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The Effects of Ethanol Extract from the Seeds, Leaves and Barks of Picralima Nitida on Histopathological Indices in Albino Rats.

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Abstract

In West African traditional medicine, picralima nitida is frequently used to treat a variety of blood-related conditions, such as anemia and diabetes, as well as malaria, diarrhea, and inflammation. By assessing the effects on the histology of several organs, this study aimed to explore the haematinic values, anti-diabetic activities, and safety profile of ethanol extracts of P. nitida leaf, seed, and bark in PHZ-induced anaemic Wistar rats. One hundred ninety Wistar rats, weighing 150–180 grams, in total, appeared to be in good health. Forty-five were employed in the investigation on alloxan-induced diabetes, and fifty-four were used in the acute toxicity test.. Nine experimental groups (A-I) representing normal, negative, and positive controls were randomly assigned to the animals, along with 200 and 400 mg/kg dosages of P. nitida leaf, seed, and stem bark extracts, respectively. After the various treatments were given orally after induction, a subset of organ tissues was taken and sectioned for histological analysis.The bark showed 20% mortality at a dose of 5000 mg/kg, with an LD50 < 3,807.89 mg/kg, whereas the leaf and seed extracts had LD50 ≥ 5000 mg/kg (practically not dangerous). The ability of the various extracts to restore the aberrant aberrations caused by PHZ produced varied. If applied clinically, these results may have positive effects on the treatment of Type 2 diabetes and anemia.

Key words: ethanol extract; seeds; leaves; barks; picralima nitida; histopathological; albino rats.

Introduction

For millennia, people have used naturally occurring minerals, plants, and animals as remedies to treat various illnesses. It is a dynamic activity that has been documented in early practitioners' writings as well as folklore. Decoctions, poultices, ointments, and solutions of plants, animal parts, and minerals were common ingredients in recipes for treating illnesses [1]. The trend shifted towards the production of pure drugs from plant and animal precursors after the discovery of pure drugs like quinine, atropine, and reserpine from plants. While

many of these remedies have vanished over time, some are still in use today and are used for the treatment of diseases by traditional medicine practitioners worldwide. The pharmacological potential of plants is still abundant despite the fact that this tendency was reversed with the introduction of exclusively synthetic medications. Of the 250 000 species of higher plants on the globe, only roughly 94 species have been or are now being used for drug production[2].Only a small portion of the 250000 species of higher plants have been used as medicinal agents, even in the field of traditional medicine practice[3].Even with the widespread availability of synthetic pharmaceuticals, a sizable section of the populace in underdeveloped nations still receives their medical care from traditional practitioners.The World Health Organization (WHO) estimates that 60% of the world's population relies on traditional medicine, and that 80% of people in underdeveloped nations virtually exclusively receive their primary medical treatment from traditional medical practices [4]. Roughly 15–20 million people who practice traditional medicine in developing nations live in West Africa alone . Africa is home to a high biodiversity of about 30,000 higher plant species, of which about 3,000 are being utilized as medicines by 60% of the continent's population [5]. Furthermore, it is believed that 80% of people seek treatment for their health issues from traditional healers initially [6]. Thus, it should come as no surprise that, as of 1996, South Africa saw the annual trading of 20,000 tons of medicinal plants representing over 700 species, with a market worth of over $60 million (or R450 million) [7]. Unfortunately, only about 350 regularly used and traded species have undergone chemical tests out of the enormous number of traditional plants utilized as traditional medicines, most often in conjunction with orthodox treatments.[8]Worldwide, people employ herbal cures and alternative medicines. In the past, most pharmaceuticals' original sources were often herbs. A significant amount of commercial drugs used today to treat conditions including asthma, high blood pressure, heart disease, and pain are still derived from herbs. Nowadays, a significant portion of prescription medications are still made with natural substances, with 25% of all medications containing one or more active compounds sourced from plants. Herbs are generally seen as "natural" and safe because they are plants. But as recent studies have demonstrated, there are hazards connected to the many forms of traditional medicine in addition to their many advantages. Even while traditional medicine treatments and therapies are widely available to consumers today, they frequently lack the knowledge of what to look for when utilizing them to prevent unneeded harm. The variety of traditional herbal products varies. Biologically active components of herbs, pollutants, and interactions between herbs and drugs can all result in side effects. Pyrolizidine alkaloids are complex compounds found in some plants that can be used or unintentionally added to herbal treatments (like comfrey, which is still accessible in the United States). This is a typical cause of toxicity to herbal medications. These alkaloids cause hepatotoxicity by causing a veno-occlusive illness, which can advance quickly and prove lethal. [9]

Apocynaceae is a family of plants that includes Picralima nitida, which was initially identified as a genus in 1896. It is native to tropical Africa, including Benin, Ghana, Ivory Coast, Nigeria, Gabon, Cameroon, Angola (Cabinda), Central African Republic, Republic of Congo, Zaire, and Uganda. Picralima nitida is the only species known to exist in it.

The Picralima nitida shrub or tree grows up to 35 meters tall and has glabrous white latex throughout. Its bole can reach a diameter of 60 cm. The bark is stiff and brittle, ranging from pale to dark greyish black or brown, smooth to slightly rough or finely striped. The leaves are opposite, simple, and whole, without stipules, and have a 1-2 cm long petiole. The blade is elliptical to oblong, measuring (5–)10–26 cm × 2–13 cm, with a cuneate base, an abruptly acuminate apex, thickly papery to thinly leathery, and 14–23 pairs of lateral veins arranged pinnately. The terminal or occasionally axillary inflorescence is a compound, umbel-like cyme that is 6–10 cm long and has 10–35 flowers; the peduncle is 2–35 mm long and has three main branches; the bracts are extremely tiny [11].

The majority of what is known about the uses of plants is the outcome of many years of human research and selection of the most successful, lustrous, and desirable plants that are available in the immediate surroundings at any particular moment [12]. Eighty percent of people in underdeveloped nations still rely on native medicinal plants to meet their basic health needs, according to the World Health Organization [13]. In addition, the advantages of phytopharmacy are widely acknowledged, and medicinal plants already play a significant role in both plant research and medicine.Using herbal remedies at home is the primary

line of therapy for 60% of children with high fevers in many African nations, including Ghana, Mali, Nigeria, and Zambia[14].The present worldwide paradigm for obtaining pharmaceuticals from plant sources makes the use of plants in medicine even more significant. As a result, attention has been drawn to the medical benefit of herbal therapies for their safety, efficacy, and affordability [15]. In my community of Umunoha, Mbaitoli, picralima nitida is a plant that has long been utilized for its alleged hematinic and hypoglycemic qualities.It is equally used to treat a wide range of illnesses in different regions of West Africa. These conventional assertions are not supported by any scientific evidence, despite their frequent use. The purpose of this study is to look at how Picralima nitida affects histopathological markers in Wistar rats that have been given alloxan or phenylhydralazine-induced anemia or diabetes, respectively.

Materials and Methods

Plant material

Picrilima nitida leaves, seed and stem-bark were used for the study

Animals

One hundred and ninety (190) male albino Wistar rats (aged 3 – 4 months) bred in the Laboratory Animal House of the Department of Veterinary Physiology and Pharmacology, Michael Okpara University of Agriculture, Umudike were used for the study. The animals weighed between 150 – 180 g and were housed at ambient temperature (25°C) with lightening period of 12 h daily. Clean drinking water and standard commercial feed (Vital®, Nigeria) were provided *ad libitum*. Ethical standards governing the use of life animals for experiments were strictly observed (Festing and Wilkinson, 2007). The ethical clearance with approval number MOUAU/CVM/REC/2020002 for this study was issued by the College of Veterinary Medicine, Michael Okpara University of Agriculture, Umudike Ethical Committee.

Plant collection, identification and extraction

The leaves, seed and stem-bark of *Picralima nitida* were collected from Umunoha village in Mbaitoli local government area of Imo state and identified by a taxonomist (Prof. F.M. Mbagwu) in the Department of Botany, Imo State University, Owerri.

The plant samples were dried on laboratory bench and pulverized into coarse powder using hammer mill (Muliner®). Five hundred gram (500 g) each of the plant material were macerated in 2 litres of 80% methanol for 48 hours with intermittent shaking at 3 hours intervals and filtered with Whatman No. 1 filter paper. The filtrates were concentrated *in vacuo* using rotary evaporator and finally dried in hot air oven (40°C). The extracts were stored in the refrigerator (4°C) throughout the period of the experiment. Percentage yield was calculated using the formula: % yield = a – b/ a × 100

Where, a = weight of original material (i.e. coarse powder) used for the extraction and b = weight of the dried extract.

Acute toxicity study:

This was done using Lorke method. A total of 105 adult rats were used for the study. The study was carried out in two phases. In the first phase, four groups; A-D of 5 rat each were given (orally) distilled water, 10 mg/kg, 100 mg/kg and 1000mg/kg of the leaf extracts of *P. nitida*, respectively. Rats in group A served as the normal control. In the second phase, three (3) groups; E-G with 5 rats in each group, were given (orally), 1600 mg/kg, 2900 mg/kg and 5000 mg/kg (higher doses) of the leaf extract of *P. nitida*, respectively. The same procedure was repeated with the seed and stem-bark extracts of *P. nitida*.

The rats were observed for signs of toxicity and mortality over a period of 24 - 72 hours, post administration. They were allowed for another 7 - 14 days to observe any delayed toxicity.

The median lethal dose (LD_{50}) of the three extracts (leaf, seed and bark) were then calculated using the formula adopted by (Khan *et al.,* 2013).

LD_{50} = √ (least dose with mortality × Highest dose without mortality)

Induction of experimental diabetes

Alloxan was used to induce experimental diabetes mellitus in this study. Following 18 h fast, the blood sugar level (FBS) of the animals was determined using auto-analyzer (Accu-Check Active® glucose kit). Diabetes was then induced in the rats by a single intraperitoneal administration of alloxan monohydrate (160 mg/kg). The FBS of the rats were checked every other day, and on the sixth day rats with FBS ≥ 126 mg/dl were

considered diabetic.

Effect of graded doses of the extracts on FBS of alloxan induced diabetic rats

Forty eight (48) alloxan-induced diabetic male Wistar rats (aged 8 – 10 weeks) were used for this study. The rats were randomly assigned into 8 groups of 6 rats per group and treated as shown in Table.

Group	Treatment
A	Negative control (Distilled water, 5 ml/kg)
B	Positive control (glibenclamide, 2 mg/kg)
C	*P. nitida* leaf 200 mg/kg
D	*P. nitida* leaf 400 mg/kg
E	*P. nitida* seed 200 mg/kg
F	*P. nitida* seed 400 mg/kg
G	*P. nitida* stem-bark 200 mg/kg
H	*P. nitida* stem-bark 400 mg/kg

Table : *Experimental design of antidiabetic study.*

All treatment were administered with oral gavage. The FBS of all the animals were measured at 0, 1, 3, 6 and 24 h post drug or extract administration using an auto analyzer (Accu Check Active®) glucose kit. The blood samples were collected from the tail vein after a tail snip.

Effects of repeated dosing of extracts on alloxan-induced diabetic rats

Forty-eight (48) diabetic male albino rats were randomly assigned into 8 groups of 6 rats per group and were treated as shown in Table 2 above. All animals were treated once daily for 21 consecutive days via oral gavage. The FBS levels of the rats were measured on days 0, 7, 14 and 21. On day 22 (24 h after the last treatment), blood samples were collected from the retro-orbital plexus through the median canthus of the eye, using heparinized capillary tubes. Blood collected from each animal was placed in plain sample bottles. The blood samples were placed in a slanting position for 30 minutes to allow for serum separation, after which they were centrifuged at 2000 r.p.m. for 10 minutes. The rats were afterwards sacrificed by cervical dislocation and vital organs like liver, kidney,and spleen were harvested into sample bottles containing 10% formal saline for histopathology.

Histopathology

Tissue samples (liver, spleen, and kidney) collected after sacrificing the rats at the end of the 21-day treatment with drug or extract were fixed in 10% formal saline for a minimum of 24 hours. The tissues were then dehydrated sequentially in ascending grades of alcohol (70%, 80%, 90%, and 100%) for 90 minutes each. Subsequently, they were cleared with xylene twice for 90 minutes each. After clearing, the tissues were transferred to infiltrating chambers I and II containing molten paraffin wax for 90 minutes, and embedded. Molten paraffin wax was used to embed the tissues to form hard blocks, which were then sectioned with a microtome. The tissue sections were mounted on glass slides coated with 20% albumin and dried on a dryer at 45°C. Deparaffinization of the tissues was performed twice using xylene for 5 minutes each. Subsequently, the tissues were rehydrated through a series of descending alcohol grades (100%, 100%, 95%, 95%, 80%, and 70%) followed by water for 10 minutes each. The tissue sections were then stained with hematoxylin and eosin (H&E), and cover slips were placed on the slides, which were mounted with Canada balsam. All sections were examined under a light microscope at different magnifications (x10, x20, and x40). Photomicrographs of the lesions were captured using an Olympus photomicroscope for observation and documentation of histopathological findings.

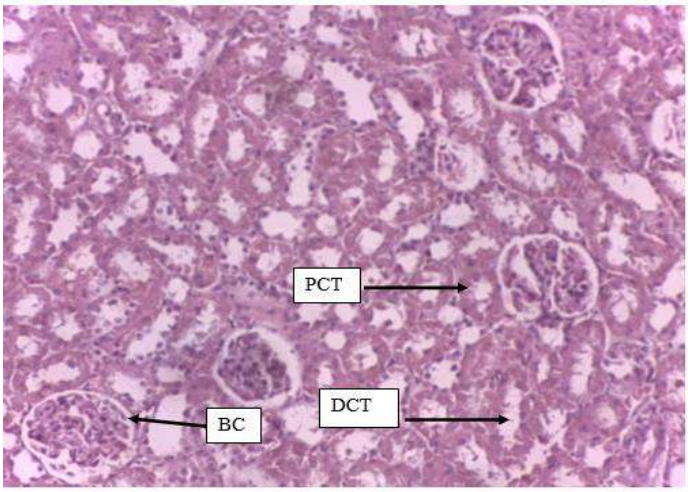
Statistical Analysis

Data obtained were presented as mean (± S.E.M.) in tables and chart. They were analyzed using one-way analysis of variance (ANOVA) (SPSS software). The variant means were separated by Least Significant Difference (LSD) of the different groups. Significance was accepted at the level of $p < 0.05$.

Results

Photomicrograph Of Kidney Organ Of The Different Groups

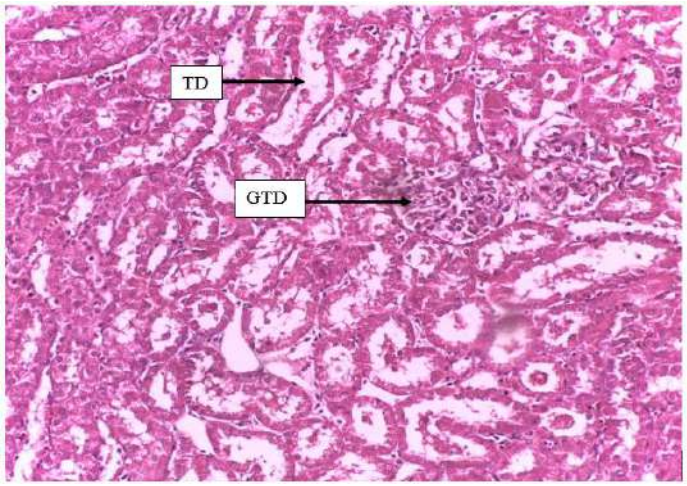
Slide 1:



Kidney A: kidney section at higher magnification (H&E × 200).

Slide 1: The photomicrograph of the histopathological section of the Kidneys of Group A (Normal control) at higher magnification (H&E × 200) showing the Proximal convulated tubules(PCT), distal convulated tubules(DCT) and bowmans capsule(BC).
Generally showing a well preserved and properly structured glomeruli,proximal and distal convulated tubules indicating a healthy and functional renal tissue.

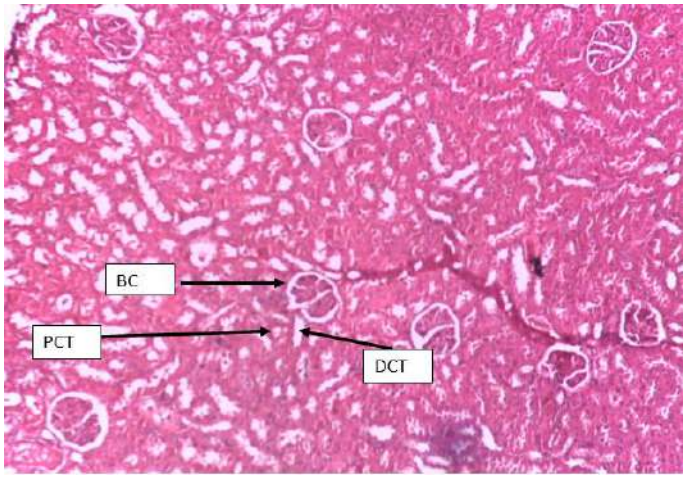
Slide 2:



Kidney B: Higher magnification of degenerative changes in tubular epithelium as well as glomerular tuft (H&E×200). Tubular degeneration (TD) & Atrophy of the Glomerular Tuft (AGT).

Slide 2: The photomicrograph of the histopathological section of the Kidneys of Group B (Negative control) which are PHZ induced anaemic rat at higher magnification (H&E × 200). It shows degenerative changes in tubular epithelium as well as accumulation of hyaline material within the glomerular tuft.

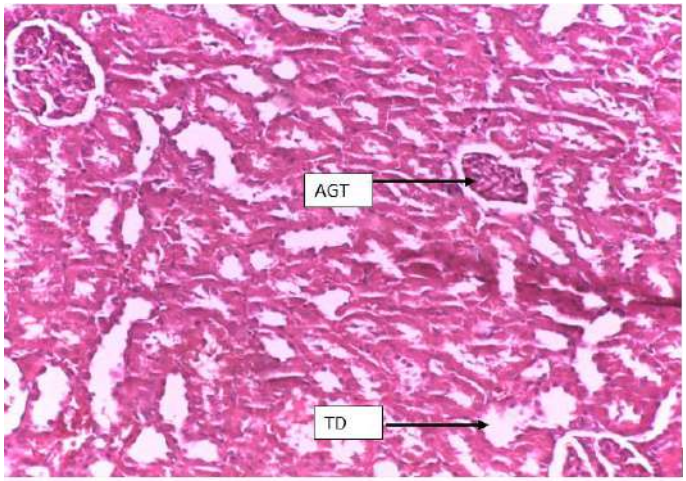
Slide 3:



Kidney C: Liver section showing Bowman's capsule and renal tubules (No significant changes in comparison with A above) (H&E×100).

Slide 3: Group C (Positive control-Bunto, 5 ml/kg): Kidney section showing Bowman's capsule and renal tubules (No significant changes in comparison with Group A above) (H&E×100).

Slide 4:

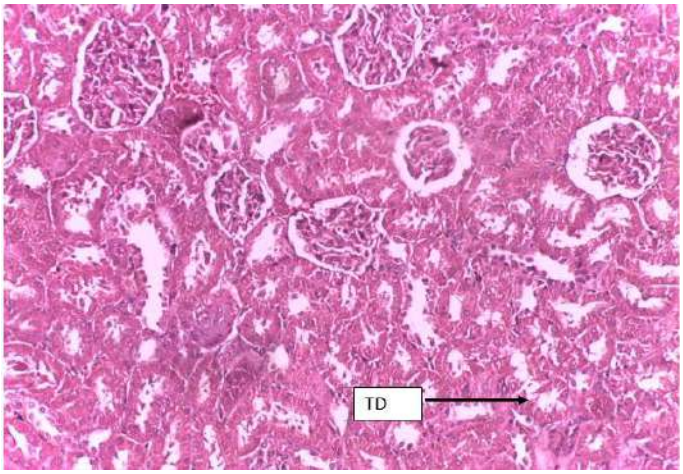


Kidney D: Tubular degeneration (TD) & atrophy of the glomerular tuft (AGT) demonstrated (H&E×200) No significant changes in comparison with A above.

Slide 4: The photomicrograph of the histopathological section of the Kidneys of Group D (*P. nitida* leaf 200 mg/kg) which are PHZ induced anaemic rat that received 200mg/kg of the leaf extract at higher

magnification (H&E × 200). It shows Tubular Degeneration (TD) & Atrophy of the Glomerular Tuft (AGT).

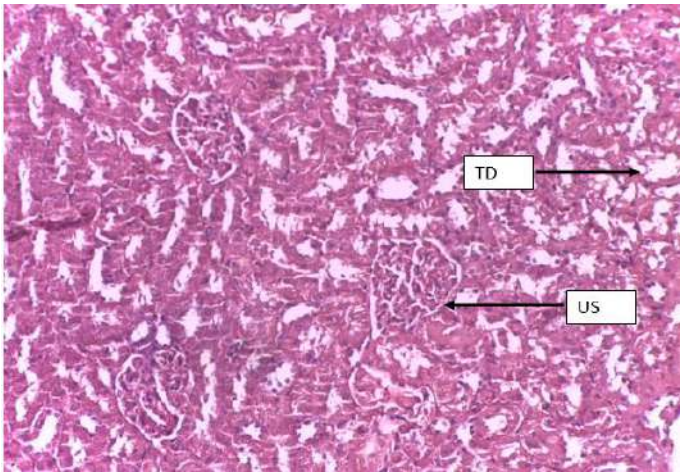
Slide 5:



Kidney E: Tubular degeneration (TD) present (H&E×200).

Slide 5: The photomicrograph of the histopathological section of the Kidneys of Group E (*P. nitida* leaf 400 mg/kg) which are PHZ induced anaemic rat that received 400mg/kg of the leaf extract at higher magnification (H&E × 200). Tubules appear smaller with thickened basement membrane showing tubular degeneration.

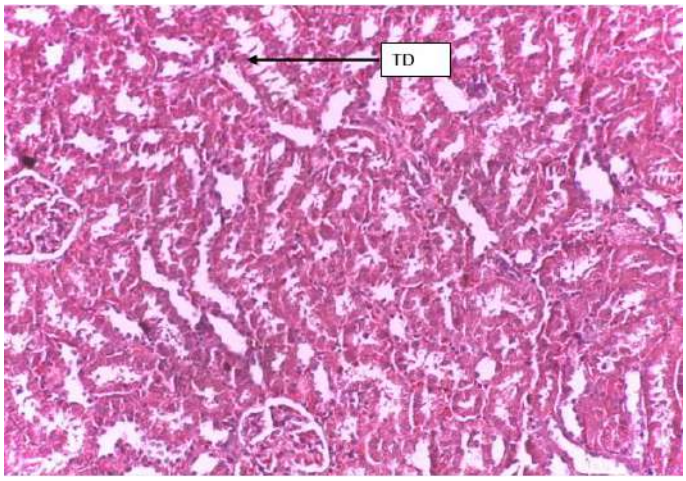
Slide 6:



Kidney F: Tubular degeneration (TD) and narrowing of Urinal Space (US) (H&E×200).

Slide 6: The photomicrograph of the histopathological section of the Kidneys of Group F (*P. nitida* seed 200 mg/kg) which are PHZ induced anaemic rat that received 200mg/kg of the seed extract at higher magnification (H&E × 200). Tubules appear smaller with thickened basement membrane showing tubular degeneration, there is increased collagen deposition in the interstitial space narrowing the urinal space.

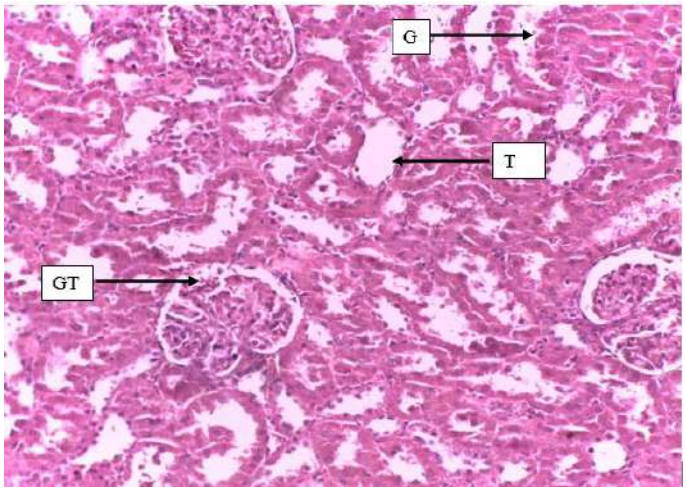
Slide 7:



Kidney G: Tubular degeneration present (TD). No significant changes in comparison with A above) (H&E×200).

Slide 7: The photomicrograph of the histopathological section of the Kidneys of Group G (*P. nitida* seed 400 mg/kg) which are PHZ induced anaemic rat that received 400mg/kg of the seed extract at higher magnification (H&E × 200). Tubules appear smaller with thickened basement membrane showing tubular degeneration.

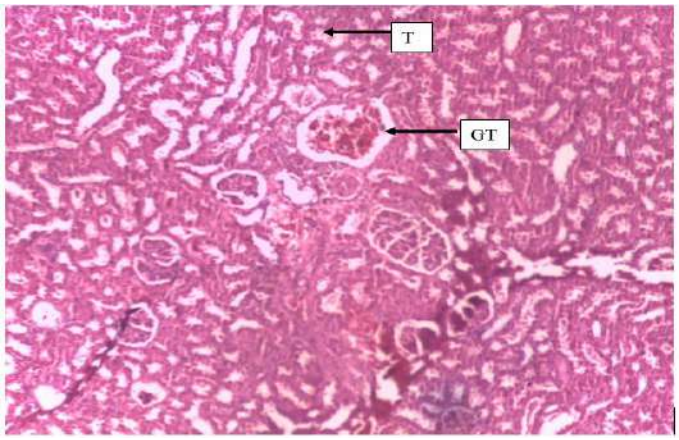
Slide 8:



Kidney H: Degeneration of both tubular (T) tuft (GT) (H&E×200).

Slide 8: The photomicrograph of the histopathological section of the Kidneys of Group H(*P. nitida* stem-bark 200 mg/kg) which are PHZ induced anaemic rat that received 200mg/kg of the stem-bark extract at higher magnification (H&E × 200). Tubules appear smaller with thickened basement membrane and increased interstitial fibrosis,there is increased fibrous tissue within the glomeruli indicating Degeneration of tubular tuft and Glomerular tuft.

Slide 9:

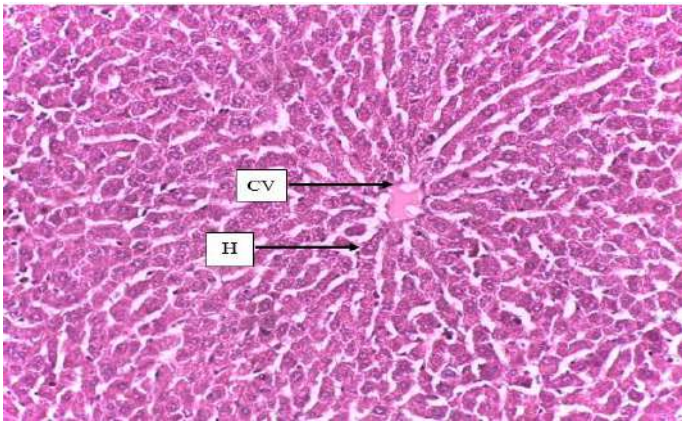


Kidney I: Tubular (T) and glomerular tuft (GT) degenerative changes (H&E×200).

Slide 9: The photomicrograph of the histopathological section of the Kidneys of Group I (*P. nitida* stem-bark 400 mg/kg) which are PHZ induced anaemic rat that received 400mg/kg of the stem-bark extract at higher magnification (H&E × 200). Tubules appear smaller with thickened basement membrane and increased interstitial fibrosis, and a shrunken glomeruli.

Photomicrograph of Liver Organ of the Different Groups

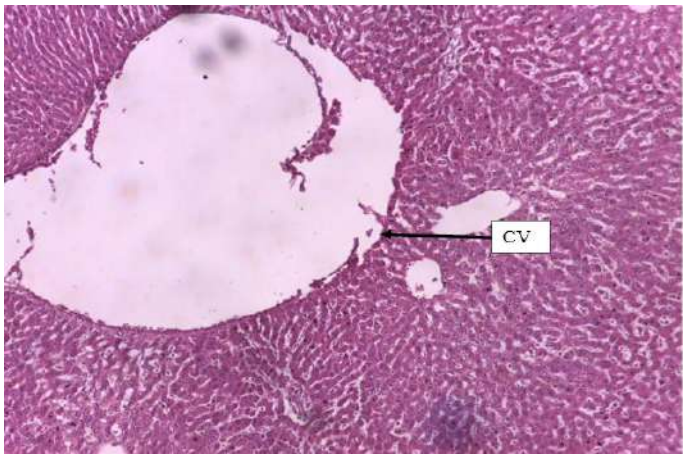
Slide 10:



Liver A: Arrays of hepatocytes (H) surrounding the central vein (CV) (H&E×200).

Slide 10: Group A (Normal control) (H&E×200).Photomicrograph of the histopathological section of the Liver showing well organized hepatic lobules with clearly defined central veins and portal triads,the overall architecture is regular indicating healthy liver tissue.

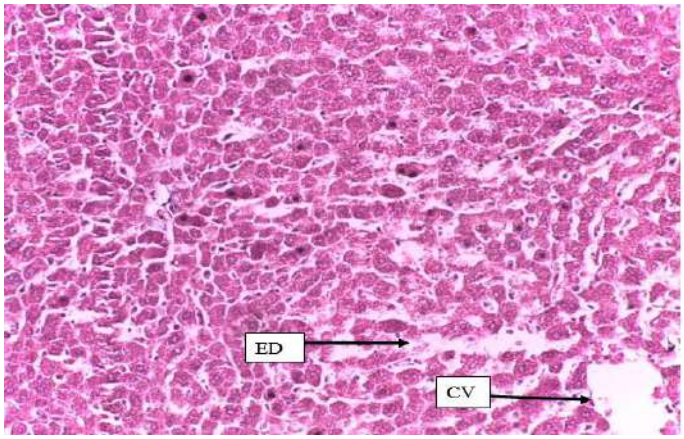
Slide 11:



Liver B: section of the liver showing dilatation of the central vein (CV) with severe fatty degeneration; Steatosis evident by 'empty cells' and peripheral nuclei (H&E×200).

Slide 11: The photomicrograph of the histopathological section of the Liver of Group B (Negative control) which are PHZ induced anaemic rat at higher magnification (H&E × 200). section of the liver shows dilatation of the central vein (CV) with severe fatty degeneration; Steatosis evident by 'empty cells'and peripheral nuclei (H&E×200).

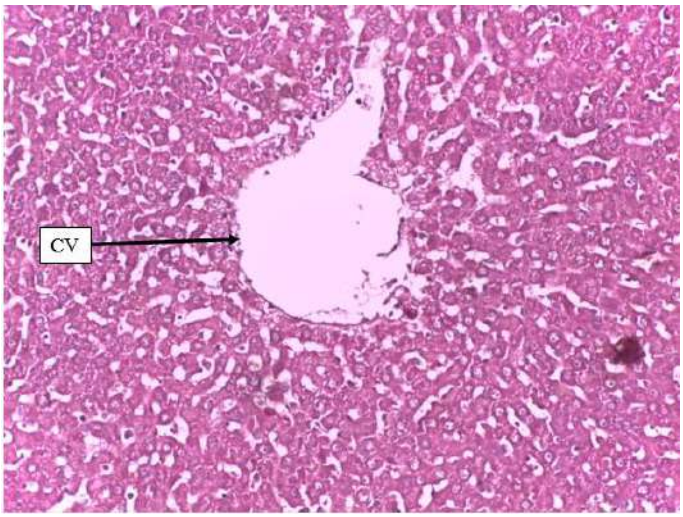
Slide 12:



Liver C: section showing dilatation of central vein (CV) and mild edematous degeneration (ED). With moderate fatty degeneration and regeneration of normal hepatocytes (H&E×200).

Slide 12: Group C (Positive control - Bunto, 5 ml/kg) section showing dilatation of central vein (CV) and mild edematous degeneration (ED). With moderate fatty degeneration and regeneration of normal hepatocytes (H&E×200).

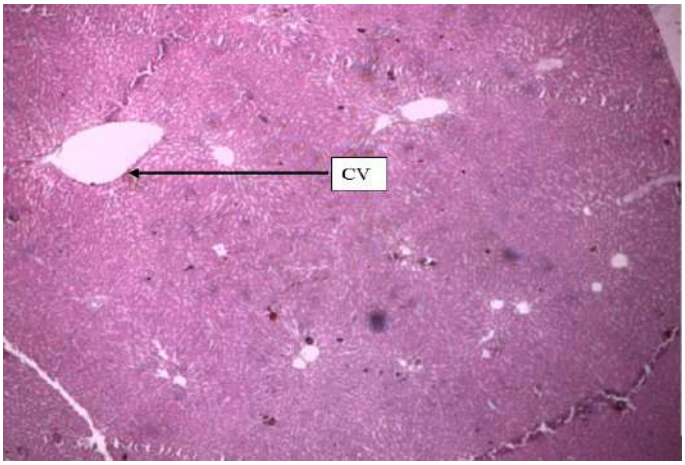
Slide 13:



Liver D: Liver section showing dilation of the central vein (CV) (H&E×200).

Slide 13: The photomicrograph of the histopathological section of the Liver of Group D (*P. nitida* leaf 200 mg/kg) which are PHZ induced anaemic rat that received 200mg/kg of the leaf extract at higher magnification (H&E × 200) Liver section shows dilation of the central vein (CV).

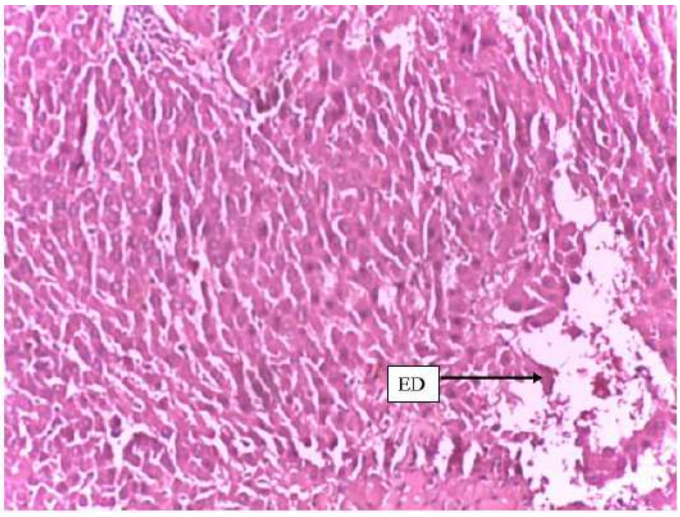
Slide 14:



Liver E: Section of the liver showing dilation of the central vein (CV) (some other areas are intact) (H&E×200).

Slide 14: The photomicrograph of the histopathological section of the Liver of Group E (*P. nitida* leaf 400 mg/kg) which are PHZ induced anaemic rat that received 400mg/kg of the leaf extract at higher magnification (H&E × 200) Liver section shows dilation of the central vein (CV).) (some other areas are intact).

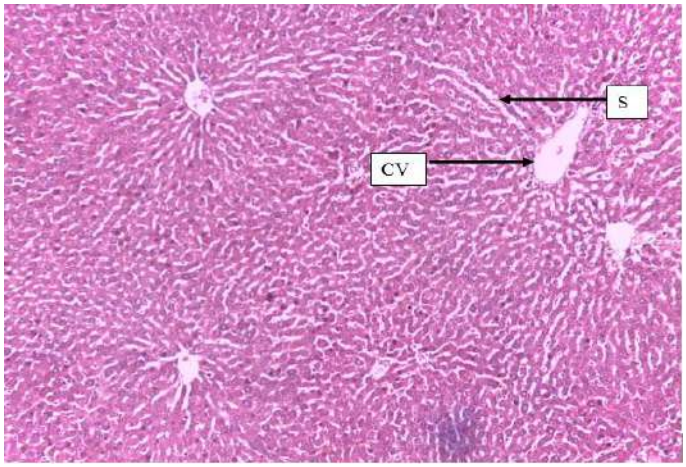
Slide 15:



Liver F: Edematous degeneration present (ED) (H&E×200).

Slide 15: The photomicrograph of the histopathological section of the Liver of Group F (*P. nitida* seed 200 mg/kg) which are PHZ induced anaemic rat that received 200mg/kg of the seed extract at higher magnification (H&E × 200) Liver section shows edematous degeneration.

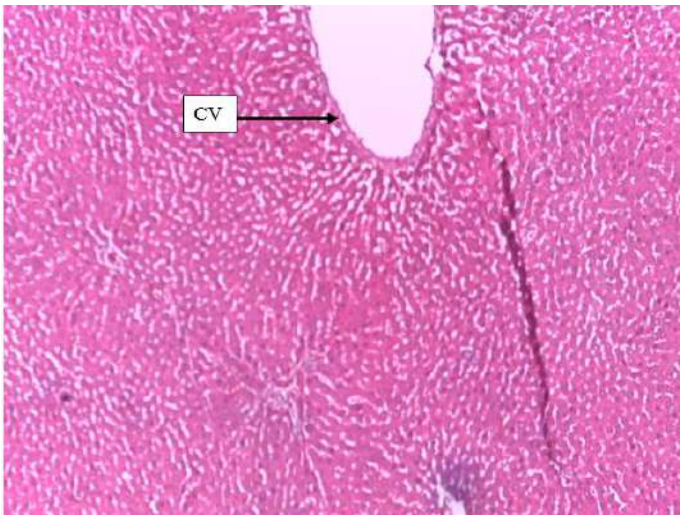
Slide 16:



Liver G: Liver section showing mild dilation of the central vein (CV) & some sinusoid (S) (H&E×200).

Slide 16: The photomicrograph of the histopathological section of the Liver of Group G (*P. nitida* seed 400 mg/kg) which are PHZ induced anaemic rat that received 400mg/kg of the seed extract at higher magnification (H&E × 200) Liver section showing mild dilation of the central vein (CV) & some sinusoid (S).

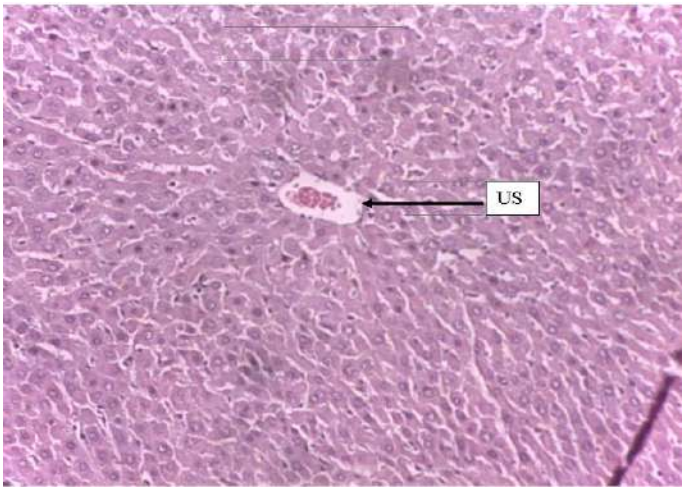
Slide 17:



Liver H: Dilatation of central vein (CV) present (H&E×200).

Slide 17: The photomicrograph of the histopathological section of the Liver of Group H (*P. nitida* stem bark 200 mg/kg) which are PHZ induced anaemic rat that received 200mg/kg of the stem bark at higher magnification (H&E × 200) Liver section showing dilation of the central vein (CV).

Slide 18:

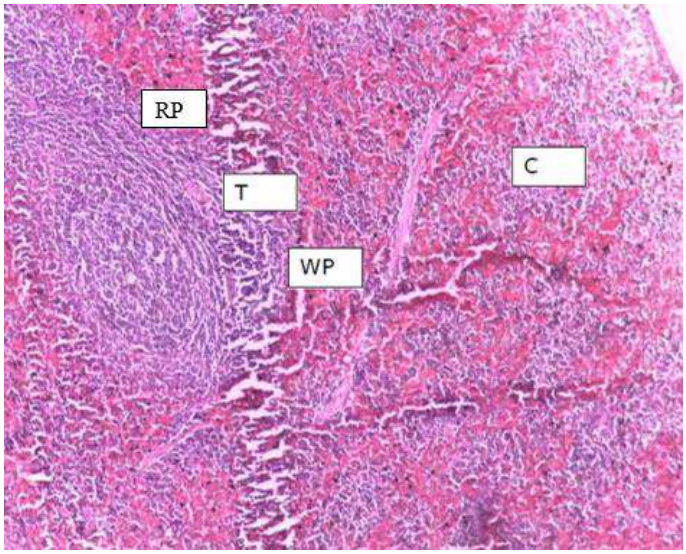


Liver I: Mild edema (H&E×200).

Slide 18: The photomicrograph of the histopathological section of the Liver of Group I(*P. nitida* stem bark 400 mg/kg) which are PHZ induced anaemic rat that received 400mg/kg of the stem bark at higher magnification (H&E × 200) Liver section showing Mild edema.

Photomicrograph of Spleen Organ of the Different Groups

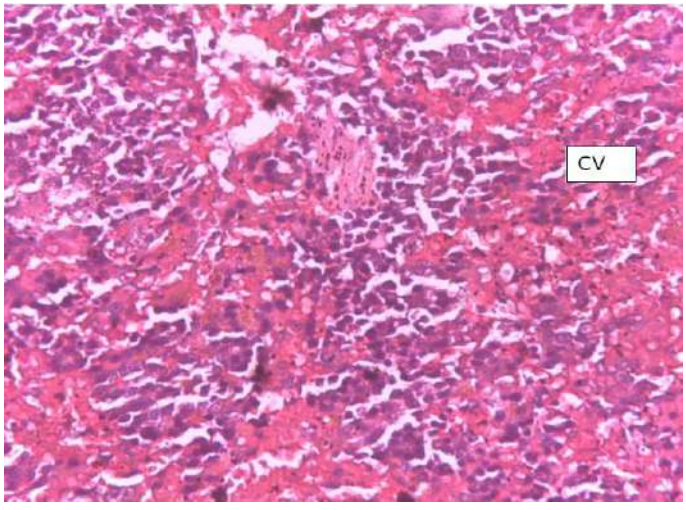
Slide 19:



Spleen A: Splenic section showing White Pulp (WP); Red Pulp (RP); Trabecula (T); and Capsule (C). (H&E×200).

Slide 19: Group A (Normal control) Splenic section showing White Pulp (WP) Red Pulp (RP), Trabecula (T) and Capsule (C). (H&E×200).

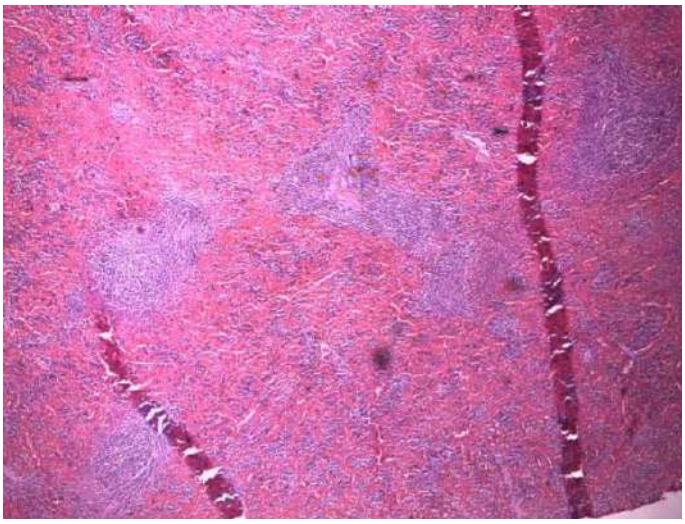
Slide 20:



Spleen B: Section shows depletion of lymphoid cells (evidence- fibrosis) (H&E×200).

Slide 20: The photomicrograph of the histopathological section of the Spleen of Group B (Negative control) which are PHZ induced anaemic rat at higher magnification (H&E × 200). It shows depletion of lymphoid cells (evidence- fibrosis).

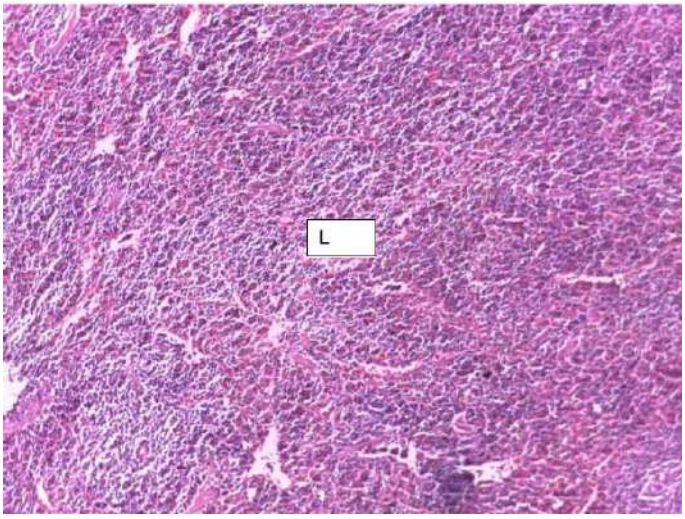
Slide 21:



Spleen C: Splenic section showing no significant change (H&E×200).

Slide 21: Group C (Positive control - Bunto, 5 ml/kg) Splenic section showing no significant change.(H&E×200).

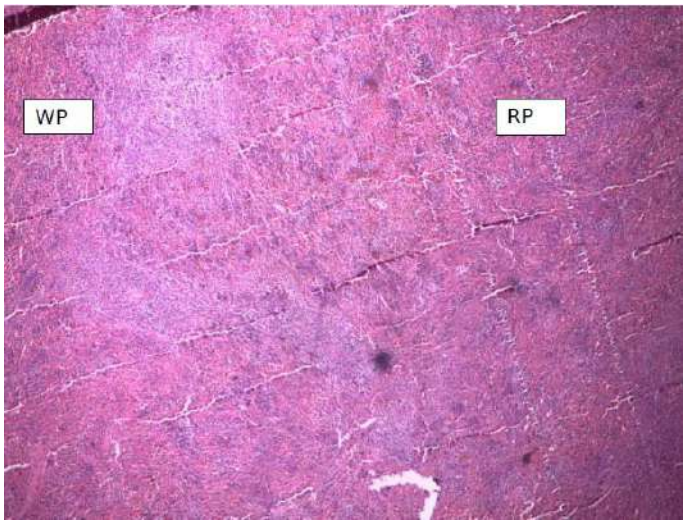
Slide 22:



Spleen D: Increase in population of lymphoid (L) cells within the parenchyma (H&E×200).

Slide 22: The photomicrograph of the histopathological section of the Spleen of Group D (*P. nitida* leaf 200 mg/kg) which are PHZ induced anaemic rat that received P.nitida leaf extract 200mg/kg at higher magnification (H&E × 200). It shows an increase in population of lymphoid (L) cells within the parenchyma. (H&E×200).

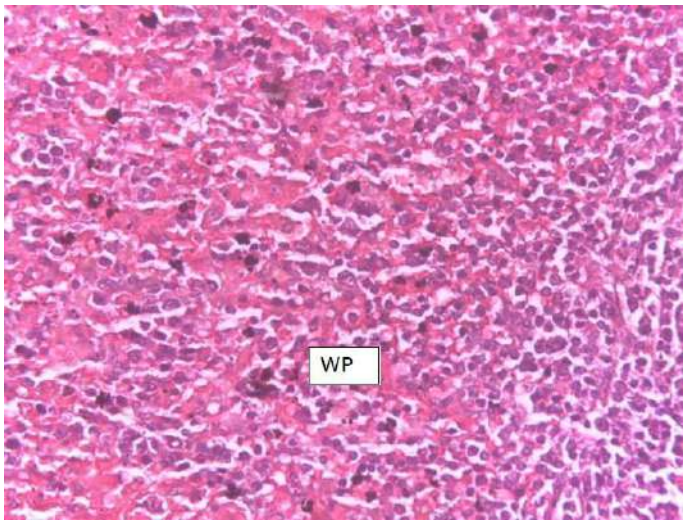
Slide 23:



Spleen E: Splenic section with significant changes (H&E×200).

Slide 23: The photomicrograph of the histopathological section of the Spleen of Group E (*P. nitida* leaf 400 mg/kg) which are PHZ induced anaemic rat that received P.nitida leaf extract 400mg/kg at higher magnification (H&E × 200). It shows Splenic section with significant changes.

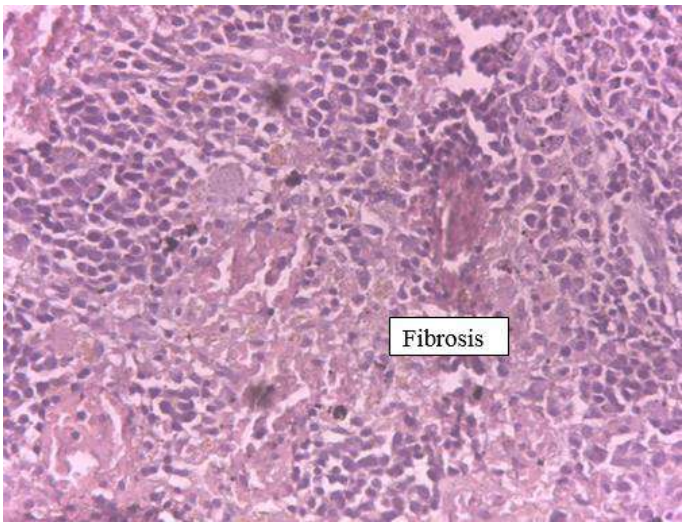
Slide 24:



Spleen F: High magnification Spleen section with no significant changes (H&E×200).

Slide 24: Group F (*P. nitida* seed 200 mg/kg) High magnification Spleen section with no significant changes. (H&E×200).

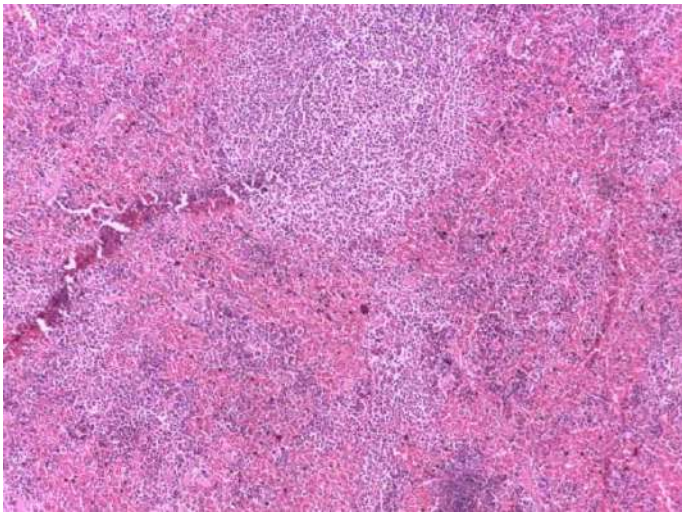
Slide 25:



Spleen G: Depletion of lymphoid cells evident (H&E×200).

Slide 25: The photomicrograph of the histopathological section of the Spleen of Group G (*P. nitida* seed 400 mg/kg) which are PHZ induced anaemic rat that received P.nitida seed extract 400mg/kg at higher magnification (H&E × 200). Depletion of lymphoid cells is evident.

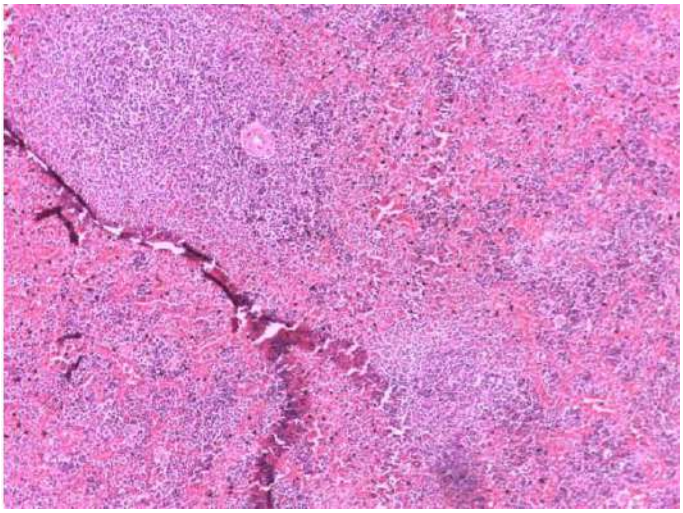
Slide 26:



Spleen H: Spleen section with no significant changes (H&E×200).

Slide 26: Group H (*P. nitida* stem-bark 200 mg/kg) which are PHZ induced anaemic rat that received P. *nitida* stem-bark 200 mg/kg Spleen section shows no significant changes.

Slide 27:



Spleen I: Spleen section with no significant changes (H&E× 200).

Slide 27: Group I (*P. nitida* stem-bark 400 mg/kg) which are PHZ induced anaemic rat that received P. *nitida* stem-bark 400 mg/kg Spleen section shows no significant changes.

Discussion:

According to experimental research, intravascular hemolysis can harm the liver and other vascular organs under any circumstance [16]. Phenylhydrazine has been found to produce oxidative damage to the liver, kidney, and spleen in addition to hemolysis-induced liver injury [17]. involves changes in iron metabolism, immune response activation that leads to spleen and liver phagocytosis, and disruption of erythropoietin's ability to connect to its receptors [18].

Through the amelioration or reversal of the high impact of PHZ on liver, kidney, and spleen from severe to moderate level, photomicrographs from this study demonstrated that the leaf, seed, and stem-bark of Picralima nitida extracts possess varying degrees of anti-hepatotoxic and nephrotoxic activities as treatment progressed to day 21. When compared to the stem-bark treated group, this capacity, particularly with the leaf and seed extract treatment at graded levels, tends to lend more support to the acute toxicity finding in this investigation.

Compared to the mild to moderate histo-damages seen in all treatment groups, the organs of the untreated rats had more significant architectural organization of the tissues with lymphocytic infiltration, degenerative defects, and glomerulus—all common features of damaged hepatocytes. While the mild to moderate lesions observed in the treatment groups may indicate the potential for ameliorative or restorative effects of the various P. nitida extracts when compared to the untreated group, the presence of obvious histopathological effects in the studied tissues (liver, kidney, and spleen) of the untreated groups implies that there were significant damages and adverse effects of the PHZ on the integrity of the tissues. The various extractives' ability to improve the condition was equivalent to the improvement shown in rats given the reference medication (Bunto) [19, 20].

The way that P. nitida leaf, seed, and stem bark aid in the healing process may be attributed to their documented antioxidant potential in scavenging free radicals of strong oxidants and/or their capacity to accelerate the process of hematological parameter restoration to nearly normal levels, shielding the liver from additional PHZ damage. Our findings support previous observations by [21, 22] about the ameliorative effect on the kidney, liver, and spleen.

Conclusion:

All things considered, this study examined how Picralima nitida affected the histology of Wistar rats that had been stimulated with phenylhydralazine and alloxan. The results show great therapeutic potential and support the traditional usage of Picralima nitida for its hematinic and hypoglycemic qualities.

Picralima nitida is safe; histopathological analysis of the visceral organs, such as the liver, kidneys, and spleen, showed no appreciable side effects. The lack of pathological alterations in these organs demonstrates the plant extract's safety and non-toxicity at the dosages employed in the study.

The thorough examination of histopathological characteristics highlights the many advantages of Picralima nitida.

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