APRW -25

Effect of Scent Leaf (*Ocimum gratissimum*) on Semen and Semen Plasma Characteristics of Rabbit Bucks

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Abstract
Twenty four (24) pubertal Buck New Zealand breed of rabbit were used to evaluate the effect of scent leaf meal (SLM) on semen and semen plasma characteristics. The trial which lasted for twelve (12) weeks had four (4) treatment groups replicated three (3) times in a completely randomized design (CRD). Dietary levels of 0.00, 20.00, 40.00 and 60.00 percent of SLM were used to formulate the rabbit diets. At the end of the trial, parameters on semen and semen plasma characteristics were determined. The parameters examined in semen characteristics were significantly ($p<0.05$) different however semen colour varied from cream white to cream milk. All the parameters of seminal plasma showed significant ($p<0.05$) difference while SLM effect on serum enzyme activity had similar values in all the parameters but varied slightly ($p<0.05$) in Alkaline phosphatase and Alanine transaminase. Semen volume, sperm concentration, sperm motility and live sperm cell maintained highest values in dietary level of 60.00 percent. Similarly albumin which plays the role of transportation in the body of animals had highest value on 60.00 percent diet. The results of this study indicated that 60.00 percent dietary level of scent leaf meal could be used to enhance semen and semen plasma indices in rabbit s.

Keywords; SLM, rabbits, semen characteristics, semen plasma and enzyme activity

Introduction

The primary goal of rabbit farming is to develop bucks that produce viable semen in other to enhance proliferation of the animal which in turn reduce protein quest. Rabbit production is one of the means of producing high quality animal protein at an affordable price in a developing country like Nigeria. The dwindling nature of rabbit production has called for finding alternative income of improving mating efficiency of the male rabbit to increase reproduction. In other to enhance sexual performance of rabbit buck, there is need to re-orient the reproductive pattern of the animal. Most of our indigenous of livestock like West African dwarf(WAD) bucks have been reported to producelow quality sperm which has led to low reproductive pattern (Onyekwere *et al.,*2017) among the livestock in Nigeria.

Numerous attempts have been made to improve the reproductive efficiency in poultry and rabbits using imported human fertility drugs such as estradiol (Chibundu, 2005) and pergonal (Onyekwere *et al*., 2017). Most recently, some plants such as scent leaf, bay leaf, curry leaf etc have been used traditionally to add flavour in human food, act as feed additive and as a natural antimicrobial compound. Compared with synthetic antibiotics or inorganic chemicals, these plant-derived products have proven to be natural, less toxic, residue free and are thought to be ideal feed additives in food animal production (Hashemi e*t al*., 2009). Ijeh *et al.* (2004) reported that scent leaf is rich in alkaloids, tannins, flavonoids, oligosaccharides, saponin and tolerable cyanogenic contents. Mensah and Okoli (2008) stated a proximate analysis of scent leaf to be 4.7% crude protein, 10.8% crude fibre and ash 12.24%. The essential oil (eugenol) present in scent leaf possesses antimicrobial activities against pathogenic strain of gram negative positive bacteria and pathogenic fungi (Matasyoh, 2007).

This study was therefore conducted to investigate the effect of scent leaf (*Ocimumgratissimum*) meal on semen and semen plasma characteristics of rabbit bucks and enzyme activity.

Materials and Methods

The study was carried out the Rabbitry, of Department of Animal Production Technology, Federal College of Agricultural, Ishiagu, Ebonyi State. Twenty four (24) pubertal New Zealand breed of male (buck) rabbits with body weight range of 1600 g – 1700 g were used to evaluate the semen characteristics, semen plasma and enzyme activity which lasted for twelve (12) weeks. The rabbits were divided into four (4) treatment groups consisting of two and replicated three (3) times in a completely randomized design (CRD). Four experimental diets were formulated at 0.0%, 20%, 40% and 60% respectively. Fresh scent leaves were purchased from local Eke market,Ishiagu, dried under room temperature and then ground into fine texture for feed formulation. The animals were individually housed in their cages and standard routine management practices carried out. Feed and water were given *ad-libitum* throughout the experimental period. Weighed quantity of feed was given to rabbits daily and body weights taken on weekly basis. Semen was collected from the Bucks twice a week for twelve (12) weeks by abdominal massaging techniques.

Data based on sperm evaluation commenced immediately after semen collection for semen volume, sperm concentration, sperm motility, live sperm cell, dead sperm cell and total sperm percentage. The biochemical constituents of seminal plasma were subjected to laboratory analysis for total protein, albumin, globulin, potassium, sodium and fructose in the

seminal plasma of the rabbits. Total protein was determined by Kedijahi method as described by Kohn and Allen (1995). Aspartate transaminase (ASP), Alanine transaminase (ALT) and alkaline phosphatase (ALP) activities were determined using spectrophotomeric method.

The data collected on these parameters were subjected to analysis of variance (ANOVA) using the techniques of Steel and Torrie (1980) and means of the treatments separated using Duncan New Multiple Range Test as outlined by Obi (1990).

Results and Discussions

The results of semen characteristics are presented in Table 1. All the parameters were significantly ($p<0.05$) different across the treatment groups. Semen volume, sperm concentration, sperm motility and live sperm values increased as dietary levels increased. This showed the effectiveness of the active ingredient in SLM for enhanced semen and sperm production, motility and longevity. The sperm motility value was highest at 60% and ranged between 54 and 55.5%, which was comparable to the values reported by Iheukwumere *et al*. (2008). The colour of semen in control treatment maintained a white colour while other treatment had cream light milk colour. This showed the reaction efficiency of scent leaf meal with body semen. Dead sperm cell showed a significant ($p<0.05$) decrease with increasing levels of SLM. This entails the ability of SLM in reducing the rate of the release of immature spermatozoathereby increasing the rate of fertilization and thus enhanced reproductive performance in rabbits. The semen pH obtained herein tends to be significantly ($p<0.05$) higher for the treatment groups in comparison with the control. According to Meacham (2002) semen has a high buffering capacity, much higher than that of most other fluids in the body, but the buffering ability tends to decrease shortly after ejaculation as a result of loss of carbon dioxide by sperm cells. The comparable semen pH values in all treatment groups were an indication that SLM supplementation in buck's diet up 60% in the diet did not affect the semen acid – alkaline equilibrium adversely.

Table 1: Effect of Scent leaf meal on semen characteristics of rabbit buck

	Dietary Levels				
Parameters	0.00	20.00	40.00	60.00	SEM
Semen Volume (ml)	0.42^{b}	0.48^{a}	0.48^{a}	0.49^{a}	0.07
Sperm concentration (x 10^{a}/ml	18.20^{d}	20.25^{c}	22.50^{b}	25.00^{a}	1.78
Sperm motility (%)	52.30^{d}	54.20^{c}	58.25^{b}	60.20^{a}	8.66
Live sperm cell (%)	51.10^{c}	52.05	50.10^{d}	52.19^{b}	7.74
Dead sperm cell (%)	18.45^{a}	13.35^{bc}	13.35^{bc}	13.40^{b}	2.16
pH	7.21^{b}	8.18^{a}	8.18^{a}	8.14^{a}	1.22
Semen Colour	Cream milk	Cream milk	Cream milk	Cream milk	

$^{a-d}$ means with different superscripts within the same row differ significantly ($p<0.05$).

The seminal plasma is presented on Table 2. The parameters of seminal plasma constituent were significantly ($p<0.05$) different. Total protein, sodium, potassium, globulin and fructose values decreased as dietary levels increased. Total protein, albumin and globulin isusually a reflection of the quality of the dietary protein, liver functioning and immune response of animals (Jiwuba *et al*., 2016). The decrease values in protein were in line with the work of (Urom *et al*., 2016). Albumin and globulin fluctuated in values showing no progressive decrease or increase across the treatments. Fructose is the principal element to maintain the sperm activity. The significant linear decrease of fructose with incremental levels of SLM suggested that, hyper sexual activity.

Table 2: Seminal plasma constituent of rabbit fed scent leaf meal

	Dietary Levels				
Parameters	0.00	20.00	40.00	60.00	SEM
Total Protein (g/L)	7.30^{a}	7.10^{b}	6.80^{c}	6.60^{d}	1.02
Sodium (mmo1/L)	136.00^{a}	134.00^{b}	131.20^{c}	130.25^{d}	19.41
Potassium (mmo1/L)	3.50^{a}	3.40^{b}	3.10^{c}	2.60^{d}	0.46
Albumin (g/L)	4.70^{b}	4.90^{a}	3.20^{b}	4.10^{c}	0.61
Globulin (g/dL)	3.50^{a}	3.75^{a}	3.30^{b}	3.20^{c}	0.50
Fructose (mg/100ml)	170.20^{a}	163.10^{b}	135.50^{c}	121.40^{d}	3.08

abcd Means with different superscripts within the same row differ significantly ($p<0.05$).

The serum enzyme activity is presented in Table 3. There were significant ($p<0.05$) difference for alkaline phosphatase and alanine transaminase while aspartate transaminase had no significant difference ($p>0.05$).The significant changes in these rum alkaline phosphatase (ALP) concentrations rabbitsfed SLM diets relative to those on control dietdid agreed with the report

that serum ALP could be influenced by changes in the physiological state of an animal.Alkalinetransaminase (ALT) is an enzyme found in the highest amount in liver and typically used to detect liver injury. The significantly high values observed for the treatment groups indicate the safety of the diets for proper liver functioning. Aspartate transaminase (AST) values of 36.00U/L obtained in all the treatments were higher and did not agree with the studies of Olabanyi *et al*. (2009) who fed diets containing mango seed kernel meal to rabbits. The similar values of 36.00 in this study showed that scent leaf meal had no negative effect on rabbit semen and sperm production during period of the study. This was in agreement with the findings of Iheukwumere *et al*. (2009).

Table 3: Effect of Scent leaf meal on serumenzyme activity of rabbit

	Dietary Levels				
Parameters	0.00	20.00	40.00	60.00	SEM
Alkaline Phosphatase (U/L)	3.00^{b}	3.10^{a}	3.10^{a}	3.10^{a}	0.47
Alkanine Transaminase (U/L)	16.40^{b}	16.50^{a}	16.50^{a}	16.50^{a}	2.53
Aspartate Transaminase (U/L)	36.00	36.00	36.00	36.00	5.53

Ab. means with different superscripts within the same row differed significantly ($p<0.05$).

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