

## The effects of aqueous extract *Garcinia Kola* on reproductive performance of male mice

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### Abstract

The aim of this study evaluated the effects aqueous seed extract of *Garcinia kola* on reproductive performance of male mice. Adult mice (n=30) were included in the present study. The mice were 8 weeks old and weighing 28±3g each. Male mice were kept in standard condition (temperature (25°C) humidity (40-70%) and 12h/12h light/ dark). The experimental animals were divided into control (n=10) and experimental (n=20) groups. The control group just received 8ml distilled water daily. However, the experimental 50gm/Kg/BW and 100gm/Kg/BW of *Garcinia kola*, for 21 consequence days in water. The present study was showed increasing in body weight 100gm/Kg/BW group and decreasing in 50gm/Kg/BW group *Garcinia kola* -treated group, the testis weight decreased in experimental groups, including 50gm/Kg/BW and 100gm/Kg/BW the *Garcinia kola* -treated compared with the control group. While were showed that statistically high significant at level (p<0.05) in body, testis weight, sperm counts and sperm motility in all experimental groups, including 50gm/Kg/BW and 100gm/Kg/BW the *Garcinia kola* -treated compared with the control group. While viability was insignificant difference at level (p>0.05) in group that received 50gm/Kg/BW *Garcinia kola* when was significant difference at level (p<0.05) in group that received 100gm/Kg/BW *Garcinia kola*. When the effect of *Garcinia kola* in sex hormones were significant different (p> 0.05) in FSH; LH and testosterone hormones when compared with control. In case of male mice treated with *Garcinia kola* daily for 21 days the lumen of the seminiferous tubules showed a significant increase in the luminal spermatozoa.

**Keywords:** aqueous, extract, *garcinia kola*, spermatogenesis, sperm parameters, mice

### 1. Introduction

*Garcinia Cola*, a member of the chocolate family Sterculiaceae (from which nuts are obtained) a tree probably originally from western tropical Africa. The cola nut is a capsule-shaped fruit composed of fleshy, irregularly shaped seeds [1]. The seeds of Cola are pink, red or white when fresh, and become brown and hard. Chewing of the fresh Cola nut is a wide spread habit of the Western and sub-Saharan indigenous. The Cola primary social and economic significance lies in its being a very concentrated source of Central Nervous System (CNS) stimulant, caffeine which may help in relieving migraine. *Garcinia kola* is now known to contain a high content of bioflavonoid compounds [8]. The medicinal importance of bitter kola is based mainly on the phytochemical components of the plant. From its roots to its leaves, the plant is known to contain several phytochemicals noted for their medicinal importance [7]. *G. kola* has also been reported to possess some hepatoprotective and aphrodisiac properties [4]. And its remarkable bioactivities have been ascribed principally to the possession of these flavonoids due to their enormous antioxidant activities [1, 6]. Based on these findings and others, this work investigates the effect of a methanolic extract of *G. kola* in cisplatin- induced renal insufficiency in rats. Cisplatin (also called cisplatinum, carboplatin) is an anticancer drug and dose dependent nephrotoxicity is a major limiting effect in its chemotherapy [12]. Theobromine which act as cerebral vasodilator and thought to relieve pain and neuralgia and proanthocyanidin is used as antitrypanosoma compound effective against *Trypanosoma brucei*. They also ease hunger and thirst,

eliminate fatigue, and provide energy Effect of *Garcinia Kola* (*G. kola*) on various organs has been widely reported and its effect in the reproductive system [3]. *Garcinia kola* can be used as anti-inflammatory and as active components of drugs derived from plants [2].

### 2. Material and method

#### 2.1 Experimental animals

Adult mice (n=30) included in the present study. The mice were 8 weeks old with average weight 28±3g each. Male mice were kept in standard condition (temperature (25°C) humidity (40-70%) and 12h/12h light/ dark). The experimental animals were divided into control (n=10) and experimental (n=20) groups. All mice fed a standard diet. The daily intake of animal water monitored at least one week before start of treatments to determine the amount of water needed per experimental animal. Thereafter, the mice were randomly divided into control (n=10) and experimental groups (n=20). The control group received daily 8 ml distilled water. However, the experimental groups split into two groups each included ten mice. Group-1, received 50 gm/Kg/BW and group-2, received 100 gm/Kg/BW of *Garcinia kola* for 21 consequence days.

#### 2.2 Epididymis sperm count, viability and motility

Sperms collection from epididymis after killed mice, putted into 2 ml of medium containing 0.5% bovine serum albumin and incubation at 37°C (with 5% CO<sub>2</sub>), the cauda epididymis sperm concentration determined using the standard hemocytometric method and sperm viability using eosin stain

and sperm motility analyzed with microscope (Olympus IX70) at 10 field and reported as mean of motile sperm according to WHO method.

**2.3 Hormones measured**

Serum collected and assaying for total testosterone, FSH and LH using a commercial ELISA kit (Competitive ELISA).

**2.4 Histology and Light microscopy**

The testes fixed in 10% formalin and embedded in paraffin. Five-micron thick sections prepared and stained with Hematoxylin and Eosin (H&E). The specimens examined under Olympus/3H light microscope-Japan.

**2.5 Statistical analysis**

Statistical comparisons were made using the ANOVA test for comparison of data in the control group and the experimental groups. The results expressed as mean ± S.E.M (standard error of means). Significant difference is written in parentheses.

**3. Result and Dissection**

Recently, the World Health Organization estimated that 80% of people worldwide rely on herbal medicines for some part of their primary health care (Knox J, and Gaster B, 2007). The study showed that there was increasing the average of body weight in 100gm/Kg/BW group and decreasing in 50gm/Kg/BW group *Garcinia kola* -treated group, the testis weight decreasing in experimental groups, including 50gm/Kg/BW and 100gm/Kg/BW the *Garcinia kola* -treated compared with the control group. This result was not consistent with Ralebona, N. *et al* (2012) [10]. Who reported that when investigate the effects of oral administration of ethanolic extract of *G. kola* on male sexual behaviour, testosterone levels and sperm parameters. Testes weights for both low and high dose treatment groups showed a significantly increased weight (p<0.05) compared to controls after 28 days of treatment. This variation attributed to method of extraction and doses. The present study found high significant (p<0.05) in body, testis weight, sperm counts and sperm motility in all experimental groups, including 50gm/Kg/BW and 100gm/Kg/BW the *Garcinia kola* -treated compared with the control group. This result was finding by Ralebona, N. *et al* (2012) [10]. Who reported that in both doses elicited an increase in sexual behavior compared to

controls and the results not consistent with Ajibade A, *et al* (2011) [3]. who found that on study investigated some effect of base on pharmacological effect of the active component histology of the testes of male adult wistar rats. The sperm count did not reveal any significant changes in the treated groups when compared with control. The study showed a insignificant difference at level (p>0.05) in group that received 50gm/Kg/BW *Garcinia kola* when was significant difference at level (p<0.05) in group that received 100gm/Kg/BW *Garcinia kola* this results not consist with the result obtained by (Akpantah, 2003) [5]. who reported that semen analysis revealed a significant reduction of sperm concentration in the eight weeks group. In the present study sex hormones FSH, LH and testosterone was significant different. This result was consistent with Ralebona, N. *et al* (2012); (Akpantah, 2003) [10, 5]. who found that testosterone levels were higher in both treatment groups compared to controls, and was not consistent with Yakubu, M and A L Quadri (2012) [13]. Who reported that testosterone, FSH and LH were not significantly altered throughout the observatory periods. In case of male mice treated with *Garcinia kola* daily for 21 days the lumen of the seminiferous tubules showed a significant increase in the luminal spermatozoa. This result was not consistent by Ajibade A *et al*, (2011) [3]. who found that on study investigated some effect of base on pharmacological effect of the active component histology of the testes of male adult wistar rats ethanolic extract of *Garcinia kola* has some adverse effects on the testis of male adult wistar rats which is dose dependant.

**4. Conclusion**

The present study conclude that when investigate the effects of aqueous extract *Garcinia kola* on Spermatogenesis and reproductive performance of mice there was improve reproductive parameters such as sperm count, viability and motility without effect of the active component histology of the testes of male adult mice.

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**Table 1:** The effects of Aqueous extract of *Garcinia kola* on sperm parameters of mice

Parameter	Control(n=10)	G. <i>Garcinia kola</i> (50gm/Kg/BW) (n=10)	G.2 <i>Garcinia kola</i> (100gm/Kg/BW) (n=10)
Body (gr)	28.20±0.67	27.20±1.37*	30.8±0.77*
Testis (gr)	0.20±0.081	0.13±0.005*	0.12±0.06*
Sperm concentration (total count) (No of sperm/mouse 106)	65.30±3.06	76.9±1.77*	89.7±1.09*
Motility (%)	35.79±2.36	74.4±1.05*	86.80±0.59*
Viability(%)	65.26±3.06	66.60±1.56	86.7±2.48*

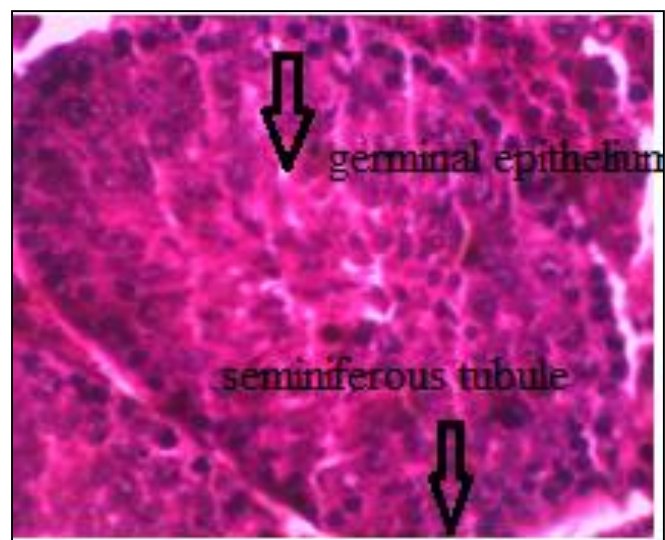
**Table 2:** The effects of Aqueous extract of *Garcinia kola* on Sex hormones

Parameter	Control(n=10)	Experiment Group
FSH (ng/ml)	0.11±0.07	0.14±3.06*
LH(ng/ml)	0.14±0.02	0.17±0.73*
Testosterone (ng/ml)	0.33±0.09	0.22±0.06*

Significant \* (P<0.05)



**Fig 1:** Regular seminiferous tubule with normal germinal epithelium morphology, in control group. (X100).



A



B

**Fig 2. A & B:** Regular seminiferous tubule with normal germinal epithelium morphology and sperm presence in lumen and a significant decrease in the luminal spermatozoa in 50gm/Kg/BW and 100gm/Kg/BW *Garcinia kola*. (X100).

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