animal. Therefore, comparative study on pellet and mash

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feeding is necessary for obtaining new information for rabbit production. The present study was undertaken to know the effect of pellet and mash feeding on nutrient digestibility, growth performance and carcass weight of growing rabbits.

Materials and Methods

Location and Time

A total of fifteen crossbred New Zealand white rabbit about 1.5 to 2.0 months of age were selected to conduct the present study and the study was carried out at the animal nutrition field laboratory, Bangladesh Agricultural University, Mymensingh. Chemical analysis of mash and pellet feed was done in the laboratory of Department of Animal Nutrition, Bangladesh Agricultural University, Mymensingh. The study was done during the period of April 24 to June 26, 2003.

Experimental design and dietary treatment

Animals were randomly distributed to three treatment groups having five animals in each group. The treatment groups were Treatment-1(T_1) concentrate feed of mash form, Treatment-2 (T_2) concentrate feed of pellet form and Treatment-3 (T_3) concentrate feed of 50% mash form and 50% pellet form. All the animals were supplied *ad libitum* green grass and fresh water was made available to the rabbits at all time.

Preparation of concentrate mixture

All the ingredients were mixed properly but only oil was added to the mixed feed just prior to use for the prevention of rancidity of fat and feed was safe for experimental animal where 3.5% oil was mixed. The composition of mash feed was given in Table 1 and the selected pellet was purchased from Quality Feed Ltd. which having 2800-2900 kcal ME/kg and 20% crude protein.

Feeding and management of rabbits

All animals were housed in individual steel cage pans having well lighted and well ventilated. Sanitary measure was taken for prevention of diseases. The rabbits were reared in three groups. *Ad libitum* supply of green grass was common to all three groups. They differ from concentrate supply. From the very beginning of the experiment up to 16 days, roughage and 70g concentrate was supplied to each rabbit but for rest of the experimental period , 80g of concentrate was supplied to each animal in the form of mash (T_1), pellet T_2) and pellet and mash (T_3).

Measurements of feed intake and live weight

The leftover of roughage and concentrate feed was measured daily in the morning prior to supply of feed and left over from supplied amount of feed was deducted for obtaining the amount of feed intake per day. Prior to start of the experiment live weight of each animal was measured and recorded. Live weight was taken once in a week in a particular day in the morning at 6.30 A.M. before feeding and the weight gain was calculated by subtracting the initial weight from the final weight and daily weight gain was calculated.

Table 1. Composition of mash feed given to growing rabbits

Ingredients	Amount of fresh feed (kg)	DM content (kg)	ME content (Kcal)	ME content (Kcal)/kg	Protein content (kg)
Maize	34	30.39	101826.6	3350.66	2.88
Wheat	15.5	13.95	43524	3120	1.53
Oil	3.5	3.50	31150	8900	0
Wheat bran	15	13.25	17218.5	1299.50	1.92
Til oil cake	11	9.97	18935.4	1899.24	3.10
Soyabean meal	20.5	18.39	38615.85	2099.83	7.36
Salt	0.50	0.45	-	_	-
Total nutrient	100	89.70	251270.35	251270/89.7=2801	16.79

Amount of Nutrient 2800 Kcal ME/kg DM, CP=19%

FCR and average daily gain

Feed conversion ratio (FCR) and average daily gain was calculated as following formula

$$FCR = \frac{\text{Daily DM intake (g)}}{\text{Daily weight gain (g)}}$$

ADG= (Final live weight- Initial live weight)/Total days of study

Growth velocity (GV)

The growth velocity was calculated in a given period of time (8 weeks) as follows

GV= (FW-IW)/IW

Where, FW= Final body weight, IW=Initial body weight

Measurement of carcass yield

At the end of experiment, two rabbits from each treatment were randomly selected. They were weighted and slaughtered un-fasted for the measurement of carcass yield, dressing percentage, organ weight, blood, skin, shank, head, trachea, lung, kidney, whole digestive tract and carcass weight were recorded.

Digestibility trail

Towards the end of the experiment a conventional digestibility trial was conducted for 7 days. At the end of collection period the sun dried faeces were mixed, together and then ground for chemical analysis. Feed and faeces samples were analyzed following the methods of AOAC (1984).

Statistical analysis

Collected data for every parameter were analyzed using MSTAT statistical programme to compute analysis of variance (ANOVA) for a completely randomized design; Duncan's Multiple Range Test (DMRT) was done to compare the treatment means for different parameters.

Results and Discussion

Effect of pellet and mash feeding on rabbit growth

Live weight gain

The growth performances of rabbits fed *ad libitum* green grass along with either pellet, mash or pellet and mash feed were presented in Table 2. The initial and final average live weights of rabbit were 665.00, 650.00, 680.00g and 1366g, 1650g, 1504g and body weight gain was 701.00, 1000.00 and 824.00g for the T_1, T_2 and T_3 respectively. The results shown that the live weight gain on different treatment groups were significantly different ($P<0.05$). Howlider and Rose (1992) observed that the total meat yield as a proportion of live weight, was not altered by sex or diet form. The pellet feed caused increase in the fatness compared with the mash feed given to monogastric broiler. Rabbit is a mono gastric animal, so it may be obtained similar result.

Table 2 Growth performances of rabbit by feeding pellet and mash

Parameters	Treatments				
	T_1	T_2	T_3	SED	Significance level
Initial body weight (g)	665.00	650.00	680.00	131.65	NS
Final body weight (g)	1366.00	1650.00	1504.00	162.69	*
Total body weight gain (g)	701.00^{b}	1000.00^{a}	824.00^{ab}	93.65	*
Growth rate (g/d)	12.52^{b}	17.86^{a}	14.71^{ab}	1.67	*
Total dry matter intake (g)	3617.37	4181.75	4286.56	295.23	NS
Daily dry matter intake (g)	64.60	74.67	76.43	5.27	NS
Growth velocity	1.12	1.76	1.29	0.35	NS
FCR	5.12	4.22	5.32	0.46	NS

a, b, Mean value with different superscripts differ significantly ($p<0.05$); T_1= Green grass + mash feed, T_2= Green grass + pellet feed, T_3= Green grass + 50% mash feed + 50% pellet feed

Growth rate

Average daily growth rate was 12.52, 17.86, 14.71g for the treatments of T_1, T_2 and T_3 respectively (Table 2) and differed significantly ($p<0.05$), this was occurred may be due to supply of pelleted diet to the animal. Lindblad *et al*. (1955) observed an increase in rate of growth of monogastric, chicks fed pelleted rations without increased consumption of feed. The findings supported the present study. El-Kerdaway *et al*., (1992) found that average daily body weight gain of rabbits was 24.9, 23.4, 21.9 and 22.1g, which is differ than the present study.

Growth velocity

The growth velocity of different dietary treatment groups did not differ significantly, but the highest growth velocity was recorded 1.76g for diet T_2, followed by T_1 (1.12g) and T_3 (1.29g) respectively.

FCR

The average FCR of among the diet were 5.21, 4.22 and 5.32 respectively and the result did not differ significantly ($p>0.05$) within the groups, but highest performance was found the pelleted group. Howlider and Rose (1992), Ruiz Feria and Lukefahr (1998), Bielanski *et al.*(1998), Sawal *et al.* (1995) also found that pelleting increased feed conversion.

Daily and total dry matter intake (g)

Average daily and total dry matter intake (up to 56 days) was 64.60, 74.67 and 76.43g and 3617.37, 4181.75 and 4286.56g for treatments T_1, T_2 and T_3 respectively and the dietary treatments did not differ significantly ($p>0.05$). Park *et al.,* (1983) reported that Hubbard broilers of 9 weeks of age eat more pellets than mash. Rabbit is also monogastric animal so similar result may be obtained.

Effect of pellet, mash and mixture of pellet and mash feeding on carcass weight

The average carcass weight was 887.50, 815.00 and 760.00g for treatments T_1, T_2 and T_3 groups respectively (Table-3) and no significant differences were ($p>0.05$) found among the treatment groups. The dressing yield (%) was 55.52, 56.97 and 56.80 % of T_1, T_2 and T_3 group respectively and the result showed non-significant ($p>0.05$).

Digestibility

The digestibility of proximate components of different diets is representing in Table-4. The results shown that digestibility of DM was highest in group T_1 followed by T_2 and T_3 respectively and T_1 significantly ($p<0.05$) higher than that of other groups. But no significant different were found another two groups. The CP content of different dietary treatment groups were 81.23, 84.86 and 81.08 % for T_1, T_2 and T_3 respectively which was significantly ($p<0.01$) differed between both treatment groups. The CF content of among the different dietary treatment groups differed significantly ($p<0.05$). The EE content of diet T_1 was significantly ($p<0.01$) higher than that of other two groups. NFE digestibility of treatments T_1, T_2 and T_3 were 80.39, 76.96 and 70.82 % respectively which was differed significantly $p<0.01$) among the treatment groups. The result agree with the result of Amber et al., (2002), Deshmukh and Pathak, (1995), Gupta et al., (1993) and Rao et al., (1987) they found similar findings of different proximate component digestibility of rabbit.

Table 3. Carcass weight and dressing yield of growing rabbit

Parameters	Treatments				
	T_1	T_2	T_3	SED	Level of significance
Carcass weight gain (g/whole period)	887.50	815.00	760.00	62.57	NS
Dressing yield (%)	55.52	56.97	56.80	1.55	NS

T_1= Green grass + mash feed, T_2= Green grass + pellet feed, T_3= Green grass + 50% mash feed + 50% pellet feed.

Table 4. Digestibility of different nutrient component

Parameters	Treatments				
Digestibility (%)	T1	T2	T3	SED	Level of significance
DM	77.09[a]	72.84[b]	70.42[b]	1.24	**
CP	81.23[b]	84.86[a]	81.08[c]	1.06	**
CF	44.85[a]	46.46[a]	37.58[b]	3.35	*
EE	88.50[a]	72.23[b]	58.87[c]	1.65	**
NFE	80.39[a]	76.96[b]	70.82[c]	1.38	**

a,b,c, mean value with different superscripts differ significantly (p<0.05) or (p<0.001).

Conclusion

From the above discussion it may be concluded that feeding of pelleted diet resulted in higher growth rate, growth velocity, dressing yield, nutrient digestibility, and better feed conversion efficiency in growing rabbits compared to those of feeding mash or mixture of mash and pellet diet. Therefore, feeding of pelleted diet may be recommended.

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