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Effect of *Haematostaphis barteri* (blood plum) leaf extracts on histopathalogical parameters of albino rats

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Abstract
Haematostaphis barteri has been extensively used as food supplement and in the treatment of haemorrhoids, stomach aches and vomiting. The present study is aimed at assessing the effects of the aqueous, ethanol and methanol leaf extracts of *Haematostaphis barteri* on the histopathological parameters in rats. The fresh leaves of *Haematostaphis barteri* were collected, dried, powdered and extracted using water, 95% ethanol and methanol. Graded doses of 25, 50, 75 and 100 mg/kg of the extracts administered for four weeks were used to evaluate the histopathological parameters in rats. Histopathological findings due to the subchronic administration of the extracts showed villous atrophy, goblet cell hyperplasia and presence of thick mucus exudates in the small intestines. There was severe glomerular and tubular degeneration of the kidneys and moderate pulmonary congestion and thickening of the interalveolar septae. Therefore, the use of *Haematostaphis barteri* plant part especially the leaves for either food supplement or medicinal purposes for long period has to be with caution because of its effect on the lungs, gastrointestinal tract and kidneys.

Keywords: *Haematostaphis barteri;* Leaves; Extracts; Histopathology

INTRODUCTION

Haematostaphis bartei Hook. F is Greek-blood red grapes referring to the dark red fruits. The bark of the tree is grey and rough. The Fulanis call the plant as Tursuji, while the Hausa call it Jar danya (Keay *et al*., 1964). *Haematostaphis barteri is* of the genus *Haematostaphis* Hook F. and a member of the Anacardiaceae family. Usually it occurs among rocks in savannah countries. In Northern Nigeria it is commonly found in Adamawa state around Hong and Song local government areas, and also in Gombe state around Kaltungo area. It is commonly used to cure haemorrhoids, stomach aches and vomiting (Shahina, 1989). *Haematostaphis barteri* has been extensively used for food and medicinal purposes in the North East Arid Zone of Nigeria. Tadzabia and his colleagues (2013) and Kubmarawa *et al* (2008) reported the presence of some phytochemical constituents in the plant parts, which may be responsible for its therapeutic potentials in haemorrhoids, stomachaches and vomiting (Bolza and Keating, 1972; Hallam, 1979; Hans-Jurgen, 1990). It can also be used as a food supplements in northern Nigeria (Tadzabia *et al*., 2013). The widespread usage

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of this plant part (leaves, fruits and bark) as medicinal agent and as food supplements needs to be evaluated for safety purposes. Therefore, this study is embarked upon in order to evaluate the effects of the leaf extracts of *Haematostaphis barteri* on histopathological parameters in rats.

EXPERIMENTAL

Collection and preparation of plant material. Fresh leaves of *H. barteri* Hook F. was collected from Hildi in Hong Local Government area of Adamawa State. The freshly gathered leaves were identified by Prof. E. T. Rabo, a plant Taxonomist in the Department of Biological Science, Faculty of Science University of Maiduguri. A voucher specimen number (00765) was assigned and sample deposited in the Research Laboratory of the Department of Chemistry. The leaves were air-dried and pulverized to a fine power and kept at room temperature until used.

Extraction of the plant material. About 400 g each of the air-dried leaves of *H. barteri* was placed in Alundum thimble and its contents were introduced into Soxhlet extractors which were connected to a condenser. The solvent used for the extraction are 95% ethanol and methanol. The extraction lasted for a period of 24 hours. The crude extracts were transferred into conical flasks and concentrated on water bath for 2 hours. The extracts were collected and stored at 4^{o}C until used. The yields were also determined. Similarly, the water extract was obtained by maceration process at which the yield was also determined.

Animals. Twenty-five (25) Wistar albino rats of both sexes weighing between 120 g and l90 g were obtained from Faculty of Veterinary Medicine; they were maintained under uniform condition and with free access to grower's marsh (Sander's Nigeria Ltd) and water ad libitum. The rats were divided into five groups of 5 rats each and were labeled accordingly for easy identification. Groups B, C, D and E were orally administered with 25, 50, 75 and l00mg/kg body weight of the leaf extracts of *H. barteri* respectively daily for 28 days, while the control (group A) received normal saline for the same period. The rats were weighed every week, and blood samples were collected from the tail of the rats for haematological analysis weekly for four weeks. The rats were then sacrificed at which the liver, kidneys, lungs, heart and intestine were removed and fixed in formal saline for routine histopathological processing.

Histopathological processing. The organs were fixed in 10% formalin for 48 hours. It was then trimmed to 5mm thick and transferred directly to 70% ethanol and then processed through graded percentage of ethanol (80%, 95% and 100%). Tissues were cleaned in xylene and transferred to molten paraffin wax in the oven maintained at 63^{o}C. The tissues were embedded in pure paraffin wax. Tissues were sectioned at 7µm thickness and stained with Haematoxylin and Eosin (H and E) for light microscopic observation. The histopathological lesions were photographed at 200 magnification (×200), using olymphusVanox-T microscope.

RESULTS

Histopathological findings. The results showed that kidneys, lungs and small intestines were the organs affected. The histopathology of kidneys treated with distilled water showing normal kidney cortex is shown in Figure 1. The kidneys of rat treated with 25 mg/kg of methanol for 4 weeks (Figure 2) and those treated with 50 mg/kg of 95% ethanol (Figure 3) showed focal areas of glomerular and tubular degeneration, mild interstitial mononuclear cell infiltration. The lungs of rat treated with distilled water showing normal histological characteristics are shown in Figure 4. The lungs of rat treated with 25 mg/kg of 95% ethanol for 4 weeks showing moderate

pulmonary congestion and thickening of interalveolar septae is shown in Figure 5. The small intestines showed marked globlet cell hyperplasia and presence of thick mucus exudates attached to the mucosa. There was also severe villous atrophy (loss, clubbing and stunting of villi) (Figure 6). Liver and cardiac muscles were not affected by the subchronic extracts administration.

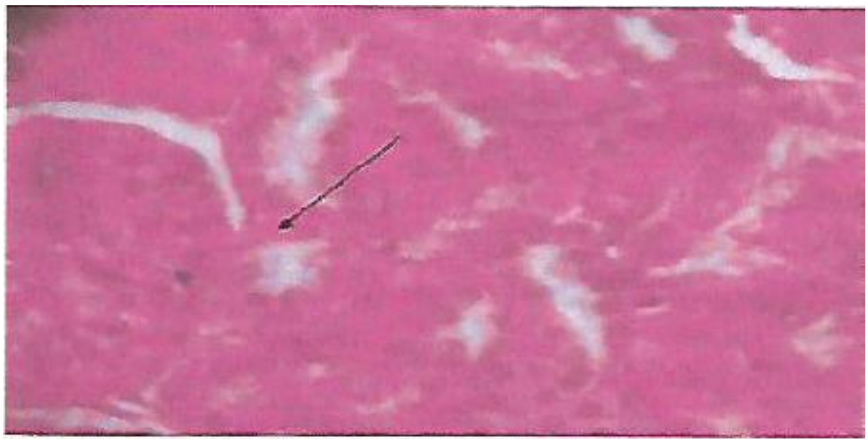

Fig 1: Normal kidney cortex of rat treated with distilled water showing intact structures (H&Ex500)

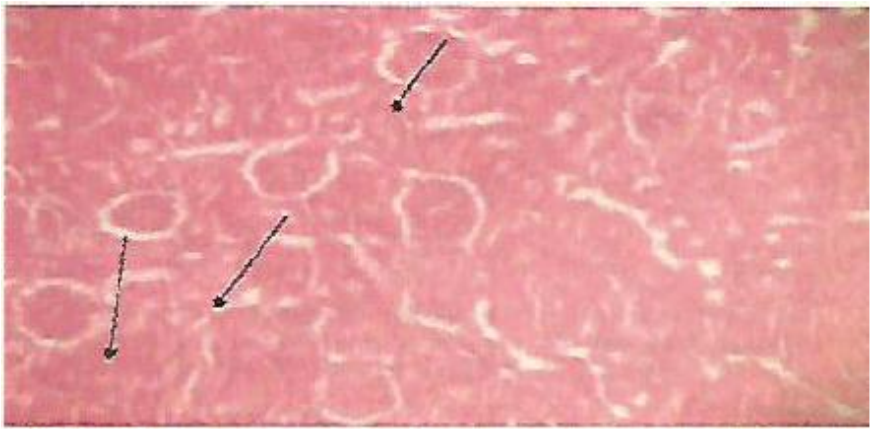

Fig 2: The kidney of albino rat treated with 25mg/kg of methanol extract of *Haematostaphis barteri* for 28 days showing focal areas of glomerular and tubular degeneration (H&E x 400).

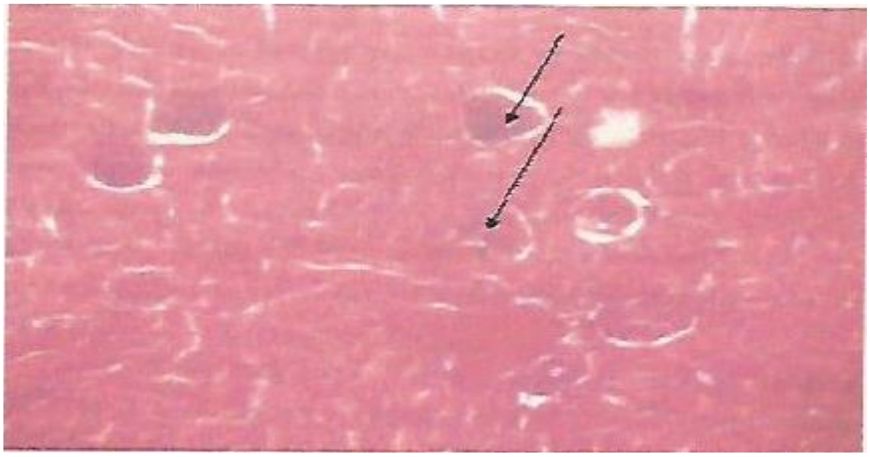

Fig 3: The kidney of rat treated with 50mg/kg of 95% ethanol extract of *Haematostaphis barteri* for 28 days showing diffuse glomerular and tubular degeneration with mild mononuclear cell infiltration (H&E x 400).

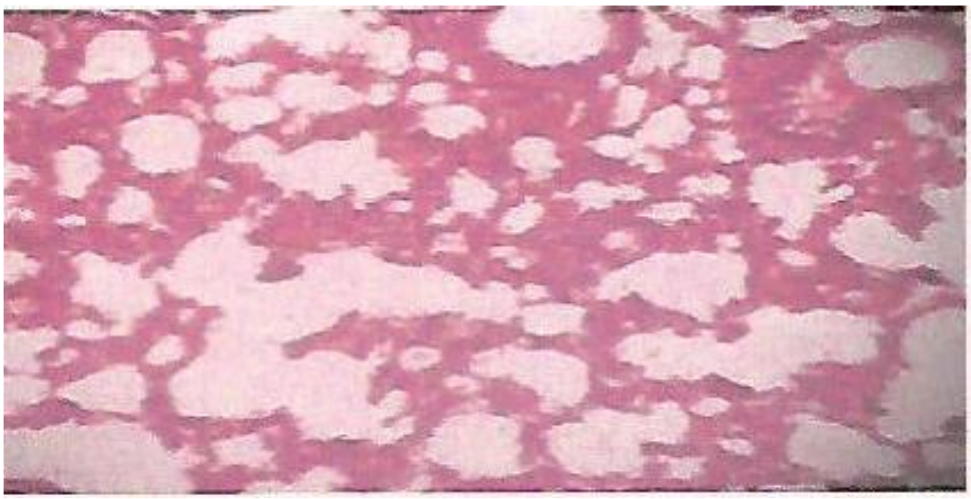

Fig 4: Apparently normal lung of albino rat treated with distilled water showing intact structures (H&E x 350)

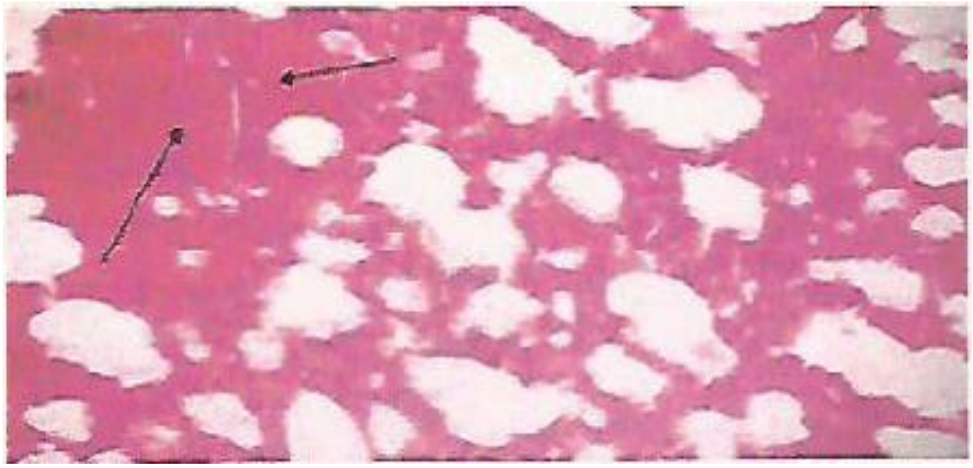

Fig 5: The lung of albino rat treated with 25mg/kg of ethanol extract of *Haematostaphis barteri* for 28 days Showing moderate pulmonary congestion and thickening of interalveolar septae, especially in the upper left quadrant (H&E x 400).

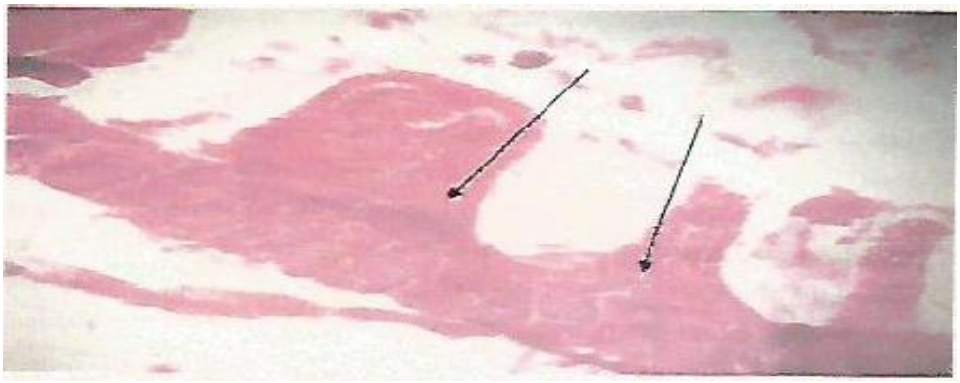

Fig 6: The small intestine of albino rat given 50mg/kg of ethanol extract of *Haematostaphis barteri* for 28 days showing severe villous atrophy (loss, clubbing and stunting of villi) and goblet cell hyperplasia (H&E x 400).

DISCUSSION

The administration of the extracts to rats has resulted in pathological changes in the lungs, kidney, and small intestines. The lesions observed in the kidneys were mainly glomerular and tubular degenerations, mononuclear cell infiltration, suggesting that the toxic principle may be excreted through the kidneys and is toxic to the tubular epithelial cells. This is in agreement with the findings of Rabo *et al* (2000) in which similar observations were made. Pulmonary congestion and thickening of interalveolar septa were observed in this study indicating wide distribution of the toxic principle to various organs and tissues of the body including the respiratory system. Small intestines showed villous atrophy, globlet cell hyperplasia and mucus exudates. This suggests that the extract has irritant property on the intestinal mucosa leading to the observed lesions. The presence of a phytochemical constituent saponin in this plant extract which was equally reported by by Rabo and his colleagues (2000) may likely be the explanation for the pathological injury and a strong reason for the agreement between both studies. It is possible that long term administration of this extract may affect the body defense mechanism through immunosuppression.

Conclusion. The leaf extracts of *Haematostaphis barteri* causes damage to kidneys, lungs and small intestine if consumed in high quantity and for long period of time. These amply justify that the plant extracts need to be use with caution for both medicinal and economic purposes.

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