Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 25s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Pharmacological Evaluation, Anti-Oxidant And Hepatoprotective Activity Of Tradescantia Fluminensis Leaves Extract On Experimental Rats

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Cite this paper as: Shadab Ali, Dr. Kehar singh Dhakad, Dr.Akhilesh Kumar Singhai, (2025) Pharmacological Evaluation, Anti-Oxidant And Hepatoprotective Activity Of Tradescantia Fluminensis Leaves Extract On Experimental Rats. *Journal of Neonatal Surgery*, 14 (25s), 238-250.

ABSTRACT

The present study investigates the pharmacological, antioxidant, and hepatoprotective activities of *Tradescantia fluminensis* leaves extract in experimental rats. The plant material was collected, authenticated, dried, and extracted using the Soxhlet extraction method, followed by percentage yield determination. A phytochemical screening confirmed the presence of flavonoids, phenolics, alkaloids, tannins, terpenoids, and saponins, which are known for their medicinal properties. The antioxidant activity was assessed using the DPPH radical scavenging assay, which demonstrated a strong free radical neutralization capacity, indicating its potential in oxidative stress management. The FTIR study identified key functional groups contributing to its biological activity. The acute oral toxicity study revealed that the extract is safe at therapeutic doses. For the hepatoprotective study, hepatotoxicity was induced in rats using Paracetamol, and the protective effects of *T. fluminensis* extract were evaluated through biochemical parameters including ALP, SGOT, SGPT, and total bilirubin levels. The treatment significantly improved these markers, suggesting its hepatoprotective potential. Histopathological analysis further confirmed reduced hepatic inflammation and cellular damage in extract-treated groups compared to control groups. The study demonstrates that *T. fluminensis* possesses potent antioxidant and hepatoprotective properties, which can be attributed to its bioactive constituents. The findings suggest its potential use as a natural therapeutic agent for oxidative stress-induced liver diseases, though further clinical research is needed for validation.

Keywords: *Tradescantia fluminensis, Hepatoprotective activity, antioxidant activity, FTIR, phytochemical screening.*

1. INTRODUCTION

Medicinal plants have been found to offer a potent alternative for managing pain and inflammation without any adverse effects. Herbal medicines have been used for centuries with some positive results. The use of herbal medicine to manage various health conditions

has increasingly received global attention and thus becoming an area of interest for researchers worldwide. *T. fluminensis*, commonly known as wandering Jew, is traditionally used for wound healing in Turkey. Folk literature also claims that the plant leaves are used to relive pain. However, there is currently no study conducted to provide scientific evidence of its analgesic activity. The present study was therefore conducted to evaluate the analgesic and anti-inflammatory activity of *Tradescantia fluminensis* leaves extract **(Waweru *et al.*, 2017).**

Liver diseases are regarded as one of the leading global health issues prevalent in developing countries. These diseases are classified into different categories, namely hepatises (no inflammatory), acute or chronic hepatitis (inflammatory), and cirrhosis or fibrosis (degenerative). The hepatoprotective herbal drugs act through various mechanisms to protect against various deleterious effects. By involving through one or more mechanisms, they act on the hepatocyte liver directly or indirectly and help in proper functioning the mechanism involved elevated antioxidant level/minimize generation of free radicals by Reactive Oxygen Species (ROS) as well as reactive nitrogen species (RNS), downward regulation of cytochrome 450, immunomodulate and phagocytic, preventing lipid peroxidation and enhance the level of natural antioxidant endowed body **(Domitrović and Potočnjak 2016).** The liver damage induced by medications represents up to 7% of all adverse reactions that may occur after drug intake; this occurs because the drugs are able to cause direct damage to hepatocytes, bile

ducts and vascular structures and can interfere with the flow of bile. The most commonly encountered manifestations include hepatitis, cholestasis, steatosis, cirrhosis, vascular and neoplastic lesions and fulminant hepatic failure. Altered hepatic metabolism of fatty acids in rats fed a hypolipidemic drug, fenofibrate. It should be added that the drug toxicity can be exacerbated by factors such as age and liver disease such as cirrhosis in which there has been a change in blood flow and hepatic impairment that alter the drug availability **(Gordon and Gonzalez 2017).**

2. MATERIAL AND METHODS

2.1 Chemical

Sodium Hydroxide, Glacial Acetic Acid, Ammonia and Nitroprusside was acquired from Merck. Himedia gave the Magnesium. Chloroform, Conc. HCl, 95% Alcohol was supplied by Clorofiltind. Fizmerck supplied Conc. H2SO4. Rankem supplied the1% Copper Sulphate Solution. Thermo Scientific gave the Petroleum ether whereas Sigma-Aldrich spplied Methanol.

2.2 Collection of plant

For the present study, *Tradescantia fluminensis* (500 gm) were collected from localized area of Bhopal. The plant was identified and authenticated by the botanist.

2.3 Extraction

The Soxhlet extraction has widely been used for extracting valuable bioactive compounds from various natural sources. Generally, a small amount of dry plant material *Tradescantia fluminensis* is placed in a thimble. The thimble is then placed in distillation flask which contains the methanol and pet ether solvent. After reaching to an overflow level, the solution of the thimble-holder is aspirated by a siphon. Siphon unloads the solution back into the distillation flask. This solution carries extracted solutes into the bulk liquid. Solute is remained in the distillation flask and solvent passes back to the solid bed of plant. The process runs repeatedly until the extraction is completed (Yadav *et al.,* 2018).

2.4 Phytochemical Quantitative Estimation

2.4.1 Total Phenolic Content

A spectrophotometer was used to evaluate the total phenolic content of *Tradescantia fluminensis* methanolic extract. In a test tube, 40 µL of plant extract (1 mg/mL methanol) or a standard gallic acid solution was mixed with 3.16 mL of distilled water and 200 µL of Folin- Ciocalteu reagent. The mixture was gently shaken and incubated for eight minutes. Next, 600 µL of sodium carbonate solution was added and thoroughly mixed. The solution was then incubated at 40°C for 30 minutes before being measured at 760 nm with a spectrophotometer against a blank. A calibration curve was created by employing gallic acid standard solutions at concentrations of 30, 50, 70, 90, and 110 µg/mL

2.4.2 Total Flavonoid Content

The total flavonoid content of *Tradescantia fluminensis* was calculated using the aluminum chloride colorimetric technique. In this step, 0.1 g of plant extract was dissolved in 1 mL of deionized water. 0.5 mL of the solution was mixed with 1.5 mL of 95% ethanol, 0.1 mL of 10% aluminum chloride hexahydrate ($AlCl_3$), 0.1 mL of 1 M potassium acetate (CH_3COOK), and 2.8 mL of deionized water. The mixture was incubated at room temperature for 40 minutes before being analyzed at 510 nm with a spectrophotometer, with deionized water Solution. Thermo Scientific gave the Petroleum ether whereas Sigma-Aldrich spplied Methanol.

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2.8 Antioxidant activity by the DPPH test

The DPPH• test relies on the capacity of the stable 2, 2-diphenyl-1-picrylhydrazyl free radical to react with hydrogen donors. The DPPH• radical has a strong UV-VIS absorption spectrum. In this test, a radical solution is decolorized after reduction with an antioxidant (AH) or a radical (R•) using the following scheme: DPPH• + AH → DPPH•-H + A•; DPPH• + R• → DPPH•-R. This spectrophotometric test employs the stable radical 2, 2 - diphenylpicrylhydrazyl (DPPH) as a reagent. Fifty µl of Dichanthium annulatum extracts (20-100µg/ml) in methanol were mixed with 5 ml of a 0.004% methanol solution of DPPH. After 30 minutes of incubation at room temperature, the absorbance at 517 nm was measured in comparison to a blank. Inhibition of free radical DPPH in percentage was calculated in following way.

2.9 FTIR analysis

The powdered sample of the pellet was loaded in FTIR spectroscope with a Scan range from 400 to 4000 cm-1 with a resolution of 4 cm-1 **(Dhivya and Kalaichelvi 2017).**

2.10 Acute Toxicity Study

Three animals were used in each phase of the step-by-step process for the acute toxic study according to OECD 423 guideline.

2.11 Experimental work

- **Animals Protocol**

IAEC Approval All animal experiments were approved by Institutional Animal Ethics Committee (IAEC).

- **Housing Condition-** The study included Male Wistar albino rats that were 2-3 months old and weighed 200-250 grams. Prior to treatment, the animals were kept in conventional animal home settings, with free access to food and water and a 12-hour light-dark cycle.

Paracetamol-induced hepatotoxicity- Accidental over dosage of paracetamol (acetaminophen), a frequently used analgesic-antipyretic medication (which can occur in drinkers and the elderly), results in immediate liver damage. The covalent binding of an oxidation product of paracetamol, i.e., N-acetyl-p-benzoquinoneimine, and sulphydryl groups of protein results in cell necrosis and lipid peroxidation, which causes hepatotoxicity, leading to increased levels of serum marker enzymes such as SGOT, SGPT, ALP, and total bilirubin **(Gulati *et al.*, 2018).**

- **Experimental design:**

Wistar albino rats of either sex were separated into five groups of six animals each and treated orally with the following for seven days.

Group 1 served as normal control and they received 1% sodium.carboxy methyl cellulose (Na.CMC) 1 mL/kg bw, p.o. Group 2 received paracetamol at dose of 1 g/kg bw (paracetamol control). Group 3 received both silymarin (50 mg/kg bw) and paracetamol dose. Group 4 represented test treatment in which rats were treated with the 1st dose of *Tradescantia Fluminensis* extract at dosages of 200 mg/kgbw along with paracetamol. Group 5 represented test treatment in which rats were treated with the 2nd dose *Tradescantia Fluminensis* extract at dosages of 400 mg/kgbw along with paracetamol. All the treatments were carried out for 30 days, starting at 4 days before the silymarin treated. Weekly measurement of body weight of all the animals was done during the experimental period.

2.11.1 Blood samples for biochemical estimation

Blood samples were collected from retro orbital venous plexus in non-heparinized tubes, centrifuged at 3000 rpm for 20 minutes, and blood sera were collected and stored at 4 ºC prior immediate determination of serum biochemical constituents which was performed by using ready-made kits from Erba. **(Aboubakr and Abdelazem 2016).**

2.11.2 Preparation of kidney homogenate

After the kidney was swiftly removed, ice-cold saline (0.9% NaCl) was immediately perfused. Using a homogenizer, a piece of the kidney was homogenized in cold Tris-HCl buffer (0.025 M, pH 7.4). After centrifuging the homogenate for ten minutes at 5,000 rpm, the supernatant was collected and utilized in a variety of biochemical tests.

2.12 Analysis of general parameters

2.12.1 Analysis of urine

After the last treatment animals were shifted to metabolic cages for 24 h in order to collect their urine individually and to estimate urine volume. Urine samples were assayed for glucose and protein by using standard diagnostic kits **(Azab *et al.*, 2016).**

Serum Creatinine and blood urea nitrogen (BUN) analysis For Creatinine, and blood urea nitrogen (BUN) plasma obtained. Creatinine and blood urea nitrogen (BUN) concentrations were determined in plasma. Samples were additionally spiked with 10 l of a Creatinine standard stock solution in 0.2 N HCl or 10 l 0.2 N HCl to controls. Renal function is assessed by serum creatinine (SCR) and blood urea nitrogen (BUN) reflects the glomerular filtration rate (GFR) poorly in mild or moderate renal impairment. BUN was measured by biochemical analyzer. In brief; urea was hydrolyzed to ammonia and carbon dioxide by urease. **(Arfat *et al.*, 2014).**

2.13 Serum biochemical parameters

Serum biochemical parameters such as ALT, AST, ALP and total bilirubin levels were measured by an enzymatic method using autoanalyzer.

2.13.1 ALP (Alkaline phosphatase) (Zhou et al., 2021).

- **Working reagent preparation**

Reconstitute one vial of Reagent 2 (pNPP substrate) and add 5.5 mL of Reagent 1 (AMP buffer) to create the "Working reagent."

- **Procedure**

Add 1000 µL of Reagent A to 20 µL of animal serum sample and well mix. For one minute, the mixture was incubated at the 37°C assay temperature. After 30 seconds, the absorbance was measured. Read again every 30 seconds, or for a maximum of 120 seconds, at a wavelength of 405 nm. It was calculated to get the mean absorbance change per minute.

2.13.2 AST (Aspartate Transaminase) or SGOT (Glutamic-oxalacetic transaminase) (Koju et al., 2022).

- **Working reagent preparation**

Mix 1volume of R2 with 4volume of R1.

- **Procedure**

Add 1000 µL of Reagent 1 to 100 µL of animal serum sample, and mixwell. For one minute, the mixture was incubated at the 37°C assay temperature. After that, add 1 mL of Reagent 2 and well mix. After 60 seconds, the absorbance was measured. Continue reading for a total of 120 seconds at a wavelength of 340 nm, or every 30 seconds. It was calculated to get the mean absorbance change per minute.

2.13.3 ALT (Alanine Transaminase) or Glutamic-pyruvic transaminase (SGPT) Working reagent preparation

Mixing four parts R1 Buffer Reagent with one part R2 Enzyme Reagent.

- **Procedure:**

Add 1000 µL of working ALT Reagent 1 to 100 µL of animal serum sample and well mix. For one minute, the mixture was incubated at 37°C. After 60 seconds, the absorbance was measured. Read again every 30 seconds for a total of 120 seconds at a wavelength of 340 nm. It was calculated to get the mean absorbance change per minute**.**

2.13.4 Total Bilirubin (Ahmed et al., 2015).

- **Reagent preparation**

A freshly made diazo solution should always be used. Mix Reagents 1 and 2 in the ratio of 4

+ 1 (e.g., 400 µl of sulfanilic acid solution and 100 µl of sodium nitrite solution). The absorbance was measured at 546 nm wavelength. The mixing ratio should be observed precisely.

The serum samples were used for the estimation of marker enzymes like alkaline phosphatase (ALP), aspartate transaminase

(AST), alanine transaminase (ALT), C-reactive protein (CRP) and blood samples were used for analysing the haematological parameters like red blood cell (RBC) count, white blood cell (WBC) count and haemoglobin (Hb) contents. The proximal interphalangeal joints from the adjuvant-induced arthritic rats were removed and fixed in 10% formalin and used for the histopathological studies **(Chen *et al.*, 2024).**

3. RESULT AND DISCUSSION

3.1 Procurement of plant material

Table: 1 Percentage Yield of plant material

S. No	Plant name	Solvent	Theoretical weight	Yield(gm)	% yield
1	*Tradescantia Fluminensis*	Methanol	500	26.87	5.49
		Pet. Ether	452	19.63	4.34

The percentage yield of plant material was assessed for *Tradescantia fluminensis* using two different solvents, methanol and petroleum ether. The theoretical weight of the plant material was 500 g for methanol extraction, which resulted in a yield of 26.87 g, equating to a 5.49% yield. On the other hand, the extraction with petroleum ether had a theoretical weight of 452 g and yielded 19.63 g, resulting in a 4.34% yield. The data suggests that methanol was more effective than petroleum ether in extracting the active compounds from the plant, as evidenced by the higher percentage yield.

3.2 Phytochemical Test of Extract

Table 2: Phytochemical test of *Tradescantia fluminensis* extract of petroleum ether

S. No.	Experiment	Presence or absence of phytochemical test
		Petroleum ether extract
1.	**Alkaloids**	
1.1	Dragendroff's test	**Absent (- ve)**
1.2	Mayer's reagent test	**Absent (- ve)**
1.3	Wagner's reagent test	**Absent (- ve)**
1.3	Hager's reagent test	**Absent (- ve)**
2.	**Glycoside**	
2.1	Borntrager test	**Absent (- ve)**
2.2	Legal's test	**Absent (- ve)**
2.3	Killer-Killiani test	**Absent (- ve)**
3.	**Carbohydrates**	
3.1	Molish's test	**Present (+ ve)**
3.2	Fehling's test	**Present (+ ve)**
3.3	Benedict's test	**Present (+ ve)**
3.4	Barfoed's test	**Present (+ ve)**
4.	**Proteins and Amino Acids**	
4.1	Biuret test	**Present (+ ve)**
4.2	Ninhydrin test	**Present (+ ve)**

5.	**Flavonoids**	
5.1	Alkaline reagent test	**Present (+ ve)**
5.2	Lead Acetate test	**Present (+ ve)**
6.	**Tannin and Phenolic Compounds**	
6.1	Ferric Chloride test	**Present (+ ve)**
7.	**Saponin**	
7.1	Foam test	**Present (+ ve)**
8.	**Test for Triterpenoids and Steroids**	
8.1	Salkowski's test	**Absent (- ve)**
8.2	**Libbermann-Burchard's test**	**Absent (- ve)**

Table 3: Phytochemical test of *Tradescantia fluminensis* extract of Methanolic extract

1.	**Alkaloids**	
1.1	Dragendroff's test	**Present (+ ve)**
1.2	Mayer's reagent test	**Present (+ ve)**
1.3	Wagner's reagent test	**Present (+ ve)**
1.3	Hager's reagent test	**Present (+ ve)**
2.	**Glycoside**	
2.1	Borntrager test	**Present (+ ve)**
2.2	Legal's test	**Present (+ ve)**
2.3	Killer-Killiani test	**Present (+ ve)**
3.	**Carbohydrates**	
3.1	Molish's test	**Absent (- ve)**
3.2	Fehling's test	**Absent (- ve)**
3.3	Benedict's test	**Absent (- ve)**
3.4	Barfoed's test	**Absent (- ve)**
4.	**Proteins and Amino Acids**	
4.1	Biuret test	**Absent (- ve)**
4.2	Ninhydrin test	**Absent (- ve)**
5.	**Flavonoids**	
5.1	Alkaline reagent test	**Present (+ ve)**
5.2	Lead Acetate test	**Present (+ ve)**
6.	**Tannin and Phenolic Compounds**	
6.1	Ferric Chloride test	**Present (+ ve)**

7.	**Saponin**	
7.1	Foam test	**Present (+ ve)**
8.	**Test for Triterpenoids and Steroids**	
8.1	Salkowski's test	**Absent (- ve)**
8.2	**Libbermann-Burchard's test**	**Absent (- ve)**

The phytochemical screening of *Tradescantia fluminensis* extracts using petroleum ether and methanol revealed differences in the bioactive compounds present. The petroleum ether extract contained carbohydrates, proteins, flavonoids, tannins, and saponins, but lacked alkaloids, glycosides, and triterpenoids/steroids. On the other hand, the methanol extract showed the presence of alkaloids, glycosides, proteins, flavonoids, tannins, and saponins, indicating that methanol are more efficient in extracting a broader range of bioactive compounds. These findings suggest that methanol is a better solvent for extracting diverse compounds from Tradescantia fluminensis.

3.3 Quantitative Estimation of Phytoconstituents

3.2.1 Total Phenolic content (TPC) estimation

S. No.	Concentration (µg/ml)	Absorbance
2.	50	0.220
4.	90	0.265

Table 4: Standard table for Gallic acid

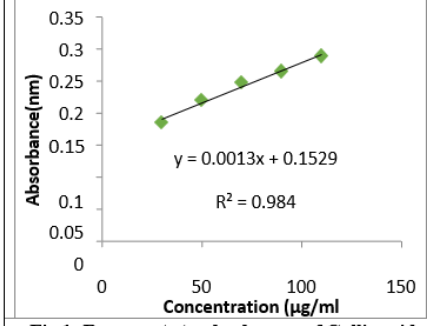


Fig 1: Represent standard curve of Gallic acid

3.2.1.1 Total Phenolic Conten

Table 5: Total Phenolic Content in *Tradescantia fluminensis* extract

S. No	Absorbance	TPC in mg/gm equivalent of Gallic Acid
1	0.183	49.30 mg/gm
2	0.224	
3	0.245	

3.2.3 Total Flavonoids content (TFC) estimation

Table 6: Standard table for Rutin

S. No.	Concentration (µg/ml)	Absorbance
2.	50	0.195
4.	90	0.235

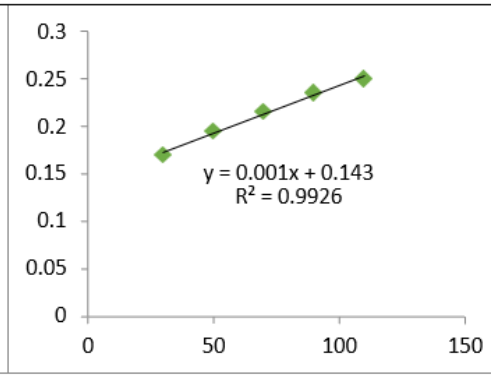


Figure 2: Represent standard curve of Rutin

3.2.3.1 Total Flavonoid Content

Table 7: Total Flavonoid Content in *Tradescantia fluminensis* extract

S. No	Absorbance	TFC in mg/gm equivalent of Rutin
1	0.172	44 mg/gm
2	0.190	
3	0.200	

The quantitative estimation of phytoconstituents in *Tradescantia fluminensis* extracts revealed significant levels of total phenolic content (TPC) and total flavonoid content (TFC). The TPC was determined using a Gallic acid standard curve, and the absorbance readings corresponded to a phenolic content of 49.30 mg/gm for the extract. Similarly, the TFC was estimated using a Rutin standard, with the extract showing a flavonoid content of 44 mg/gm. These results indicate that *Tradescantia fluminensis* contains notable amounts of phenolic and flavonoid compounds, both of which are known for their antioxidant and therapeutic properties.

3.4 Anti-Oxidant Activity

3.4.1 DPPH 2, 2- diphenyl-1-picryl hydrazyl Assay

Table 8: DPPH radical scavenging activity of Std. Ascorbic acid

Concentration (µg/ml)	Absorbance	% Inhibition
20	0.489	51.755
40	0.441	55.589
60	0.356	64.149
80	0.297	70.090
100	0.159	83.987
Control		0.993
IC50		21.77

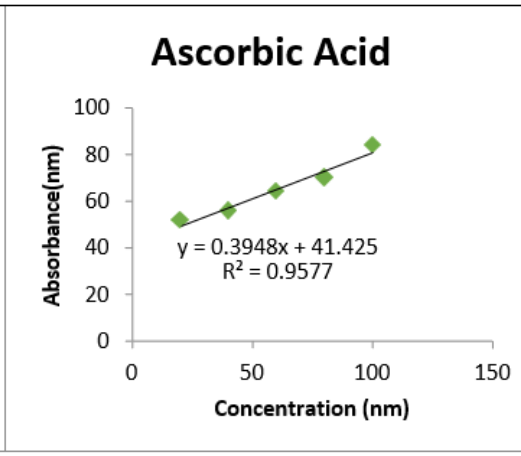


Figure 3: DPPH radical scavenging activity of Std. Ascorbic acid

Table 9: DPPH radical scavenging activity of methanol extract of *Tradescantia fluminensis*

Concentration (µg/ml)	Absorbance	% Inhibition
20	0.526	46.798
40	0.471	49.679
60	0.461	50.747
80	0.428	54.273
100	0.376	59.829
Control	0.936	
IC50	50.10	

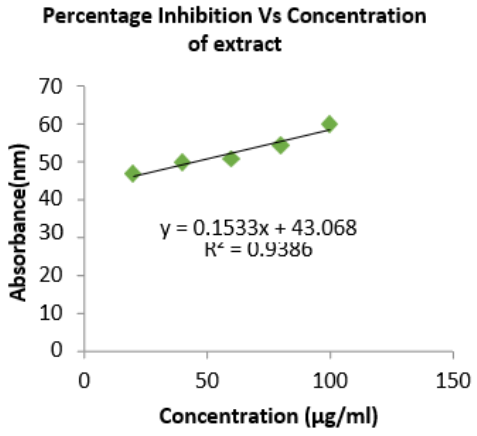


Figure 4: Represents the Percentage Inhibition *Vs* Concentration of extract

Both normal ascorbic acid and a methanol extract of *Tradescantia fluminensis* had their DPPH radical scavenging activity tested. Ascorbic acid has a high antioxidant activity (IC50

= 21.77 µg/ml) and can effectively neutralize free radicals. The methanol extract of *Tradescantia fluminensis* demonstrated modest antioxidant activity (IC50 = 50.10 µg/ml). This suggests that the extract has a weaker antioxidant potential than ascorbic acid, but still exhibits significant radical scavenging ability. The increased inhibition at higher concentrations implies that the extract has a dose-dependent impact.

3.5 FTIR analysis

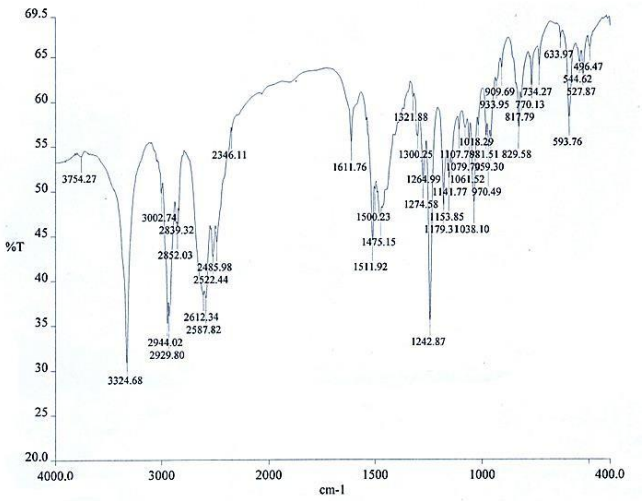


Figure 5: FTIR analysis of Tradescantia fluminensis

3.6 Paractamol induced Hepatotoxicity Model

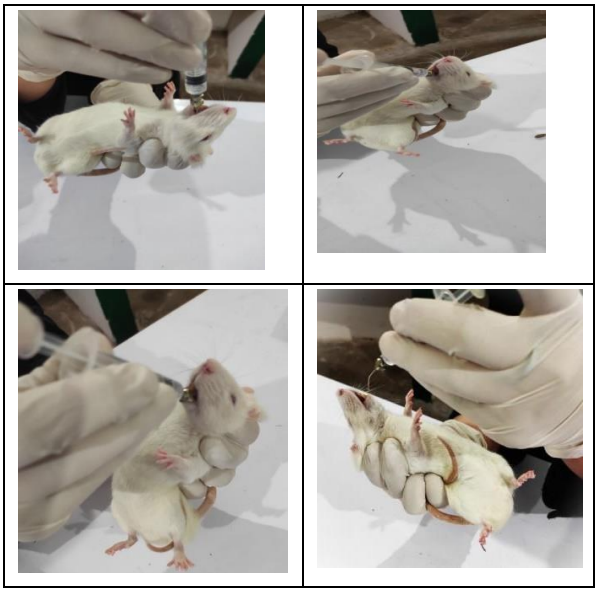


Figure 6: Paracetamol induced Hepatotoxicity Model

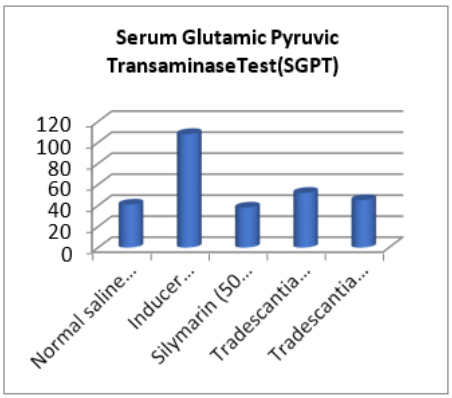
Figures illustrate the experimental setup for a paracetamol-induced hepatotoxicity model in rats, designed to assess the potential protective effects of various treatments on liver damage. Group I serves as the normal control with no hepatotoxicity, while Group II receives a paracetamol (1 g/kg bw) to induce liver damage. Group III, the positive control, is treated with silymarin (50 mg/kg bw), a known hepatoprotective agent. Groups IV and V receive different doses of methanol extract from Tradescantia fluminensis (200 mg/kg/day and 400 mg/kg/), which are evaluated for their potential hepatoprotective effects. This model allows for comparison of the liver's response to paracetamol-induced damage and the efficacy of silymarin and plant extract treatments in mitigating toxicity.

3.7 Analysis of general parameters

3.7.1 Serum Glutamic Pyruvic Transaminase Test (SGPT)

Table10:SerumGlutamicPyruvicTransaminase Testresults

S.No	TreatmentGroup	Results (Mean±SD)
1.	Normalsaline1ml/kgbw	40.85±1.25
2.	InducerParacetamol(1g/kg bw)	108±0.90
3.	Silymarin(50mg/kgbw)	37.99±1.71
4.	*Tradescantiafluminensis* extract(200mg/kgbw)	52.02±1.34
5.	*Tradescantiafluminensis* extract(400mg/kgbw)	45.15±1.40

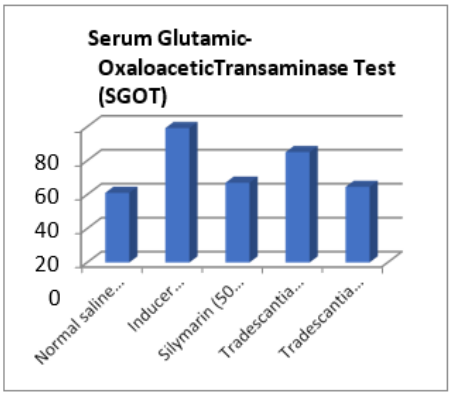


Graph1:BargraphrepresentstheSerum GlutamicPyruvicTransaminasetestresults

3.7.2 Serum Glutamic-Oxaloacetic Transaminase Test (SGOT)

Table11:SerumGlutamic-Oxaloacetic TransaminaseTestresults

S.No	TreatmentGroup	Results (Mean±SD)
1.	Normalsaline1ml/kgbw	40.99±1.75
2.	InducerParacetamol(1g/kg bw)	79.16±1.60
3.	Silymarin(50mg/kgbw.)	46.97±1.73
4.	*Tradescantia fluminensis* extract(200mg/kgbw)	65.01±1.83
5.	*Tradescantia fluminensis* extract(400mg/kgbw)	44.53±4.02

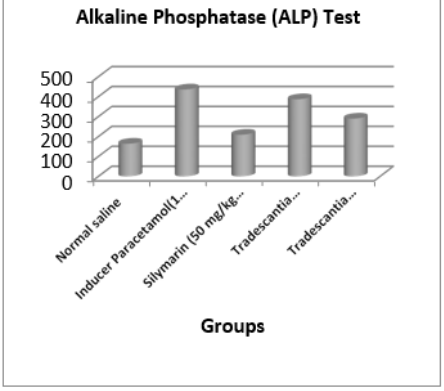


Graph2:BargraphrepresentstheSerum Glutamic-OxaloaceticTransaminasetestresults

3.7.3 Alkaline Phosphatase (ALP) Test

Table 12: Alkaline Phosphatase (ALP) Test results

S.No	Treatment Group	Results (Mean±SD)
1.	Normal saline	164±7.49
2.	Inducer Paracetamol (1 g/kg bw)	436±5.02
3.	Silymarin (50 mg/kg bw)	208.99±2.79
4.	*Tradescantia fluminensis* extract (200 mg/kgbw)	387±2.23
5.	*Tradescantia fluminensis* extract (400 mg/kgbw)	289.98±2.03

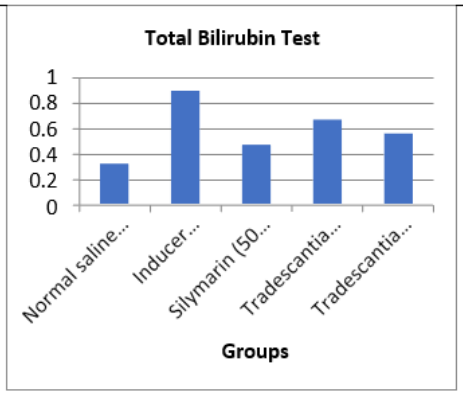


Graph 3: Bar graph represents the *Alkaline Phosphatase (ALP) test* results

3.7.4 Total Bilirubin Test

Table 13: Total Bilirubin Test results

S.No	Treatment Group	Results (Mean±SD)
2.	Inducer Paracetamol (1 g/kg bw)	0.90±0.03
4.	*Tradescantia fluminensis* extract (200 mg/kgbw)	0.67±0.04

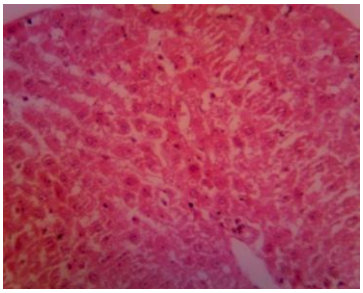


Graph 4: Bar graph represents the *Total bilirubin test* results

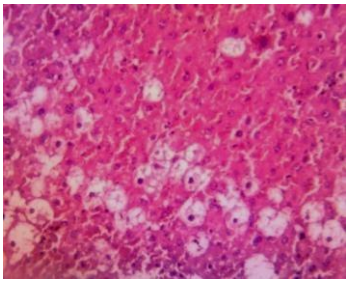
The analysis of general parameters provides insights into the protective effects of *Tradescantia fluminensis* methanol extract against paracetamol-induced hepatotoxicity. In terms of urine volume, the negative control group showed a slight decrease, while both concentrations of the extract increased urine volume, particularly at the higher dose, indicating a potential impact on renal function. Body weight was significantly reduced in the negative control group due to liver damage, but treatment with the higher extract dose led to some recovery, although silymarin showed the most significant weight preservation. Serum creatinine and blood urea nitrogen (BUN) levels, markers for kidney function, were elevated in the negative control group, but both concentrations of the extract reduced these levels, suggesting kidney protection. Regarding serum biochemical parameters, SGPT, SGOT, and ALP levels were elevated in the negative control group, indicating liver injury. The extract, especially at 400 mg/kg, showed a moderate reduction in these enzyme levels, indicating liver protection. Similarly, total bilirubin levels, which reflect liver function, were reduced by the extract, particularly at the higher dose. These results suggest that *Tradescantia fluminensis* extract offers some protection against hepatotoxicity, with the higher dose showing a more pronounced effect, potentially through antioxidant or anti-inflammatory mechanisms.

3.8 Histopathological studies

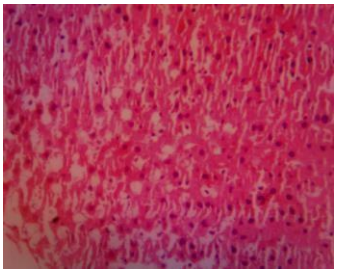
Group I- Normal



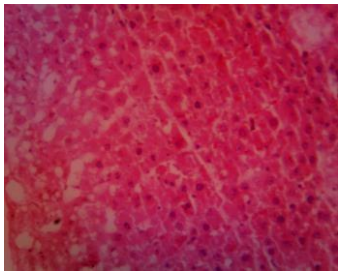
Group II- Induced



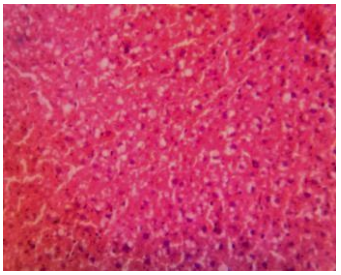
Group III- Standard



Group IV- 200mg/kg



Group V- 400mg/kg



4. SUMMARY AND CONCLUSION

The present study focuses on the pharmacological evaluation, antioxidant, and hepatoprotective activities of *Tradescantia fluminensis* leaves extract using experimental rat models. The plant was carefully selected based on its traditional medicinal use, followed by collection and botanical verification to ensure authenticity. The collected plant material was subjected to drying and extraction using the Soxhlet extraction method, and the percentage yield of the extract was calculated. A phytochemical investigation, including qualitative analysis, confirmed the presence of various bioactive compounds such as flavonoids, phenolics, alkaloids, tannins, terpenoids, and saponins, which are known for their medicinal properties. The antioxidant activity was assessed using the DPPH radical scavenging assay, which demonstrated a strong free radical neutralization capacity, supporting its role in oxidative stress management. Further, the FTIR analysis identified functional groups responsible for the biological activity of the extract.The acute oral toxicity study was conducted to evaluate the safety profile, and no adverse effects were observed at therapeutic doses. The pharmacological study focused on hepatoprotective activity, where hepatotoxicity was induced in rats using paracetamol, followed by treatment with *T. fluminensis* extract. The hepatoprotective effects were assessed through biochemical tests, including ALP, SGOT, SGPT, and total bilirubin estimation, which showed significant improvement in liver function parameters, suggesting protective effects against liver injury. Additionally, histopathological analysis of liver tissues confirmed a reduction in hepatic inflammation, necrosis, and cellular damage in extract-treated groups compared to control groups. The collected data was systematically compiled and analyzed to establish the plant's hepatoprotective efficacy.

In conclusion, the study demonstrated that *T. fluminensis* leaves extract exhibits significant antioxidant and hepatoprotective properties, supporting its traditional use in liver disorders. The presence of bioactive compounds, particularly flavonoids and phenolics, contributes to its free radical scavenging ability, hepatocyte regeneration, and membrane stabilization. Histopathological analysis further supported the hepatoprotective potential, showing reduced liver damage in treated rats compared to the control group.

These findings suggest that *Tradescantia fluminensis* leaves possess bioactive compounds with potent antioxidant properties, which contribute to their hepatoprotective effects. This plant could be a promising natural therapeutic candidate for the prevention and treatment of liver diseases. Further studies are recommended to isolate the active constituents and explore the underlying mechanisms of action, as well as to evaluate the extract's efficacy in clinical settings.

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