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COMPARATIVE EFFECTS OF SUN-DRIED RABBIT FAECES AND SUN DRIED PARTIALLY FERMENTED RABBIT FAECES ON THE PERFORMANCE OF GROWING RABBITS, ORGAN WEIGHTS AND ENZYME ACTIVITIES

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Target Audience: Animal nutrtritionists, livestock farmers, research scientists.

ABSTRACT

The effects of sun-dried rabbit faeces (SDRF) and sun-dried partially fermented rabbit faeces (SDPFRF) as feed supplements, on the performance of growing rabbits, organ weights, plasma glucose, serum transaminases and alkaline phosphatase were studied.

The eight weeks feeding trial involving twenty four 6 weeks old male and female New Zealand white rabbits weighing 600 - 650g in a completely randomized design were fed, three diets containing 0% (control), 5% SDRF and 5% SDPERF. The sun-dried rabbit faeces (SDRF) and sun-dried partially fermented rabbit faeces (SDPFRF) were high in protein content, with (22.24% and 28.42% respectively, The SDPFRF was low in fat (0.94%) but high in fibre (16.74%) while SDRF was high in both fibre and fat levels (15.42 and 1.8%) respectively. Both supplements supplied appreciable amounts of protein and minerals.

The 5% level of inclusion of SDPFRF in the diet gave significantly ($P<0.05$) better weight gains than the 5% SDRF. Feed efficiency and protein efficiency were the same for the control and 5% SDPERF supplements, which were superior to the 5% SDRF diet. There was no incidence of enteritis or mortality among the treatment groups.

Key words: Rabbits, sun-dried rabbit faeces, performance, organ weights, enzymes.

DESCRIPTION OF PROBLEM

Although rabbit production is still not on high scale in Nigeria; the rabbit being a small animal could be raised even within the household for meat production. Compared to poultry and swine, rabbits have a higher digestibility of roughage. In order to encourage rabbit producers in Nigeria, alternative sources of feeds must be made readily available and at the lowest possible cost.

In the developing countries, environmental pollution caused in the past by ineffective environmental sanitation is a major challenge. With large-scale production of cattle, swine and poultry, increasingly large amounts of manure

need to be disposed of in order to avoid environmental pollution. However, manure from livestock and municipal wastes can be recycled and fed to animals and these besides serving as nutrients, minimize environmental problems (1,2,3). The recycling of rabbit manure is useful because it has been shown to contain significant amounts of microbial protein synthesized in the hindgut of the rabbit (4).

Some workers have reported the beneficial effects of activated sewage sludge on the growth of some classes of livestock (5,6), while the beneficial value of dried poultry manure on livestock production has also been established (7,8). Beaudonim (9) reported that dried sewage sludge in the diet of pigs, increases the number of pigs farrowed while dried poultry wast serves as a significant source of crude protein, calcium and phosphorus (5).

Changes in blood constituents reflect stress conditions resulting from nutritional or pathological disorder as shown in studies with broiler chicken (10). The evaluation of some blood enzymes can help in diagnosing cases of myocardial infarction and liver damage due to hepatotoxic drugs or chemicals.

The objective of this study was to evaluate the effect of feeding sun-dried and sun-dried partially fermented rabbit faeces on the performance of growing rabbits, organ weights and activities of some blood enzymes.

MATERIALS AND METHODS

Five kilograms of rabbit faeces were collected from the rabbitry of the Teaching and Research Farm of the University of Agriculture, Abeokuta. Half of the faeces was allowed to ferment for five days while the other half was not treated. Both the unfermented and untreated faeces were sun-dried in flat trays and thereafter separately milled in a hammer mill into fine particles.

Three diets containing 0% (control), 5% sun-dried rabbit faeces and 5% sun-dried partially fermented rabbit faeces were formulated as shown in Table 1. The diets were all pelleted and calculated to contain 18.49 - 18.84% crude protein.

Twenty four 6-week old New Zealand white male and female rabbits weighing 600 - 650g, were obtained from the University Teaching and Research Farm. The animals were divided into three groups of eight rabbits each, with an average weight of 612.5g for each group. Each group was further sub-divided into two, such that four rabbits were obtained for each sub-group with two rabbits per cage. The rabbits were fed the pelleted feed daily at 0.080h and given water *ad libitum* for a period of eight weeks. Body weight gains, feed intake, feed efficiency, and protein efficiency ratio were taken weekly.

Table 1: Percentage composition of experimental diets

components	Dietary Level of Rabbit Faeces		
	0% SDRF	5%SDRF	5%SDPFRF
Yellow Maize	45.54	43.10	44.77
Soyabean Meal	17.38	14.84	12.89
Blood Meal	2.58	2.50	2.84
fish Meal	1.00	1.00	1.00
Wheat Bran	30.00	30.00	30.00
Oyster Shell	2.00	2.00	2.00
Bone Meal	1.00	1.00	1.00
[1]SDRF	–	5.00	–
[2]SDPFRF	–	–	5.00
Vit/Min Premix	0.25	0.25	0.25
Salt	0.25	0.25	0.25
Calculated Analysis			
Protein (%)	18.84	18.67	18.49
Energy ME (Kj/og)	11.26	11.26	11.49
Fibre (%)	15.64	15.86	15.84
Calcium (%)	0.94	0.96	0.96
Methionine (%)	0.74	0.74	0.84
Lysine (%)	0.62	0.64	0.70

[1]SDRF: Sun-dried rabbit faeces
[2]SDPFRF: Sun-dried partially fermented rabbit faeces.

At the end of the experiment, four rabbits from each diet group were selected at random and bled. Blood was obtained from the right ear with fine capillary tubes and emptied into test tubes kept in an inclined position for about 6 hours. The serum was separated by centrifugation at 400 rpm. X 10 min. and stored in a deep freezer ready for analysis. Plasma glucose, alkaline phosphatase, glutamic oxaloacetic transaminase (GOT) and glutamic-pyruvic transaminase (GPT) were analyzed by different analytical methods (11,12,13).

Liver, kidneys and caeca were removed, blotted on filter paper, weighed and their protein contents determined (14).

Statistical Analysis

Performance records of the animals were subjected to one way analysis of variance (15). Duncan multiple range test was used to determine significant differences between treatment means (16).

RESULTS AND DISCUSSION

The sun-dried rabbit faeces used in this experiment contained 22.24% crude protein and 15.42% crude fibre, while sun-dried partially fermented rabbit faeces had higher crude protein and crude fibre values of 28.42% and 16.74% respectively, suggesting that they can be suitable for rabbit feeding (Table 2).

Table 2: Chemical Composition of Dried Rabbit Faeces and the Experimental Diets (g/100g Dry matter)

Chemical Composition %	Experimental Diets				
	S.D.R.F.	S.D.P.F.R.F.	0% SDRF	5% SDRF	5% SDPFRF
Moisture	7.24	5.58	2.10	2.25	1.45
Crude Protein	22..24	28.42	20.64	20.45	20.42
Ether Extract	1.98	0.94	10.64	10.54	11.42
Crude Fibre	15.42	16.74	20.42	21.48	24.72
Nitrogen Free Extract	41.37	34.98	33.56	32.90	30.96
Ash	10.35	11.84	11.24	10.88	9.51
MINERAL					
Potassium (%)	0.244	0.264	0.148	0.164	0.164
Sodium(%)	0.052	0.074	0.044	0.046	0.050
Phosphorus(%)	0.070	0.082	0.244	0.246	0.252
Magnesium (%)	0.184	0.186	0.048	0.54	0.060
Calcium(%)	0.846	0.892	0.942	0.948	0.996
Zinc (ppm)	258	264	270	284	268
Manganese(ppm)	244	258	264	276	268
Iron (ppm)	138	136	132	138	142

SDRF - Sun-dried rabbit faeces
SDPFRF - Sun-dried partially fermented rabbit faeces

The performance of rabbits fed the experimental diets is shown in Table 3. It was interesting to note that although daily feed intake was comparable for the treatment groups, ranging from 75.00 to 78.57g/day, daily weight gain was significantly ($P<0.05$) different for the groups. Daily weight gain was highest for rabbits on 0% SDRF(control), closely followed by those on 5% SDPFRF and lowest ($P<0.05$) for rabbits on 5% SDRF. The significantly ($P<0.05$) better growth response by rabbits on 5% SDPRFR over the rabbits on 5% SDRF was expected because of the higher level of crude protein in SDPFRF when analyzed (Table 2). This result agrees with the findings of an earlier study (17).

The values of feed efficiency ratio were similar in rabbits fed the control and 5% SDPFRF diets, although it appeared that the 5% SDPFRF diet was better utilized than the control and SDRF diets. This may be attributed to the enhanced protein level in the fermented rabbit faeces (SPDFRF) compared to

Table 3: Effect of Diets on Growth Performance of Rabbits

Performance parameters	Dietary Level of Rabbit faeces*			
	0% SDRF	5% SDRF	5% SDPFEF	S.E.M.**
Initial Body Weight (g)	612.50	612.50	612.50	4.84
Final Body Weight (g)	1512.50[a]	1112.02[c]	1497.3[b]	32.60
Daily Weight-gain (g/day)	16.09[a]	8.92[b]	15.80[a]	2.10
Daily Feed intake (g/day)	78.21[ab]	75.00[b]	78.57[a]	4.40
Feed Efficiency ratio	0.21[a]	0.10[b]	0.21[a]	0.04
Protein Efficiency ratio	1.11[a]	0.55[b]	1.12[a]	1.02
Mortality	0	0	0	0

* Means along the same row with different superscripts are significantly different (P<0.05).
** Standard errors of mean: Values are the means of eight analyses.

the sun-dried (unfermented) faeces (SDRF). A higher level of growth has been reported in rabbits fed high protein feedstuffs (18).

The wet and dry organ weights and their protein contents are shown in Table 4. The dry weight of the liver expressed as percentage of body weight was highest (1.84%) on 5% SPDFRF and lowest on 5% SDRF (1.26%). The weights of the caecum followed the same trend whereas the weight of the kidney was different, being highest on 0% SDRF and lowest on 5% SDRF. There were no significant (P>0.05) differences in the wet and dry weights of the liver, kidney or caecum for the different dietary treatments. The percentages of protein in the organs were significantly (P<0.05) highest in the liver, kidney and caecum of rabbits fed 5% SDPFRF diets and lowest (P<0.05) in rabbits on 5% SDRF. The control diet in all cases compared favourably with SPDFRF diet, thereby suggesting that SDPFRF at 5% inclusion level in a practical rabbit diet is a good feed supplement with no adverse effect on the animal.

Table 4: Organ Weights and Protein Contents of Organs of Rabbits fed different Levels of Rabbit faeces.

Organs	Dietary Level of Rabbit Faeces		
	0% SDRF	5% SDRF	5% SDPFRF
Liver			
Wet Weight (g)	3.64	3.42	3.98
Dry Weight (% of body weight)	1.64	1.26	1.84
Protein (% of dry weight)	54.24[b]	50.64[c]	64.20[a]
Kidney			
Wet Weight (g)	0.64	0.62	0.66
Dry Weight (% of body weight)	0.38	0.26	0.34
Protein (% of body weight)	50.48[b]	46.40[c]	56.48[a]
Caecum			
Wet Weight (g)	0.94	0.86	1.06
Dry Weight (% of body weight)	0.44	0.42	0.46
Protein (% of body weight)	58.72[a]	52.40[b]	62.40[a]

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