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Effect Of Garcina Kola On The Reproductive Organ Weight And Histology Of The Testis And Anterior Pituitary Gland Of Wistar Rats

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ABSTRACTS

The effect of Garcinia kola on the reproductive organ weight and histology of the testis and anterior pituitary gland of Wistar rats was investigated. Twenty male wister rats weighing on the average 190g body weight, were used in this study and were divided into 4 groups (A,B,C,D) of 5 rats each. Group A rats were used as control and were fed normal rate chow only and water ad libitum. Group B rats were fed Garcinia kola diet (5%w/w). Group C rats were fed with Garcinia kola diet (10% w/w) while group D rats were fed Garcinia kola diet (15%w/w) and both groups had water ad libitum. A significant ($p<0.05$) fall in body weight and weight of testis was observed there where no significant change in weight of Epididermis, Serminal vesicle, and Ventral postrate. Histological observation revealed that, group B rats, did not show any structural difference in both testis and anterior pituitary gland, when compared to group A. groups C and D rats however, revealed disruption of basement membrane of serminifierous tubule of testis, near absence of sperm in lumen of serminifierous tubule, increase in interstitial space and reduction in interstitial cells of Leydig. Congestion of cells of anterior pituitary gland were observed, these changes being marked in group D rats. The significance of this study therefore is that Garcinia kola has an inhibitory effect on the reproductive activities of male Wistar rats.

Keywords: Garcinia Kola, Testis, Pituitary gland, Rats.

The issue of fertility has been of interest to many workers in recent times. The reason being firstly the problem of infertility, and secondly, the problem of population control or birth control. So many workers have picked interest in developing contraceptives. So far, these have been achieved in females but is yet to be achieved in males. Most workers have tried to study hormonal system, in undesirable effects that usually accompany the action of their products. Paul and Patil (1992) reported that the anterior pituitary gland of rats pretreated with gossypol acetone, a component of cotton seed, showed that corticotrophs (ACTH cells) and gonadotrophs (FSH and LH cells) showed dose related regression, while thyrotiophs (TSH cells) and prolactine (PRL cells) remained unchanged. These observation, were made after a special staining method. Therefore cottonseeds have the ability to reduce reproductive activities along with pituitary testicular axis of rats but its effect on the TSH cells is undesirable. Reproductive studies have shown, that chemical and physical agents such as medication, hypoxia, hormonal defects especially those of androgen and estrogen, nutritional defects, exposure to certain drugs and other agents may affect gonads in one way or the other (Heywood and Wordsworth, 1980). In line with this, is the characteristic abundant interstitial and arrest of follicular development observed by Eonham et al (1990) in ovaries pretreated with 15,30 and 60mg/kg/day of oral dose of halfan for 13 weeks in a reproductive performance study. In this work the effect of Garcinia kola on the reproductive organ weight and histology of the testis and anterior pituitary gland was studied with the aim of assessing its effect on the pituitary-testicular axis of wistar rats.

Gacinia kola is large forest tree that abounds in most part of eastern Nigeria and it is composed chiefly of flavonoids, bitfavonoids, tannis, sapomins and resins (Iwu and Igbko 1982). It does not contain caffeine. It is being used in traditional medicine for the treatment of a broad spectrum of ailments. It is known to inhibit gastrointestinal motility (Braid 1990). There was also considerable reduction in body and organ weight due to consumption of Garcinia kola and this was attributed to malabsorption and concomitant nutrient deficits induced as an endogenous effect of Garcinia kola (Braid, 1989). The seeds of Garcinia kola are used in treatment of headache, chest cold, bronchitis, sore throat, cough, backaches, rheumatism and dysentery (Oliver 1990).

MATERIALS AND METHODS

Twenty matured male Wistar rats purchased from the Biological science department of the

University of Benin were kept in a well-ventilated animal house and normal atmospheric conditions for a period of three weeks before commencement of experiment. The rats were divided into four groups of five rats each. Control group received normal rat chow while experimental groups received Garcinia kola diet. All rats had water ad libitum.

At the end of an experimental period of six weeks, animal were weighed, and sacrificed and testis, epididermis, serminal vesicle, and ventral postrate were removed washed and weighed. Tissue sections of testis and anterior pituitary gland were produced via normal histo-chemical methods of fixation, dehydration impregnation, embedding, sectioning and staining (H &E). Garcinia kola seeds were obtained from a local market in Benin. The outer coats of the seeds were removed, and seeds were dried to a constant weight in the oven at a temperature of 60°C in order to eliminate water. The seeds were then grounded and the power obtained was used to prepare Garcinia kola diet as follows:

For group B, Garcinia kola diet was prepared by mixing 10g of GK powder and 95g of rat chow.

For group C, Garcinia kola diet was prepared by mixing 10g of GK powder and 90g of rat chow.

For group D, Garcinia kola diet was prepared by mixing 15g of GK powder and 85g of rat chow.

Student t-test was used to determine statistical significance of values within groups. The level of probability was set at 0.05. All results are presented as Mean $\pm$ SEM

RESULT

Table 1. Effects of kola on Rat organs and body weight

	Group A	Group B	Group C	Group D
Body weight (g)	190±4.2	186±5	165±5	160±5
Weight of testis	1.8±0.06	1.5±0.06	1.1±0.05	1.2±0.05
Weight of epididermis	1.36±0.09	1.38±0.05	1.34±0.09	1.36±0.05
Weight of serminal vesicle	0.54±0.05	053±0.05	0.52±0.05	0.54±0.05
Weight of ventral postrate	0.40±0.05	0.38±0.05	0.41±0.05	0.39±0.05

Table 1 shows effect of Garcinia kola ingestion on body weight and weight of reproductive organs of male wistar rats after six weeks.

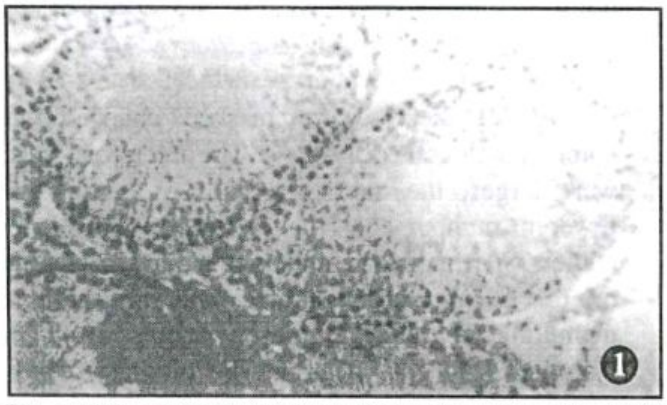

Fig. 1: Photomicrograph of Testis of control group A. Mag x 500

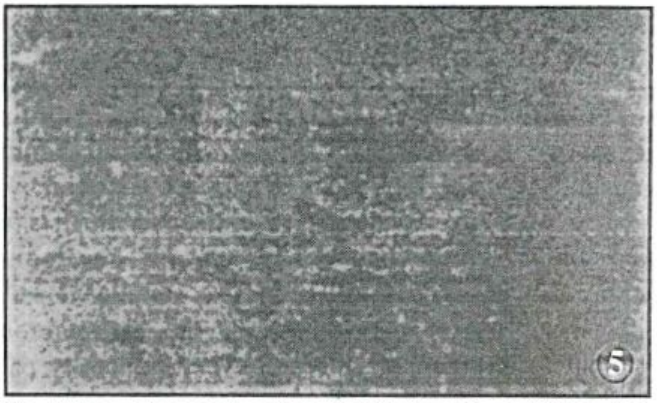

Fig. 5: Photomicrograph of Anterior Pituitary Gland of Wistar Rats

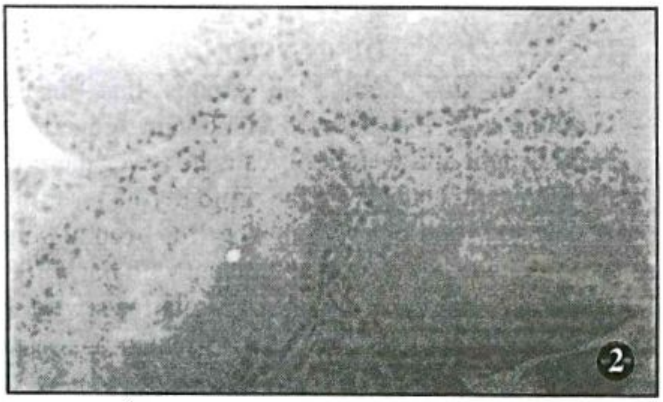

Fig. 2: Photomicrograph of Testis treated with 5% w/w Bitter Kola, Diet Group B. Mag x 500

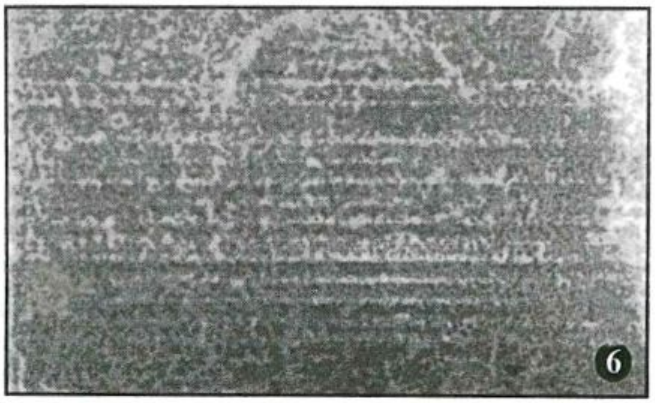

Fig. 6: Photomicrograph of Anterior Pituitary gland treated Wistar Rats.

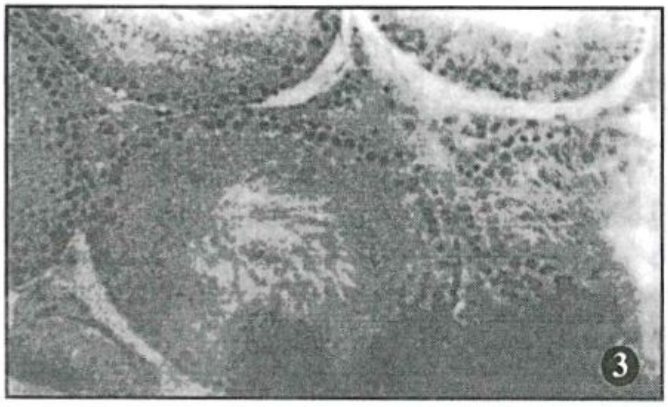

Fig. 7: Photomicrograph of Testis treated with 10% w/w Bitter kola Diet, Group C. Mag x 500

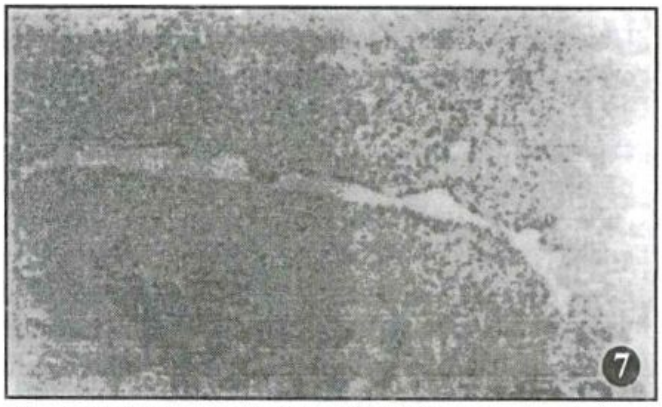

Fig. 7: Photomicrograph of Anterior Pituitary gland treated with 10% w/w Bitter kola Diet, Group C. Mag x 200

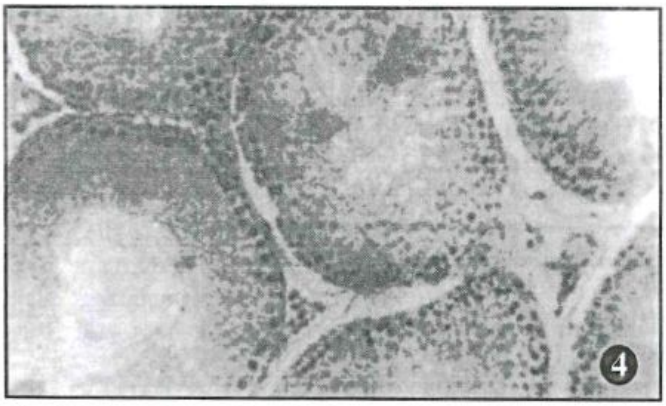

Fig. 4: Photomicrograph of Testis treated with 15% w/w Garcina Kola Diet

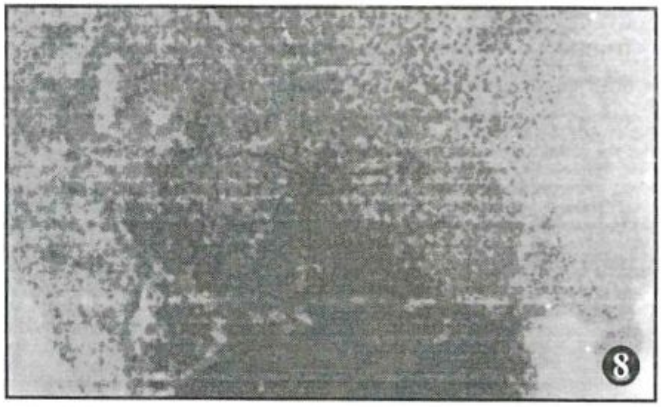

Fig. 8: Photomicrograph of Anterior Pituitary gland treated with 15% w/w Bitter kola Diet, Group C. Mag x 200

Histological Observations

Group A (Control Group): The group A rats, showed normal sermniferous tubules separated by interstitial space containing highly cellular connective tissue cells of Leydig with nuclei staining deeply. The sermniferous tubules are enclosed by a continuous basement membrane, deep to which is the germinal epithelium made up of developing spermatozoa, and setoli cells also staining deeply. The interior of the lumen, of the sermniferous tubules, chromophob cells were very numerous, pale looking with faintly stained nuclei. The acidophilic cells had faintly stained nuclei. Basophilic cells were fewer than chromophob cells and their nuclei stained deeply (Fig. 5).

Group B: Histological observation of sections from this group revealed them to be similar to sections from group A (Fig. 2 and Fig. 6).

Group C: This group revealed mild changes, such as larger interstitial spaces, interstitial cells of Leydig stained faintly, near absence of spermatozoa in the lumen of serminiferous tubule, disruption of basal lamina, when compared to control (Fig. 3). Anterior pituitary gland sections showed congestion of cells, which were unremarkable (Fig. 7).

Group D: There were marked changes when compared to control group. The interstitial spaces were larger, the interstitial cells of Leydig were fewer in number and smaller in size with picnotic nuclei. Spermatozoa could not be found in the lumen of the serminiferous tubule and the basement membrane of the serminiferous tubule was highly disrupted (Fig. 4). The anterior pituitary gland of this group showed congested and unremarkable cells (Fig. 8).

DISCUSSION

In this study, the groups that ingested Garcinia kola diet showed significant reduction in body weight and weight of testis however there was no signicant change in the Epididermis, serminal vesicle and ventral postrate. The drop in body weight and weight of testis, is in agreement with Barid 1989, where he reported that Garcinia kola for six weeks. And this effect was attributed to malabsoption and concomitant nutrient deficit induced as an endogenous effect of Garcinia kola. This nutrient

deficit could by the possible way through which the reproductive organ is affected.

Group C and D rats showed larger interstitial spaces, fewer interstitial cells of Leydigs and absence of spermatozoa in the lumen of their serminiferous tubule. These findings are similar to those of Heywood Wordsworth (1980), where oestrogen induced certain changes in the testis, including atrophy of the serminiferous tubule, change in interstitial cells of leydigs and inhibition of spermatozenesis.

The anterior pituitary gland sections of groups C and D showed congestion of cells, which were unremarkable. These suggest a degenerative action of Garcinia kola. However, we could not ascertain the reason for this, since there were no inflammatory cells to suggest adverse effect on the nature and function of these cells. It could be viewed therefore that decrease in number of spermatozoa in treated groups, and reduction in interstitial cells of Leydig, may be due to the malfunctioning of the gonadothrophic cells of the anterior pituitary gland. These results shows that Garcinia kola reduce body weight, weight of testis and inhibit spermatogenesis. But the mechanism of action is not understood.

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