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# HISTOLOGICAL EFFECTS OF MORINGA EXTRACT ON CARBON TETRACHLORIDE INDUCED HEPATOXICITY IN ADULT WISTAR RATS.

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#### Abstract

This study was carried out to determine the effect of moringa extract on carbon tetrachloride induced hepatotoxicity in adult Wister rats. Twenty rats weighing between 150 - 220g were used. The rats were divided into four groups A, B, C, D of five animals each. Group A served as the control group and received 0.5ml of distilled water. The experimental groups received different doses of drugs as follows; Group received 0.8ml of extract, Group C received 0.4ml of carbon tetrachloride while Group D received 0.4ml and 0.8ml of moringa extract. The administration lasted for twenty days between the hours of 12- 3.30pm using intubation method. Twenty four hours after the last administration, the animals were anestathized under chloroform vapour and disected. Liver tissues were removed, weighed and fixed in zenker's fluid for histological studies. The relative liver weights for group C were significantly higher than the control. The relative liver weight of group B and C increased significantly relative to the control group. The histological results reveal distortion of liver cells in group C and normal cell architecture in group Band C. the extract has a hepatprotective effects on carbon tetrachloride induced hepatotoxity.

Keyword: moringa, carbon tetrachloridehepatoxicity, hepatoprotectivity and wisar rat.

## INTRODUCTION

Moringa oleifera is the most widely cultivated species of a monogeric family, the Moringaceae that is native to the sub-Himalayan tracts of India, Pakistan, Ban gladesh and Afghanistan. Moringa oleifera or the horseradish tree is a pantropical species that is known. It is called Zogole in Hausa language. It is believed to have variety usages which include combating malnutrition, anticancer and is being promoted as a panacea<sup>[1,2,3,4,6]</sup>. Thus this study was undertaken to investigate the hepatoprotective nature of Moringa oleifera on induction of CCl<sub>4</sub> known to cause liver damage in wistar rats since it has been used non-conventionally in the treatment of certain diseases associated with liver, kidney, cough, diarrhea etc. Cirrhosis can be induced in animals by chronic administration of carbon tetrachloride or a toxin or several chemical carcinogens<sup>[5]</sup>.

The liver is the largest of the abdominal viscera, occupying a substantial portion of the upper abdominal cavity. It performs a wide range of metabolic activities necessary for homeostasis, nutrition and immune defence. It is composed largely of epithelial cells (hepatocytes), which are bathed in blood derived from the hepatic portal veins and hepatic arteries. There is continuous chemical exchange between the cells and the blood. Hepatocytes are also associated with an extensive system of minute canals, which form the biliary system into which products are secreted. The liver is important in the removal and breakdown of toxic, or potentially toxic, materials from the blood <sup>[10]</sup>. In adults the liver weighs 2% of body mass <sup>[7, 10]</sup>.

Cells of the liver include hepatocytes, hepatic stellate cells - also known as perisinusoidal lipocytes, or Ito cells - sinusoidal endothelial cells, macrophages (Kupffer cells), the cells of the biliary tree - cuboidal to columnar epithelium - and connective tissue cells of the capsule and portal tracts.

The liver is a highly sensitive organ which plays a major role in maintenance and performance of the homeostasis in our body. It is the chief organ where important processes like metabolism and detoxification take place.

Thus this study was undertaken to investigate the hepatoprotective nature of Moringa oleifera on induction of  $CCl_4$  known to cause liver damage in wistar rats since it has been used non-conventionally in the treatment of certain diseases associated with liver, kidney, cough, diarrhea etc.

Thus the liver is prone to injury due to the chronic exposure to drugs, environmental toxicants and other xenobiotics<sup>[8]</sup>. The liver disorders are one of the serious health problems, throughout the world. More than 350 million people were affected with chronic hepatic infections and in India above 20,000 deaths were reported every year due to liver disorders. Hepatocellular carcinoma is one of the most common tumors in the world with over 250,000 new cases each year<sup>[9]</sup>.

This study focuses on the histological effects of moringa extract on carbon tetrachloride induced hepatoxicity in adult wistar rats.

# **MATERIALS AND METHODS**

**Procurement of Plant**: The leaves of Moringa oleifera was procured from Nibo in Awka south (Anambra) and authenticated at the department of Botany Nnamdi Azikiwe University, Awka.

**Preparation of extract**: Fresh leaves of Moringa oleifera were collected, shade-dried and pounded into powder before extraction. The powder was macerated into absolute alcohol at room temperature. The filtrate was concentrated under reduced pressure and later evaporated in a water bath using evaporating dish at 45°C. A greenish paste was obtained.

**Experimental animals:** Twenty (20) adult Wistar rats weighing 150 to 220g were obtained for the study. The animals were fed with standard diet and water and were adapted to the laboratory environment in the Department of Human Anatomy for two weeks in order to acclimatize. The administration lasted for twenty eight days between the hours of 12 - 3:30pm using intubation method.

Wistar rats weighing between150 and 220 g were grouped into four (4) groups of A, B, C and D of five animals each. Group A served as control and received 0.5ml of distilled water. Group B, C and D received different doses of drugs as follows:

- ➢ group B received 0.8ml of extract.
- group C received 0.4ml of carbon tetrachloride.
- > group D received 0.4ml of tetrachloride and 0.8ml of extract.

Oral route of administration was used and the administration lasted for twenty days.

**Tissue processing and staining:** Twenty four hours after the last administration, liver tissues were removed and weighed. Blood for serum preparation were collected through cardiac puncture. Serum samples were separated from clot by centrifugation using bench top centrifuge. They were then dissected and the liver tissues were removed, and fixed in zenker's fluid for histological studies. The tissues were transferred into an automatic processor where they went through a process of dehydration in ascending grades of alcohol (ethanol) 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 deparaffinised hydrated and stained using the routine haematoxylin and eosin staining method (H&E). The stained sections were examined under the light microscope.

## **RESULT AND DISCUSSION**

In this study relative liver weight of group B and C increased significantly relative to the control group. The histological results reveal distortion of liver cells in group C and normal cell architecture in group Band C. the extract has a hepatprotective effects on carbon tetrachloride induced hepatotoxity.





#### Group D. 0.8ml of moringa extract and 0.4ml of CCl<sub>4</sub>

From this study, we therefore inferred that leave extract of Moringa oleifera has an appreciable ability to prevent damage to the liver.

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