Evaluation of Cardiac Histological Alterations Induced by Graded Doses of Ethanolic Extract of *Baphia nitida (Abosi)* in Adult Male Wistar Rats.

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ABSTRACT

Aim: This study aimed to investigate the histological effects of graded doses of ethanolic extract of *Baphia nitida* leaves on the heart of adult male Wistar rats following oral administration.

Study Design: Twenty-five adult male Wistar rats were randomly assigned into five groups (n=5). Group A served as the control and received normal feed only, Group B received 100 mg/kg Baphia nitida only, Group C received 200 mg/kg ethanolic extract of *Baphia nitida*, Group D received 300 mg/kg ethanolic extract of *Baphia nitida*, while Group E received 400 mg/kg ethanolic extract of *Baphia nitida*.

Place and Duration of Study: This study was carried out at the Department of Human Anatomy, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria.

Methodology: Fresh leaves of *Baphia nitida* were harvested from Igbariam Campus and authenticated at the Herbarium Unit, Department of Botany, Nnamdi Azikiwe University, Awka, Anambra State. The leaves were air-dried at room temperature and ground into coarse powder using a laboratory mill. Eight hundred grams (800 g) of the powdered leaves were macerated in 4 litres of ethanol for 48 hours using a mechanical shaker. Administration of the extract was carried out orally for twenty-one (21) consecutive days. Twenty-four hours after the last administration, the animals were anaesthetized with chloroform and sacrificed using the Ignasia method. The hearts were harvested, weighed, rinsed in normal saline, and fixed in 10% formalin for histological analysis. Data obtained were analyzed using ANOVA followed by post hoc LSD test, while body weight analysis was carried out using Student's dependent t-test. Acute toxicity study (LD50) of the extract was also conducted using thirteen rats through oral administration.

Results: Histological examination of the heart revealed mild to moderate myocardial inflammation, mild areas of hemorrhage, mild congestion of blood vessels, and evidence of tissue regeneration in treated groups. There were also alterations in selected cardiac parameters across the treatment groups when compared with the control group. The observed histological changes were more pronounced at higher doses of the extract.

Conclusion: The findings of this study suggest that ethanolic extract of *Baphia nitida* possesses relatively low acute toxicity but may induce mild dose-dependent histological alterations in cardiac tissues following prolonged administration. Although severe myocardial degeneration was not observed, continuous or excessive consumption of the extract may predispose cardiac tissues to subtle inflammatory and vascular changes.

Keywords: *Baphia nitida*, cardiotoxicity, histopathology, biochemical analysis, Wistar rats

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INTRODUCTION

The heart is a vital muscular organ responsible for maintaining blood circulation throughout the body by pumping oxygenated blood and nutrients to tissues while simultaneously facilitating the removal of metabolic wastes such as carbon dioxide and other toxic by-products. Proper cardiac function is essential for sustaining physiological homeostasis, and any structural or biochemical alteration in the myocardium may predispose individuals to severe cardiovascular disorders including myocardial inflammation, cardiomyopathy, arrhythmias, and heart failure. Cardiovascular diseases remain among the leading causes of morbidity and mortality globally, accounting for millions of deaths annually. Oxidative stress, inflammation, exposure to xenobiotics, and toxic metabolites have been implicated as major contributors to myocardial injury and degeneration (Benjamin et al., 2019).

In recent years, medicinal plants have attracted considerable scientific attention due to their therapeutic potentials, affordability, accessibility, and relatively lower adverse effects compared to synthetic drugs. The World Health Organization has reported that a significant proportion of the population in developing countries depends largely on traditional herbal medicine for primary healthcare management. Consequently, there has been increasing interest in evaluating the pharmacological, toxicological, biochemical, and histopathological effects of medicinal plants used in ethnomedicine. Several plant-derived bioactive compounds such as flavonoids, alkaloids, tannins, saponins, phenolics, and terpenoids have demonstrated antioxidant, anti-inflammatory, cardioprotective, hepatoprotective, nephroprotective, and neuroprotective activities (Adeyemi & Akindele, 2008; Onwukaeme, 1995).

Baphia nitida Lodd., commonly known as camwood or “Abosi,” is a tropical medicinal plant widely distributed across West Africa. The plant belongs to the family Fabaceae and has long been utilized traditionally for the treatment of inflammatory disorders, arthritis, sprains, wounds, rheumatism, asthma, gastrointestinal disturbances, and microbial infections (Neuwinger, 1996). Historically, Baphia nitida has also been used as a source of red dye and for cultural body coloration practices in many African communities (Dalziel, 1937). Phytochemical investigations have demonstrated that the plant contains significant quantities of flavonoids, tannins, phenolic compounds, alkaloids, and saponins which contribute to its medicinal properties (Akande et al., 2018).

Studies on Baphia nitida have revealed important pharmacological activities including antioxidant, anti-inflammatory, antimicrobial, antidiarrheal, anxiolytic, and neurosedative effects. Onwukaeme (1995) reported that flavonoids isolated from Baphia nitida exhibited significant anti-inflammatory activity in experimental animal models. Similarly, Adeyemi et al. (2006) demonstrated that ethyl acetate extract of Baphia nitida possessed neurosedative and muscle-relaxant properties in mice, while Adeyemi and Akindele (2008) further established its antidiarrheal activity. In another study, Chioma (2016) observed strong antioxidant and anti-inflammatory activities of methanol extract of Baphia nitida, suggesting its ability to scavenge reactive oxygen species and reduce oxidative tissue injury. The antioxidant properties of Baphia nitida were further supported by Akande et al. (2018), who demonstrated that ethanol extracts of the plant exhibited significant free radical scavenging activities attributable to its high phenolic and flavonoid content.

Oxidative stress has been recognized as one of the principal mechanisms involved in cardiac injury and myocardial degeneration. Excessive production of reactive oxygen species overwhelms endogenous antioxidant defense systems, leading to lipid peroxidation, mitochondrial dysfunction, protein oxidation, inflammatory responses, and cellular necrosis within cardiac tissues. Drug-induced cardiotoxicity, particularly from prolonged exposure to toxic agents such as paracetamol and heavy metals, has been associated with myocardial inflammation, vascular congestion, hemorrhage, oxidative stress, and degeneration of cardiac muscle fibers (Yousef et al.,2010). Consequently, medicinal plants possessing antioxidant and anti-inflammatory activities are increasingly being investigated for their cardioprotective potentials.

Several experimental studies conducted by Nweke Elizabeth Obioma and colleagues have demonstrated the protective and therapeutic effects of medicinal plant extracts against tissue injury induced by toxic substances in Wistar rats. Nweke et al. (2019) reported the protective effect of ethanolic extract of Persea americana seed

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

against potassium aluminium sulphate-induced nephrotoxicity, while Okafor et al. (2019) demonstrated the hepatoprotective potential of Anacardium occidentale leaves against paracetamol-induced hepatotoxicity. Similarly, Nweke et al. (2024) evaluated the hepato- and renoprotective effects of methanol seed extract of unripe Carica papaya in carbon tetrachloride-exposed rats and observed significant tissue protection. These findings support the growing evidence that phytochemicals derived from medicinal plants possess the ability to attenuate oxidative stress and tissue degeneration.

Furthermore, investigations by Nweke et al. (2025) demonstrated that ethanol extract of Fonio millet improved hepatic health in diabetic rats, while Ezenwatu and Nweke (2025) reported ameliorative effects of Vernonia amygdalina on alloxan-induced testicular damage. Molokwu et al. (2025) and Maduanusi et al. (2025), in studies co-authored with Anyiam Kennedy Ekenedirichukwu, demonstrated that ethanolic extract of Solanum torvum exhibited protective biochemical and histological effects against mercury-induced kidney, testes, liver, and stomach toxicity. These studies collectively reinforce the significance of medicinal plants in reducing oxidative tissue damage and inflammatory alterations induced by toxic agents.

Recent studies by Anyiam Kennedy Ekenedirichukwu have also highlighted the protective effects of plant extracts against toxicological damage in experimental animals. Anyiam et al. (2025) demonstrated the neuroprotective effects of ethanolic extract of Aloe vera against mercury-induced damage in the amygdala and hippocampus of rats through histological and molecular docking analyses. Similarly, Ezeani et al. (2025) observed that Aloe barbadensis mitigated mercury-induced Alzheimer-like symptoms in the basal ganglia of Wistar rats. Ogbuokiri et al. (2025) further reported that Mentha piperita extract exerted protective effects against mercury chloride-induced cardiorenal toxicity in adult male Wistar rats. These findings suggest that medicinal plants rich in antioxidant phytochemicals may provide substantial protection against tissue inflammation, vascular congestion, oxidative stress, and cellular degeneration.

Despite the increasing number of studies evaluating the pharmacological properties of medicinal plants, there remains limited information regarding the histological and biochemical effects of graded doses of ethanolic extract of Baphia nitida on the heart. Most available studies have focused primarily on its anti-inflammatory, antioxidant, antimicrobial, and neurosedative properties with little emphasis on myocardial histology and cardiac biochemical alterations following prolonged administration. Therefore, there is a need to investigate the potential effects of Baphia nitida on cardiac tissues to establish its safety profile and possible cardiomodulatory activities.

This study was therefore designed to evaluate the histological and biochemical effects of graded doses of ethanolic extract of Baphia nitida leaves on the heart of adult male Wistar rats. The findings from this study may contribute to the scientific validation of the ethnomedicinal use of Baphia nitida and provide additional information regarding its possible therapeutic or toxicological effects on cardiac tissues.

MATERIALS AND METHODS/ EXPERIMENTAL DETAILS / METHODOLOGY

EXPERIMENTAL ANIMALS USED

A total of 25 male wistar rats weighing between (150-250g) were used in this study. The sample size of five animals per group was adopted in accordance with previous toxicological and histopathological studies involving medicinal plant extracts in rodents where statistically meaningful biological differences were detected using similar group sizes. Furthermore, the study was designed as a preliminary experimental investigation intended to evaluate dose-related effects while minimizing animal use in accordance with the principles of Reduction, Refinement and Replacement (3Rs) in animal research.

The experimental animals were obtained from Tochukwu Farm Nnewi, Anambra state and maintained in the animal house of the Department of Anatomy, Faculty of Basic Medical Sciences Chukwuemeka Odumegwu Ojukwu University, Uli. According to the principles of laboratory animal care, (National Institutes of Health Publication, 1985). The animals were weighed and randomly assigned to five (5) different cages and left to acclimatize for two (2) weeks. They were fed with normal rat chow bought from vital feed (Growers) made by Grand cereals limited a subsidiary of UAC Nigeria PLC KM 17, Zawan roundabout, Jos, Plateau State.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

ETHICAL APPROVAL

This was obtained from the faculty of basic medical sciences Chukwuemeka Odumegwu Ojukwu University, Uli campus in compliance with the relevant laws and institution's guidelines.

All authors hereby declare that "Principles of laboratory animal care" (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws where applicable. All experiments have been examined and approved by the appropriate ethics committee**.**

MATERIALS USED

1. 25 male wistar Rats
2. *Baphia Nitida leaf*
3. Ethanol
4. Electronic weighing balance (NAPCO precision instruments JA-410)
5. Oral cannula
6. Distilled water
7. Standard cages
8. Cotton wool and Hand gloves
9. Beakers and measuring cylinder
10. 2ml hypodermic syringe
11. Animal weighing balance (CAMRY LB11)
12. Plain containers
13. Diethyl ether
14. Vital top feed (jos, Nigeria)
15. Dissecting kits
16. 10% Buffered formalin
17. Filter paper (WHATMAN QUALITATIVE FILTER PAPER NO.1,SIGMAN ALDRICH WHA1001042)
18. Thermostat oven(DHG-9023A,PEC MEDICAL USA)
19. Hand glove

LIMITATIONS OF THE STUDY

One of the major limitations of this study was the relatively small sample size and short duration of administration of the ethanolic extract of *Baphia nitida*. The twenty-one-day exposure period may not have been sufficient to fully evaluate the long-term cardiotoxic or cardioprotective effects of the plant extract. A longer duration of study with a larger sample population could provide more comprehensive and statistically robust findings.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

Another limitation was that the study was restricted to adult male Wistar rats only, which may limit the generalization of the findings to female animals and humans due to physiological and hormonal differences. In addition, only selected biochemical and histological parameters were assessed, while important cardiac biomarkers such as troponin, creatine kinase-MB (CK-MB), oxidative stress markers, and inflammatory cytokines were not evaluated.

Furthermore, phytochemical characterization and molecular analyses were not conducted in this study. Identification of the specific bioactive compounds responsible for the observed effects, as well as evaluation of molecular pathways involved in myocardial inflammation and tissue regeneration, would provide deeper insight into the mechanisms underlying the cardiac effects of *Baphia nitida*.

TOXICITY STUDY OF ETHANOLIC LEAF EXTRACT OF *BAPHIA NITIDA*

The median lethal dose (LD_{50}) of Ethanolic leaf extract of *Baphia Nitida was* carried out this was determined using the method of Dietrich Lorke (1983) and was found to be greater than 500mg/kg.

The LD50 was calculated using the formula:

LD50=√(minimum lethal dose×maximum non-lethal dose)

$LD_{50}= \sqrt{a \times b}$

a= maximum dose with 0% mortality

b= minimum dose with 100% mortality

EXPERIMENT PROTOCOL

Twenty five (25) animals (wistar rats) was weighed and allocated into five (5) groups of five (5) animals each. The groups was designated as groups A,B,C, D, and E, . Group A served as the control group and was administered with distilled water all the groups were fed *ad libitum with* normal rat chow. The experimental groups B, C, D, and E, were administered with graded doses of the extract of *Baphia nitida* leaf.

Group A- normal rat chow and water

Group B- 100mg/kg of Baphia nitida leaf extract

Group C- extract of *Baphia nitida* leaf. 200mg/Kg

Group D - *Baphia nitida* leaf. 300mg/Kg

Group E - *Baphia nitida* leaf. 400mg/Kg

The administration was given orally for (21days) twenty one days. Then twenty four (24hrs) after the last administration, the animals was anaesthetized with chloroform and dissected. A rat hearts were also harvested.

PREPARATION OF *BAPHIA NITIDA* LEAF EXTRACT.

A *Baphia nitida* leaves were harvested from Igbariam campus. They were identified at the herbarium units, Botany Department, Nnamdi Azikiwe University Awka, Anambra State. These *Baphia Nitida* leaves were air-dried under ambient laboratory conditions (25–28°C). They were stored in a container that had a lid to keep the potency. The dried leaves were ground using laboratory mill to a coarse form. 800g of ground leaves were macerated /soaked in 4 litres of ethanol sealed and allow staying for 48hrs inside mechanical shaker. After 48hrs, the mixture was sieved using a porcelain cloth and was further filtered using filter paper into a clean glass beaker. The filtrate was concentrated using Rotary Evaporator to turn the extract to a jelly-like/paste-like form which was stored in refrigerator for future use.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

HISTOLOGICAL STUDIES

The hearts collected were rinsed in normal saline solution and then the following tissue procession took place.

FIXATION

The heart was fixed in 10% formal saline, in a container with light fitting lids for three (3) days to prevent autolysis, improve staining quality and also to aid optical differentiation of cells.

DEHYDRATION

The tissue was dehydrated to remove water that is immiscible with xylene and wax. This was done using different grades of alcohol ranging from 50% - absolute alcohol for 30 minutes each.

CLEARING/ DEALCHOLIZATION

The dehydrated tissue was cleared by removing the alcohol from the tissue. It was done by immersing the tissue through 3 changes of xylene for 30 minutes each.

WAX IMPREGNATION/ INFILTRATION

The cleared tissue was impregnated and infiltrated to remove the clearing agent (xylene) in a hot oven temperature of 60 degrees Celsius by passing it through three (3) changes of molten paraffin wax in a hot air oven for 30 minutes each.

EMBEDDING

The infiltrated tissue was buried or embedded with molten paraffin wax in an embedded mould and allowed to solidify.

MOUNTING ON WOODEN BLOCK

The paraffin block of tissue was attached to a wooden block with the aid of a hot spatula held in between wood block and paraffin wax, the spatula melted the wax which solidified when spatula was removed.

MICROTOMY

The block of tissues was sectioned using Berg's rotary microtome machine. It was trimmed to obtain the cutting surface of the tissue at 15 microns and was sectioned at 5 microns. It was later dried in a hot plate for staining.

HAEMATOXYLIN AND EOSIN STAINING METHOD OF Drury *et al.*, (1976).

Heart tissues were processed using standard paraffin embedding techniques. Sections of 5 μm thickness were prepared using a rotary microtome and stained with Haematoxylin and Eosin (H&E) according to the method of Drury et al. (1976). Prepared slides were examined under a light microscope and photomicrographs were captured for histopathological evaluation.

Results: Nuclei stained blue while the cytoplasm stained pink or red.

Histological sections were independently examined by an experienced histologist who was blinded to group allocation. Lesions were evaluated semi-quantitatively based on the degree of myocardial inflammation, vascular congestion and tissue degeneration. The slides were finally viewed under Olympus light photo microscope and their micrographs taken. All these were done in the Anatomy department, faculty of Basic Medical Sciences Abia State University Uturu.

Declaration of Interest

None

Funding Source

This research did not receive any specific grant from funding agencies in the public, commercial, or non-profit sectors.

Statistical Analysis

Research objectives and hypothesis of the study was considered before analyzing data. Statistical analyses were performed using IBM SPSS Statistics version 27. Data are presented as mean ± standard error of mean (SEM). Comparisons among groups were performed using one-way analysis of variance (ANOVA) followed by Fisher's Least Significant Difference (LSD) post hoc test where appropriate. Statistical significance was accepted at $p < 0.05$

RESULTS

Table 1: Comparative mean relative heart weight following administration of *Baphia nitida*

Groups (N=5)	**Relative Heart weight (g)**
	Mean±SEM
Group A (control)	1.73±0.26
Group B (100 mg/kg EBN)	0.44±0.00*
Group C (200 mg/kg EBN)	0.43±0.03*b
Group D (300 mg/kg EBN)	0.44±0.04*
Group E (400 mg/kg EBN)	0.29±0.03*d
P-ratio	0.000
F-ratio	23.380

Data was analysed using ANOVA followed by post Hoc Fisher's LSD comparison and data were considered significant at *p<0.05*. *: significant, #: not significant when Groups B, C, D, E compared to Group A, a: significant, b: not significant when Group C is compared to Group B and C: significant and d: not significant when Group E is compared to Group D.

Table 2 result shows a decrease in the relative Heart weight with significance in Groups B, C, D and E (*p=0.000, p=0.000, p=0.000, p=0.000).* It also shows an insignificant decrease when Group C is compared to Group B (*p=0.937*) and an insignificant decrease when Group E is compared to Group D (*p=0.411*).

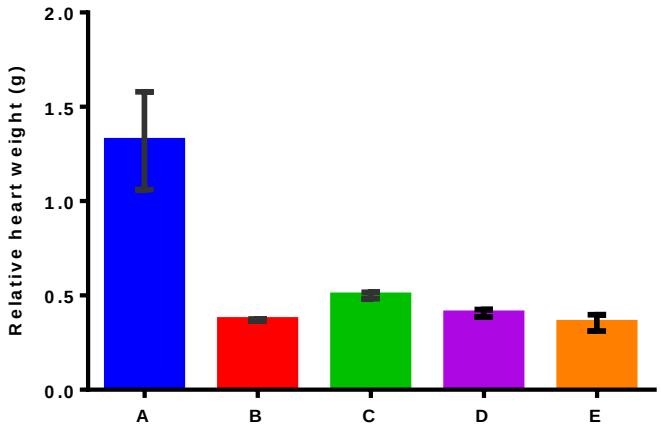
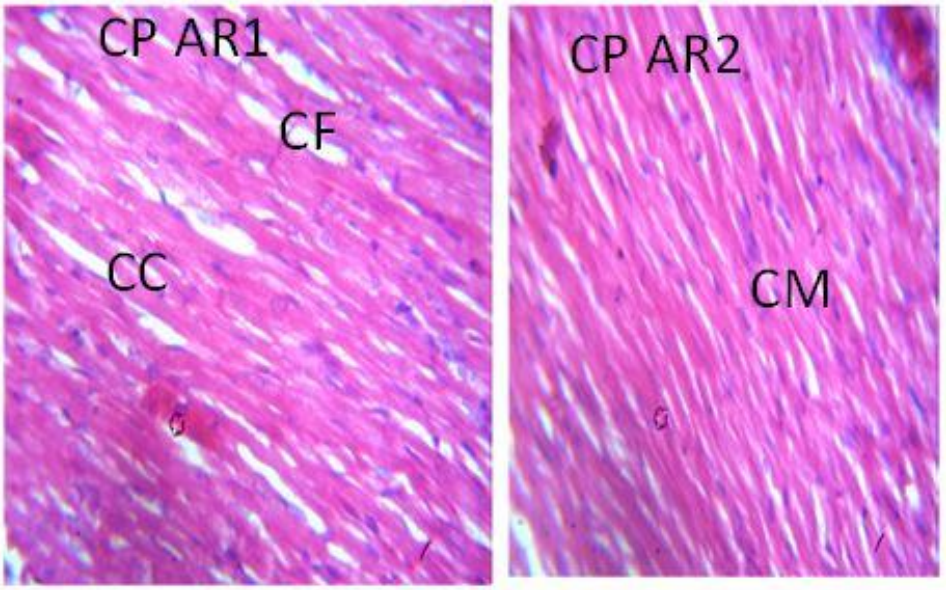


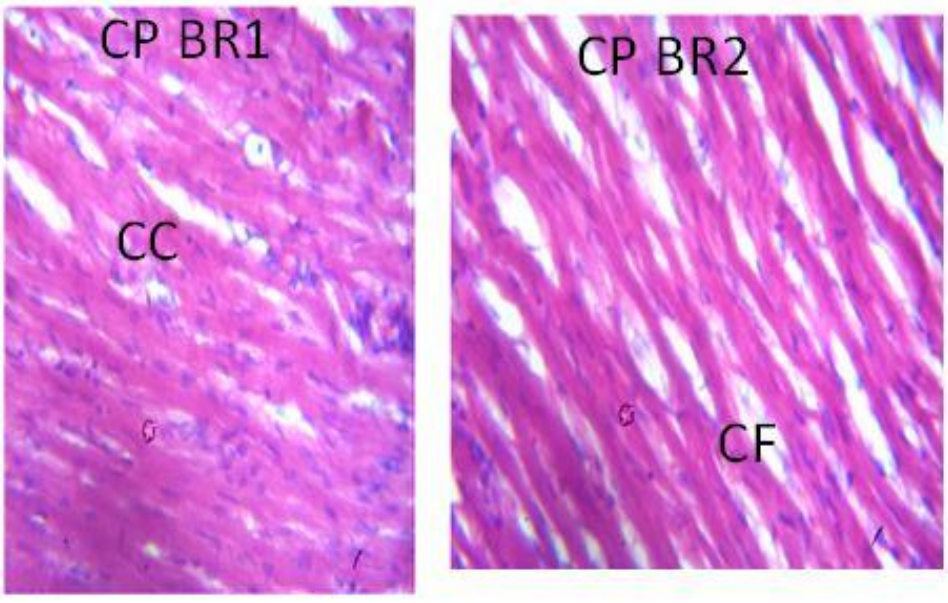
Fig 1: Comparative mean relative heart weight following administration of *Baphia nitida*

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

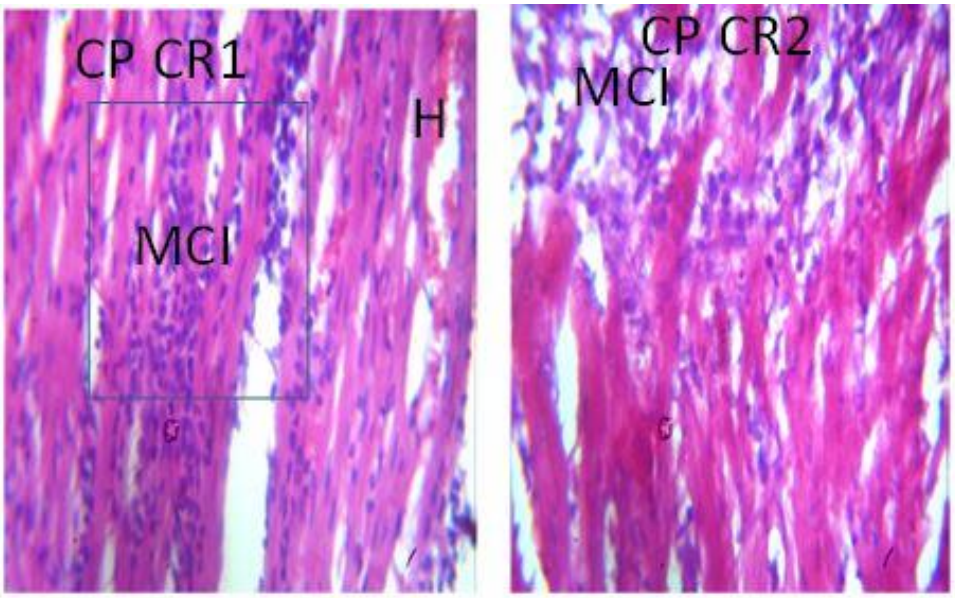
HISTOLOGICAL ANALYSIS



A



B



C

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

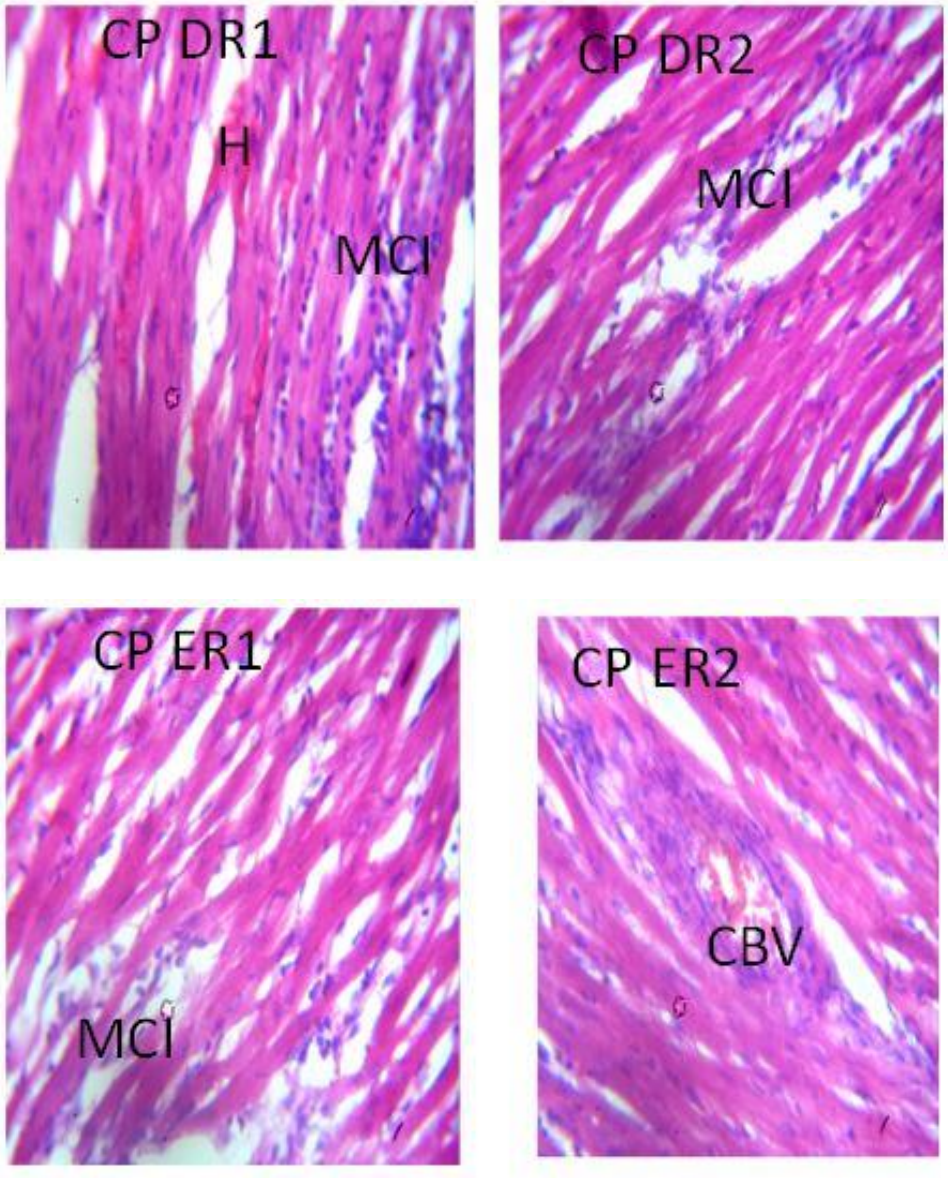


Fig 2: (A)Photomicrograph of group AR1R2 heart section showing normal cardiac tissue with cardiac cell(CC), Cardiac fiber(CF) and cardiac muscle(CM) (B)Photomicrograph of group BR1R2 heart section administered with 100mg/kg of Baphia nitida showing cardiac tissue with active cardiac cell(CC), cardiac fiber(CF), and cardiac muscle(CM) (C)Photomicrograph of group CR1R2 heart section administered with 200mg/kg of Baphia nitida showing mild degeneration with mild myocardioac inflammation(MI) with mild areas of hemorrhage(H) (D)Photomicrograph of group DR1R2 heart section administered with 300mg/kg of Baphia nitida showing mild regeneration with moderate myocardioac inflammation(MI) with mild areas of hemorrhage(H) (E) Photomicrograph of group ER1R2 heart section administered with 400mg/kg of Baphia nitida showing moderate regeneration with moderate myocardioac inflammation(MI) and mild congestion of blood vessel(CBV)

DISCUSSION

Medicinal plants continue to play important roles in traditional healthcare systems due to their diverse pharmacological properties and therapeutic potentials. *Baphia nitida* (camwood), a medicinal plant widely distributed across West Africa, has been traditionally utilized for the management of inflammatory conditions, wounds, rheumatism, arthritis, and other pathological disorders (Irvine, 1961). The present study evaluated the histological and biochemical effects of graded doses of ethanolic extract of *Baphia nitida* leaves on the heart of adult male Wistar rats. The findings from this study revealed that administration of the extract produced alterations in body weight, relative heart weight, and myocardial histoarchitecture, suggesting dose-dependent effects on cardiac tissues.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

The acute toxicity study conducted in this research revealed that the LD50 of ethanolic extract of *Baphia nitida* was above 5000 mg/kg, indicating relatively low acute toxicity. This observation aligns with the work of Adeyemi and Akindele (2008), who reported that extracts of *Baphia nitida* demonstrated relatively safe pharmacological profiles at moderate doses in experimental animals. The low acute toxicity observed in this study may be attributed to the antioxidant phytochemicals present in the plant, including flavonoids, phenolics, tannins, and alkaloids, which have been shown to exert protective biological activities against oxidative tissue injury.

The present study further demonstrated significant reductions in relative heart weight across most treatment groups when compared with the control group. Reduction in organ weight has been associated with tissue degeneration, cellular shrinkage, inflammatory changes, and toxicological responses induced by prolonged exposure to xenobiotics. This observation aligns with the work of Ogbuokiri et al. (2025), who reported alterations in cardiorenal parameters following administration of *Mentha piperita* extract in mercury chloride-induced toxicity in Wistar rats. Similarly, Anyiam et al. (2025) observed structural tissue alterations following mercury-induced neurotoxicity in experimental animals treated with ethanolic extract of *Aloe vera*. The reduction in relative heart weight observed in this study may therefore indicate mild cardiotoxic effects associated with prolonged administration of the extract at higher doses.

Histological examination of the heart tissues revealed mild to moderate myocardial inflammation, mild areas of hemorrhage, vascular congestion, and evidence of tissue regeneration in treated groups. These findings suggest that administration of graded doses of ethanolic extract of *Baphia nitida* may induce mild inflammatory responses and vascular alterations within cardiac tissues. This observation aligns with the work of Jaishankar et al. (2014), who reported that prolonged exposure to toxic substances may result in oxidative stress, vascular congestion, inflammatory infiltration, hemorrhage, and degeneration of cardiac muscle fibers. Similarly, Arunachalam et al. (2021) demonstrated that toxicological exposure induces myocardial injury through oxidative stress, lipid peroxidation, inflammatory cytokine activation, and structural degeneration of cardiac tissues in experimental rats. The mild myocardial inflammation observed in this study may be linked to oxidative stress-induced activation of inflammatory pathways within cardiac tissues. Oxidative stress has been recognized as one of the major mechanisms underlying myocardial injury following exposure to toxic agents and phytochemicals at high concentrations. Reactive oxygen species generated during oxidative stress can damage cellular membranes, proteins, and nucleic acids, thereby triggering inflammatory responses and vascular abnormalities (Yousef et al., 2010). The observed areas of hemorrhage and congestion of blood vessels may also indicate disruption of vascular integrity and altered blood circulation within the myocardium.

Interestingly, the presence of mild to moderate regeneration observed in some treatment groups may suggest possible adaptive or protective responses of cardiac tissues against toxic injury. This finding supports previous studies by Nweke et al. (2024), who demonstrated hepato- and renoprotective effects of methanol seed extract of *Carica papaya* in carbon tetrachloride-exposed Wistar rats. Similarly, Molokwu et al. (2025) and Maduanusi et al. (2025) reported protective histological effects of *Solanum torvum* against mercury-induced tissue toxicity in the kidney, testes, liver, and stomach. The regenerative tendencies observed in the present study may therefore be attributed to the antioxidant phytochemicals present in *Baphia nitida*, which may help attenuate oxidative tissue injury while simultaneously promoting mild cellular repair mechanisms.

Furthermore, the findings of this study are also comparable with the reports of Nweke et al. (2019), who demonstrated protective properties of ethanolic extract of *Persea americana* seed against experimentally induced toxicity in Wistar rats. Okafor et al. (2019) also reported that medicinal plant extracts possess the ability to reduce tissue injury and oxidative damage through antioxidant mechanisms. The cardiomodulatory effects observed in the present study may therefore involve both protective antioxidant activities and mild dose-dependent toxicological responses depending on the concentration and duration of administration.

Overall, the findings from this study suggest that ethanolic extract of *Baphia nitida* possesses relatively low acute toxicity but may induce mild dose-dependent histological alterations in cardiac tissues following prolonged administration. Although severe myocardial degeneration was not observed, continuous or excessive consumption of the extract may predispose the heart to subtle inflammatory, vascular, and degenerative changes.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

CONCLUSION

The findings of this study revealed that ethanolic extract of *Baphia nitida* possesses relatively low acute toxicity and did not produce severe cardiac damage following oral administration in adult male Wistar rats. However, histological examination of the heart showed mild to moderate myocardial inflammation, mild vascular congestion, and areas of tissue regeneration in the treated groups, suggesting that the extract may induce subtle dose-dependent alterations in cardiac tissues.

The study therefore indicates that although *Baphia nitida* may possess certain regenerative and pharmacological properties, prolonged or excessive consumption could predispose the heart to mild inflammatory and vascular changes. Further studies involving advanced biochemical, phytochemical, and molecular analyses are recommended to fully elucidate the mechanisms underlying its cardiological effects and establish its safety profile for therapeutic use.

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COMPETING INTERESTS

The authors declare that they have no known financial interests that influenced the work reported in this paper. The research was conducted independently, without any financial support, commercial sponsorship, or affiliations that might present a conflict of interest.

AUTHORS' CONTRIBUTIONS

"NWEKE, ELIZABETH OBIOMA" designed the study and managed the literature searches, '**ANYIAM, KENNEDY EKENEDIRICHUKWU**' wrote the protocol and performed the statistical analysis, and '**NWEKE, TOCHUKWU MIRACLE**' wrote the first draft of the manuscript…All authors read and approved the final manuscript.

ETHICAL APPROVAL

This was obtained from the ethical committee, faculty of basic medical sciences Chukwuemeka Odumegwu Ojukwu University, Uli campus in compliance with the relevant laws and institution's guidelines.

All authors hereby declare that "Principles of laboratory animal care" (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws where applicable. All experiments have been examined and approved by the appropriate ethics committee**.**

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