

PHYSIOLOGICAL RESPONSES OF MALE RABBIT FED GRADED LEVELS OF FERMENTED AFRICAN LOCUST BEAN (*Parkia biglobosa*) MEAL

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ABSTRACT

The experiment was conducted at rabbitry farm of the Bauchi state College of Agriculture to investigate the effects of Fermented African Locust Bean Meal (FALBM) on physiological responses of male rabbits. Presented in a completely randomized design and lasted for a period of 8 weeks. Five dietary treatment levels were formulated and allotted to the experimental animals as T1, T2, T3, T4 and T5. Each treatment was replicated four times, with two rabbits per unit which make a total number of 40 experimental bucks. The buck weight from 1.5-2.5 kg. The experimental diets were fed twice a day (morning and evening). Clean drinking water was provided *ad-libitum*. The data obtained were analyzed using sample t-test of Statistical Package for Social Science (SPSS). The values of PVC, HB and WBC have shown no significance difference ($P > 0.05$). Serum biochemistry values observed were similar and within normal range of 45.0 to 122 g/L. In conclusion, the FALBM can be included in the male rabbit diet for the overall improvement of their biochemical parameters such as lymphocyte, basophil, respectively. Therefore, FALBM is recommended at 100 % level of inclusion for better physiological responses of male rabbits without detrimental effect.

Key words: Bucks, supplement, physiological response, semen

Description of Problem

Rabbit production in Nigeria plays a significant role in the development and provision of food and family income (1). The African Locust Bean tree is a leguminous plant which produces seed grain that is often cheap and readily available in Northern Nigeria; the seed is rich in protein and is used as a flavor intensifier for soups and stew (2). The fermented seeds, Dawadawa (Hausa), netetu (Senegal) serve primarily as a condiment for seasoning sauces and soups (3). It contributes calcium, lipids and proteins to the diets of rabbits (2). Growth and reproductive performance of animals may be improved by the inclusion of some feedstuff from many legumes as alternative source for energy and protein for which African Locust Bean is one (5). Raw African locust bean seeds are palatable for rabbits and are used in some commercial feeds (mixture of non-ground ingredients). The locust bean seed contains low trypsin inhibitors, hydrocyanic acid and tannins

(6). It was reported by (7) that fermented African Locust Bean Meal (FALBM) contains 30 to 36 % crude protein while (7) similarly reported 25 and 38% crude protein content of the seed on a dry matter basis and has the potential to be utilized in livestock feeding. Therefore, this work seeks to evaluate the effect of FALBM on the physiological parameters of rabbit bucks.

MATERIALS AND METHODS

Mix breed rabbit bucks of between 3 to 4 months of age, weighing 1.5- 2.5kg with well descended testicles were purchased from local rabbit farmers in Bauchi and its environs. The rabbits were grouped into five (5) treatments in a Completely Randomized Design (CRD) with four (4) replicates of two bucks per each. The treatments were graded levels of fermented African locust beans in the diet at 0, 5, 10, 15 and 20 % designated to treatments as T1, T2, T3, T4 and T5 respectively. The rabbits were housed in

individual cages measuring 30 x 36 inches (2.5 x 2.5 feet) (8) and allowed an acclimatization period of one week before the commencement of the research work. Feed was offered at 25 g per kg body weight (8) while water was providing *ad libitum* throughout the 9 weeks experimental period.

Processing of Locust Beans Meal used in this experiment included: decortication of matured pods, boiling, dehulling, separation of hull from beans and then fermentation was conducted.

At the 8th week of the experiment, blood samples (2mls) were collected through the ear vein, using sterile disposable syringes and needles (23 gauge-needles). The samples (1mL each) were placed into two bottles; one containing Ethylene diamine tetra acetic acid (EDTA) and the other a plain bottle without anticoagulant. The samples were taken to the biochemistry laboratory of Abubakar Tafawa Balewa University, Bauchi laboratory and analyzed for PCV, Hb and WBC differentials, TP, Albumin and Globulin

Data obtained were expressed as mean ($\pm$ SEM) and subjected to Statistical Package for Social Science (SPSS), using Sample t-test and the means were separately using Turkey range test.

RESULTS AND DISCUSSION

Hematological parameters of the bucks fed graded levels of Fermented Locust Bean Meal

Hematological parameters of the bucks fed graded levels of Fermented Locust Bean Meal is shown in Table 2. There was high significant difference ($P < 0.05$) in lymphocyte and basophils at T3 and T2 while PVC and HB were similar ($P > 0.05$). The values obtained agrees with the finding of (7). As describe the maximum value recorded in PCV was 39.50 seen in T2 (25 %) while minimum value was 36.75 in T3 (50%), which were all within normal value for rabbit of (30-50%) (9).

Serum Biochemistry of the bucks fed graded levels of Fermented Locust Bean Meal

Serum Biochemistry of the bucks fed graded levels of Fermented Locust Bean Meal is shown in Table 3. All parameters investigated under serum biochemistry (total protein, albumin and globulin) were similar ($P > 0.05$). All observed values were within the normal range of 45.0 to 122 g/l (10). Globulin and albumin level in serum shows no significant ($P > 0.05$) difference among the treatment groups. However, T1 (0 %) designated as control group, shows higher mean globulin level of 34.25 g/L and the lower was 30.67 g/L in T5 (100 %). Similarly, the albumin value obtained from all group were within the normal range of 27.0 to 43.0 g/L (11).

Table 1. Composition and Calculated Analysis of Experimental Diet

INGREDIENTS	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	T5 (20%)
Maize	50.16	42.64	46.88	44.73	36.92
Soya bean	9.84	12.37	3.11	0.26	3.0
Wheat offal	10	10	10	10	10
Groundnut husk	20	20	20	20	20
ALBM	0	5	10	15	20
Fish meal	5.6	5.6	5.6	5.6	5.6
Bone	3	3	3	3	3
Premix	0.5	0.5	0.5	0.5	0.5
Methionine	0.2	0.2	0.2	0.2	0.2
Lysine	0.2	0.2	0.2	0.2	0.2
Salt	0.5	0.5	0.5	0.5	0.5
TOTAL	100	100	100	100	100
Calculated analysis					
ME (Kcal/kg)	3026.58	3025.77	3039.51	3045.74	3041.65
Crude protein (%)	16.02	17.62	16.18	16.41	18.14
Crude fibre (%)	5.93	6.77	7.36	8.30	9.41
Ether Extra (%)	4.48	4.61	4.58	4.51	5.18

Calcium (%)	0.53	0.81	0.55	0.55	0.57
Phosphorus (%)	0.44	0.44	0.39	0.34	0.40

ALBM- African locust bean meal, ME= Metabolizable energy.

Table 2: Hematological parameters of experimental bucks fed graded levels of Fermented Locust Bean Meal

Parameter	Treatment					RV (%)
	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (100%)	
PCV (%)	38.50±1.19	39.50±1.19	36.75±1.60	38.25±0.63	37.75±1.93	35-45
Hb (g/dl)	12.8±0.40	13.3±0.14	12.5±0.20	12.7±0.21	12.9±3.30	12-18
Neutrophil (%)	34.25±1.65	36.00±2.12	33.75±2.63	34.25±2.06	30.75±1.50	30-60
Leucocyte x10 ⁹ /L	11.40±0.57	11.00±0.41	11.00±0.71	11.25±0.48	11.75±0.25	5-12000
Lymphocyte (%)	37.25±2.56 ^b	42.25±1.03 ^{ab}	44.00±0.82 ^a	41.25±0.48 ^{ab}	41.025±0.95 ^{ab}	30-60
Monocyte (%)	5.00±0.82	5.00±1.15	3.75±0.25	3.75±1.1	4.50±1.29	2-10
Basophil (%)	0.50±0.29 ^{ab}	1.00±0.00 ^a	0.50±0.29 ^{ab}	0.00±0.00 ^b	0.25±0.25 ^{ab}	0-2
Eosinophil (%)	1.75±0.25	2.50±0.50	2.50±0.50	2.00±0.41	1.50±0.29	2-10

^{abc} means on the same row different superscripts are not significantly different (P<0.05), RV – range value, Hb - Haemoglobin (11)

Table 3: Serum biochemistry of experimental bucks fed graded levels of Fermented Locust Bean Meal.

Parameter	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (100%)	RV
Total Protein (g/L)	65.00±3.19	63.75±2.32	66.00±3.65	68.25±3.68	62.33±3.75	55-70
Albumin (g/L)	30.75±2.46	31.50±0.65	31.25±2.69	34.25±3.71	31.67±0.25	25-40
Globulin (g/L)	34.25±1.25	32.25±1.70	34.00±1.08	34.00±0.71	30.67±2.50	25-40

T1 - control, T2 – 25 % fermented locust bean meal, T3 – 50 % fermented locust bean meal, T4 – 75 % fermented locust bean meal, T5 –100 % fermented locust bean meal, RV – range value (11)

Conclusion and Application

In conclusion, the fermented locust bean meal can be included in the male rabbit diet for the overall improvement of their biochemical parameters such as lymphocyte, basophil, respectively. Fermented locust bean meal is recommended at 100 % level of inclusion for better physiological responses of male rabbits without detrimental effect.

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