

Full Length Research Paper

Evaluation of Hepatoprotective Effects of *Rauwolfia Vomitoria* Leaf Extract on the Kidneys of Adult Wistar Rats

*¹Ezejindu D. N., ¹Nwokoro Tochukwu., ²Obaji NN.

¹Department of Anatomy, College of Health Science, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria.

²Department of Physiology, College of Health Sciences, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria.

Abstract

***Rauwolfia vomitoria* is a medicinal plants that have served through the ages as the mainstay in the treatment of variety of diseases and preservation of human health. The aim of this study is to evaluate the hepatoprotective effects of oral administration of *Rauwolfia vomitoria* leaf extract on the kidneys of wistar rats weighing between 195-215kg. They were divided into four groups designated as A,B,C and D. Group A served as the control and was orally administered with 0.4ml of distilled water, the experimental groups; B,C and D were administered with 0.6ml, 0.75ml and 0.81ml of *Rauwolfia vomitoria* leaf extract respectively for twenty eight days. Twenty four hours after the last administration, the animals were weighed, anaesthetized under chloroform vapour and dissected. Kidney tissues were removed, weighed, and trimmed down for histological studies. The final body weighed of the experimental groups increased significantly ($P<0.001$) with the control. The relative kidney weights of the experimental groups were statistically similar with the control. Histological results showed normal kidney cell architecture in the experimental groups relative to the control. This study therefore suggests that consumption of *Rauwolfia vomitoria* leaf extract at different doses did not induce the kidneys of adult wistar rats.**

Key words: kidney weight, Body weight, *Rauwolfia vomitoria*, Hepato protecture, Wistar rats.

INTRODUCTION

Rauwolfia vomitoria is one of the medicinal plants that have served all through the ages as the mainstay in the treatment and preservation of human health.

It belongs to the family opocynacea and its common names include serpent wood, swizzler stick among others. The parts that are commonly used for herbal remedies are roots, root bark, leaves and stem-bark (Gill, 1992).

The plant is of different species. The Indian species is called *Rauwolfia serpentina*. The African species of the plant *Rauwolfia vomitoria* had twice the amount of

reserpine of the indian species, *Rauwolfia serpentine* (Kutalek and Prinz, 2007).

The main alkaloid present in *Rauwolfia* which is called *reserpine* was first discovered by swiss scientist, schiller and muller of CIB pharmaceuticals in Switzerland in 1952. Reserpine according to Okpako (1991), is a major constituent of antihypertensive drugs.

Traditionally, it is used against snakebite, fever, and nervous disorders. In Nigeria and Ghana, herbalists used it as an emetic and purgative, in the same region, children are treated with this plant for cerebral cramps, jaundice and gastrointestinal disorders (Zohera and Uriel, 2005).

The pharmaceutical derivatives are used mainly as anti-hypertensive and sedative drugs. Its sedative property is attributed to its ability to balance body response to stress and anxiety and to increase oxygen delivery to the brain (Oliver, 1982).

*Corresponding Authors Email: damianezejindu@gmail.com;
Tel: +2348032715300

The roots and the leaves of *Rauwolfia vomitoria* are brewed as tea and used in humans for treatment of hypertension, insanity, and cholera (Shavorov, 1965).

A bioactive carboline alkaloid, alstonine, present in the root and leaves of *Rauwolfia vomitoria* have anti-cancer activity. (Denis *et al.* (2006) and Pettit *et al.* (1994)) While the antipyretic effect of the leaf extract has also been demonstrated (Amole and Onabanjo, 1991).

Folk medicinal uses of the roots are extensive, particularly for their emetic, purgative, dysenteric, abortive and insecticidal properties (Principle, 1989).

The kidneys participate in whole body homeostasis regulating acid base balance, electrolyte concentrations, extracellular fluid volume and regulating of blood pressure (Schrier *et al.*, 1972). The kidney is the primary organ of drug and xenobiotic excretion, toxic effects of chemicals and drug usually appear primarily in the kidney tissues (Azab *et al.*, 2013).

Consequently, the aim of the present study is to investigate the hepatoprotective effects of *Rauwolfia vomitoria* leaf extract on the kidney of adult wistar rats.

MATERIALS AND METHOD

Breeding of Animals

Twenty wistar rats weighing between 195-215kg were procured from animal house of Anatomy Department, University of Calabar, Cross River State, Nigeria. They were bred in the animal house of university of Uyo, Akwa Ibom State. They were allowed for a period of seven days for acclimatization under normal temperature (27°C -30°C) before their weights were taking. They were fed ad libitum with water and guinea feed pellets from Agro fed mill Nigeria ltd.

Drug preparation

Rauwolfia vomitoria leaves were plucked from Eket in Akwa Ibom State and were identified and authenticated at herbarium unit of botany department, University of Uyo. They were dried in an oven at a temperature of 50°C and crushed using laboratory blender. Extraction of the extract was done using ethanol. 300mg of the extract/kg body weight were dissolved in 10mls of distilled water and administered to the animals.

Experimental protocols

The twenty animals were weighed and allocated into four groups of five animals each. The groups were designated as A, B, C and D. Group A served as the control and received 0.4ml of distilled water; the experimental groups B, C and D received 0.6ml, 0.75ml and 0.81ml of *Rauwolfia vomitoria* leaf extract

respectively for twenty eight days. Twenty four hours after the last administration, the animals were weighed and recorded. They were anaesthetized under the influence of chloroform vapour and dissected. Kidney tissues were removed and weighed. The tissues were trimmed down to a size of 3mmx 3mm thick and fixed in zinkers fluid for four hours for histological studies.

Tissues Processing

For easy study of sections under microscope, the tissue passed through several processes of fixation, dehydration, clearing, infiltration, embedding, sectioning and staining. Fixation was carried out in zinkers fluid. The tissues remained in the fluid for four hours. After fixation, the tissues were washed over night under a stream tap water. Dehydration of the fixed tissues was carried out in different percentages of alcohol 50%, 70% and 90% absolute. After dehydration, tissues were cleared in xylene for two hours after which infiltration was done in molten paraffin wax at a temperature of 60°C for two hours each in two changes and then sectioned. Haematoxyline and eosine method was used.

RESULTS

Morphometric Analysis of Body weighed

The final body weight for the experimental groups B,C and D increased significantly ($P < 0.001$) Relative to the control (A). Table 1.

Morphometric Analysis of kidney weights

The relative kidney weights for the experimental groups B, C, and D increased significantly ($P < 0.001$) relative to the control (A). Table 2.

Histopathological Findings

Figure 1, 2, 3 and 4 shows the Histopathological structure of kidney.

DISCUSSION

Knowledge of the health attributes of plants dates back thousands of years. Today scientific research has identified essential minerals and compounds in plants that are not only required for proper nutrition but are responsible for health maintenance and disease prevention. These health promoting compound are referred to as phytonutrients.

Table 1. Comparison of mean initial and final body and weight change in all groups (A, B, C & D).

	GP A	GP B	GP C	GP D	F-RATIO	PROB OF SIG
INITIAL BODY WT	196.20±4.30	198.70±5.20	199.80±7.20	206.40±3.6.30	69.240	< 0.001
FINAL BODY WT	219.40±6.40	225.30±7.60	228.10±5.70	231.40±4.70	42.440	< 0.001
WEIGHT CHANGE	23.00±6.70	27.10±5.50	29.50±3.60	25.60±4.20	20.150	< 0.001

(Mean ±SEM given for each measurement)

Table 2. Comparison of mean relative kidney weight of all the groups (A, B, C & D)

	GP A	GP B	GP C	GP D	F. RATIO	PROB OF SIG.
KIDNEY WT	5.10±0.300	5.30±0.240	5.39±0.410	5.41±0.006	54.20	< 0.001

(Mean ± SEM given for each measurement)

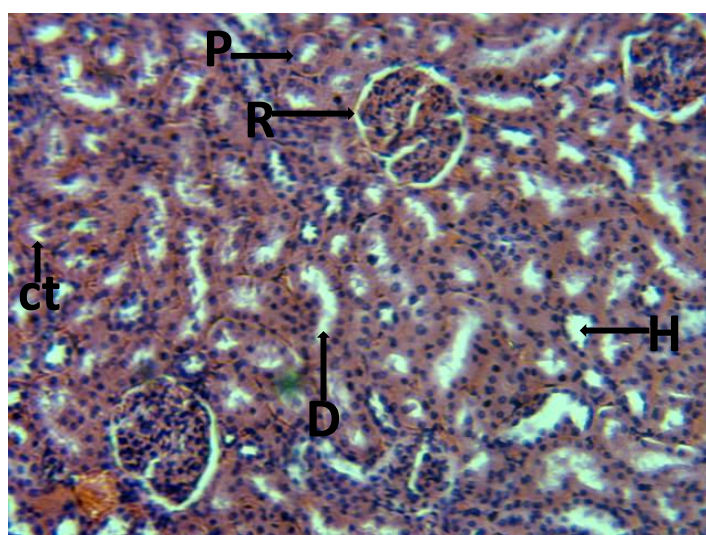


Figure 1. Micrograph 1(control) showing normal histological structure of renal corpuscle (R), proximal convoluted tubule (P), distal convoluted tubule (D), Henle loop (H), and collecting tubule (ct), stained by H & E technique, x 200.

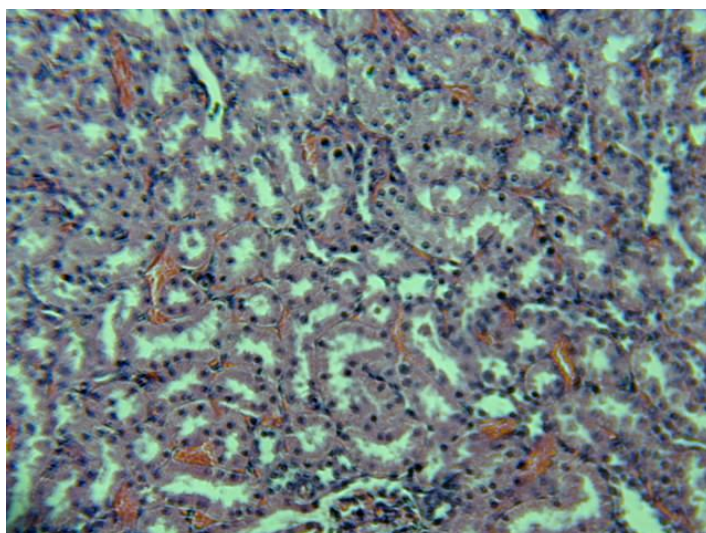


Figure 2. Micrograph 2 Group B, (treated with 0.6ml of *Rauwolfia vomitoria* leaf extract) showing normal histoarchitecture of the kidney, stained by H & E technique, x 200.

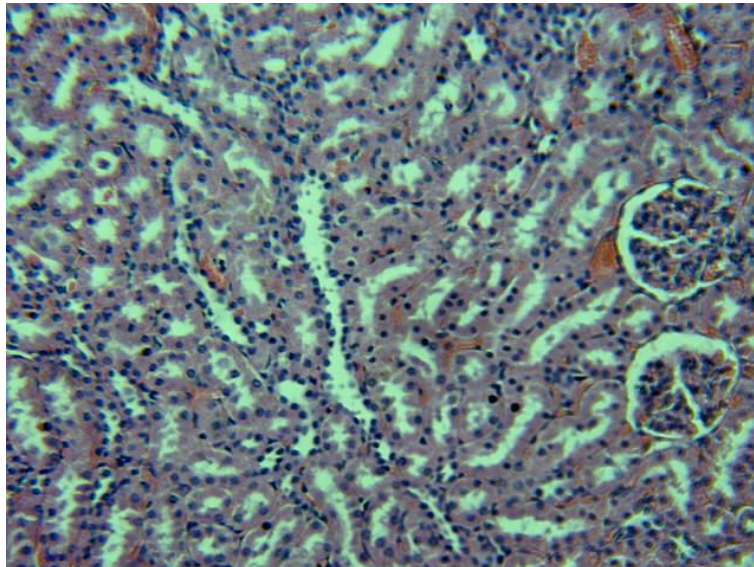


Figure 3. Micrograph 3 Group C, (treated with 0.75ml of *Rauwolfia vomitoria* leaf extract), showing none distortion of the histological structure of the kidney, stained by H & E technique, x 200.

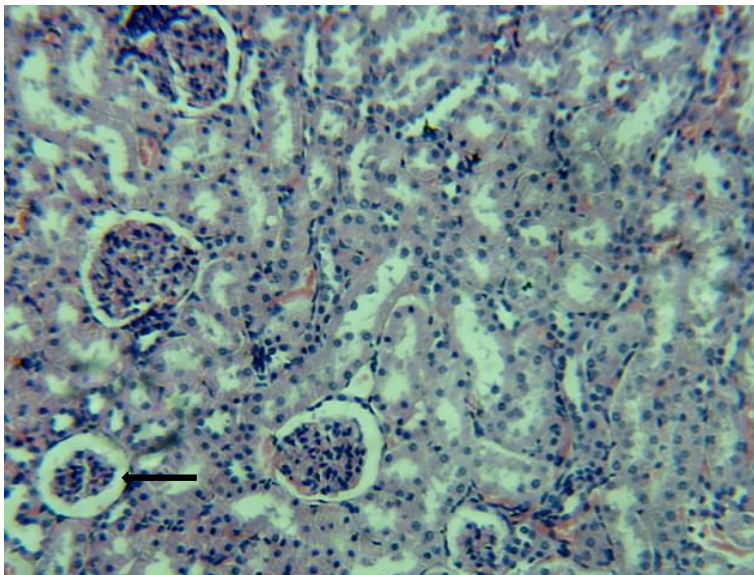


Figure 4. Micrograph 4 Group D,(treated with 0.81ml of *Rauwolfia vomitoria* leaf extract), showing normal histological structure of the kidney, though, vacuolation of renal corpuscle is observed (Arrow),stained by H & E technique, x 200.

Rauwolfia vomitoria is a phytonutrient whose consumption has been associated with reduced risks of cerebral cramps, jaundice, gastrointestinal disorder, hypertension, cardiovascular diseases and insanity (Shavorov, 1965).

The Pharmaceutical derivatives of *Rauwolfia vomitoria* are used mainly as antihypertensive and sedative drugs. Its sedative property is attributed to its ability to balance body response to stress and anxiety

and to increase oxygen delivery to the brain (Oliver, 1982)

Decoctions of leaves of *Rauwolfia vomitoria* has a powerful emetic effect and chopped leaves stewed with animal fat are applied to swellings (Burkill, 1994). The active component of *Rauwolfia vomitoria* as reported by gill is reserpine which reduces the cardiac output by negative isotropic effect and chronoscopic effects thereby reducing and relaxing theme which lead to

reducing total peripheral resistance and blood vessels and relaxing them which led them to reducing total peripheral resistance and blood pressure (Walker, 1996).

In the present study, the final body weight for the experimental groups treated with different doses of *Rauwolfia vomitoria* leaf extract increased significantly with the control. *Rauwolfia vomitoria* leaf extract in this instance function as a dietary supplement enhancing growth.

The comparison of the mean relative organ weight of the experimental animals with the control revealed no significance decrease or increase ($P < 0.00$). This could be as a result of antioxidant properties possessed by *Rauwolfia vomitoria* leaf extract.

The histopathological findings indicated that there were no histopathological lesions observed in the experimental groups treated with different doses of *Rauwolfia vomitoria* leaf extract compared with the control (A).

The present study therefore agrees with previous researches on antioxidant and hepatoprotective properties possessed by *Rauwolfia vomitoria* leaf extract.

CONCLUSION

From this study, we inferred that *Rauwolfia vomitoria* leaf extract administered in high and low doses has antioxidant and protective properties that could prevent damage to the kidneys.

REFERENCES

- Amole OO, Onabanjo AO (1991). Antipyretic effects of the extract of *Rauwolfia Vomitoria* in Rabbits Nig.J.Nat prod. Med 3:77-78.
- Azab S, Abdel-Dam M, Eidahshan O (2013). Phytochemical, cytotoxic, hepatoprotective and antioxidant properties of *Deionix regia* leaves extract Med. Chem. Res (In Press)
- Burkill HM (1994). Useful plants of West Tropical. Vol.2. families E-I Royal Botanical Gardens, Kew.
- Denis DL, Capodice JL, Gorrochum P, Katz AE, Buttyan R (2006). Antiprimate Cancer activity of a carboline alkaloid enriched extract from *Rauwolfia Vomitoria*. Int.J.Oncol 29 (5): 1065-1073.
- Gill LS (1992). Ethnomedical uses of plants in Nigeria Benin: Uniben Press, University of Benin.
- Kutalek R, Prinz A (2007). African Medicinal Plants in Yaniv Z and U. Bachrach (eds) Handbook of medicinal plants; New Delhi, CBS Publishers
- Okpako DT (1991). Principal of pharmacology: A tropical Approach: New York, Cambridge University Press.
- Oliver B (1982). Medicinal plants in Tropical West Africa plant acting on cardiovascular system. J Ethnopharmacol 5: 1-17.
- Pettit DK, Hoffman AS, Horbett TA (1994). Correlation between corneal epithelial cell outgrowth and monoclonal antibody binding to the cell binding domain of absorbed fibronectin.J.Biomed Mater Res. 28 (6): 685-91.
- Principle P (1989). The economic significance of plants and their constituents as drugs. In wagner H, HIKino H, Fam Sworth NR (Eds). Economic and Medicinal Research vol 3, Academic Press London Pp. 1-17.
- Schrier RW, Beri, TH, Judith A (1972). Mechanism of the Antidiuretic Effect Associated with interruption of parasympathetic pathways journal clinical investigation 51 (10:2613-20).
- Shavorov Z (1965). The healing powers of herbs with special references to obstetrics and gynecology 43-44.
- Walker AF (1996). Hearts and Herbs. Biologist 43:177-180.
- Zohera Y, Uriel B (2005). Handbook of medicinal Plants. Haworth Press

How to cite this article: Ezejindu DN, Nwokoro T, Obaji NN (2014). Evaluation of Hepatoprotective Effects of *Rauwolfia Vomitoria* Leaf Extract on the Kidneys of Adult Wistar Rats. Int. J. Med. Med. Sci. Vol. 1(2):21-25