HEPATOPRTECTIVE EFFECTS OF MORINGA OLEIFERA EXTRACT ON LIVER OF WISTAR RATS

Ezejindu D N, Udemezue O.O. and Chinweife KC
Department of Anatomy, College of Health Sciences, Nnamdi Azikiwe University, Nnewi Campus Anambra State, Nigeria.
Corresponding Authors Email: ezejindudamian@gmail.com

ABSTRACT

This work is aimed at determining the hepatoprotective effects of Moringa oleifera on liver of adult wistar rats. Twenty four wistar rats weighing between 190 – 230kg were used. They were divided into four groups (A,B,C & D) of six animals each. Group A served as the control and received 0.3ml of distilled water orally. The experimental groups B,C &D received 0.5ml, 0.6ml & 0.7ml of Moringa oleifera extract orally respectively. The administration lasted for twenty one days. The animals were weighed, sacrificed using chloroform vapour method. The liver tissues were removed weighed and trimmed down for histological studies. Results of this study showed non-distortion of the liver architecture in the experimental groups relative to the control. Our findings therefore suggest that chronic Moringa oleifera consumption may not put the liver at risk of adverse histopathological condition.

Keywords: Wistar rats, Hepatoprotective, Moringa oleifera, Liver weight, Body weight.

1. INTRODUCTION

Moringa oleifera is the fast growing, evergreen deciduous tree. It can reach a height of 10-12m[1] and the trunk can reach diameter of 45cm[2]. The bark has a whitish – grey colour and is surrounded by thick cork. Young shoots have purplish – white hairy bark. The tree has an open crown of drooping, fragile branches and leaves build up a feathery of tripinnate leaves[3].

All Moringa food products have a very high nutritional value. You can eat the leaves, especially young shoots, young pods, flowers, roots and in some species even the bark. Leaves are low in fats and carbohydrates and rich in minerals, iron and vitamin B [4,5,6,7]. Around the world, every part of the Moringa oleifera tree has been used effectively against varying ailments. Leaves rubbed against the temple can relieve headaches, leaf tea treat gastric ulcers and diarrhea, application of a poultice of fresh leaves stops bleeding from a shallow cut, extracts can be used against bacterial or fungal skin complaints, and it has an anti-bacterial and anti-inflammatory effects when applied to wounds or insect bites.[8,9,10].

Moringa oleifera has been used to combat malnutrition especially among infants and nursing mother. Four NGOs in particular – Trees for Life International church World Service Educational Concerns for Hunger Organization and Volunteer Partnership for West Africa have advocated Moringa oleifera as a natural nutrition for the tropics [11]. One author stated that the nutritional properties of Moringa oleifers are now so well known that there seems to be little doubt of the substantial health benefit to be realized by consumption of Moringa oleifera leaf powder in situations where starvation is imminent [12]. From the potential properties of Moringa oleifera, there is need to
investigate the hepatoprotective effects on the liver. Hence, this study aims at investigating the effects of Moringa oleifera extract on the liver of adult wistar rats.

2. MATERIALS AND METHODS

Breeding of Animals

Twenty four wistar rats were purchased from the animal house of Anatomy Department University of Calabar, Cross River State, Nigeria of Uyo Akwa Ibom State. They were allowed for seven days for acclimatization under normal temperature (27ºC – 30ºC) before their weights were taken. They were fed ad-libitum with water and guinea feed pallets from Agro feed mill Niger Ltd.

Drug Preparation

Moringa oleifera leaves were collected from Mbaise in Imo State and was dried in an oven at a temperature of 50ºC and crushed using laboratory blender. Extraction was done using ethanol. 250mg of this extract / kg body weight was dissolved in 10mls of distilled water and administered to the animals.

Experimental Protocols

Table 1: Comparison of mean initial and final body weight and weight change in all the groups (A,B,C&D) (Mean ±SEM given for each measurement)

<table>
<thead>
<tr>
<th></th>
<th>GP. A</th>
<th>GP. B</th>
<th>GP. C</th>
<th>GP. D</th>
<th>F-RATIO</th>
<th>PROB. OF. SIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL BODY WT</td>
<td>198.20 ± 4.50</td>
<td>206.80 ± 3.60</td>
<td>219.10 ± 5.10</td>
<td>226.20 ± 3.30</td>
<td>66.140</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>FINAL BODY WT</td>
<td>218.00 ± 4.10</td>
<td>220.30 ± 5.30</td>
<td>228.50 ± 2.50</td>
<td>235.40 ± 5.40</td>
<td>34.220</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>WT. CHANGE</td>
<td>19.80 ± 2.30</td>
<td>13.50 ± 4.60</td>
<td>9.40 ± 2.70</td>
<td>9.20 ± 4.80</td>
<td>6.340</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

The twenty four animals were weighed and allocated into four groups (A, B, C & D) of six animals each. Group A served as the control and administered 0.3ml of distilled water; the experimental groups B, C & D were administered 0.5ml, 0.6ml and 0.7ml of Moringa oleifera extract respectively for twenty one days. Both the control and experimental groups were scarified using the chloroform inhalation method. Liver tissues were removed, weighed trimmed down and fixed in zeners fluid histological studies. The tissues were transferred into an automatic processor where they went through a process of dehydration in ascending grades of alcohol 70,80,95% and absolute alcohol for 2 changes each. The tissues were then cleared in xylene and embedded in paraffin wax. Serial sections of 5 micron thick were obtained using a rotary microtome. The tissue sections were deparaffined hydrated and stained using the routine haematoxylin and eosin staining method (H &E). The stained sections were then examined under the light microscope.

3. RESULTS

3.1. Morphometric Analysis of Body Weights

The final body weight for the experimental groups increased significantly (P<0.001) relative to the control.
3.2. Morphometric Analysis of Liver Weight

Table 2: Comparison of mean relative liver weight of all the groups (A,B,C&D) (Mean ±SEM given for each measurement)

<table>
<thead>
<tr>
<th></th>
<th>GP. A</th>
<th>GP. B</th>
<th>GP. C</th>
<th>GP. D</th>
<th>F-RATIO</th>
<th>PROB. OF. SIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIVER WT.</td>
<td>5.20 ± 0.320</td>
<td>5.25± 0.240</td>
<td>5.35± 0.400</td>
<td>5.45± 0.500</td>
<td>53.20</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

The relative liver weights for the experimental groups increased significantly (P<0.001) with the control.

3.3. Histopathological findings

Fig. 1. Micrograph 1 (control)
The micrograph of liver shows hepatic plates separated by spaces called sinusoids. The central vein surrounded by hepatocytes arranged in plates radiating outwards from it.

Fig. 2. Micrograph 2 (treated with 0.5ml of extract)
The portal triad is centrally placed. It is composed of the branches of the portal vein, hepatic artery and bile dust.
Fig. 3. Micrograph 3 (treated with 0.6ml of extract)
The micrograph shows portal tract centrally placed with hepatic plates conveying towards it.

Fig. 4. Micrograph 4 (treated with 0.7ml of extract)
The micrograph shows hepatocytes arranged in plates radiating away from the central vein.

4. DISCUSSION
Adult wistar rats fed with low and high doses of Moringa oleifera extract were used in the present study. The final body weights of the experimental animals increased significantly relative to the control. The extract of Moringa oleifera in this instance functions primarily as dietary supplement enhancing growth.

The relative weights of organ of the experimental animals compared with the control were statistically similar to the control. This study agrees with previous studies that Moringa oleifera did not cause any histopathological lesions to the liver cells. This could be as a result of anti-inflammatory and anti-arhritic properties of the extract. This result agree with previous researches that extract of roots of Moringa oleifera reduces the carrageenin-induced paw oedema to similar extent as the potential anti-inflammatory drug indomethacin.

Aurantiamide acetate and 1,3 dibenzyl urea isolated from roots showed significant anti-inflammatory/antiarthritic activity mediated via inhibition of TNF-alpha, IL-2 and other cytokines.
Our study clearly demonstrated that extract of Moringa Oleifera extract possesses strong antioxidant properties and hepatoprotective effect on the liver cells.

REFERENCES