Research Article

Histopathological Effects of Crude Extracts of *Portulaca oleracea* in Male Rats Viscera

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ABSTRACT

The extracts (AEPO and MEPO) were prepared using cold maceration. The extracts (25 mg/kg, 50 mg/kg and 75mg/kg) and control (distilled water) were orally administered to the animals (5 per group) for 50 days for histopathological study. Photomicrographs of the kidneys of extracts (AEPO and MEPO) treated rats revealed that the extracts caused no visible lesions in the kidneys, which is similar to what was observed in the control rats. Photomicrographs of the livers of extracts (AEPO and MEPO) treated rats revealed that the extracts caused diffused cellular infiltration of the periportal area by mononuclear cells, which is similar to what was observed in the control rats. It can therefore be concluded that *Portulaca oleracea* probably has no deleterious effect at histological level on the livers and kidneys in male rats.

Keywords: *Portulaca oleracea*, Histology, Kidneys, Livers, Rats.

INTRODUCTION

Portulaca oleracea belongs to the family of Portulacaceae. It is commonly called Purslane in English language, babbajibji in Hausa language and esan omode or papas an in Yoruba language. It is a fleshy annual herb, much-branched and attaining 30 cm long [1].

It is used medicinally in Ghana for heart-palpitations [2]. The plant is used as a diuretic in Nigeria [3]. A tisane of the plant is drunk in Trinidad as a vermifuge [4]. At some areas near Benin City (Nigeria), the plant, along with other ingredients is taken as an aid to the development of the foetus [5].

It has been reported that its aqueous and methanol extracts have contractile effects on isolated intestinal smooth muscle in *in-vitro* preparations [6]. Its extracts have been reported to have protective effects on hypoxic nerve tissue [7], anti-inflammatory effects [8], wound-healing activity [9] as well as has having spermatotoxic or antispermatogenic effect in male rats [10]. Its skeletal muscle relaxant effect has also been reported [11].

However, due to scanty information from literature on the effect of *Portulaca oleracea* on kidneys and livers 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 150 g and 250 g bred in the Pre-clinical Animal House of the college of Medicine, University of Ibadan 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 University of Ibadan Ethics Committee on guiding principles on care and use of animals.

Plant Material

Fresh specimens of *Portulaca oleraceae* were collected from the Botanical Garden of the Forestry Research Institute of Nigeria, Jericho, Ibadan, and was authenticated in the above named institute where a voucher specimen (No FHI 108334) was deposited.

Preparation of the Extracts

Large quantity of the fresh specimens of *Portulaca oleracea* were washed free of soil and debris, and the roots were separated from the leaves and stems. The leaves and stems were air-dried for six weeks, and the dry specimens were pulverized using laboratory mortar and pestle, and then divided into two samples A and B.

(i) Aqueous Extract of *Portulaca oleracea* (AEPO)

Weighted Portion (431.33 g) of sample A was macerated and extracted with distilled water (1:2 wt/vol) for 72 hours at room temperature (26 – 28^{O}C). The resulting solution was then filtered using a wire-gauze and a sieve with tiny pores. The distilled water was later evaporated using steam bath to give a percentage yield of 11.8 % of the staring material. The dried material was reconstituted in distilled water to make up test solutions of known concentrations.

(ii) Methanolic Extract of *Portulaca olearacea* (MEPO)

Weighted portion (420.52 g) of sample B was macerated and extracted with 70 % methanol (1:2 wt/vol) for 72 hours at room temperature (26 – 28^{O}C). The resulting

solution was then filtered using a wire-gauze and a sieve with tiny pores. The 70 % methanol was later evaporated using steam bath to five a percentage yield of 10.2 % of the starting material. The dried material was reconstituted in distilled water to make up test solutions of known concentrations.

Ten gramme of AEPO and MEPO were dissolved in 100 mL of distilled water to give a concentration of 0.1 g/mL.

The dosages of AEPO and MEPO administered in these studies were in accordance with those reported by [12].

Experimental Design

Thirty-five male rats (150 – 250 g) were randomly divided into seven groups, with each consisting of five animals. The seven groups were subjected to the following oral treatments once a day for fifty (50) days:

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

Group II received 25 mg/kg of AEPO.

Group III received 50 mg/kg of AEPO.

Group IV received 75 mg/kg of AEPO.

Group V received 25 mg/kg of MEPO.

Group VI received 50 mg/kg of MEPO.

Group VII received 75 mg/kg of MEPO.

Collection of Tissue Samples

Twenty four hours (day 51) after the last dosing of the groups, all the animals were sacrificed by an overdose of diethyl ether and the kidneys and livers 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 ^{0}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 ^{0}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 ×100 and ×400 magnifications.

RESULTS

Kidneys

Plates 1 and 2 respectively show the transverse sections through the kidneys of the control rat and rat treated with 75 mg/kg of MEPO for 50 days.

Treatment of rats with all the treatment doses of AEPO and MEPO (25 mg/kg, 50 mg/kg and 75mg/kg) produced no visible lesions on the kidneys, which is similar to what was observed in the control rats.

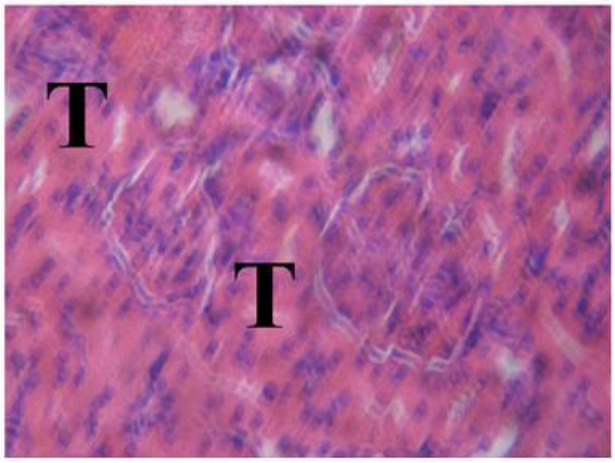

Plate 1: Effect of 50 days treatment of rat with distilled water (control) on rat kidney (×400).

Photomicrograph showing normal renal tubule (T) with no visible lesion.

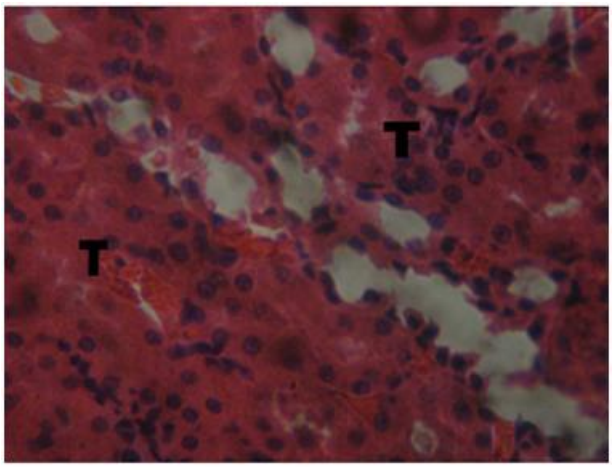

Plate 2: Effect of 50 days treatment of rat with MEPO (75 mg/kg) on rat kidney (x400)

Photomicrograph showing normal renal tubule (T) with no visible lesion.

Liver

Plates 3 and 4 respectively show the transverse sections through the livers of the control rat and rat treated with 75 mg/kg AEPO for 50 days.

Treatment of rats with all the treatment doses of AEPO and MEPO (25 mg/kg, 50 mg/kg and 75mg/kg) caused diffused cellular infiltration of the periportal area by mononuclear cells, which is similar to what was observed in the control rats.

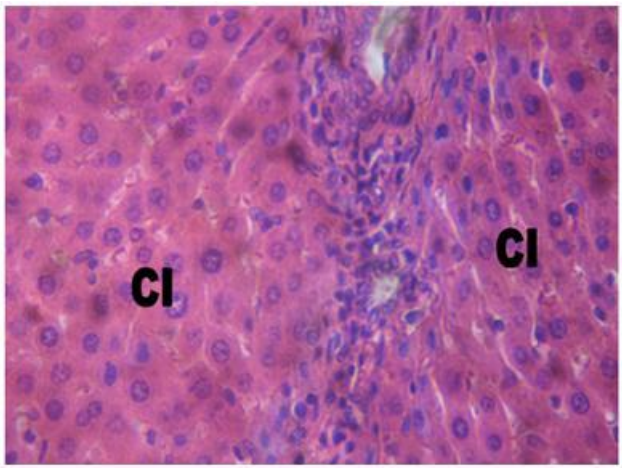

Plate 3: Effect of 50 days treatment of rat with distilled water (control) on rat liver (×400).

Photomicrograph showing diffused cellular infiltration (CI) of the periportal area by mononuclear cells.

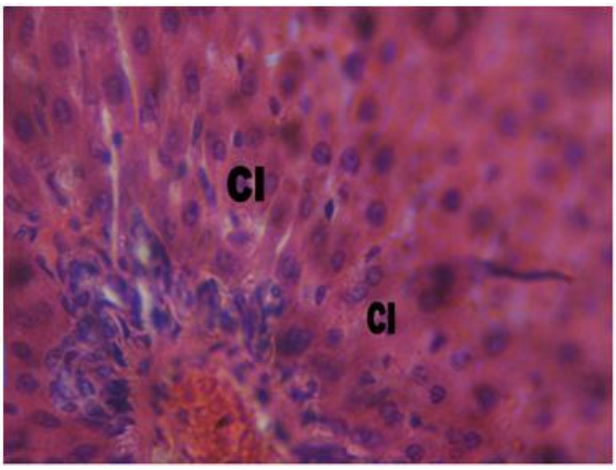

Plate 4: Effect of 50 days treatment of rat with MEPO (75 mg/kg) on rat liver (x100)

Photomicrograph showing diffused cellular infiltration (CI) of the periportal area by mononuclear cells.

DISCUSSION

Photomicrographs of the kidneys of extracts (AEPO and MEPO) treated rats revealed that the extracts produced no visible lesions on the kidneys which probably indicate that the extracts have no toxic effects on the kidneys at histological level. Contrary result was reported by [13] in the *Erythrophleum africanum* extract treated rats.

Photomicrographs of the livers of the extracts (AEPO and MEPO) as well as control rats revealed that different doses of the extracts caused diffused cellular infiltration of the periportal area by mononuclear cells, which is similar to what was observed in the control rats. Contrary result was reported by [14] in the *Vitex doniana* extract treated rats. Since this pathologic observation is common to the crude extracts treated as well as the control rats, it can be inferred that this pathologic observation was not due to the effects of treatments with the crude extracts, this probably indicates that the crude extracts have no toxic effect on the livers at histological level. However, this pathologic observation could be due to some environmental or genetic factors.

In conclusion, this study has shown that the crude extracts of *Portulaca oleracea* have no toxic effects on the visceral organs (kidneys and livers), nevertheless, considering our initial findings on haematology and blood chemistry in animal model, it is recommended that moderation should be exercised in the consumption of *Portulaca oleracea* for medicinal purposes.

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