

EFFECTS OF ETHANOL LEAF EXTRACT OF JATROPHA TANJORENSIS ON PULMONARY HISTOLOGY IN ALBINO RABBITS.

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The effects of ethanol leaf extract of *Jatropha tanjorensis* on pulmonary histology in albino rabbits was investigated. Eighteen (18) male and female rabbits weighing 2.0 – 3.0kg were randomly assigned into three (3) groups of six (6) animals each comprising one (1) control group and two (2) experimental (test) groups. The control group was administered distilled water and 3kg of standard animal feed, while experimental (test) groups I and II received 100mg/kg and 300mg/kg body weights of ethanol leaf extracts of *Jatropha tanjorensis*, respectively for sixty (60) days. The diets of the animals was further supplemented with 3kg feed mixed with 10g and 30g of finely ground dried *Jatropha tanjorensis* leaves respectively. Histopathological assessment revealed dose dependent alterations in the pulmonary tissues of treated rabbits characterized by collapsed aveolar sacs (AS), thick interaveolar septa (IAS), inflammatory cell infiltrates found around the peribronchial and perivascular regions was present in the 100mg/kg treated group. For the 300mg/kg body weight group, there was a more pronounced thickening of the alveolar septa, congested bronchioles with inflammatory cells, mucus plugs, collapsed alveolar sacs and presence of hemorrhage.

These findings suggest that prolonged administration of *Jatropha tanjorensis* leaf extract may exert harmful effects on the integrity of the lungs emphasizing the need for caution in its therapeutic and dietary applications.

Key words: *Jatropha tanjorensis*, ethanol leaf extract, albino rabbits, histopathology.

Introduction

The respiratory system, specifically the lungs is crucial for gaseous exchange and the maintenance of physiological balance. The pulmonary vessels comprise of the alveoli, bronchi, bronchioles and an extensive capillary network that facilitates oxygen and carbon dioxide exchange. The strength of these structures is important as they are highly prone to damage from xenobiotics, bioactive compounds and environmental pollutants (kumar, Abbas & Aster 2021, West 2021). Histopathological changes such as interstitial inflammation, alveolar congestion, fibrosis and degeneration of the epithelium are indicative of pulmonary toxicity and a compromised respiratory function. There has been a global dependence on medicinal plants in recent years due to their affordability, availability and perceived safety. Reports from

several sources suggest that many herbal plants contain biologically active compounds that are capable of inducing toxicological effects, especially when consumed in high doses or for prolonged periods (Ekor, 2019, Fasinu and Bouic, 2020). There is a possibility that these toxic effects may not be limited to only primary target organs but may extend to secondary organs such as the lungs via systemic circulation.

Jatropha tanjorensis, commonly known as “hospital too far” is widely consumed in West Africa for its ethnomedicinal properties which include anti diabetic, antihypertensive and hematinic effects (Iwalewa et al, 2021; Oyewole & Akingbala, 2020). Phytochemical analysis has demonstrated that the plant is composed of alkaloids, tannins, saponins, flavonoids and phenolic compounds many of which exhibit pro-oxidant and antioxidant activities depending on concentration and biological content (Sasidharam et al, 2020, Ajayi et al, 2022).

Due to its efficiency in extracting both polar and non-polar compounds, ethanol extraction is often employed in phytochemical studies. It is important to note that ethanol leaf extracts may likely concentrate particular phytochemicals to levels capable of tissue irritation and inducing cellular toxicity (Pandey & Tripathi, 2019) Studies based on plant- derived toxicants repeatedly show their ability to induce inflammatory response, oxidative stress and structural damage in pulmonary tissues, which includes infiltration of inflammatory cells, alveolar septa thickening and the disruption of epithelial integrity (Lietal 2021, Zhang et al, 2023). Although various studies have evaluated the hepatic, hematological and renal effects of *Jatropha tanjorensis*, there is a lack of data on the pulmonary effects especially at the histological level. Most studies tend to concentrate on systemic benefits without proper analysis of potential organ-specific toxicity (Iwalewa et al, 2021, Systemic, Ajayi et al, 2022). Due to their well-developed respiratory system and sensitivity to toxic agents, albino rabbits serve as a suitable experimental model for studies on respiration and this allows for accurate assessments of histomorphology changes (Suckew, Stephens & Wilson, 2019).

Administration of leaf extracts of *Jatropha tanjorensis* has been shown to induce alterations in hematological and biochemical parameters, suggesting systemic toxicity at higher doses (Adebayo et al, 2018, Yakubu et al, 2018). Histopathological investigations also revealed structural changes in vital organs which indicate that the plants bioactive constituents may exert deleterious effects beyond their therapeutic benefits (Oyewole & Akingbala, 2018). Exposure to plants chemicals through oral or systemic routes can lead to bioaccumulation and secondary pulmonary damage which may be mediated by oxidative stress pathways and inflammatory responses (Ekor, 2014). Considering the increasing consumption of *Jatropha tanjorensis* and its assumed safety, it is important to conduct detailed toxicological evaluations focusing on organs that are not commonly studied such as the lungs. Good Knowledge of histopathological effects of ethanol leaf extracts of *Jatropha tanjorensis* on pulmonary tissues will provide significant findings on its safety profile and potential health risks.

The study will evaluate the effects of ethanol leaf extracts of *jatropha tanjorensis* on the pulmonary histology of albino rabbits thereby contributing to existing knowledge on plant induced pulmonary toxicity and help in guiding evidence – based use of other herbal remedies.

1.2 STATEMENT OF THE PROBLEM

Though *Jatropha tanjorensis* is widely used traditionally as a medicinal/herbal plant and also for dietary purposes, there is limited scientific evidence regarding the plant's histopathological implications. Despite the progress recorded in the use of synthetic organic medicinal products of the twenty first (21st) century, more than 30% prescribed medicines in industrialized countries are synthesized directly or indirectly from plants. Traditional medicine is becoming more popular in both developing and developed countries (Onwuliri&Wonang; 2005). It is known as the first medical care administered to many Nigerians. Traditional medical knowledge of plant medicines and their uses by indigenous cultures, is not limited to conservation of cultural practices and biological diversity but also for community healthcare and in the development of drugs now and in future (Hanazak et al, 2000). Traditional medical knowledge of plant medicines has been widely documented through ethnobotanical studies which emphasize the role of indigenous knowledge systems in identifying therapeutic plants (Pei,2001).

1.3 Objectives of the Study

- i. To determine the histological changes in the lungs of albino rabbits administered with ethanol leaf extracts of *Jatropha tanjorensis*.
- ii. To compare the lung tissues of treated (test) and untreated (control group) albino rabbits.
- iii. To investigate possible pathological features such as alveolar damage, necrosis, fibrosis and congestion in lung tissues.

1.4 JUSTIFICATION OF THE STUDY

The increasing global dependence on medicinal plants for therapeutic purposes has heightened scientific interest in validating their safety profiles especially at the histological and organ-specific levels. *Jatropha tanjorensis* commonly known as “hospital too far” is widely consumed in West Africa for its acclaimed antihypertensive, antioxidant and hematinic properties (Akinmoladum et al; 2021; Omoregie& Osagie, 2012). In spite of its medicinal value, there is limited comprehensive evaluation of its potential toxicological effects on vital organs such as the lungs, particularly under conditions of prolonged exposure to ethanol based extracts.

The pulmonary system is highly susceptible to xenobiotic due to its extensive blood supply and direct exposure to circulating phytochemicals following systemic absorption. From previous laboratory practices, it is known that ethanol extracts of medicinal plants concentrate biologically active compounds such as saponins, flavonoids, tannins and alkaloids which may induce effects which may either be protective antioxidant, deleterious pro-inflammatory or cytotoxic depending on dose and duration of action (Yuan et al; 2016)

Consequently, histopathological evaluation of lung tissue provides important insights into salient structural changes such as alveolar distortion, infiltration of inflammatory cells, disruption of the bronchial structure and epithelial degeneration. Although studies have documented the beneficial pharmacological properties

of *Jatropha tanjorensis*, including anti-anemic and antioxidant effects (Akinmoladun et al; 2018) emerging evidence is suggestive of members of the *Jatropha* genus containing potentially toxic substances such as phorbol esters, which have been implicated in inflammatory and irritant responses in biological tissues (De Vappa et al; 2010, Sabandar et al; 2013). These compounds may greatly affect pulmonary integrity by exerting oxidative stress, cellular degeneration, and lipid peroxidation which made it necessary for this investigation into the histology of the lungs.

It is also correct to say that most existing toxicological studies on *Jatropha tanjorensis* have basically focused on hepatic, hematological and renal functions which still widens the lack of data on respiratory tissues. This represents a crucial knowledge gap, particularly because respiratory compromise may occur before the onset of observable symptoms of functional impairment. Also evaluating pulmonary histology in albino rabbits, provides a valuable clinically relevant model for human extrapolation which includes comparable airway branching patterns and alveolar organization (Suckow, et al; 2019)

The use of ethanol as a solvent in the extraction of phytochemicals further justifies this study as it replicates common traditional preparation methods while increasing the bioavailability of lipophilic plant or phytoconstituents. However, ethanol extracts may also potentiate toxicity by enhancing the delivery of higher concentrations of active compounds to systemic circulation, thereby increasing the risks of organ-specific effects (Azwanida, 2015).

Following the wide spread consumption of *Jatropha tanjorensis* and the inadequate data available on its pulmonary safety profile, this study is very important to – elucidate dose-dependent histopathological distortions in lung tissue. It will contribute to the field of phytomedicine safety evaluation.

1.5 Scope of the Study

The study is focused on and limited to the investigation of the histopathological effects of ethanol leaf extracts of *Jatropha tanjorensis* on the lungs of albino rabbits.

The scope covers the following aspects:

- i. **PLANT MATERIAL AND EXTRACTION:** Collection, identification and authentication of *Jatropha tanjorensis* leaves.
- ii. Preparation of extract using ethanol as solvent
- iii. **EXPERIMENTAL ANIMALS:** Adult male and female albino rabbits weighing 2.0 – 3.0kg. The animals (rabbits) were acclimatized to the laboratory environment for a period of 14 days (2 weeks)
- iv. Histological evaluation of the lungs was carried out to check for alteration or distortions in the lungs.

1.6 Scope Limitations

a. **Species – specific differences:** The results from albino rabbits may not directly translate to humans or other species due to physiological variations.

b. **Sample size:** The number of albino rabbits may limit statistical power and generalization of findings.

c. Method of extraction: Only ethanol extract was tested in this study Aqueous or methanol solvent extracts may present different phytochemical effects.

d. Duration of study: The study was carried out for 60 (sixty) days which may not fully capture long term histopathological outcomes.

e. Simplicity in the analytical method: Histopathological studies provide only structural results without correlating other mechanisms such as biochemical, genetic and functional.

f. Laboratory setting: Since the experimental environment is controlled, it minimizes confounders and may not reflect real-life exposure conditions.

2.1. Literature Review

Jatropha tanjorensis commonly known as “hospital too far” is a medicinal plant widely consumed in West Africa as a vegetable used in soups, pottages and stews and in traditional remedy for health conditions such as anemia, inflammation and hypertension. Phytochemical investigations have confirmed the presence of flavonoids, saponins, tannins, phenolic compounds and alkaloids which are all implicated for its reported pharmacological activities. Because it enhances the yield of both polar and non-polar bioactive compounds, thereby providing a more far reaching phytochemical profile than other extracts, ethanol extraction is commonly employed in experimental toxicology. Recent literature on pharmacognosy has emphasized that medicinal plants with high content of phenols, may exhibit both protective antioxidant effects and potential organ-specific toxicity depending on dosage and duration of exposure (W.H.O, 2019, OECD, 2008). Despite their therapeutic “benefits, medicinal plants are not constitutionally safe. There has always been a belief that natural equals safe”, this is however being contested by increasing reports of toxicological effects, especially when extracts are consumed in high doses or over prolonged periods.

2.2. Overview of *Jatropha Tanjorensis*

Jatropha tanjorensis is a hybrid species belonging to the family Euphorbiaceae. It is widely consumed as a leafy vegetable and also used ethnomedicinally for the treatment of diabetes, hypertension, anemia and infections (Iwalewa et al, 2005; Omoregie & Osagie, 2012). Phytochemical analyses reveal that *Jatropha tanjorensis* leaves contain large quantities of flavonoids, alkaloids, phenols, saponins and glycosides which are known to contribute to its antioxidant and anti-inflammatory properties (Akinmoladun et al, 2018; Ayeni et al, 2021). Since all these compounds are known to modulate oxidative stress pathways, they may influence responses of pulmonary tissue to injury. It is worthy of note that members of the *Jatropha* genus have toxic constituents including phorbol esters which can stimulate irritation, cytotoxicity and inflammation (De Vappa et al, 2010). *Jatropha tanjorensis* though considered less toxic when compared with other *Jatropha* species such as *Jatropha curcas*, recent studies suggest that high concentration or prolonged use may result in adverse histological alterations in organs such as the liver, kidney and even the lungs (Yakubu et al; 2008, Adewale et al; 2020).

There is however inadequate direct evidence on the effects of the plant on the lungs particularly in albino rabbit models which exposes on important gap in translational toxicology.

2.3. Histology of the Lungs

The lungs are highly specialized organs that are responsible for gas exchange and are structurally modified to maximize surface area while maintaining diffusion distance which is minimal. The respiratory system (the lungs) is divided into respiratory and conducting zones.

The respiratory zone: This zone is made up of alveoli, alveolar ducts and sacs. It is lined by type I pneumocytes which function in facilitating the exchange of gas). It also has type II pneumocytes which are responsible for the regeneration of epithelia and the production of surfactants (Standring, 2021).

Alveolar macrophages phagocytose foreign particles by providing an additional immune defense.

The conducting zone which is comprised of the trachea, bronchi and bronchioles is lined by pseudo stratified ciliated columnar epithelium with goblet cells within, which play an important role in mucociliary clearance (Ross and Pawlina, 2020). The mechanism traps and removes inhaled particles, toxic substances and pathogens.

The expansive blood supply and thin alveolar capillary barrier make it prone to circulating toxins which include compounds derived from plants. Damage to this structure may present as edema, inflammation, degeneration of the epithelial and fibrosis all of which alter respiratory function.

2.4. TOXICOLOGICAL EFFECTS OF PLANT EXTRACTS ON THE LUNGS

The lungs are a primary target for xenobiotic toxicity resulting from their high perfusion rate as well as exposure to both systemic and inhaled agents. Plant derived compounds, particularly the ones extracted with ethanol may induce pulmonary toxicity using different mechanisms.

1. INFLAMMATION AND OXIDATIVE STRESS: Certain phytochemicals can create reactive oxygen species (ROS), disturbing endogenous antioxidant defenses resulting into lipid peroxidation, denaturation of proteins and damage to DNA (Li et al; 2021)

The oxidative stress usually reinforces inflammatory cascades which are characterized by cytokines release and infiltration of leucocytes.

2. HISTOPATHOLOGICAL CHANGES

Studies carried out on plant extracts have reported structural changes in the lung, including

- i. Degeneration of the bronchial epithelia
- ii. Congestion of the vascular system
- iii. Thickening of the alveolar wall
- iv. Interstitial edema

Adewale et al; (2020) demonstrated that high doses of plant extracts could distort normal tracheobronchial network, while Yakubu et al (2008) reported dose-dependent damage to tissues which is associated with phytochemical toxicity.

3. DEGENERATIVE AND FIBROTIC CHANGES

Prolonged exposure to toxic phytochemicals may result to pulmonary fibrosis and deposition of excessive amounts of collagen (West, 2021) thereby compromising elasticity of the lungs and efficiency in gas exchange.

4. IMMUNE MODULATING EFFECTS

Some phytochemicals may either suppress or overstimulate immune responses, changing macrophage activity and mucociliary clearance, thereby making them more prone to infections or chronic inflammation (Sasidharan et al, 2020)

All these mechanisms are documented but there is limited information on the effects of *Jatropha tanjorensis* and pulmonary histology.

5. EXPERIMENTAL USE OF ALBINO RABBITS IN PULMONARY STUDIES

Albino rabbits are extensively used in respiratory research due to their physiological and anatomical similarities to human lungs, specifically in air way branching patterns and organization of the epithelium (Suckow et al; 2019). Their relatively large lung size allows for in-depth histological examination, making them appropriate for evaluating structural changes that are caused by toxic agents.

Rabbit models have been potently used to study inflammation of the airways, mucociliary function and toxicological responses which provides valuable contributions into human respiratory diseases.

3.1. Research Methodology

1. Research design

The study adopted an experimental design aimed at evaluating the effects of ethanol leaf extracts of *Jatropha tanjorensis* on pulmonary (lung) histopathology in albino rabbits

The experimental animals were randomly assigned into control and treatment groups and were dosed over a sixty (60) day-period. The major parameter assessed was histopathological changes.

2. Plant Materials

Fresh leaves of *Jatropha tanjorensis* was collected from a farm in Port Harcourt, Rivers-State, Nigeria. The plant was authenticated at the Department of plant science and biotechnology, University of Port-Harcourt, Choba. The leaves were washed, air dried under shade at room temperature and pulverized into fine powder using an electric grinder. Extraction of plant compounds was carried out by cold maceration in absolute ethanol for 72 hours and shaken intermittently. Concentration of the filtrate was carried out using a rotary evaporator under reduced pressure to yield a residue which was dark-green and stored in a desiccator at 4°C

3. Experimental Animals

Eighteen (18) healthy male and female albino rabbits weighing 2.0 – 3.0kg were obtained from the anatomy animal house, University of Port Harcourt, Choba. The animals were kept in well ventilated cages under standard laboratory conditions. Experimental grouping and treatment Eighteen (18) albino rabbits were randomly divided into three (3) groups each of six (6) male and female albino rabbit sub groups.

The treatment were given as follow:

Group I: Control group animals were administered distilled water and standard animal feed.

Group II: Animals received 100mg/kg body weight of ethanol leaf extract.

Group III: Animals received 300mg/kg body weight of ethanol leaf extract.

Administration of the extract was done manually.

Animal feed

Control group animals received uncontaminated feed (feed without *Jatropha tanjorensis* leaf extracts). 3kg feed was administered to this group of animals. Group II experimental animals received 10mg/kg body weight *Jatropha tanjorensis* leaf powder mixed with 3kg animal feed. Other parameters were considered as weights of albino rabbits which was taken on a daily basis.

On day 61, the animals were “sacrificed” with organs being excised. The specific organs of interest, being the lungs, went through further processes of histopathological study.

Materials for Histology Study

- a. Materials for tissue collection, fixation, tissue processing, sectioning, staining with hematoxylin and eosin (H&E) and microscopic examination.

a. Tissue collection

- i. **Euthanasia:** The animals were “sacrificed” and the lungs excised and collected immediately to prevent autolysis and damage to the tissue.
- ii. **Trimming:** The tissue was cut into small pieces of 5mm thickness to allow proper penetration of fixative.
- iii. **Fixation:** The tissue sample was immediately immersed in 10% natural buffered formalin for 48 hours to preserve the structure of the cells.
- iv. **Labelling:** Samples are labelled according to experimental group indicating control or test groups.
- v. **Tissue Processing:** Graded solutions of alcohol were used for dehydration of the tissues.
- vi. **Clearing:** Clearing was done using xylene in order to remove alcohol from the tissue after dehydration.
- b. To make the tissue receptive to molten paraffin wax.
- c. To render the tissue cleared or transparent which implies its readiness for proper infiltration.
- vii. **Embedding:** The tissue was embedded in paraffin wax to produce paraffin blocks for ease in sectioning.
- viii. **Sectioning:** Microtome was used for cutting sections into tiny fragments
- ix. **Staining:** Staining was done using hematoxylin and eosin (H&E) stains.
- x. **Microscopy:** The light microscope was used in viewing the processed tissues already placed on slides.

The lungs obtained from the albino rabbits were sliced and dehydrated with a range of concentrations of ethyl alcohol and then cleared with xylene and embedded in molten paraffin wax. The embedded tissue blocks were sectioned with a rotatory microtome and slides were prepared with the sections. The tissues were stained with Ehrlich’s hematoxylin and eosin blue using Lillie’s method (Lillie, 1965).

4. RESULTS AND FINDINGS

The effects of ethanol leaf extracts of *Jatropha tanjorensis* on pulmonary histopathology in albino rabbits was studied. Lung sections from albino rabbits in the control group administered distilled water and animal

feed presented normal histological features with clear alveolar spaces, presence of thin inter alveolar septa, intact bronchioles devoid of evidence of congestion, cellular infiltration and inflammation.

The control group is represented in photomicrograph I.

For the low dose group (100mg/kg) body weight, lung sections revealed slight distortions with collapsed alveolar sacs (AS), thick interalveolar septa (IAS), inflammatory cell infiltrates basically lymphocytes found around the peribronchial and peric-vascular regions. The bronchioles (BR) are lined with respiratory epithelium. The low dose group 100mg/kg body weight is represented in photomicrograph 2.

For the medium dose group (300mg/kg) body weight, lung sections revealed moderate histological alterations and mild distortions including more pronounced thickening of the alveolar septa when compared with the low-dose (100mg/kg) body weight group. Bronchioles are congested with inflammatory cells and mucus plug, collapsed alveolar sacs (AS) and the presence of hemorrhages. Medium dose group. 300mg/kg body weight is represented in photomicrograph 3.

All photomicrographs have magnifications of x400 H&E (Hematoxylin and Eosin) stain.

From observations, histopathological examinations of the lung tissues from the control group presented normal pulmonary structure with intact alveolar sacs, clear lining of the bronchioles and thin inter-alveolar septa. It is also evident that control group animals had bronchioles devoid of any form of congestion, cellular infiltration and inflammation. However, lung sections from albino rabbits administered low dose (100mg/kg) body weight of ethanol leaf extracts of *Jatropha tanjorensis*, presented dose-dependent alterations. Mild distortions of the lungs was observed with collapsed alveolar sacs (AS), thick interalveolar septa (IAS), inflammatory cell infiltrates basically lymphocytes found around the peri-bronchial and perivascular regions. The bronchioles are lined with respiratory epithelium.

For lung sections of experimental group II animals: 300mg/kg body weight, changes observed include a more pronounced thickening of the alveolar septa, congestion in the bronchioles with inflammatory cells and mucus plug. There was also collapse of the alveolar sacs and presence of hemorrhage.

It is evident that the extent of pulmonary damage was dose-dependent, increasing with the dose of the extract administered.

5. DISCUSSION

This study on the effects of ethanol leaf extract of *Jatropha tanjorensis* on pulmonary (lung) histopathology in albino rabbits provides evidence that ethanol leaf extracts of *Jatropha tanjorensis* induces dose-dependent histopathological changes in the lungs of albino rabbits. The alterations observed include collapsed alveolar sacs (AS), thick interalveolar septa (IAS), inflammatory cell infiltrations which are primarily lymphocytes found around the peribronchial and perisavcular regions. The bronchioles are lined with respiratory epithelium, these alterations are evident in low-dose (100mg/kg) body weight group.

For the medium-dose group (300mg/kg) body weight, the following changes/alterations are evident: a more pronounced thickening in the alveolar septa (AS), congested bronchioles with inflammatory cells, mucus

plugs, collapsed alveolar sacs (AS) and presence of hemorrhage. All of these changes suggests pulmonary toxicity possibly mediated by bioactive phytochemicals. These findings are in accordance with previous studies by Olayemi&Akinlolu 2018, who examined the histological effects of aqueous and ethanol leaf extracts of *Jatropha tanjorensis* in wistar rats. Reports from that study demonstrated mild to moderate pulmonary congestion, thickening of alveolar septa and infiltration of inflammatory cells in high dose-groups. Lesions found were attributed to oxidative stress and possible phytochemical irritation by alkaloids and saponins.

Another study carried out by Adebayo et al, in 2019 who studied the effects of ethanol leaf extract of *Jatropha tanjorensis* on the lungs, liver and kidneys of albino rats show lung sections with alveolar wall thickenings, congestion and mild hemorrhagic spots in treated groups. From interpretations, the damage was dose-dependent suggesting systemic toxicity at high extract concentration. Yet, another study by Ezeonu et al, (2020) on sub acute toxicity of *Jatropha tanjorensis* ethanol extract in rats indicated inflammatory cell infiltrations and congestion in lung and hepatic tissues which led to conclusions, that prolonged administration of *Jatropha tanjorensis* may compromise respiratory integrity. Previous reports also show that *Jatropha tanjorensis* contains alkaloids, tannins and saponins compounds reported to exert irritant or oxidative effects on tissues. Comparable pulmonary degenerations have also been reported in rodents exposed to other *Jatropha* species emphasizing the toxic potentials of the genus. Due to the absence of high mortality rates, it is suggestive that the observed changes in the lungs occur sub clinically which again emphasizes the need for biochemical assays of oxidative and inflammatory markers in future studies involving extracts from *Jatropha* species.

A major limitation of this study is a complete absence of long-term exposure data. However, the findings provide evidence that chronic or prolonged consumption of *Jatropha tanjorensis* may endanger pulmonary health.

CONCLUSION

Ethanol leaf extracts of *Jatropha tanjorensis* produced dose-dependent histopathological alterations in the lungs of albino rabbits.

These findings thereby raise safety concerns regarding its indiscriminate and unsupervised consumption which further lends credence to the significance of toxicological evaluation.

Photomicrographs of lung tissue



Figure 1a

CONTROL LUNG

Histologically normal lung tissue

Features: Clear alveolar spaces

Thin interalveolar septa

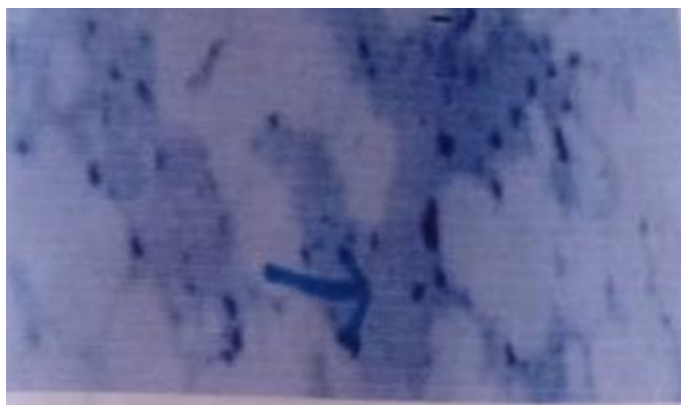


Figure 1b

TEST GROUP (LOW DOSE)

100mg/kg body weight

Features:

Slight distortions

Collapsed alveolar spaces (AS)

Thick interalveolar septa (IAS)

Inflammatory cells



Figure 1c

TEST GROUP (MEDIUM DOSE)

300mg/kg body weight

Features:

Pronounced thickening of alveolar septa

Congested bronchioles

Mucus plugs

Collapsed alveolar sacs

Presence of hemorrhage

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