Kigelia africana FRUIT AND LEAF MEALS: POTENTIAL REPRODUCTIVE ENHANCER IN RABBITS

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ABSTRACT
This experiment was conducted to investigate the potentials of Kigelia africana (KA) fruit and leave meals on reproductive performance of rabbit does. A total of 108 rabbits were used for this experiment. There were nine treatment groups consisting of 0%, 5%, 10%, 15% and 20% inclusions of KA fruit and leaf meals separately with a common control (0%) in a factorial 2×4 plus control. The results revealed that the KA significantly increased the percentage acceptability/receptivity of rabbit does with increasing inclusion levels. All the fertility parameters evaluated were not significantly influenced except for the litter size which was significantly (P>0.05) higher in rabbit doe fed the KA fruit. Conclusively, KA parts (fruit or leaf) did not influence receptivity at full maturity, however, receptivity was improved with increased inclusion levels (as a factor).
Keywords: *Kigelia africana*, Diets, inclusion levels, Rabbit does, Acceptability,

INTRODUCTION

Over the years, ethnobotanical plants like *Kigelia africana* have been used for the management and treatment of many ailments in folklore medicine. Their application is however gradually gaining grounds due to their availability and affordability. In animal production, the role of these ethnobotanical plants cannot be over emphasized; they serve as possible sources of food/nutrients supplying some of the essential nutrient requirements of farm animals at a low price due to their minimal competition with man. Additionally, they serve as therapeutic agents boosting reproductive performance as well the overall health of the animals. *Kigelia africana* plant parts have been used and described as an aphrodisiac (Abioye *et al*., 2024); specifically, the fruit is valued as an aphrodisiac and is used in traditional medicine to address gynecological problems (Assanti *et* al., 2022). While these traditional uses are well-documented, scientific research on the efficacy and safety of *Kigelia africana* as an aphrodisiac is still ongoing hence, this research.

MATERIALS AND METHODS

Diet Preparation

Kigelia africana fruit and leaf used for this experiment were collected within Ilorin, Kwara State, Nigeria. They were properly washed and allowed to drain. The fruits were finely chopped and air dried. The dried fruit and leaf were milled with a bore milling machine into a powder form. Experimental diets of varied levels (5%, 10%, 15% and 20%) of *Kigelia africana* fruit and leaf meal were compounded independently (Table 1) with a common control. The diets were formulated to meet the nutrient requirements of rabbits recommended by NRC (2000).

Table 1: Composition of Experimental Diet Supplemented with *Kigelia africana* Meals

Ingredients	0%	5%	10%	15%	20%
Maize	30	30	30	30	30
Soybean Meal	20	20	20	20	20
Wheat Offal	8	6	6	3	1
Maize offal	16	15	14	18	22
Rice husk	22	20	16	10	3
Fish Meal	1	1	1	1	1
KA Meal	0	5	10	15	20
Salt	0.5	0.5	0.5	0.5	0.5
Dicalcium phosphate	2	2	2	2	2
Lysine	0.05	0.05	0.05	0.05	0.05
Premix	0.45	0.45	0.45	0.45	0.45
Total	**100**	**100**	**100**	**100**	**100**
%crude protein	16.16	16.18	16.36	16.61	16.68
% crude Fibre	11.11	11.71	11.88	11.80	11.50
ME (Kcal/kg)	2,456.40	2,366.83	2,286.66	2,247.39	2,212.82

Experimental plan and feeding trial
A total of 108 ten-week-old rabbits were used for this experiment. Seventy-two (72) rabbit does and thirty-six (36) bucks in ratio 2:1 were randomly allotted to nine (9) treatment groups containing eight does and four bucks per treatment, in a factorial 2×4 plus control and they were fed KA fruit and leaf meals independently at 0%, 5%, 10%, 15% and 20% inclusion. Rabbits were housed individually where feed and water were offered *ad libitum*. The experiment lasted for fourteen weeks.

Pubertal characteristic observations
At six weeks after the commencement of the experiment (16-weeks of age), libido/receptiveness of does were observed. The rabbit does were closely observed for pubertal signs and reproductive alertness by introducing each to buck from same treatment. Receptivity of rabbit does and reaction/activity of the bucks were observed from the time of introduction and noted in seconds as described by Gado *et al*., (2015). The responses were recorded in seconds for each treatment groups. This process was repeated multiple times, however, data obtained at 22 and 24 weeks of age when larger percentage of receptive does were obtained are used. Age at which each rabbit attained puberty/sexual maturity was recorded based on their responses.

Fertility evaluation of rabbit does
At twenty-six weeks of age, bucks and does of same treatment were crossed using natural mating in a ratio 1:2. The dates of mating were recorded for each doe for determination of gestation periods. Conception was observed in does after ten days and up to fourteen days after mating through palpation. Parturition date, litter size, birth weight of kids, abnormalities in kids, mortality rate and gestation period were recorded for each doe. The kid birth weights were taken using a sensitive digital scale (Electronic scale, Model EHA251) and were recorded in grams.

Statistical Analysis
All data obtained was subjected to statistical analysis using the analysis of variance (ANOVA) procedure following a Factorial Design (SAS, 2012) and the levels of significance was determined using the Duncan's Multiple Range Test.

RESULTS AND DISCUSSION
Table 2 show the result of receptivity of rabbit does to bucks. There was a significant difference ($p<0.05$) in the acceptability of bucks by the does. Comparing the interval of examination, KA leaf meal inclusion significantly increased ($p<0.05$) receptivity of rabbit does. However, does on fruit meal had the shortest time of reaction/receptiveness to bucks indicating that the leave maybe a better libido enhancer. Receptivity and percentage acceptability in rabbit does at 24 weeks of age were the same for both fruit and leaf inclusions. Looking at the inclusion levels however, the receptivity significantly increased ($p<0.05$) as level of inclusion increased. This implies that the effectiveness of KA meals is greatly dose dependent. This result is corroborated with past believe that the bark extract can be used to enhance sexual libido and erection in males (Abioye *et al*., 2024). This potential can be attributed to the presence of numerous bioactive compounds in KA. Compounds such as saponin, flavonoids, alkanoids, steroidal glycosides and phenols have been reported (Aliyu and Adeyina, 2022). These compounds are capable of stimulating hormonal activity; improve blood flow and vascular function which aids erectile function. Phenols are known for oxidative stress modulating potentials, which could support general sexual health. Conception of the does was significantly ($p<0.05$) increased with fruit meal inclusion. Similarly, the level of inclusion of the treatments significantly ($p<0.05$) influenced the conception percentage. It increased with an increase in treatment levels. The effects of the bioactive compounds could be also be responsible for these results.

Table: Receptivity of Rabbit Does Fed *Kigelia africana* Fruit and Leaf meals

KA Parts	Acceptance at 22 weeks (second)	%Acceptability at 22 weeks	Acceptance at 24 weeks (second)	%Acceptability at 24 weeks	Conception (%)
Fruit	5.58[b]	65.00[b]	8.93	95.00	92.50[a]
Leaf	9.25[a]	72.50[a]	10.68	95.00	90.00[b]
P value	0.01	0.0001	0.12	-	0.0001
Treatment levels (%)					
0	6.25	50.00[d]	10.88	87.50[b]	75.00[c]
5	7.56	62.50[c]	9.69	87.50[b]	81.30[b]
10	6.63	62.50[c]	9.19	100[a]	100[a]
15	8.25	75.00[b]	10.56	100[a]	100[a]

20	8.38	93.75[a]	8.69	100[a]	100[a]
P value	0.84	0.0001	0.71	0.0001	0.0001
Type*Levels	NS	*	NS	-	*
P value	0.74	0.77	0.77	-	0.0001
SEM	1.01	0.00	0.79	0.00	0.00

a, b, c – means with different superscript are significant along the column, * – significant, NS – Not-significant

4.6.1.1.1.1 Table 3. Fertility Performance of Rabbit Does Fed *Kigelia africana* Fruit and Leaf Meals

KA Parts	Gestation period(days)	Litter size (no)	Birth weight(g)	Mortality (%)	Abnormality (%)
Fruit	30.63	6.68[a]	41.59	0.73	0.00
Leaf	30.78	6.10[b]	42.22	0.53	0.00
P value	0.51	0.0003	0.45	0.18	0.00
Inclusion Levels (%)					
0	30.88	4.25[e]	36.58[b]	0.75	0.00
5	30.38	6.13[d]	43.00[a]	0.63	0.00
10	31.19	6.63[c]	43.23[a]	0.5	0.00
15	30.63	7.13[b]	43.40[a]	0.56	0.00
20	30.44	7.81[a]	42.47[a]	0.68	0.00
P value	0.16	<.0001	<.0001	0.84	-
Parts*Levels	NS	NS	NS	NS	-
P value	0.45	0.46	0.81	0.65	0.00
SEM	0.16	0.11	1.37	0.10	0.00

a, b, c – means with different superscript are significant along the column, no- number, NS- Not significant

The results of reproductive performance of rabbit does fed *Kigelia africana* fruit and leaf meal are presented in Table 3. Among all the parameters evaluated, only the litter size showed a significant ($P<0.05$) difference among the varied levels of the treatments. The litter size increased with increase in the treatment inclusion levels and was significantly highest at 20%. Physiologically, higher number in litter size implies that multiple eggs have been released by the does, this suggest that *Kigelia africana* might have some super ovulatory effects on the rabbit does and this may be corroborated with the fact that *Kigelia africana* plant is been used by the traditional healers to treat infertility in man and woman of child bearing age, (Oyeku *et al*., 2011). It could also be associated with antioxidant potential possessed by plant. According to Shan Wang *et al*. (2017), the reactive oxygen specie (ROS) produced during ovarian physiological metabolism is maintained with the help of antioxidant thereby ensuring oocyte maturation, ovulation, fertilization, implantation and embryo development.

CONCLUSION AND RECOMMENDATION

Based on the result obtained from this study, it can be concluded that *Kigelia africana* fruit and leaf meal can be used to improve reproductive performance of rabbit, paying attention to the level of inclusion. The results showed that these treatments can be used up to 20% even though 10% and 15% also have similar results.

It is therefore recommended that *Kigelia africana* fruit and leaf meal be used at 15% inclusion for improved reproductive performance. Further research is essential to unbundle the active ingredients present in the plant.

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