**A**

**RESEARCH PROPOSAL**

**ON THE TOPIC:**

**THE INFLUENCE OF SELECTED TROPICAL FORGAES AND TIGER-NUT BASED-DIET ON THE HEMATOLOGY AND SERUM BIOCHEMISTRY OF WEANER GROWER RABBITS**

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**SUMMARY**

Rabbits are pseudo ruminants, they consume both forage and concentrate for optimum growth and physiological functioning. Exploring the benefits of rabbits as source of protein to humans and income to producers, there is need to boost it production by exploring different feedstuff to enhance rabbit growth and feed efficiency. One of those feed ingredients that can be exploited is *Cyperus esculentus* commonly called tiger nut. It is an under-utilized crop which belongs to the family Cyperaceae and is cultivated in Nigeria mainly for its rich vegetable milk as substitute for cow milk. It possesses vital agronomic and nutritional potentials as the conventionally used energy sources. It is rich in Omega -3-fatty acids, crude protein (9%) and metabolizable energy (2700 kcal kg–1) as well as minerals (potassium and phosphorus) and vitamins E and C. Tiger nut is high in fiber and essential amino acids (Bosch, et al., 2008). Forages such as *Panicum maximum* (guinea grass), *Pennisetum purpureum* (elephant grass), *Tridax procumbens* are also acceptable because of their high fibre content and other nutritional value for rabbit growth and development. Hence, this study will be undertaken to evaluate the hematological and serum biochemistry effect of three forages on twenty five(25) Rabbits of about 6weeks to 8weeks old weighing from 350 - 550g using Completely randomized design in four dietary treatments. Each treatment will be replicated five times with two rabbits per replicate in completely randomized design. The rabbits will be housed in cages, fitted with feeders and drinkers. Blood samples will be collected from two rabbits per treatment on the 21th day of the experiment for determination of hematological and serum biochemistry analysis. All the data obtain will be expressed as mean ± standard error and analyzed using One Way Analysis of Variance (ANOVA). Significant means will be separated by applying Duncan multiple range.

**INTRODUCTION**

**Background of the Study**

Rabbits are pseudo ruminants, they consume both forage and concentrate for optimum growth and physiological functioning (Szendro et al., 2015). Exploring the benefits of rabbits as source of protein to humans and income to producers, there is need to boost it production by exploring different feedstuff to enhance rabbit growth and feed efficiency. One of those feed ingredients that can be exploited is *Cyperus esculentus* commonly called tiger nut. It is an under-utilized crop which belongs to the family Cyperaceae and is cultivated in Nigeria mainly for its rich vegetable milk as substitute for cow milk. It possesses vital agronomic and nutritional potentials as the conventionally used energy sources (Chalupa-Krebzdak, et al., 2018). It is rich in Omega -3-fatty acids, crude protein (9%) and metabolizable energy (2700 kcal kg–1) as well as minerals (potassium and phosphorus) and vitamins E and C. Tiger nut is high in fiber and essential amino acids (Bosch, et al., 2008). They are many researches on the importance of tiger nuts as feed additives and supplements to livestock. Recent studies indicated that residue or the whole plant of tiger nut is high in energy, fair in amino acids composition with little or no-tolerable allergens and serves as a useful ingredient in livestock feeds (Bamgbose, et al., 2003; Belewu, and Abodunrin, 2008). According to El-Shenawy et al., (2019), the starchy content of tiger nut presumably provides prebiotic properties to colon bacteria in livestock. The milk has been found to be good in preventing arteriosclerosis (Chukwuma, *et al.,* 2010). Adel, et al., (2000) also reported the nutrients contents of tiger nut (*Cyperus esculentus*) that can be deeply explored and contains 22.14–44.92% lipids, 3.28–8.45% proteins, 23.21–48.12% starch, 8.26–15.47% fibers and 1.60–2.60% ashes. In addition, it contains bioactive substances such as organic acids, alkaloids and phenols. Forages such as *Panicum maximum* (guinea grass), *Pennisetum purpureum* (elephant grass), *Tridax procumbens* are also acceptable due to their nutritional value for rabbit growth and development. The use of forages such as *Panicum maximum* (guinea grass), *Pennisetum purpureum* (elephant grass), Tridax procumbens in the feeding of rabbits had been recommended for the rabbit producer by Iyeghe-Erakpotobor and Mohammad (2008). Iyeghe-Erakpotobor and Mohammad (2008) reported the growth performance of rabbit when using these forages as supplements. According to them, these forages can be provided as supplement to the basic concentrate diet to meet the fiber and some of the vitamin requirements. Linga and Lukefahr (2000) advocated that the rabbits can be raised on basic forages diets. It is of interest that forages are available in abundance in the tropics and that rabbits being a pseudo ruminant can successfully handle forages for growth. Optimum production has not been sustained when rabbits are raised solely on forages or concentrate (Iyeghe-Erakpotobor et al., 2006; Iyeghe-Erakpotobor and Mohammad, 2008). Cases of positive effects of raising rabbits on forages has been reported by Phimmasan et al. (2004) although negative effect in terms of weight loss was reported by Bamikole and Ezenwa (1999). The use of forages and other agricultural by-products such as; *Tridax precumbens* (Taiwo et al., 2005) Moringa (*Moringa oleifera*) (Odeyinka et al., 2008), Acacia *(Acasia nilotica*) (Abdu et al., 2011), composite cassava meal (Ukachukwu et al., 2011), and Commelina benghalensis, Leucerna leucocephala, Boerhavia diffusa, Impomia triloba (Yakubu et al., 2012) have been documented. Forages such as Panicum maximum (guinea grass), Pennisetum purpureum (elephant grass), Tridax procumbens are acceptable by rabbits (Abu et al., 2008). Ukpe et al. (2009) and Nwagu et al. (2010) had carried out feeding trials on rabbit using legumes such as Stylosanthes, groundnut haulms, Calopogonium mucunoides. Hence, this study will be undertaken to evaluate the hematological and serum biochemistry effect of three forages on weaner rabbit’s production.

**Problem Statement**

Feed components and physiological state of an animal affects its blood constituents, hematological and serum biochemical parameters and are viable indices used to determine stress due to nutrition and other factors in livestock including rabbits (Bamishaiye, 2009). High cost of conventional feedstuffs is one of the major limiting factor to large scale commercial rabbit production in Nigeria and there are mostly published research information on the concentrate intake of Rabbits but seemingly little information on the comparative intake of forages and concentrate for rabbits on hematological and serum parameters is recorded, hence this research finding.

**Justification of the Study**

In recent years, more people are involved in rabbit production but are faced with high cost of feeding. It has become imperative to develop appropriate and cost effective feeding systems for rabbit farmers. However, several authors have suggested that, the increasing scarcity of animal proteins and high cost of the conventional feedstuffs in most developing countries can be addressed by incorporating forages in the diets of rabbits (Bawa *et al.,* 2008; Yakubu and Wafar, 2014). Among monogastric animals, rabbit has been reported to utilize fibrous materials for production of meat. Studies showed that chemical composition of forages could serve as a potential source of nutrients for animals (Aduku and Olukosi, 1990). Forages can be fed in the dry form as hay or fresh. Forages such as *Panicum maximum* (guinea grass), *Pennisetum purpureum* (elephant grass), *Tridax procumbens are* acceptable by rabbits and contains the essential nutrients required for rabbit growth and development (Abu *et al.,* 2008). Animal’s blood parameters provide the opportunity to analyze its physiological, nutritional and pathological status and it aids in diagnosing nutritional and or environmental stress. Hematological factors indicate certain production characteristics while the serum biochemical profile buttresses the general health characteristics of the animal. The result of this work will enhance the engenderment of more salubrious rabbits by producers and thus abbreviate the overall cost of feed, aliment and additionally rekindle the confidence of consumers and their interest to consume more meat and thus be able to derive more benefits associated with victualing rabbit meat and increased productivity; hence, broaden knowledge benefiting Animal feed industries and agricultural stakeholders in the long-run on comparative utilization of these forages.

**Objectives of the Study**

The objective of this study will be to;

* evaluate the effect of *Tridax procumbens,* *Panicum maximum,* *Pennisetum purpureum* and tigernut-based diet on the hematological parameters of weaner grower Rabbits.
* evaluate the effect of *Tridax procumbens,* *Panicum maximum,* *Pennisetum purpureum* and Tigernut-based diet on the serum biochemistry of weaner grower Rabbits.

**METHODOLOGY**

**Experimental site**

The experiment will be conducted at the Rabbitry Research unit and the Analysis conducted in Animal Science laboratory of the Department of Animal Science, Akwa Ibom State University, Obio Akpa Campus, Oruk Anam Local Government Area, Akwa Ibom State respectively. The area lies between latitude 4030’N and 50 00’N and longitudes 700 30’E and 800 00’E. The climate of the experimental site is a tropical rain forest characterized with high temperature (average of 300C), high rainfall (about 1500mm) and relative humidity of 70% on average (SLUS-AK, 1989).

**Sources of Experimental Materials**

The forages (*Tridax procumbens,* *Panicum maximum* and *Pennisetum purpureum*) will be sourced around the experimental site and the botanical identity will be confirmed. Additionally, the rabbits and the tiger nuts for the experiment will be purchased from local producers around Oruk Anam and Abak vicinity.

**Experimental animals and management**

Twenty (20) Rabbits of about 6weeks to 8weeks old weighing from 350 - 550g will be used. These animals will be obtained from local producers and Rabbitry Unit of Akwa Ibom State University, Obio Akpa. The animals will be managed intensively, kept in hutches, where they will be provided with water and a tigernut diet concentrate diet. The animals will also be kept under controlled conditions, relative humidity and the 12-hours light-dark cycle will also maintain. They will stay in the cage for up to 10 days to acclimatize.

**Experimental design**

Completely randomized design will be used for the experiment. The animals will be assigned to four dietary treatments. Each treatment will be replicated five times with a rabbit per replicate in completely randomized designed. The rabbits ‘T2, T3 and T4’ will be assigned one of the three forages; Tridax procumbens, Panicum maximum and Pennisetum purpureum respectively while T1 will serve as the control group which will be maintained on only the concentrate feed. The feeding will be done on the test groups twice daily for 8 weeks (2 months). Their body weight changes will be measured before and after treatment.

**Experimental Diet**

Four dietary diets will be used for this research. A tiger nut-based diet will be formulated and three forages; *Tridax procumbens,* *Panicum maximum* and *Pennisetum purpureum* will be served as treatment diets. The dietary diets will be fed at 20g/kg body weight of the animals respectively. The feeding will be done on the test groups twice daily for 8weeks (2 months). Their body weight changes will be measured before and after the experimental phase.

**Table: Experimental Diet Table of the concentrate**

|  |  |
| --- | --- |
| **Ingredient** | **Composition** |
| **Maize** | **52.00** |
| **Soybean meal** | **20.00** |
| **GNC** | **10.00** |
| **Fish meal** | **3.00** |
| **Tiger nut residue** | **5.00** |
| **White PKC** | **4.20** |
| **Bone meal** | **5.00** |
| **Salt** | **0.25** |
| **Lysine** | **0.20** |
| **Starter Premix** | **0.25** |
| **Methionine** | **0.10** |
| **Total** | **100** |

**Calculated composition**

|  |  |  |
| --- | --- | --- |
| **S/N** | **Nutrients** | **composition** |
| **1** | **Crude protein** | **19%** |
| **2** | **Ash** | **10%** |
| **3** | **Gross energy** | **2800kcal/kg** |
| **4** | **Crude fibre** | **6%** |
| **5** | **calcium** | **0.95%** |
| **6** | **phosphorus** | **0.65%** |
| **7** | **Crude fat** | **8%** |

**Data Collection**

Blood samples will be collected from three rabbits per treatment on the 56th day of the experiment for determination of hematological and serum biochemistry analysis. 5mls of blood will be collected by puncturing the jugular vein and allowing free flow of blood into labeled sterile universal bottle containing 1.0mg/ml ethyl diamine tetracetic acid (EDTA) as anticoagulant to determine the haematological parameters. Another 5mls will also collected into a labeled sterile sample bottles without anticoagulant to determine the serum biochemistry.

**Data Analysis**

All the data obtain will be expressed as mean ± standard error and analyzed using One Way Analysis of Variance (ANOVA). Significant means will be separated by applying Duncan multiple range as outlined by Duncan (1955).

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