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Short Communication

Effect of ethanolic extract of tiger nut (*Cyperus esculentus*) on reproductive traits of Red Sokoto does



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Abstract

The study was conducted to determine the effect of ethanolic extract of tiger nut (*Cyperus esculentus*) on reproductive traits of Red Sokoto does. The does were divided into four treatment groups of three replicates with two animals per replicates. The goats were treated with ethanolic extract (ET) of Tiger nut at 0ml (T1), 5ml (T2), 10ml (T3) and 15ml (T4) for twenty (20) weeks. After which the goats were examined for the reproductive traits. The results reveals a significant difference ($p < 0.05$) in gestation length, weight at birth, pre-partum weight, post-partum weight, weaning weight and no significance different in the weight of placenta. Does in T2 and T3 has the highest Haemoglobin and PCV values, this was followed by Does in T4 and T1 Respectively. In conclusion ethanolic extract has the capability of influencing reproductive traits.

Keywords: *Cyperus esculentus*, ethanolic extract, Red Sokoto does, reproductive traits

Effet de l'extrait éthanolique d'écrou tigre (*Cyperus Esculentus*) sur des traits reproducteurs de Red Sokoto



Résumé

L'étude a été menée pour déterminer l'effet de l'extrait éthanolique d'écrou tigre (*Cyperus esculentus*) sur des traits reproducteurs de Sokoto rouge. Les actions ont été divisées en quatre groupes de traitement de trois répliquats avec deux animaux par répliquats. Les chèvres ont été traitées avec extrait éthanolique (ET) d'écrou de tigre à 0 ml (T1), 5 ml (T2), 10 ml (T3) et 15 ml (T4) pendant vingt (20) semaines. Après quoi les chèvres ont été examinées pour les traits de reproduction. Les résultats révèlent une différence significative ($p < 0,05$) dans la longueur de la gestation, le poids à la naissance, le poids pré-parturique, le poids post-partum, le poids du sevrage et aucune signification différente dans le poids du placenta. Est-ce que dans T2 et T3HA les valeurs Hémoglobine et PCV les plus élevées, cela a été suivi par le T4 et T1 respectivement. En conclusion, l'extrait éthanolique a la capacité d'influencer les traits de reproduction.

Mots-clés: *Cyperus Esculentus*, extrait éthanolique, Red Sokoto, traits de reproduction

Introduction

Tiger nut (*Cyperus esculentus*) is cultivated for human consumption and as well as livestock feed. It is one of the underutilized and widely distributed plants in subtropical and tropical regions. In Nigeria it is cultivated mainly in the northern Nigeria especially middle belt regions (Gambo *et al.*, 2014). Tiger nut is a tuber that belongs to the family *Cyperaceae*, with a slightly sweet flavour (Shaikh *et al.*, 2013). Tiger

nut has been historically used in herbal medicines and in the cosmetic industry in the production of soap and oil (Aremu *et al.*, 2016). Hence, these studies seek to evaluate the effect of ethanolic extract of tiger nut on reproductive traits which includes pre-partum weight, post-partum weight, weight at birth, gestation length, weaning weight, kidding loss and placenta weight of Red Sokoto does.

Materials and methods

Description of study area

The study was carried out at the Teaching and Research Farm of the Department of Animal Production, Federal University of Technology, Minna, Niger State, Nigeria. Minna is located between latitude 9°31' and 9°42' North and longitude 6°29' and 6°41' East of the equator. The mean annual rainfall is between 1,000 mm to 1,500 mm, with an average highest temperature in the month of March and lowest temperature in the month of August. The mean annual temperature is between 21 to 36.5° C. Minna is located in the Guinea Savannah vegetation belt of Nigeria and has two distinct seasons; wet from March to October and dry from November to March Shaikh *et al.* (2013).

Collection of plant materials

10 grams (10kg) Fresh tiger nuts (*Cyperus esculentus*) were purchased from Kure Ultra-modern market, Minna, Niger State, Nigeria. The fresh tiger nut were screened and washed to remove sand and other debris, sun dried and pulverized in to fine powder using pestle and mortar in line with method of Ekaluo *et al.*, (2015). The tiger nut powder was soaked in 80% ethanol solution for 48hours mixed every 6 hours then filtered using cloth. The filtrate was evaporated using rotatory evaporator to reduce excess ethanol.

Experimental design procedure

The Twenty four Red Sokoto does were randomly divided in to four treatment of three replicate and two (2) animals per replicate in a completely randomized design. The animals were acclimatized for two weeks before the commencement of the research. The control and the treatment groups were treated with 0ml, 5ml 10ml and 15ml of tiger nut ethanolic extract per kilogramme body thrice (3 times) a week respectively. The tiger nut ethanolic extract was administered at 0ml, 5ml, 10ml and 15ml through oral gavage throughout the

experiment. After twenty weeks (30wks) of experiment reproductive traits were analyzed.

Source and management of experimental animals

Twenty four (24) Red Sokoto does within the age range of 5-6 months were used for this experiment. The does were purchased from within Niger state principally from goat markets (Izom goat market, Biramafu and Bida goats market). The purchased goats were allowed to acclimatise to the new environment for a period of eight (8) weeks (this was done purposely to prepare the does for sexual maturity). During acclimatization, the goats were administered with Ivomectin®; a broad spectrum anti-parasitic drugs to remove both internal and external parasites. PPR-VAC® was used to vaccinate against peste des petits ruminants (PPR). Broad spectrum anti-biotic (20 % Oxyteracycline manufactured by Heibei huarun pharmacy co Ltd, china), Penstrep (manufactured by Kepro, Holland), Envite multi vitamin (manufactured by Ventidia pharmaceutical Ltd, India), albendazole (manufactured by Jawa international limited, Lagos, Nigeria) and some other drugs were administered when necessary to keep the animals in good health. Feed and water were provided *ad libitum*.

Data analysis

Data collected were subjected to Analysis of variance (ANOVA) using SPSS version 20. The mean separation was done using Duncan multiple range Test (2006) where significance occurred.

Results

The results of reproductive traits of Red Sokoto does used in this experiment revealed a significant difference ($p < 0.05$) in the weight of does pre-partum, post-partum, kidding lost, placenta weight, weaning weight, litter size and birth weight

while gestation length shows no significant difference ($p>0.05$). Treatment (T4) treated with 15mls of ethanolic extract of Tiger nut had highest weight of does pre-partum followed by the does treated with 5mls of ethanolic extract (T2) while the does treated with 10mls in (T2) and the control (T1) had the least weight of does pre-partum respectively. T4, T3 and T2 are statistically similar ($p>0.05$) but were higher than ($p<0.05$) than those of control

(T₁) in the weight of does post-partum. Placenta weight are statistically equal ($p>0.05$) but the does in treatment (T1) had the highest weight of placenta.(10.17kg) followed by the does in treatment (T2) with 9.50kg while does in treatment (T4) had the least weight of placenta with 7.50 kg, which could be attributed to the highest level of treatment. Kidding lost is statistically equal ($p>0.05$) across all treatment with numerically higher kidding loss in T2.

Table 1: Effect of ethanolic extract of tiger nut on reproductive traits of Red Sokoto does

Parameters	T ₁	T ₂	T ₃	T ₄	SEM
Pre-partum weight(kg)	16.67 ^b	20.17 ^{ab}	18.50 ^{ab}	22.00 ^a	1.17
Post-Partum weight(kg)	14.50 ^{bc}	17.17 ^{ab}	15.67 ^b	19.83 ^a	1.2
Kidding Loss(kg)	2.5	2.67	2.17	2.5	0.3
Birth weight	1.67 ^b	1.87 ^{ab}	2.7 ^a	1.87 ^{ab}	0.08
Gestation Length(days)	148.83 ^a	148.00 ^{ab}	147.00 ^b	146.2 ^b	0.71
Placenta weight(kg)	10.17 ^a	9.50 ^{ab}	8.67 ^b	7.50 ^b	0.7
Weaning weight(kg)	5.48 ^b	7.65 ^{ab}	8.79 ^a	5.67 ^b	0.08

Abc Means within a row having different superscripts differed significantly ($p<0.05$)
 T1=0ml, T2=5ml; T3=10ml; T4=15ml

Discussion

There is also a significance difference across the treatment groups in terms of birth weight and weaning weight ($p<0.05$). T3 treatment group had the higher birth weight and weaning weight ($p<0.05$) compared to other treatment groups. This result agrees with the finding of Ekaluo *et al.* (2015) and Adama *et al.* (2020) who found that the pre-partum weight, post-partum weight, litter size, kidding loss, birth weight and weaning weight showed significance ($p<0.05$) in albino rat and rabbit administered ethanolic extract of tiger nut respectively. However, the present finding disagrees with the finding of Allough *et al.* (2015). The coefficient of variation (CV) gives an indication of variability in parameters measured and allows comparisons between the traits that were measured in different treatment groups. The significance ($p<0.05$) difference observed in pre-partum weight, post-partum weight, birth weight, kidding loss,

placenta weight and weaning weight could be attributed to the effects of ethanolic extract. The significance effect ($p<0.05$) of ethanolic extract in the reproductive traits observed in this present study agrees with the findings of Ramatunga *et al.* (2018) who opined that the Sannean goat treated with ethanolic extract has good reproductive traits but contradicted with the report of Turkson *et al.* (2014). Furthermore, low dose administration of tiger nut meal significantly increase the reproductive traits than that of the high dose therapy. This finding on reproductive traits is consistent with other research findings by Ekaluo *et al.* (2015). It was also observed that the tiger nut increase oestrogen and progesterone profiles of the does but exact mechanism were yet to be known. This speculated mechanism was discovered during the performance of hormonal assay which also agrees with findings of Adama *et al.* (2020). The result obtained in this present study On the

reproductive parameters confirms the result of Islam *et al.* (2013) who found clear demarcation between sannean does treated with extract of tiger nut and those without extract.

Conclusion

Based on this present finding, does from treatment administered 10mL of tiger nut extract had the best result in birth weight, kidding loss, gestation length and weaning weight which could be attributed to the best quantity of extract required by the does.

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