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The Effect of Cyperus esculentus on Sperm Function Parameters in Prepubertal Mice as a Model for Human

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Abstract

The objective of this work was to study the effect of oral administration of Cyperus esculentus (CE) and its alcoholic extract on sperm function parameters in prepubertal mice as a model for human. The animals were divided into three groups each contains 6 animals. Group 1 was treated with 150 mg/kg body weight/day of crude CE, group 2 was treated with same dose of alcohol extract of CE and group 3 regarded as control throughout six weeks period. The results showed a significant (p < 0.05) increase in the mean of sperm concentration, sperm motility percent and progressive sperm motility between treated groups and control. There was no differences among groups in the mean of sperm normal morphology and sperm viability. No significant differences was recorded in the mean of body weight among groups throughout the study. The results revealed that the administration of Cyperus esculentus may enhance certain sperm characters in prepubertal mice without affecting body weight.

Key words: Cyperus Esulentus, sperm, concentration, motility, mice

Introduction

Cyperus esculentus (Chufa Sedge, Yellow Nut sedge, Tiger nut Sedge, Earth almond) is a member of the grass family Cyperaceae to which nut sedge weeds also belong. This plant was originally native to the Mediterranean region but its cultivation has now spread to many other warm countries [1]. The oldest cultivated plants in Ancient Egypt Chufa was no doubt an important food element in ancient Egypt during dynastic times, [2]. The tubers are edible, with a slightly sweet, nutty flavour. The nuts are either consumed raw or in the dried form, mainly as a snack [3,4]. The tubers are consumed either a nut or grated. They are quite hard and are generally soaked in water before they can be eaten, thus making them much softer and giving them a better texture [4]. They were used to make cakes in ancient Egypt and used for ice cream and beverage making. Tiger nuts have excellent nutritional qualities with a fat composition similar to olives and a rich mineral content, especially phosphorus and potassium. The oil of the tuber was found to contain 18% saturated (palmitic acid and stearic acid) and 82% unsaturated (oleic acid and linoleic acid)fatty acid [5].The tubers contain about 25% oil, which are resistant to peroxidation, 50% digestible carbohydrates, 4% protein and 9% crude fiber[6,7]. Recently, a university study has identified a time window between eight and 12 weeks of fetal development during which reproductive problems, including low sperm count, are determined. [8] and due to nutritional qualities of Cyperus esculentus the objective of the present study is to find out the effect of oral administration of its on sperm function

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parameters in prepubertal mice as a model for human.

Materials and methods:

Prepubertal male Balb/C mice (35 days old) were placed in an air conditioned room at 22 – 24 °C with light period of 14 hr. The mice were divided into three groups (control group, treated groups G1and G2). Group 1 was administrated with drinking water 150 mg/kg BW/day of crude Cypres esculentus after grinding and soaked in warm water .Groups 2 was administrated with drinking water same dose of alcohol extract of Cypres esculentus for 6 weeks. While the control group was given distilled water. The dose used for human by ( herbalist ) was estimated to be about 100 mg- 200 mg /KgBW /day ( i.e., 1 to 2 tea spoonful three times daily ) according to that , the same dose was calculated for mice [9].Body weight for each mouse was recorded at the beginning, during and end of the experimental period, using a mechanical balance( Tetesa, Germany ). The animals of each groups were sacrificed by cervical dislocation at the end of the experiment .The epididymis were quickly freed from the attached fat and connective tissue ,the tail of epididymis was minced ,using fine and sharp microsurgical scissor in to 200 small pieces in a small well of Petri-dish containing 0.5ml of normal saline, until getting a homogenized solution which contained the spermatozoa and incubated at 37°C until examination[10],then 10µL drop of this solution was put on a warm clean slide and protected by cover slid slip (22x 22 mm) to be examined under a high power magnification of 40X objective[11,12] , to estimate sperm concentration, sperm motility % and progressive sperm motility %.The mean number of spermatozoa in 10 random microscopically fields were considers. Eosin negrosin stain used for viability & abnormality estimation by mixed 10µL drop spermatozoal solution +2 drops of 1 % eosin stain after 30 second 3 drops of 10% nigrosin added and mixed, a drop of mixture placed on a microscope slid and smear prepared within 30 second (count at least 100-200) . Statistical analysis Statistical analysis was performed using SPSS (Statistical Package for Social Science; Version 7.5).Crude data analysis was done using paired sample t test for tables with mean and standard error of mean (S.E.M.) The differences between the values were considered statistically significant at(P<0.05)[13].

Results :

The effect of orally administration of crude Cypres esculentus and alcohol extract of it in a dose of (150 mg/kg BW/day) on certain sperm Function parameters of prepubertal male mice was shown in table 1. There was a significant P<0.05 increase in the mean of sperm concentration, sperm motility percent and progressive sperm motility between treated groups and control . There was no differences among groups in the mean of sperm normal morphology and sperm viability. No significant differences P>0.05 was recorded in the mean of body weight among groups through out the study table2.
Table 1: The effect of (150 mg/kg BW/day) orally administration of crude plant and alcoholic extract of (Cyperus esculentus) on Sperm Function parameters of prepubertal male mice.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Sperm Function parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concentration (10^6/ml)</td>
</tr>
<tr>
<td>Control group</td>
<td>12.6±2.18</td>
</tr>
<tr>
<td>Treated group(1)</td>
<td>33.75±1.61</td>
</tr>
<tr>
<td>Treated group(2)</td>
<td>28.00±3.39</td>
</tr>
</tbody>
</table>

* P<0.05 a significant differences from the control group
Number of animals per each group = 6

Table 2: Changes in the body weight associated with daily administration of (150 mg/kg BW/day) crude plant and alcoholic extract of (Cyperus esculentus) to prepubertal male mice.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Body weight (g) mean±SE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight before treatment</td>
</tr>
<tr>
<td>Control group</td>
<td>16.41±2.00</td>
</tr>
<tr>
<td>Treated group(1)</td>
<td>15.4±1.102</td>
</tr>
<tr>
<td>Treated group(2)</td>
<td>16.71±0.446</td>
</tr>
</tbody>
</table>

Number of animals per each group = 6

Discussion:
In this investigation, it has been found that oral administration of crude plant and alcoholic extract of Cyperus esculentus significantly enhanced certain sperm function parameters such as sperm concentration, sperm motility percent and progressive sperm motility. Cyperus esculentus locally known as Hjabb el aziz which used to treated male infertility and increased sperm count [14]. On the other hand it affects semen volume as well as testes weight, vass deferens, testis length, right testis circumference, epididymal length, and weight of reproductive tract [15] although the percentage of motile spermatozoa and their progressiveness usually give a good indication on sperm quality and are important in predicting mammalian fertility[16]. The seeds of Cyperus esculentus established as a very nutritious[17,18]. Rich mineral content, especially phosphorus and potassium, oil resistant to peroxidation and fatty acids (palmitic acid, stearic acid, oleic acid and linoleic acid) [5,6,7]. In addition to its anti-inflammatory properties upon inflammation, and immunostimulatory effects [19] may play an important role in spermatogenesis and enhancement of sperm motility parameters with out affecting sperm morphology and
viability. Even though high nutritional quality of *Cyperus esculentus* the result of this investigation recorded no significant differences in the mean of body weight this may be due to low protein content[5,18]. In conclusion the results revealed that the administration of *Cyperus esculentus* in this dose enhanced certain sperm characters in prepuberal mice without affecting body weight, so it may be recommended to use small amounts from this sedges as food supplementation in prepuberal stage to improve reproductive system maturity.

References:

تأثير استخدام عشب الهليون الازهاري في المعالجة الوقشية لنطف ذكور الفئران غير البالغة كمواد تلائمية

أسماء محسن عبد الهادي العيساوي
عماد عبد الواحد محمد المشهداني

الخلاصة:

هدف الدراسة الحالية إلى معرفة تأثير رفع نسبة لوز الأرض (CE) عند استخدام القهوة عشب الهليون في تناول الفئران قبل البلغ، حيث واجب في هيئة التجربة (18) إلى ثلاثة مجموعات لكل مجموعة تضم ستة حيوانات. المجموعة الأولى أظهرت متوسط لوز إجمالي 150 مليمغ/EEDED من القهوة، والمجموعة الثانية أظهرت نفس الجرعة من المجموعة الأولى، والمجموعة الثالثة أظهرت جرعة متقدمة فئة مقدارها ستة ملغم/الجمجمة. أظهرت النتائج زيادة معنوية (p<0.05) في معدلات عدد الطرقات في بنية التحركية ونسبة الشആة النحوية بين المجموعات الثلاثة، ولذلك يمكن استخدام القهوة عشب الهليون لزيادة نسباً ونسبة الشائها بين المجموعات الثلاثة. كا تأثر النتائج عند وجود رفوف معنوية في معدلات اوران إعداد المعينة بين المجموعات الثلاثة، في ذكر الفئران قبل البلغ دون أن يكون لها تأثير على إعدادات أورانها.