

Visceral Histopathological Alterations in Rats Treated with Ethanol Extract of *Jatropha Gossypifolia* (POHL)

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Abstract

Objective: This study was designed to evaluate the effect of ethanol extract of *Jatropha gossypifolia* on some visceral organs in male Wistar rats.

Methods: Six hundred gram of air-dried *Jatropha gossypifolia* leaves were cold macerated in 70% ethanol and concentrated using water-bath. Twenty male Wistar rats (80-120 g) were divided into control (distilled water) and EEJG-treated (62.5, 125, 250 mg/kg) groups (5 per group) for histopathological study. The animals were orally treated on daily basis for 30 days. Histology of kidneys, livers and hearts was carried out.

Results: Photomicrographs of the kidneys, livers and hearts of extract treated rats revealed that the extract produced no visible lesions in the kidneys, livers and hearts which are similar to what were observed in the control rats.

Conclusion: It can therefore be concluded that *Jatropha gossypifolia* probably has no deleterious effect on the aforementioned visceral organs in male rats.

Keywords: *Jatropha gossypifolia*, Histology, Kidneys, Livers, Rats.

INTRODUCTION

Jatropha gossypifolia (Pohl) belongs to the family of Euphorbiaceae, which occur preferentially in tropical and subtropical environment [1]. It is called Bellyache bush in English language, "Faux manioc" in French language and "Lapalapa pupa" by the Yoruba language speaking people of Nigeria.

The plant is used medicinally as an anti-diabetic, antidiarrheal, antiophidian, healing and antipyretic agent [2].

Pharmacologically, it is used as an anticholinesterase [3], hemostatic [4], tocolytic [5], immunomodulatory [6] and contraceptive agent in female rodents [7] as well as has having spermatotoxic or antispermatogenic effect in male rats [8].

However, due to scanty information from literature on the effect of *Jatropha gossypifolia* on kidneys, livers and hearts in male rats, this study therefore aims at investigating the effect of this plant on these aforementioned visceral organs in male rats.

MATERIALS AND METHODS

Experimental Animals

Adult male rats weighing between 80 g – 120 g bred in the Pre-Clinical Animal House of the College of Medicine and Health Sciences, Afe Babalola University were used. They were housed under standard laboratory conditions and had free access to feed and water; they were acclimatized for two weeks to laboratory conditions before the commencement of the experiments. All experiments were carried out in compliance with the recommendations of Afe Babalola University Ethics Committee on guiding principles on care and use of animals.

Plant Material

Fresh samples of *Jatropha gossypifolia* plants were collected from the Botanical garden of the University of Ibadan, and were authenticated in the Forestry Research Institute of Nigeria (FRIN), Jericho, Ibadan where a voucher specimen (No. FHI. 110178) was deposited in their Herbarium.

Preparation of Ethanol Extract of *Jatropha gossypifolia* (EEJG)

Large quantity (1.5 kg) of fresh specimens of the leaves of *Jatropha gossypifolia* were washed free of debris and air-dried. The dried stems and leaves were pulverized using laboratory mortar and pestle. Weighted portion (600.00 g) of the pulverized specimen with 70 % ethanol (1:2 wt./vol.) for 72 hours at room temperature. The resulting solution was then filtered using a wire-gauze and a sieve with tiny pores (0.25 mm). The 70 % ethanol

was later evaporated using water-bath to give a percentage yield of 10.96 % of the starting material. The dried material was reconstituted in distilled water to make up test solutions of known concentrations.

Ten gramme of EEJG were dissolved in 100 mL of distilled water to give a concentration of 0.1g/ml.

The dosage of EEJG administered in this study was in accordance with those reported by [8].

Experimental Design

Twenty male (80 – 120 g) rats were randomly divided into four groups, with each consisting of five animals. The four groups were subjected to the following oral treatments once a day for thirty (30) days:

Group I: received 0.5 mL/100 g of distilled water as control group

Group II: received 62.5 mg/kg of EEJG

Group III: received 125 mg/kg of EEJG

Group IV: received 250 mg/kg of EEJG

Collection of Tissue Samples

Twenty four hours (day 31) after the last dosing of the groups, all the animals were sacrificed by an overdose of diethyl ether and the kidneys, livers and hearts were harvested (isolated).

Histological Preparation of Tissues

After harvesting the tissues, they were immediately fixed in 10 % formalin. The tissues were then cut in slabs of about 0.5 ml transversely and the tissues were dehydrated by passing through different grades of alcohol. 70 % alcohol for 2 hours, 75 % alcohol for 2 hours, 100 % alcohol for 2 hours and finally 100 % alcohol for 2 hours. The tissues were then cleared to remove the alcohol; the clearing was done for 6 hours using xylene. The tissues were then infiltrated in molten paraffin wax for two hours in an oven at 57 °C. Thereafter the tissues were embedded. Serial sections were cut using rotary microtome at 5 micron (5µm) up from water.

The satisfactory ribbons used were picked from a water beta (50 - 55 °C) with microtome slide that has been coated on one side with egg albumin as an adhesive and the slides were dried in an oven. Each structure was deparaffinised in xylene for 1 minute before immersed in absolute alcohol for 1 minute and later in descending grades of alcohol for about 30 seconds each to dehydrate it. The slides were then rinsed in water and immersed in alcoholic solution hematoxylin for about 18 minutes. The slides were rinsed

in water, then differentiated in 1 % acid alcohol and then put inside a running tap water to blue and then counter stained in alcoholic eosin for 30 seconds and rinsed in water for a few seconds before being immersed in 70 %, 90 % and twice in absolute alcohol for 30 seconds, each to dehydrate the preparations. The preparations were cleared of alcohol by dipping them in xylene for 1 minute. Each slide was then cleared, blotted and mounted with DPX and cover slip and examined under the microscope. Photomicrographs were taken at $\times 100$ and $\times 400$ magnifications.

RESULTS

Kidneys

Plates 1 and 2 respectively show the transverse sections through the kidneys of the control rat and rat treated with 250 mg/kg of EEJG for 30 days.

Treatment of rats with all the treatment doses of EEJG (62.5 mg/kg, 125 mg/kg and 250 mg/kg) produced no visible lesions on the kidneys, which is similar to what was observed in the control rats.

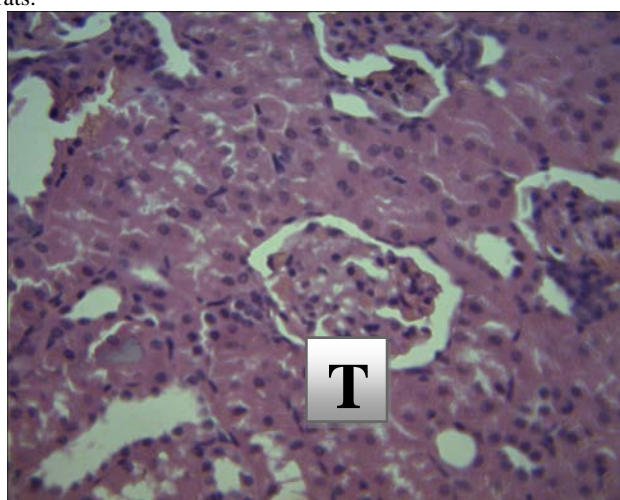


Plate 1: Effect of 30 days treatment of rat with distilled water (control) on rat kidney ($\times 400$). Photomicrograph showing normal tubule (T) with no visible lesions.

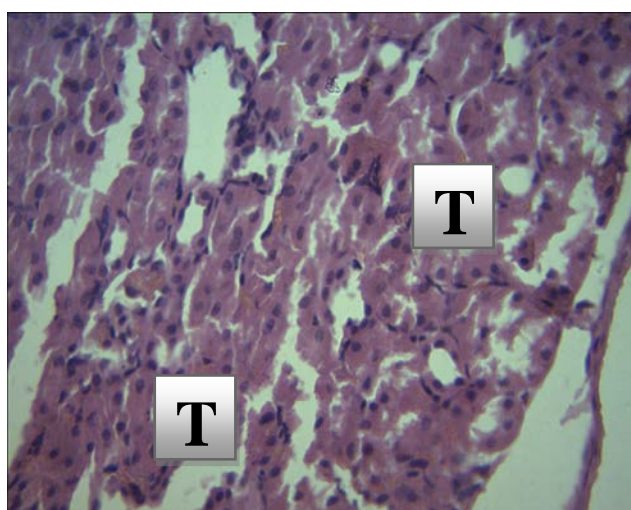


Plate 2: Effect of 30 days treatment of rat with EEJG (250 mg/kg) on rat kidney ($\times 400$). Photomicrograph showing normal tubule (T) with no visible lesions seen.

Livers

Plates 3 and 4 respectively show the transverse sections through the livers of control rat and rat treated with 250 mg/kg of EEJG for 30 days.

Treatment of rats with all the treatment doses of EEJG (62.5 mg/kg, 125 mg/kg and 250 mg/kg) produced no visible lesions in the livers, which is similar to that observed in the control rats.

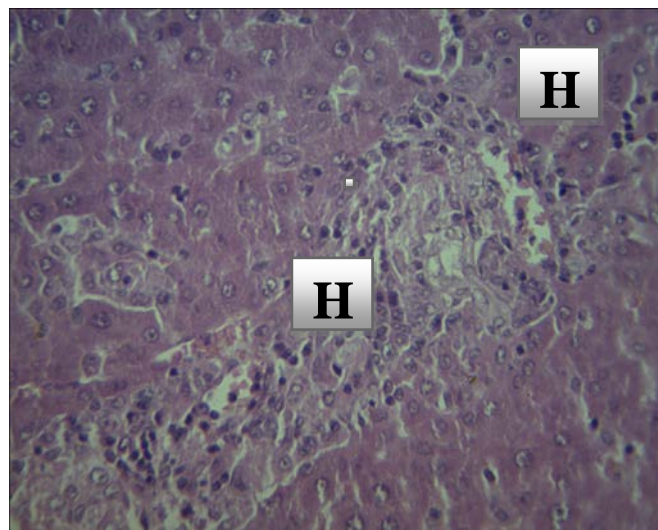


Plate 3: Effect of 30 days treatment of rat with distilled water (control) on rat liver ($\times 400$). Photomicrograph showing normal hepatocytes (H) with no visible lesion.

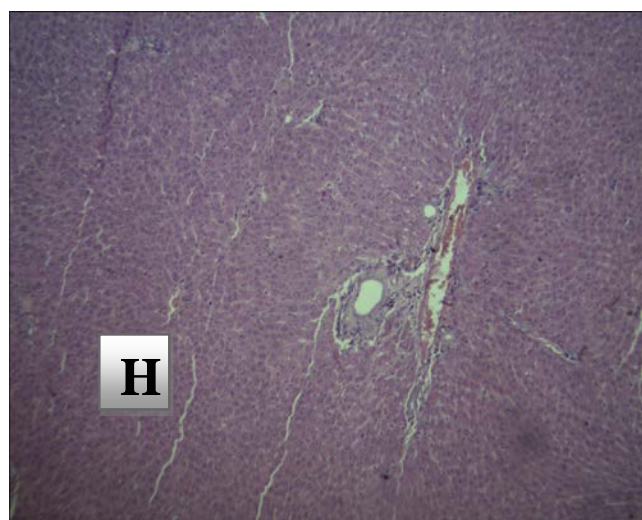


Plate 4: Effect of 30 days treatment of rat with EEJG (250 mg/kg) on rat liver ($\times 100$). Photomicrograph showing normal hepatocytes (H) with no visible lesion.

Hearts

Plates 5 and 6 respectively show the transverse sections through the hearts of control rat and rat treated with 250 mg/kg of EEJG for 30 days.

Treatment of rats with all the treatment doses of EEJG (62.5 mg/kg, 125 mg/kg and 250 mg/kg) produced no visible lesions in the hearts, which is similar to what was observed in the control rats.

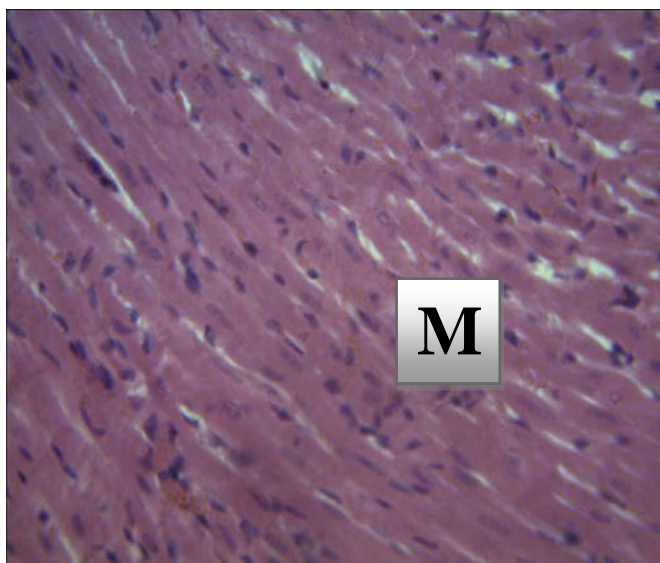


Plate 5: Effect of 30 days treatment of rat with distilled water (control) on rat heart ($\times 400$).
Photomicrograph showing normal myocardium (M) with no visible lesion.

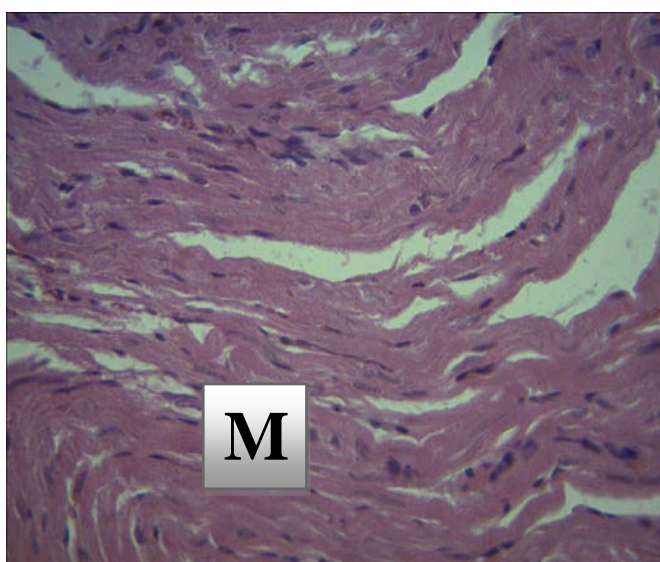


Plate 6: Effect of 30 days treatment of rat with EEJG (250 mg/kg) on rat heart ($\times 400$).
Photomicrograph showing normal myocardium (M) with no visible lesion.

DISCUSSION

Photomicrographs of the kidneys of extract treated rats revealed that the extract produced no visible lesions on the kidneys which probably indicate that the extract has no toxic effect on the kidneys at histological level. Contrary result was reported by [9] in the *Erythrophleum africanum* extract treated rats.

Photomicrographs of the livers of extract treated rats revealed that the extract produced no visible lesions on the livers which probably indicate that the extract has no toxic effect on the livers at histological level. Similar result was reported by [10] in *Garcinia kola* extract treated rats.

The photomicrographs of the hearts of extract treated rats revealed that the extract produced no visible lesions on the hearts which probably indicate that the extract has no toxic effect on the hearts at histological level. Contrary result was reported by [11] in *Piper sarmentsoum* extract treated rats.

In conclusion, this study has shown that the crude extract of *Jatropha gossypifolia* has no toxic effects on rats visceral organs (kidneys, livers and hearts), nevertheless, considering our initial physiological findings in animal model, it is recommended that moderation should be exercised in consumption of *Jatropha gossypifolia* for medicinal purposes.

Conflict of Interest- We vehemently declare that there is no conflict of interests in this research work.

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