THE EFFECT OF AQUEOUS EXTRACT OF ANACARDIUM OCCIDENTALE STEM BACK ON THE HISTOLOGY OF THE TESTES OF ADULT WISTAR RAT

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Abstract

Aim: The aim of carrying out this research work was to determine the possible effect of administration of aqueous extract of Anacardium occidentale (cashew) stem back on the testes of adult Wistar rats.

Methods: Fifteen adult Wistar rats of both sexes weighing 140g - 240g were acquired from the animal house of Department of Medical Laboratory Science, College of Health Technology, Akure, Ondo State. The Wistar rats were randomly assigned into 3 groups; Group I which was the control was orally given water, Group II was orally given 20mg/kg extract of Anacardium occidentale via orogastric tube for a period of 21 days, while Group III was orally given 40mg/kg of Anacardium occidentale via orogastric tube for a period of 21 days.

Results: The histological findings of the testes showed that there were no cyto-architectural distortions and no evidence of apoptotic bodies in the treated groups when compared with the control group.

Conclusion: Oral administration of aqueous extract of 40mg/kg Anacardium occidentale does not have histological effects on the testes of adult Wistar rats.

Keywords: Anacardium occidentale, Anacardiaceae, Testes.

INTRODUCTION

Anacardium occidentale (cashew) belongs to the family of the flowering plants- Anacardiaceae (Leslie, 2005). It is a multipurpose tree of the amazon that grows up to 15m high and by far the most important economically (De-Souza et al., 1992). Over 50% of annual cashew production of 400,000 tones are from south Asia, East Africa, especially India and Tanzania while West Africa produces small quantities of Cashew (Opeke, 2005). Extracts of the plant has been used in various ways as an anti-diabetic, antibacterial, anti-inflammatory and antihypertensive agents. Phytochemical studies have produced evidence that the extract of the plant contains bioactive components like garlic acid, flavonoids, tannins etc all of which show gastro-protective functions through anti-secretory, antacids and cyto-protective actions. In the last 20 years, the interest in medicinal plants have increased together with the number of investigations into their biological effects on human beings and animals herbal medicine is used up to 80% of the population in the developing countries (Jaouad et al., 2004). Medicinal plants are believed to be an important source of new chemical substances with potential therapeutic effects (Eisener, 1990). Extracts from roots, stem and fruits of Anacardium occidentale have been used by the Cameroonians and other countries for Medicine (Sokeng et al., 200). In the traditional Nigerian and Brazilian pharmacopoeia, stem back of Anacardium occidentale is known for its anti-inflammatory effects (Mota et al., 1985; Cheng,
The leaves or the back of Anacardium occidentale is used in Brazil for the treatment of eczema, psoriasis, scrofula, dyspepsia, venereal diseases, sexually transmitted diseases, impotency, bronchitis, cough, intestinal colic, leishmaniosis and syphilis related skin disorders (Franca et al., 1993). The back and leaves of cashew is a rich source of tannins, which is a group of plant chemicals with documented biological activities (Laurens, 1999). Ofusori et al., (2008) reported that Anacardium occidentale does not have a toxic effect on the brain and kidney of Swiss albino mice. This research work was carried out to study the histological effect of this plant extracts on the testes of adult Wistar rats.

MATERIALS AND METHODS

Study Area
This research work was carried out at the Department of Medical Laboratory Science, College of Health Technology, Akure, Ondo State, Nigeria.

Experimental Animals
A total of 15 adult Wistar rats of both sexes were acquired from the animal house of the Department of Medical Laboratory Science, College of Health Technology, Akure, Ondo State. The animals were in healthy conditions and weighed 140g-240g. The animals were transferred to the animal location and were allowed to acclimatize for three weeks under a favorable climatic condition and were properly fed with standard rat pellets and water.

Collection of the stem back of Anacardium occidentale (Cashew)
The back of Anacardium occidentale (cashew) tree were obtained from a farm land in Akure, Ondo State on July, 2013. The bark of the cashew was identified at the Department of Agricultural Science, Federal University of Technology, Akure, Ondo State.

Extract preparation of Anacardium Occidentale (Cashew)
Fresh stem back of Anacardium occidentale was air dried at room temperature and pulverized with pestle and mortar. 120g of the coarse powder was macerated with 1000ml of distilled water and the mixture was left for 48 hours, the mixture was filtered with Whatman filter paper. The extract was used for this research work.

Experimentation
Fifteen adult Wistar rats were randomly divided into three 3 groups of 5 animals each. The rat in group I were given water orally, the rats in group II were orally given 20mgs/kg extract of Anacardium occidentale for a period of 21 days while rats in group III were orally given 40mg/kg extract of Anacardium occidentale for a period of 21 days.

Samples Collection and Preparations for Histology
After 24 hours of the last administration, the animals were sacrificed by spinal dislocation. The testes were harvested and examined with the naked eyes for any gross morphological changes. The testes were appropriately labeled, fixed with 10% formol saline and standard manual tissue processing techniques were employed. Sections of about 3μm -5μm were cut by a Slee Medical Rotary Microtome and stained with Haematoxylin and Eosin (Carlton, 1967). The slides were analyzed with the aid of a light microscope for histological changes (Barbara et al., 2006). The slides were viewed and captured on a Brunel light microscope, 20 mega pixels (Brunel SP35 Digital Trinocular).

RESULTS

Physical and Behavioural Observations
From observation made during the course of this research work, there was no difference in behavioral changes noticed between the control group of the animal and the treatment groups. There was no mortality, stress or abnormal behavioral changes observed within the treated groups throughout the administration period. Overt signs of toxicity such as lascrimation, squinting and protrusion of the eyeball etc. were not expressed by the rats throughout the period of this research work.
Table 1: Histological findings

<table>
<thead>
<tr>
<th>Group</th>
<th>Dose of extract</th>
<th>Gross findings</th>
<th>Microscopic interpretation</th>
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<tbody>
<tr>
<td>I</td>
<td>water</td>
<td>No gross abnormal findings seen</td>
<td>No distortion in cell architecture</td>
</tr>
<tr>
<td>II</td>
<td>20mg/kg</td>
<td>No gross abnormal findings seen</td>
<td>No distortion in cell architecture</td>
</tr>
<tr>
<td>III</td>
<td>40mg/kg</td>
<td>No gross abnormal findings seen</td>
<td>No distortion in cell architecture</td>
</tr>
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</table>

The histological observation of the testes showed no distortion in cell architectures in all the treated groups. The Seminiferous Epithelium (SE), Interstitial tissue (IT) and Convoluted Tubules (CVT) of the treated groups showed no differences from that of the control.

DISCUSSION
This study revealed that aqueous extract of Anacardium occidentale (cashew) stem back up to 40mg/kg, has no toxic effect on the cyto-architecture of the testes of an adult Wistar rat. The pharmacological mechanism behind this result may be traced to some phytochemical contents of Anacardium occidentale. The stem back of cashew is adopted in Africa as an anti-malaria therapy, Ngadjui et al., (2002) noted in his work on the anti-malarial agents from some Cameroonian plants that abiatane, diterpenoids, quinines, triterpenoids and flavonoids are the principal phytochemical contents of some of the plants screened. Although some of these phytochemicals may not have successfully been isolated in Anacardium occidentale as literature review is scanty in this area, it is believed that some of its phytochemicals may be synonymous to those found in some other plants such as Croton zambesicus, which is also used traditionally in Nigeria as an anti-malaria therapy. However, the toxicity of Anacardium occidentale has not been extensively studied (Paris et al., 1997). However, Leonard et al., (2007) observed in a research study that the kidney and the liver of adult Wistar rats were damaged after being orally treated with 14g/kg extract of Anacardium occidentale. Malini and Vanithakumarin (1990) indicated that chronic administration of β- sterol (lipids isolated from Anacardium occidentale leaf extract) subcutaneously to rats for 60 days was well tolerated and there was no clear evidence of lesions either in the liver or in the kidney. Although the fruits of Anacardium occidentale are commonly eaten, the leaves and the back have been shown to display a wide spectrum of biological and pharmacological activities, which provide experimental support for empiric ethnopharmacological use of this plant in folk medicine. Anacardium occidentale has been reported to have an anti inflammatory action (Mota et al., 1985; Ojewole, 2004), Antimicrobial (Laurens, 1999), hypoglycaemia and antidiabetic (Kamtchouing, et al., 1998) activities. The folkloric use of Anacardium occidentale may be validated by this research work or study since the therapeutic dose often used is higher to the dose exhibiting non-toxicity in the study.

Conclusion
Oral administration of aqueous extract of Anacardium occidentale up to 40mg/kg does not have any effect on the histology of the testes of adult Wistar rats.
REFERENCES


