

A.A. Aganga, **Incorporation of Grass-hay, Whole Cereal Grains (Segaolane) and Bambara Groundnut Meal Compared to Lucerne into the Diets of Rabbits**

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Abstract: Ten, three months old, Californian white rabbits were used in a randomised block design with five rabbits per group in a feeding trial that lasted for 98 days in Sebele, Gaborone. The study was aimed at determining the feed intake, water intake and body weight changes of rabbits when fed on bambara groundnut meal compared to lucerne as protein source. The rabbits were caged individually. They were divided into two groups of five, of similar average body weights. The control group received lucerne as a protein source, while the other group were fed on bambara groundnut meal. The daily ration of the rabbits consisted of grass-hay (40%), whole cereal grains (Segaolane) (30%) and lucerne or bambara groundnut meal (30%). All rabbits were given water daily. Data collected indicated that the means of the water intake (ml) of the rabbits were not significantly different. The average daily protein supplement intake (g) was significantly higher ($P < 0.05$) for rabbits fed on Bambara groundnut meal than those fed on lucerne, but the daily body weight changes were not significantly different between the groups.

Key words: Rabbit, Weight gains, Bambara groundnut and Lucerne

Introduction

The rabbit is one of the animals that have been domesticated by man basically for supplying meat and the important point in favour of domestic rabbit is that it compares favourably with other meat producing farm animals in its conversion of feed crops into meat for human consumption (Templeton, 1968). Rabbit offers an alternative to other meat producing species for the improvement of human's protein supply and the realisation of a monetary income. This is due to its excellent area of productivity and the fact that rabbits need not be in competition with humans for food (Eschborn, 1985).

The meat is white, fine grained, delicately flavoured, nutritious and appetising. It's high in its proteins and low in its fat and caloric content hence low cholesterol content. This reduces the risk of heart disease such as atherosclerosis. The size of the carcass, the fine qualities of the meat and the wide range in methods for preparation make it an excellent and economical meat for use in any season of the year (Templeton, 1968). Rabbit meat is easily digestible. Only a slight amount of uric acid (the cause of gout) is formed through metabolism. Therefore, it is suitable for a special diet (Eschborn, 1985). Meat production per doe (female rabbit) is higher than in all other herbivores farm animals due to the high rate of reproduction. Apart from being prolific, rabbits are also herbivores which efficiently convert fodder to meat. The whole point of meat production is to convert plant proteins of little or no use to people as food into high value animal proteins. In efficient production systems, rabbits can turn 20 per cent of the proteins they eat into edible meat (Lebas, 1986). Cook (1977) stated that the energy expenditure per kilogram of weight gain of rabbits lies markedly below that of sheep and even 47 per cent below that of cattle. Sharky (1973) found that the protein formation between the 6th and 16th week of a rabbit's life is 45 per cent higher than in lambs. The advantageous utilisation of energy and protein result in the highest productivity per area of all meat producing farm animal species.

In subsistence-oriented rabbit production, it is important to utilise feeds not suitable for man. However, a relatively high danger exists that the plants or plant parts offered may be toxic, so knowledge of local poisonous plant species is a prerequisite for feeding of wild herbs. The achievement of the rabbit's exceptionally high protein formation demands a plentiful food supply in the period before puberty (approximately 3 months of life) in order to obtain higher daily weight gains (Eschborn, 1985). There are many feeds that are suitable for rabbits and balanced rations, properly fed, assist in maintaining a higher natural resistance to diseases and in producing maximum growth. The cereal grains such as sorghum, wheat and so on, are palatable and may be fed whole to rabbits. The grains should be plump and free from any indication of spoilage. Protein supplements of plant origin from soybeans, peanuts, sesame etc., are desirable for balancing rations for rabbits (Templeton, 1968). The main objective of this study is to determine body weight gains of rabbits when fed Bambara groundnut meal (jugo bean) compared to lucerne as feed protein source.

Materials and Methods

The study was conducted at Estate Management Unit (E.M.U.) in Sebele, Gaborone. Ten, three months old, Californian white rabbits were used in a randomised design balanced for sex. Out of these ten rabbits, eight were males and two were females. The rabbits were caged individually. They were divided into two groups of five, of approximately equal average body weights. In the Control (group one) labeled A(A1-A5), rabbits were fed on lucerne as feed protein source. In the treatment (group two) labelled B(B1-B5), rabbits were fed on Bambara groundnut meal as a feed protein source. In both treatments, wooden boards were laid on the cages' floors to allow the rabbits to have access to their faecal material as well as preventing the wire mesh from stressing the rabbits under their feet. The cages were raised on stands, about one metre above a concrete floor.

The feeding trial lasted for 98 days. The initial mean body weights were equal for both groups. Table 1, shows the chemical composition of feed ingredients provided for the rabbits. The daily ration of the rabbits consisted of buffalo grass hay (40%), lucerne or Bambara groundnut meal (30%) and (segaolane) sorghum (30%). A vitamin/mineral block was available free choice to each rabbit. Feed was given on daily basis and the left overs were weighed before being removed and that was to help in determining the amount of feed intake. Weighing of the feed was done using an electronic balance. The amount of water given and leftover daily was measured using a plastic measuring cylinder to determine the amount of water consumed. The rabbits were weighed after every two weeks, using an electronic balance. The data collected were the initial body weight, the final body weight, the weight gained by the rabbits, the average daily weight gained, daily feed intake and the daily water intake. The data were then subjected to statistical analysis T-test was used to separate the means, (SAS Inc. SAS' version No. 6.04).

Results

The data shown in Table 2, showed the production parameters of the experimental rabbits. The means and SE for the daily weight gains (g) were 5.47 ± 0.580 and 6.47 ± 1.90 for group one and two respectively, while the means and SE's for water intake (ml) were 479.2 ± 9.89 and 491.5 ± 7.94 for both group one and two respectively. Average daily feed intakes (g) were 138.8 ± 8.68 and 150.1 ± 10.7 for groups one and two respectively. The feed conversion efficiencies were 25.4 and 23.2 for rabbits in group one and two respectively.

Table 1: Chemical composition of feed fed to rabbits

Feed	DM	Ash	EE	CP	CF	Ca	Mg	P	K
Jugo bean	91.1	4.24	6.56	18.26	5.19	0.014	0.143	0.214	1.3
'Segaolane'	90.25	1.7	2.7	11.5	2.6	1.78	0.248	0.334	0.42
Sorghum									
Grain									
Buffalo	91.98	8.25	1.6	8.82	25.5	0.94	0.318	0.218	0.52
Grass hay									
Lucerne	92.6	6.7	2.9	15.2	29.3	1.062	0.278	0.218	1.63

Table 2: Performance of rabbits fed Lucerne or Bambara groundnut meal as protein source.

	Control Lucerne as a Protein source	Test group Bambara g/nut as a protein source	
	Mean±SE	Mean±SE	Significance
Initial body weight (kg)	002.580±0.103	002.590±0.346	NS
Final body weight (kg)	003.110±0.134	003.160±0.202	NS
Weight gained (kg)	000.536±0.0568	000.634±0.186	NS
Average daily weight gained (kg)	005.470±0.580	006.470±1.90	NS
Average daily segaolane intake (g)	054.300±2.56	055.200±2.96	NS
Average daily grass-hay intake (g)	040.000±3.47	040.200±4.54	NS
Average daily protein supplement intake (g)	044.500±2.65	054.700± 3.24	*
Average daily water intake (ml)	479.200±9.89	491.500±7.94	NS
Average daily feed intake (g)	138.800±8.68	150.100±10.7	NS
DM/gain (g/g; (Feed conversion).	025.4	023.2	

N.S; Not significant at $P > 0.05$, *: Significant at $P < 0.05$

Discussion

The average daily weight gained (grams) did not show any significant differences between the groups. The means were 5.47 ± 0.58 and 6.47 ± 1.90 for group one and group two respectively. The averages of both daily cereal grains intake and buffalo grass hay intake also did not differ statistically for both group one and group two. The average daily protein supplement intake showed a significant difference at $P < 0.05$ between the groups. The means were 44.5 ± 2.65 and 54.7 ± 3.24 for group one and group two respectively. The data indicated that rabbits had much preference for Bambara groundnut meal than for lucerne.

Bambara groundnut meal as one of the proteinaceous legumes is highly desired by rabbits compared to lucerne. This is in line with the findings of Templeton (1968), who pointed out that protein supplements of plant origin from soy bean, flaxseeds, cotton seeds, peanuts and the like are desirable and are highly preferred by rabbits. Protein sources provided to the rabbits did not influence the mean water intake (ml). The means and SE's were 427.2 ± 9.89 and 491 ± 7.94 for both group one and group two respectively. There was also no significant difference in average daily feed intake (grams) of rabbits between the two groups. The means and SE's were 138.8 ± 8.68 and 150.1 ± 10.7 for both groups respectively. The feed conversion efficiencies were 25.4 and 23.2 for group one and group two respectively. That was an indication that 25.4 grams of feed were needed daily to put one gram weight gain per day for each rabbit in group one, while 23.2 grams were needed for each rabbit in group two. The study shows that bambara groundnut meal or lucerne can be fed as protein sources to rabbits.

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