

PERFORMANCE EVALUATION OF GROWING RABBIT FED DIETS CONTAINING VARYING INCLUSION LEVELS OF *CENTROSEMA PUBESCENS* OR *CALAPOGONIUM MUCUNOIDES* IN THE SAVANNAH ZONE OF NIGERIA

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ABSTRACT

Twenty-five mixed bred weaner rabbits (average initial weight 576 to 602 g) were used to investigate the nutrient potential and digestibility of *Centrosema pubescens* and *Calapogonium mucunoides*. The forages were cut, air dried and milled. Five experimental diets were formulated, diet T₁ contained no forage; diets T₂ and T₃ contained *Centrosema pubescens* at 10% and 20% inclusion level respectively; *Calapogonium mucunoides* was incorporated into diet T₄ and T₅ at 10% and 20% inclusion level respectively, mainly in substitution to maize, palm kernel and ground nut cakes. The animals were randomly distributed among diets. Average daily feed intake and average daily weight gain were monitored. The experiment lasted for ten weeks. Data obtained were subjected to one-way analysis of variance. The highest final weight (1321 g) was observed in T₁ though similar to T₂ (1181 g) (10% *Centrosema pubescens*), T₃ (1247 g) (20% *C. pubescens*) and T₄ (1193 g) (10% *Calapogonium mucunoides*), and the lowest final weight (1017 g) was observed in T₅ (20% *C. mucunoides*). Average daily weight gain also followed the same trend: 11.7, 9.6, 10.4, 9.6 and 8.4 g/d in T₁, T₂, T₃, T₄ and T₅, respectively, the difference between the control or T₃ treatment (20% *C. pubescens*) in one hand and T₅ treatment (20% *C. mucunoides*) in the other hand being significant (P<0.05). For the feed intake, values were 66.0, 62.4, 55.9, 61.3 and 58.8 g/d for treatment T₁ to T₅ respectively, with T₁ and T₂>T₃ and T₅ (P<0.05). The best feed efficiency were observed for T₃ and T₁ (0.19 and 0.18 g gain/g feed intake) and the worst for T₅ (0.14 g/g) (P<0.05). In conclusion, the incorporation of *Centrosema pubescens* at 20% inclusion level gives results similar to the control and better than the incorporation of *Calapogonium mucunoides*.

Key words: Rabbit, Growth, *Centrosema pubescens*, *Calapogonium mucunoides*.

INTRODUCTION

In developing countries of the tropics, the conventional energy feed stuff such as cassava, maize, guinea corn and millet are not only scarce but expensive. In addition, they constitute a major regular source of food for humans (Bawa *et al.*, 2007). Their inclusion in animal diets has made the livestock feeds to be more expensive.

Utilization of leaf meal such as *Glyricidia sepium* (Ige *et al.*, 2006), cassava plant (Eruvbetine *et al.*, 2003), wild sun flower (Odunsi *et al.*, 1996), mimosa leaf meal (Nworgu and Fapohunda, 2002) *Calapogonium mucunoides* (Asongwed *et al.*, 2003) etc. as source of protein and/or energy in livestock nutrition has been investigated and suggested by livestock nutritionist, largely due to the abundant availability of forage crops especially during raining season and high cost of conventional energy and/or protein feed stuffs.

Apart from the fact that rabbit has short production cycle which can assist to close the gap of protein shortage in Africa, it can also depend perfectly on forage such as *Tridax procumbens*, *Gilircidia*

sepium, *Centrosema pubescens* etc., that are used as concentrate feed ingredient or supplement to the concentrate.

The focus of this study therefore is to assess the effect of feeding pelleted concentrate embedded with varying levels of *Centrosema pubescens* and *Calapogonium mucunoides*, two forages of the Fabaceae family.

MATERIALS AND METHODS

The experiment was conducted at the livestock unit of Teaching and Research Farm, Ladoké Akintola University of Technology, Ogbomoso, Oyo State, Nigeria. It lasted for ten weeks. The forages (*Centrosema pubescens* and *Calapogonium mucunoides*) were harvested around the experimental site, chopped and air dried and were later milled and stored till the time of use. Five experimental diets were formulated such that diet I contained none of the test ingredients. Diets II and III contained *Centrosema pubescens* at 10% and 20% inclusion level while diets IV and V contained *Calapogonium mucunoides* at 10% and 20% inclusion respectively. Each experimental diet was thoroughly mixed then processed to pellet form. The proximate analysis of the test ingredients and experimental diets were carried out using AOAC (1990) procedure. Twenty-five mixed bred weaner rabbits of average weight ranged from 576–602 g were allotted to the five experimental treatments T₁ to T₅ in a completely randomized design with five replicate per treatment. They were supplied one of the experimental diet I to V and water *ad-libitum* throughout the duration of the feeding trial. All data collected were analysed using one way analysis of variance as expressed in SAS (2000) package. The means that were significant were separated using Duncan's Multiple Range Test (Duncan 1955) of the same statistical package.

RESULTS AND DISCUSSION

Table 1 shows the composition of experimental diets as well as laboratory analysis of the diets and test ingredients.

Table 1: Percentage composition of experimental diet (Dry Matter basis)

Ingredient	Diet I	Diet II	Diet III	Diet IV	Diet V	Calapo.	Centro.
Maize	24	15	6	15	5.5		
Palm kernel cake	4	4	4	4	4		
Ground nut cake	10.5	7	4	7	6.5		
Soya	4	4	4	4	4		
Starch	1	1	1	1	1		
Wheat offal	21	23.5	25.5	23.5	25.5		
Rice Bran	30	30	30	30	30		
<i>Centrosema pubescens</i>	-	10	20	-	-		
<i>Calapogonium muc.</i>	-	-	-	10	20		
Oyster shell	3	3	3	3	3		
Bone meal	2	2	2	2	2		
Common Salt	0.25	0.25	0.25	0.25	0.25		
Premix ^a	0.25	0.25	0.25	0.25	0.25		
Total	100	100	100	100	100		
Chemical composition							
Dry Matter (%)	91.36	91.27	91.34	91.61	90.55	87.62	87.76
Crude Protein (%)	16.67	16.76	16.57	16.87	17.15	22.03	19.98
Crude Fibre (%)	7.62	7.98	9.47	8.67	9.84	21.73	21.16
Ether Extract (%)	3.76	3.84	3.72	3.91	3.82	3.79	3.57
Gross Energy (kcal/kg)	3976	3968	3971	3983	3965	3424	3389

^a Premix supplied per type kg diet: Vit. A, 100,00 IU; Vit. D 2,000,000 IU; Vit. E, 23,00mg; Vit K3 2,000mg; Vit. B, 3,000 mg; Vit. B2, 6,000 mg; Niacin, 50,00 mg; Calcium, 800 mg; Panthotenate, 10,000 mg; Vit. B6, 5,000 mg; Vit B12, 250 mg; Folic acid, 100 mg; Biotin, 50 mg; choline chloride, 40,000 mg; Selenium, 120 mg and Anti oxidant, 120,00 mg

Dry matter (DM), crude protein (CP), ether extract (EE) and gross energy (GE) values of the experimental diets were very close to each other while the crude fibre (CF) level increased as the inclusion level of forages increased. The CP, EE and GE of *Calapogonium mucunoides* were greater than that of *Centrosema pubescens* while the CF of the *C. pubescens* is greater than that of *C. mucunoides*. This implies that the two forages were nutritionally different especially when CP, EE, GE and CF were considered. The *C. mucunoides* CP value agreed with the value (22.6-27.6) reported by Asongwed *et al.* (2003) but the CF value (21.73) was relatively lower than 24.19% reported. The CP of *C. pubescens* (19.98%) is similar to 19.82% reported by Ojebiyi *et al.* (2006) but lower than 25% reported by Ugwu and Chukwuka (2001) but the value of CF, EE and GE obtained agreed with the value reported.

The average final weights were significantly ($P < 0.05$) influenced by the different diets. Highest value of 1322 was obtained from T₁ (control diet) while the least value 1017 was obtained from T₅ (20% *C. mucunoides*). T₂, T₃ and T₄ were statistically ($P > 0.05$) similar to the control diet implying that the inclusion of *Centrosema pubescens* up to 20% and *Calapogonium mucunoides* up to 10% has no important effect on the growth performance .

Table 2: Performance characteristics of weaver rabbits fed varying inclusion level of *Centrosema pubescens* or *Calapogonium mucunoides*

Parameter	T ₁	T ₂	T ₃	T ₄	T ₅	SEM
Initial weight (g)	587	576	594	587	604	36
Final weight (g)	1322 ^a	1182 ^{ab}	1247 ^{ab}	1193 ^{ab}	1017 ^b	44
Average daily weight gain (g)	11.67 ^a	9.61 ^{ab}	10.36 ^a	9.62 ^{ab}	8.40 ^b	0.76
Average daily feed intake (g)	66.0 ^a	62.4 ^a	55.9 ^b	61.3 ^{ab}	58.8 ^{ab}	1.9
Feed efficiency (g gain/g feed)	0.18 ^a	0.15 ^{ab}	0.19 ^a	0.16 ^{ab}	0.14 ^b	0.01

^{a, b} means with different superscripts along the same rows are significantly different ($P < 0.05$)

It was also observed that daily weight gain of rabbits fed *Centrosema pubescens* increased as the inclusion level increased, the reverse was the case for rabbit on *Calapogonium mucunoides*. Animals fed the control diet had the highest (66.0 g/d) daily feed intake though statistically ($P > 0.05$) similar to other treatments except treatment T₃ (20% *C. pubescens*). This observation could be as a result of bulkiness of the diets.

Animal placed on T₃ had a better feed efficiency (0.19) compared to other animals. It could also be observed that the value increased as the inclusion level of *C. pubescens* increased but decreased with increase inclusion level of *C. mucunoides*. This was contrary to the report of Nweze (2005) that rabbits placed on fresh *Calapogonium mucunoides* perform better than those placed on fresh *Centrosema pubescens* supplement.

CONCLUSIONS

Hence, it could be concluded from the findings that incorporation of *Centrosema pubescens* at 20% inclusion level gives results similar to the control and better than the incorporation of *Calapogonium mucunoides*.

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