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The effect of aqueous seed extract of *Moringa Oleifera* on sperm count, motility and morphology in male albino wistar rats

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ABSTRACT

The effect of aqueous seed extract of Moringa oleifera on sperm count, sperm motility and morphology was studied in male albino wistar rats. Fifteen (15) male albino wistar rats weighing between 160 – 200g at start of experiment were used. The rats were divided into 3 groups of five (5) rats each. Group one was control and was given distilled water, group two was the low dose group (LD) and was given 300mg/kg body weight of M. oleifera seed extract and group three; the high dose group (HD) was given 600mg/kg body weight of the extract. The extract was administered per oral route and all the animals were allowed free access to food and water. The feeding lasted for four weeks. At the end of the feeding period, the animals were sacrificed and the epididymis was harvested for determination of sperm count, motility and morphology. Results obtained showed that sperm count was 162.80 ± 8.89, 129.40 ± 6.69 and 192.60 ± 7.65 (x10 ^{6} cells/mm^{3}), for control, HD and LD group, respectively. The sperm count in HD group was significantly higher ($P<0.05$) than control and low dose group ($P<0.001$). There was no significant difference in motility and morphology among the control, low dose and high dose groups. In conclusion, this evaluation provides evidence that aqueous extract of Moringa oleifera may increase sperm count at high dose and may not improve the percentage of normal sperm cells. Therefore, chronic consumption of M. oleifera may not improve fertility in males.

Keywords: *Moringa Oleifera*, sperm count, sperm motility, sperm morphology

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INTRODUCTION

Moringa oleifera is a small deciduous tree with sparse foliage, at a distance especially in flower but immediately recognized when with fruit [1]. *Moringa oleifera* tree is cultivated and used as vegetables (leaves, green pods, flowers and roasted seeds). It is used in soups mixed with groundnut cake, as spice (roots), for cooking and cosmetics (seed oil) and all its parts have medicinal value [2]. *Moringa oleifera* has an impressive medicinal use with high nutritional value [3]. Due to its numerous uses it has been called tree of life in many cultures of the world. It is called "Sogali" in Hausa, "Iwowo" in Igede, "Ewe-ile" in Yoruba and "Odudu Oyibo" in Ibo [4]. *Moringa oleifera* is one of the plants that have been documented to have the ability to cure up to 300 illnesses [2]. Phytochemical evaluations of *Moringa oleifera* reveal that it contains alkaloids, tannins, proteins, electrolytes, saponins and flavanoids [5]. It also contains vitamins, anti-oxidants and does not contain toxic substances [6]. In addition, it has been documented to contain essential amino acids, omega 3 oils and it is anti-inflammatory [3].

Among its numerous uses in fighting a host of illnesses is its ability to combats colds, flus, skin diseases, diarrhea, osteoporosis and anaemia [7].

Sexual dysfunction may affect men of every age, race, background and lifestyle. Disturbances such as stress and insufficient nutrients in meal are some of the leading causes of sexual dysfunction.

In males stressors could induce suppression of testosterone secretion and spermatogenesis. The altered function also affects count quality, motility and morphology of sperms [8]. Some literatures have quoted the usefulness of Moringa in the treatment of sexual dysfunction, improve sexual dysfuntion, prolong sexual activity and increase sperm count [9]. There is still paucity of data supporting this claim. This work is therefore carried out to ascertain this claim.

MATERIALS AND METHODS

Experimental Animals

Fifteen (15) albino wistar rats weighing initially between 160 – 200g were randomly assigned into 3 groups of 5 rats each. Group 1 was the control fed on normal rat chow only. Groups 2 and 3 were fed on low and high dose of *Moringa oleifera* respectively. The feeding was with the aid of an orogastric cannula. All the groups were allowed free access to water and food and the experiment lasted for 4 weeks.

Preparation of different doses of Moringa Oleifera

The low and high doses were determined after the LD_{50} was done. The low dose was taken as 300ml/kg body weight while the high dose was 600ml/kg body weight. The administration was done daily.

Experimental procedure

At the end of four (4) of weeks feeding, the rats were sacrificed by cervical dislocation and their testes harvested to get the epididymis which was macerated to collect sperm for analysis.

Sperm Analysis:

Sperm count, Motility and Morphology

One drop of sperm was placed in a glass slide and ten (10) random feeds were manually scored for the member of motile and non-motile sperm. Motility was expressed as a percentage of motile sperm to total sperm cells.

Epididymal sperm concentration was determined using the WHO manual of 1999 [10].

Briefly a 50µl aliquot of epididymal sperm was diluted with 950µl of diluents 50g sodium carbonate, 10ml formalin (35%) and 0.25g trypan blue were added and made up to a final volume of one liter (1L) with distilled water). A cover slip was secured to the counting chambers of a Neubauer type hemocytometer. Approximately 10µl of the thoroughly mixed diluted specimen was transferred to each of the counting chambers of the hemocytometer, which was allowed to stand for five (5) minutes in a humid chamber in order to prevent drying.

The relative proportion of abnormal sperms were analysed using the method by Bauer *et al.*[11].

Statistical analysis

Results were expressed as mean ± SEM. A one way analysis of variance (ANOVA) test (with Bonferroni post-test of $P<0.05$ and Pearson correlation were used for statistical analyses. Differences were regarded as statistically significant of $P<0.05$ and highly significant of $P<0.001$.

RESULTS

3.1 Sperm Count

The mean sperm count in control, low dose and high dose groups were 162.80±8.89, 129.40±6.69 and 192.60±7.65 ($x10^6$ cells/mm^3) respectively. The sperm count in low dose was significantly lower ($P<0.05$) when compared with control. The high dose group had significantly higher ($P<0.05$) sperm count, compared with control and low dose ($P<0.001$) group, respectively (Figure 1).

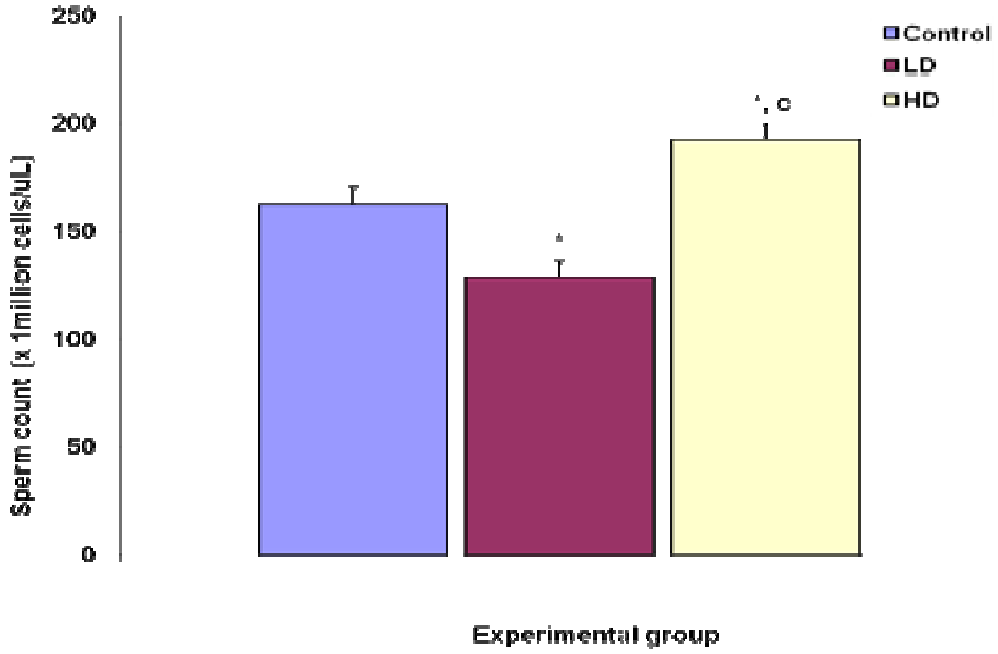

Figure 1: Comparison of sperm count between the different experimental group
Values are mean ±SEM, n = 5.
**p<0.05 vs Control; c = p<0.001 vs LD*

3.2 Sperm motility

The sperm motility for control, LD and HD groups was 41.40 ± 1.86, 37.40 ± 2.29 and 44.00 ± 3.32%, respectively. There was no significant difference among the groups (Figure 2).

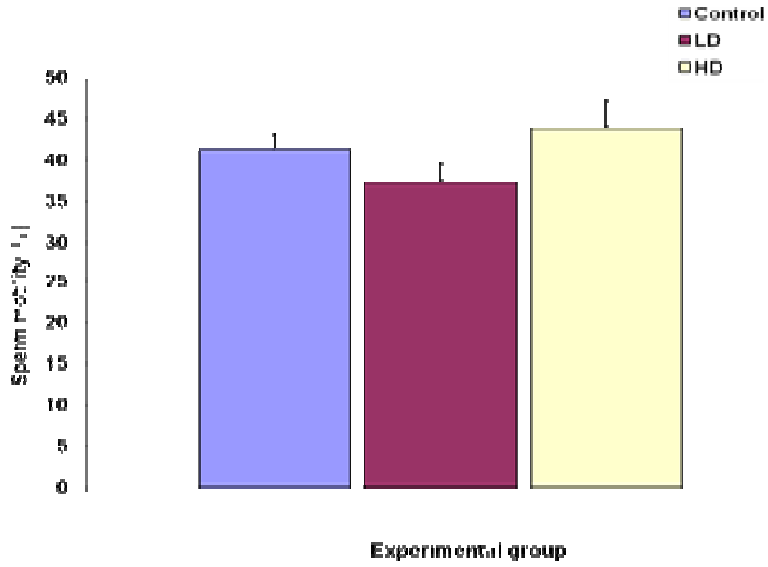

Figure 2: Comparison of sperm motility between the different experimental group
Values are mean ±SEM, n = 5.

Morphological changes in control, LD and HD groups fed with *M. oleifera* seed extract

Normal cells

The percentage of normal spermatocytes for control, LD and HD group was 82.60 ± 0.33, 81.40 ± 1.86 and 82.00 ± 2.12%, respectively. There was no significant difference in the percentage of normal spermatocytes among the groups (Figure 3).

Curved body

The percentage of spermatocytes with curved body for control, LD and HD groups were 7.40 ± 0.68, 7.60 ± 0.93 and 9.20 ± 0.92%, respectively. There was no significant difference among the groups (Figure 3).

Pin head
The percentage of spermatocytes with pin head for control, LD and HD groups were 4.40 ± 0.68, 5.00 ± 2.90 and 4.40 ± 1.29%, respectively. There was no significant difference among the groups (Figure 3).

Curved tail
The percentage of spermatocytes with curved tail in control, LD and HD groups were 5.60 ± 0.98, 6.20 ± 1.20 and 4.40 ± 1.21%, respectively. There was no significant difference among the groups (Figure 3).

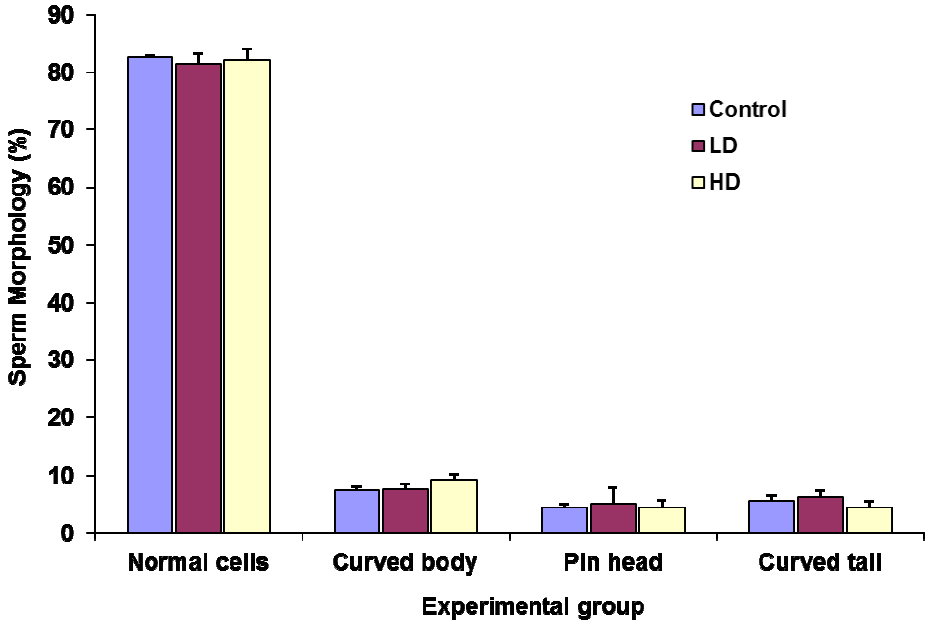

Figure 3: Comparison of sperm morphology between the different experimental group. Values are mean ± SEM, n = 5

DISCUSSION

Fertility enhancing capacity of some plant extracts has been documented in several studies. The side effects that are mostly associated with administration of synthetic anti-fertility drugs have shifted attention to natural products [12]. The process of spermatogenesis from germ cells recruitment to spermeogenesis takes some weeks. In mammals, the epididymis is known to play an important role in final development of motility and storage of sperm.

In this study, the long term exposure of male rats to *Moringa oleifera* resulted in increased sperm count, without affecting the quality of sperm as there was no significant difference in motility among the groups. This effect was further buttressed by the result on the morphology of the sperm. There was no significant change in the number of normal sperm cells among the groups. This may be because *Moringa oleifera* has non - toxic properties as previously reported [13 - 15]. Our study is consistent with the findings of Awodele *et al* [16], who reported a decrease in sperm count following *Moringa oleifera* administration. They also reported that both morphology and motility were unaffected [16].

CONCLUSION

In conclusion, this evaluation provides evidence that aqueous extract of *Moringa oleifera* may increase sperm count at high dose and may not improve the percentage of normal sperm cells. Therefore, chronic consumption of M. oleifera may not improve fertility in males.

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