POS -38

Effects of Onions - Ginger Mix Supplementation Levels on Semen Quality of Local Breeder Cocks

A. Nwaele, C.C. Achonwa, I.P. Ogbuewu and M.U. Iloeje
Department of Animal Science and Technology, Federal University of Technology,P.M.B. 1526, Owerri, Imo State, Nigeria.
Corresponding author: I.P. Ogbuewu; E-mail: dr.ogbuewu@gmail.com; Tel: 08035441864

Abstract
The objective of this experiment was conducted to determine the effect of onion-ginger mix supplementation on semen quality of Nigerian local breeder cocks. Thirty-six local breeder cocks were used for the experiment. The local breeder cocks were divided into two equal groups, T1 and T2 with each group replicated thrice. Birds in group 1 received basal diet and as the control, while birds in group T2 received basal diet supplemented with 5g onions and 5g ginger per 300 g feed for 3 weeks. The experimental diets were fed on an *ad libitum* basis to the birds during 35 d. Results revealed that onion-ginger mix supplementation at 5g per 300 g feed improved sperm forward motility ($p<0.05$). There was no effect of inclusion level of onion-ginger mix supplementation in diets on semen volume, pH, and sperm concentration. These results suggest that dietary onion-ginger mix may be used to improve sperm motility in local breeder cocks.

Keywords: Semen, onion-ginger mix, local breeder cocks

Quality semen is indispensable in poultry production in the tropics. It is well established that efficiency of sperm production and quality tend to remain uniform throughout the reproductive life of the cock but may be significantly altered by age, nutrition, and drugs. Among these factors, nutrition is the most prominent. Lipids are among major components of sperm membranes involved in a series of processes, which ultimately influence their fertilizing potential (Alvarez and Stoney 1995). High level of lipid in avian spermatozoa renders sperm cells vulnerable to the adverse effect of lipid peroxidation which is correlated to male fertility.

In an attempt to overcome fertility problem due to poor reproductive performance in male poultry, several authors have shown that certain tropical plant materials such as garlic, onions, ginger, turmeric among others with antioxidants activity could be used to protect the sperm membrane and at the same time increase sperm viability. Specifically, ginger (*Zingiber officinale*) rhizome and Onion (*Allium cepa*) bulbs are used worldwide as a spice (Khan *et al*., 2012). They contain several biologically active compounds and their pro-fertility effects are attributable to these bioactive compounds (Ali *et al*., 2008). However, there paucity of information on the effect of onion-ginger mix supplementation and fertility of Nigerian local breeder cocks.

The objective of present study was to investigate the effect of onion-ginger mix levels on semen quality parameters of Nigerian local breeder cocks.

Materials and Methods

This study was conducted at the Poultry Unit of the Teaching and Research Farm of the Department of Animal Science and Technology, Federal University of Technology, Owerri. The study site is located at latitude 4.4 and 6.3 N and longitude $6^{0}15^{0}$and $8^{0}15$'E (Google Earth, 2015). A total of 36 clinically healthy adult local breeder cocks were used in this study. These cocks were routinely used for semen collection. Animals were randomly divided into 2 equal groups T1 and T2. Birds in group T1 received basal diet (Table 1) and was kept as control while, group T2 was supplemented onions-ginger mix at 5g each per 300g feed. All these treatments were continued for consecutive 5 weeks. Water was provided *ad libitum* throughout the experimental period. The study period was from mid September to mid October, 2017.

Table 1: Nutrient composition of the experimental diet

Parameters (%)	(Control)
Crude protein	18.0
Ether extract	6.0
Crude fibre	5.0
Calcium	1.0
Phosphorus	0.40
Lysine	0.85
Methionine	0.35
ME (Kcal/kg)	2900

The experimental cocks were trained for 14 days to ejaculate by abdominal massage method of Burrows and Quinns (1937). Semen was collected by abdominal massage method at 35th day of the experiment. Two ejaculates per animal were collected on each collection day.Each ejaculate was evaluated for color, volume, percent motility, sperm concentration and morphology. The semen samples obtained from 6 cocks in each group were pooled and used for the determination of sperm motility. To examine motility of spermatozoa, a drop of semen was placed on glass slide and mixed with a drop of 2.9 % sodium citrate. Slide was examined under ×200 magnification under a light microscope DM300. Mean values of various parameters for cocks of two groups were calculated.

Data were analyzed using the mixed procedure of SAS (2008). Differences between means were determined by t-test ($p< 0.05$) and the results were presented as means± SEM in bar charts.

Results and Discussion

Figure I shows that the ejaculate volume of cockerels fed a diet containing 5 g onions and 5 g ginger did not differ significantly (p>0.05) with those in the control group. Mean values of semen volume and sperm concentration were not significantly (p>0.05) affected by the dietary inclusions of onion-ginger mix in the diet of cockerels (Figures I and II).

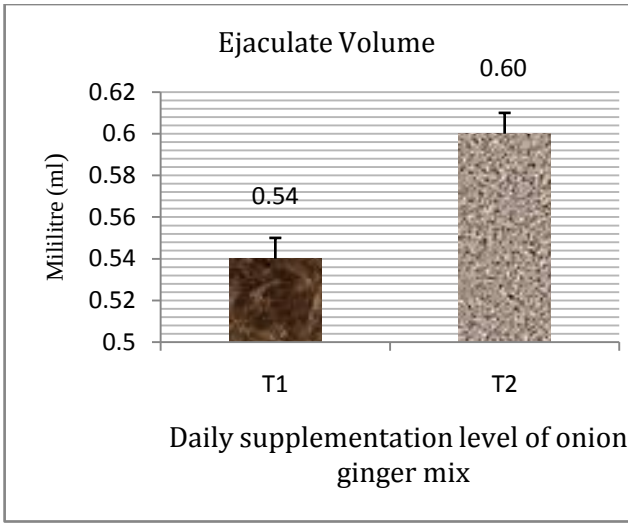

Fig. I: Effect of daily supplementation level of onion-ginger mix on semen volume

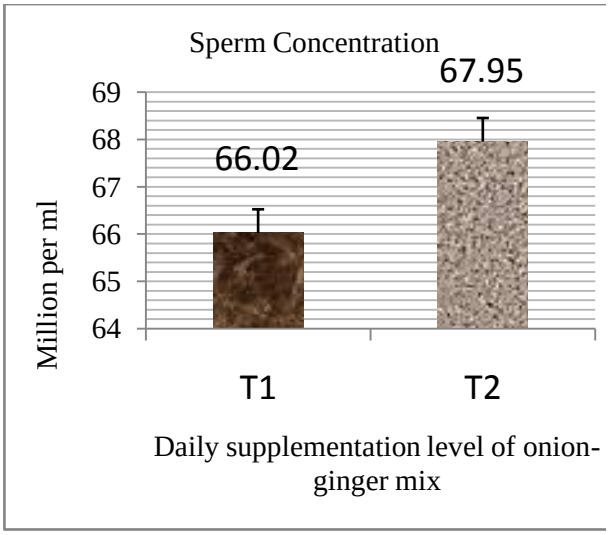

Fig. II. Effect of daily supplementation level of onion-ginger mix on sperm concentration

Daily supplementation level of onion-ginger mix had a significant effect (p>0.05) on semen pH (Figure III). Hafez and Hafez (2000) reported a pH ranging from 7.2 - 7.6 in domestic cockerels. Okoro *et al.* reported a pH value of 7.67-8.00. However, values reported in this study ranged from 7.00 - 8.00. Daily supplementation with 5 g onion and 5 g ginger per 500 g dry matter feed significantly increased (p<0.05) sperm motility by 14.52% (Figure IV).

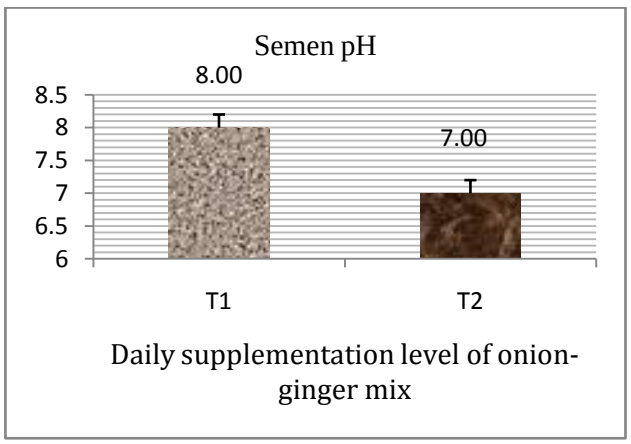

Fig. III: Effect of daily supplementation level of onion-ginger mix on semen pH.

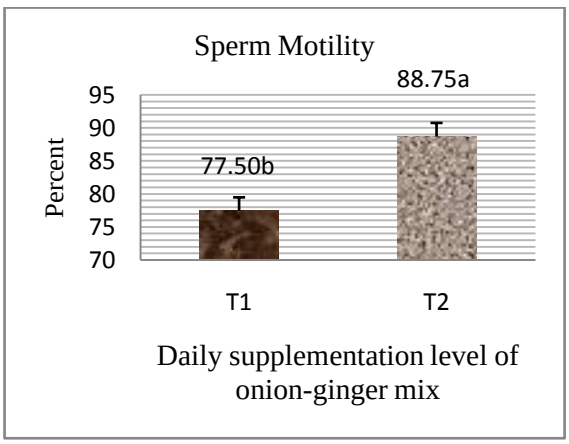

Fig. IV: Effect of daily supplementation level of onion-ginger mix on sperm motility [a,b] Bars with different superscripts are significantly different at p<0.05

The results obtained in this study are higher when compared with the values obtained by Machebe and Ezekwe (2005). Khaki et al. (2008) also demonstrated that the administration of onion juice (1 g / rat/day) for 20 days increases sperm concentration, sperm viability, and sperm motility. In conclusion, these results suggest that dietary onion-ginger mix may be used to improve sperm motility in local breeder cocks.

References

Ali, B.H., Gerald, B., Musbah, O.T. and Abderrahim, N. (2008). Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale*): A review of recent research. *Food and Chemical Toxicol.,* 46: 409-420..

Alvarez J.G. and Storex, B.T. (1995) Differential incorporation of fatty acids into and antoxidative loss of fatty acids from phospholipids of human spermatozoa. *Molecular Reproduction and Development*, 42:332-346.

Burrows, W.H., Quinn, J.P. (1937). The collection of spermatozoa from the domestic fowl and turkey. *Poult. Sci.,* 16:19-24

Khaki, A., Fathiazad, F., Nouri, M., Khaki, A.A., Khamenehi, H.J. and Hamadeh, M. (2009). Evaluation of androgenic activity of *Allium cepa* on spermatogenesis in the rats. *Folia Morphology,* 68(1):45-51.

Khan, R.U. Naz, S.J., Nikousefat, Z., Tufarelli, U., Javdani, M., Qureshi, M.S. and Laudadio, V. (2012). Potential applications of ginger (*Zingiber officinale*) in poultry diets. *World's Poult. Sci. J.,* 68:245-252.

Machebe, N.S. and Ezekwe, A.G. (2002). Ejaculate characteristics of three genotypes of local cocks in the humid tropics. In: *J. of Tropc. Agric., Food, Env. and Extension,* 3(2): 33 – 36.

SAS. (2008). Statistical analysis system. SAS User Guide: Release 9.2. SAS Institute, Cary NC.