HEPATOPROTECTIVE INVESTIGATIONOF *FICUS LYRATA* AND *FICUS ELASTIC*LEAVES EXTRACT

ABSTRACT

In hepatotoxic Albino rats caused by isoniazid and paracetamol, the hydroalcoholic extract of Ficus lyrata and Ficus elastic leaves was evaluated for hepatoprotective activity. The degree of protection was measured by estimating biochemical parameters such as serum glutamate Oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT),ALP and the level of total serum bilirubin. In rats that had been toxicated with isoniazid and paracetamol.Hydroalcoholic extract (100 mg/kg, 200 mg/kg) demonstrated a noteworthy hepatoprotective effect in a dose-dependent manner. The extract's hepatoprotective benefits were on par with those of the prescribed medication silymarin 2.5 mg/kg body weight.

Key Words: Ficus lyrata, Ficus elastic, Hepatoprotective activity

1. Introduction

Herbal remedies derived from nature are carefully considered to be safe and effective natural treatments for a range of illnesses. The purpose of this study was to demonstrate the hepatoprotective, antioxidant, and preliminary chemical screening properties of *Ficus elastic and lyrata*. After thoroughly washing the dried Leaves material under running water, an electronic grinder was used to grind it. The powder was extracted in stages using the maceration process and an ethanol-water solvent combination. *Ficus lyrata and Ficus elastic* were evaluated using various standards criteria, including phytochemical screening, percentage loss, yield, and organoleptic evaluation.

Ficus lyrata and *Ficus elastic* leaf are significant medicinal plants that are used to cure a variety of illnesses in traditional medicine. For two reasons, the liver may be regarded as the most significant organ in drug toxicity: first, it serves as a functional barrier between the site of absorption and the systemic circulation and is a key location for the metabolism and removal of foreign substances; second, these characteristics also make the liver a prime target for drug toxicity.

Consequently, drug-induced liver damage presents a significant clinical challenge. Since the liver is essential for the detoxification and excretion of several endogenous and exogenous substances, damage to it or impairment of its function can have a number of negative effects on health.Management of liver diseases is still a challenge to modern medicine.

2. METHODOLOGY

2.1 Selection of animals

Swiss albino rats weighing between 150 and 200 g of were employed in the current study. Before the trial started, the animals were given two weeks to acclimate. They were then kept in typical laboratory settings, with a temperature of 25±2ºC, a relative humidity of 45–65%, and a 12-hour light/dark cycle. Throughout the investigation, the animals were given unlimited water and regular laboratory animal nutrition. The Institution Animal Ethical Committee formally accepted the protocol for animal experimentation.The Organization for Economic Co-operation and Development (OECD) guideline No. 420 was used while testing for acute oral toxicity. (CPCSEA NO.1582/PO/Re/S/11/CPCSEA)In this investigation, water was available to the Swiss albino rats at all times during an overnight fast. For the first 24 hours and then for the following 14 days, the animals were monitored for death or any aberrant behavior after the extract was given orally at a concentration of 2000 mg/kg body weight. There were further behavioral, neurological, and autonomic reactions seen.

2.2 Isoniazidand Paracetamol induced hepatoprotective activity of Leaves extract of *Ficus lyrataand Ficus elastic,*

2.2.1Experimental designs for *Ficus lyrata* leavesExtractIsoniazid induced hepatoprotective

Group –I: Normal control (Sterile distilled water ml/kg, p.o.)

Group –II: Isoniazid solutions were prepared in sterile distilled water (100 mg/kg, p.o.)

Group -III:*Ficus lyrata* Extract (100mg/kg, p.o.) + Isoniazid (100 mg/kg, p.o.)

Group –IV:*Ficus lyrata* Extract (200mg/kg, p.o.) + Isoniazid (100 mg/kg, p.o.)

Group –V: Silymarin (2.5 mg/kg, p.o.) + Isoniazid (100 mg/kg, p.o.)

Five groups, each with six creatures, were created from the animals. Group –Ireceived 1ml/kg p.o. of sterile distilled water was given to the first group. Group II was received Isoniazid solutions at a dose of 100 mg/kg p.o.Group-III and Group -IV were received 100 mg/kg and 200 mg/kg of hydroalcoholic leaves extract of Ficus lyrata, respectively. For 21 days, Group 5 was given silymarin (2.5 mg/kg p.o.) once daily. The animal was anesthetized with ether after 21 days in order to draw blood from the retroorbital plexus, and it was subsequently slaughtered while still under ether anesthesia in order to remove the liver. Numerous biochemical analyses were conducted.

2.2.2 Experimental designs for *Ficus lyrata* leavesExtract Paracetamol induced hepatoprotective

Group –I: Normal control (Sterile distilled water ml/kg, p.o.)

Group –II: Paracetamol solutions were prepared in sterile distilled water (50 mg/kg, p.o.)

Group -III:*Ficus lyrata* Extract (100mg/kg, p.o.) + Paracetamol, (50 mg/kg, p.o.)

Group –IV: *Ficus lyrata* Extract (200mg/kg, p.o.) + Paracetamol, (50 mg/kg, p.o.)

Group –V: Silymarin (2.5 mg/kg, p.o.) + Paracetamol, (50 mg/kg, p.o.)

Five groups, each with six creatures, were created from the animals. Group –Ireceived 1ml/kg p.o. of sterile distilled water was given to the first group. Group II was received paracetamol solutions at a dose of 50 mg/kg p.o.Group-III and Group -IV were received 100 mg/kg and 200 mg/kg of hydroalcoholic leaves extract of Ficus lyrata, respectively. For 21 days, Group 5 was given silymarin (2.5 mg/kg p.o.) once daily. The animal was anesthetized with ether after 21 days in order to draw blood from the retroorbital plexus, and it was subsequently slaughtered while still under ether anesthesia in order to remove the liver. Numerous biochemical analyses were conducted.

2.2.3 Experimental designs for *Ficus elastic* leavesExtractIsoniazid induced hepatoprotective

Group –I: Normal control (Sterile distilled water ml/kg, p.o.)

Group –II: Isoniazid solutions were prepared in sterile distilled water (100 mg/kg, p.o.)

Group -III:*Ficus elastic* Extract (100mg/kg, p.o.) + Isoniazid (100 mg/kg, p.o.)

Group –IV:*Ficus elastic* Extract (200mg/kg, p.o.) + Isoniazid (100 mg/kg, p.o.)

Group –V: Silymarin (2.5 mg/kg, p.o.) + Isoniazid (100 mg/kg, p.o.)

Five groups, each with six creatures, were created from the animals. Group –Ireceived 1ml/kg p.o. of sterile distilled water was given to the first group. Group II was received Isoniazid solutions at a dose of 100 mg/kg p.o.Group-III and Group -IV were received 100 mg/kg and 200 mg/kg of hydroalcoholic leaves extract of *Ficus elastic*, respectively. For 21 days, Group 5 was given silymarin (2.5 mg/kg p.o.) once daily. The animal was anesthetized with ether after 21 days in order to draw blood from the retroorbital plexus, and it was subsequently slaughtered while still under ether anesthesia in order to remove the liver. Numerous biochemical analyses were conducted.

2.2.4 Experimental designs for *Ficus elastic*leavesExtract Paracetamol induced hepatoprotective

Group –I: Normal control (Sterile distilled water ml/kg, p.o.)

Group –II: Paracetamol solutions were prepared in sterile distilled water (50 mg/kg, p.o.)

Group -III:*Ficus elastic* Extract (100mg/kg, p.o.) + Paracetamol, (50 mg/kg, p.o.)

Group –IV:*Ficus elastic* Extract (200mg/kg, p.o.) + Paracetamol, (50 mg/kg, p.o.)

Group –V: Silymarin (2.5 mg/kg, p.o.) + Paracetamol, (50 mg/kg, p.o.)

Five groups, each with six creatures, were created from the animals. Group –Ireceived 1ml/kg p.o. of sterile distilled water was given to the first group. Group II was received paracetamol solutions at a dose of 50 mg/kg p.o.Group-III and Group -IV were received 100 mg/kg and 200 mg/kg of hydroalcoholic leaves extract of *Ficus elastic*, respectively. For 21 days, Group 5 was given silymarin (2.5 mg/kg p.o.) once daily. The animal was anesthetized with ether after 21 days in order to draw blood from the retroorbital plexus, and it was subsequently slaughtered while still under ether anesthesia in order to remove the liver. Numerous biochemical analyses were conducted.

3. RESULT AND DISCUSSION

Dose-dependent hepatoprotective effect was demonstrated by both test groups, i.e., high dose and low dosage treated groups. Liver activity improved in the test groups that received only the plant extract. It is evident that "Ficus lyrata and Ficus elastic leaves" are plants with hepatoprotective properties. According to this study, the leaves of *Ficus lyrata*and *Ficus elastica* significantly reduce the hepatotoxicity caused by the medications used to treat tuberculosis. *Ficus lyrata* and *Ficus*

*elastic*leaves may have a hepatoprotective effect because of their antioxidant capability, which implies that plant extract may be helpful in preventing liver damage brought on by oxidative stress.

Elevated blood levels of SGPT, SGOT, and ALP activities indicate hepatocyte injury to the liver and, in turn, indirect impairment of liver function after APAP-induced hepatotoxicity. Following APAP treatment, there was a significant ($p<0.05$) increase in SGPT, SGOT, and ALP activities, as shown in Table. Ficus lyrata and Ficus elastic leaf extract treatments at 100 and 200 mg/kg both markedly decreased the increase of these enzymes ($p<0.05$). The observed decrease in hepatic enzymes was comparable to both the control group's and the group that received silymarin pretreatment..The apparent leakage of cellular enzymes into plasma is one of the classic indicators of hepatic injury or damage.

Furthermore, the presence or lack of particular enzymes in the bloodstream can be used to determine the kind and extent of liver damage. Alkaline phosphatase, aspartate aminotransferase, and alanine aminotransferase are frequently utilized as marker enzymes in general alanine aminotransferase measurements to assess APAP-induced hepatotoxicity. This study's improvement in SGPT, SGOT, ALP, and serum bilirubin levels demonstrates the hepatoprotective impact of Ficus lyrata and Ficus elastic leaves. Serum bilirubin increases caused by isoniazid, paracetamol, and Ficus lyrata and Ficus elastic leaf extract are suppressed. Transaminase levels have been shown to rise following Isoniazid therapy in earlier investigations (Reddy et al., 2013). The increase is time-dependent, with a significant elevation observed after 48 hours ($p<0.05$), indicating severe hepatocellular damage from these typically cytoplasmic enzymes leaking into the bloodstream. (Asha, *et al.*, 2004).

3.1 Hepatoprotective activity of *Ficus lyrata*leaves extractin Isoniazid induced hepatotoxicity

Hepatoprotective activity of hydroalcoholic extract of *Ficus lyrata*leaves and Silymarin on % SGOT levels, %SGPT levels, % serum bilirubin levels, % ALP levels in Isoniazid induced hepatotoxicity in rats table 1, 2, 3, 4.Results ofHepatoprotective activity ofhydroalcoholic extract of *Ficus elastic*leaves and Silymarin on % SGOT levels, %SGPT levels, % serum bilirubin levels, % ALP levels in Isoniazid induced hepatotoxicity in rats table 3.5, 3.6, 3.7, 3.8.

Table 1: Effect of Hydroalcoholic extract of *Ficus lyrata*leaves and Silymarin on % SGOT levels in Isoniazid induced hepatotoxicity in rats.

Treatment	Dose	SGOT (%)
Normal	1 ml/kg, p.o.	162 ± 2.5
Isoniazid	100 mg/kg, p.o.	341.45 ± 6.5
*Ficus lyrata*leaves	100 mg/kg p.o.	214.0 ± 3.0***
*Ficus lyrata*leaves	200 mg/kg p.o.	189.0 ±3.5***
Silymarin	2.5 mg/kg p.o.	168.0 ± 2.9***

Table 2: Effect of Hydroalcoholic extract of *Ficus lyrata*leaves Fruits and Silymarin on %SGPT levels in Isoniazid induced hepatotoxicity in rats

Treatment	Dose	SGPT (%)
Normal	1 ml/kg, p.o.	160.0 ± 2.0
Isoniazid	100 mg/kg, p.o.	321.0 ± 3.50
*Ficus lyrata*leaves	100 mg/kg p.o.	194.0 ± 4.0***
*Ficus lyrata*leaves	200 mg/kg p.o.	179.0 ± 3.50***
Silymarin	2.5 mg/kg p.o.	155.0 ± 3.50***

Table 3: Effect of *Ficus lyrata*leaves and Silymarin on % serum bilirubin levels in Isoniazid induced hepatotoxicity in rats

Treatment	Dose	Serum Bilirubin (%)
Normal	1 ml/kg, p.o.	120.0 ± 5.50
Isoniazid	100 mg/kg, p.o.	285.0 ± 3.50
*Ficus lyrata*leaves	100 mg/kg p.o.	159.0 ± 4.51***
*Ficus lyrata*leaves	200 mg/kg p.o.	129.0 ± 1.60***
Silymarin	2.5 mg/kg p.o.	115.0 ± 4.50***

Table 4: Effect of *Ficus*

***lyrata*leaves and Silymarin on % ALP levels in Isoniazid induced hepatotoxicity in rats**

Treatment	Dose	ALP (%)
Normal	1 ml/kg, p.o.	162.0 ± 3.20
Isoniazid	100 mg/kg, p.o.	325.0 ± 5.57
*Ficus lyrata*leaves	100 mg/kg p.o.	219.0 ± 4.30***
*Ficus lyrata*leaves	200 mg/kg p.o.	186.0 ± 3.78***
Silymarin	2.5 mg/kg p.o.	170.0 ± 5.40***

3.2Hepatoprotective activity of *Ficus elastic*leaves extractIsoniazid induced hepatotoxicity

Table 5: Effect of Hydroalcoholic extract of *Ficus elastic*leaves and Silymarin on % SGOT levels in Isoniazid induced hepatotoxicity in rats

Treatment	Dose	SGOT (%)
Normal	1 ml/kg, p.o.	160 ± 2.5
Isoniazid	100 mg/kg, p.o.	328.45 ± 6.5
*Ficus elastic*leaves	100 mg/kg p.o.	205.0 ± 3.5***
*Ficus elastic*leaves	200 mg/kg p.o.	177.0 ± 3.5***
Silymarin	2.5 mg/kg p.o.	165.0 ± 2.5***

Table 6: Effect of Hydroalcoholic extract of *Ficus elastic*leaves and Silymarin on %SGPT levels in Isoniazid induced hepatotoxicity in rats

Treatment	Dose	SGPT (%)

Normal	1 ml/kg, p.o.	155.0 ± 2.0
Isoniazid	100 mg/kg, p.o.	321.0 ± 3.50
*Ficus elastic*leaves	100 mg/kg p.o.	188.0 ± 4.0***
*Ficus elastic*leaves	200 mg/kg p.o.	165.0 ± 3.50***
Silymarin	2.5 mg/kg p.o.	162.0 ± 3.50***

Table 7: Effect of *Ficus elastic*leaves and Silymarin on % serum bilirubin levels in Isoniazid induced hepatotoxicity in rats

Treatment	Dose	Serum Bilirubin (%)
Normal	1 ml/kg, p.o.	120.0 ± 5.50
Isoniazid	100 mg/kg, p.o.	274.0 ± 3.50
*Ficus elastic*leaves	100 mg/kg p.o.	147.0 ± 4.81***
*Ficus elastic*leaves	200 mg/kg p.o.	123.0 ± 1.50***
Silymarin	2.5 mg/kg p.o.	113.0 ± 4.50***

Table 8: Effect of *Ficus elastic* leaves and Silymarin on % ALP levels in Isoniazid induced hepatotoxicity in rats

Treatment	Dose	ALP (%)
Normal	1 ml/kg, p.o.	162.0 ± 3.20
Isoniazid	100 mg/kg, p.o.	340.0 ± 5.57

*Ficus elastic*leaves	100 mg/kg p.o.	215.0 ± 4.30***
*Ficus elastic*leaves	200 mg/kg p.o.	178.0 ± 3.78***
Silymarin	2.5 mg/kg p.o.	167.0 ± 5.40***

3.3Hepatoprotective activity of *Ficus lyrata*leavesextractParacetamol induced hepatotoxicity model

Hepatoprotective activity of extract of *Ficus lyrata*leaves and Paracetamol on % SGOT levels, %SGPT levels, % serum bilirubin levels, % ALP levels in Paracetamol induced hepatotoxicity in rats. Table 9, 10, 11, 12. results ofHepatoprotective activity of hydroalcoholic extract of *Ficus elastic*leaves and Silymarin on % SGOT levels in Paracetamol induced hepatotoxicity in rats. table 3.13, 3.14, 3.15, 3.16.

Table 9: Effect of Hydroalcoholic extract of *Ficus lyrata*leaves and Silymarin on % SGOT levels in Paracetamol induced hepatotoxicity in rats

Treatment	Dose	SGOT (%)
Normal	1 ml/kg, p.o.	158 ± 2.5
Paracetamol	50 mg/kg, p.o.	352.45 ± 6.5
*Ficus lyrata*leaves	100 mg/kg p.o.	227.0 ± 3.5***
*Ficus lyrata*leaves	200 mg/kg p.o.	203.0 ± 3.0***
Silymarin	2.5 mg/kg p.o.	179.0 ± 3.5***

Table 10: Effect of Hydroalcoholic extract of *Ficus lyrata*leaves and Silymarin on %SGPT levels in Paracetamol induced hepatotoxicity in rats

Treatment	Dose	SGPT (%)

Normal	1 ml/kg, p.o.	151.0 ± 2.0
Paracetamol	50 mg/kg, p.o.	316.0 ± 3.50
*Ficus lyrata*leaves	100 mg/kg p.o.	189.0 ± 4.0***
*Ficus lyrata*leaves	200 mg/kg p.o.	174.0 ± 3.50***
Silymarin	2.5 mg/kg p.o.	152.0 ± 3.50***

Table 11: Effect of *Ficus lyrata*leaves and Silymarin on % serum bilirubin levels in Paracetamol induced hepatotoxicity in rats

Treatment	Dose	Serum Bilirubin (%)
Normal	1 ml/kg, p.o.	122.0 ± 5.50
Paracetamol	50 mg/kg, p.o.	304.0 ± 3.50
*Ficus lyrata*leaves	100 mg/kg p.o.	201.0 ± 4.51***
*Ficus lyrata*leaves	200 mg/kg p.o.	165.0 ± 1.60***
Silymarin	2.5 mg/kg p.o.	125.0 ± 4.50***

Table 12: Effect of *Ficus lyrata*leaves and Silymarin on % ALP levels in Paracetamol induced hepatotoxicity in rats

Treatment	Dose	ALP (%)
Normal	1 ml/kg, p.o.	155.0 ± 3.20
Paracetamol	50 mg/kg, p.o.	337.0 ± 5.57
*Ficus lyrata*leaves	100 mg/kg p.o.	232.0 ± 4.30***
*Ficus lyrata*leaves	200 mg/kg p.o.	191.0 ± 3.78***
Silymarin	2.5 mg/kg p.o.	175.0 ± 5.40***

3.4Hepatoprotective activity of *Ficus elastic*leaves extractParacetamol induced hepatotoxicity model

Table 13: Effect of Hydroalcoholic extract of *Ficus elastic*leaves and Silymarin on % SGOT levels in Paracetamol induced hepatotoxicity in rats

Treatment	Dose	SGOT (%)
Normal	1 ml/kg, p.o.	165 ± 2.5
Paracetamol	50 mg/kg, p.o.	339.45 ± 6.5
*Ficus elastic*leaves	100 mg/kg p.o.	219.0 ± 3.5***
*Ficus elastic*leaves	200 mg/kg p.o.	181.0 ± 3.5***
Silymarin	2.5 mg/kg p.o.	168.0 ± 2.5***

Table 14: Effect of Hydroalcoholic extract of *Ficus elastic*leaves and Silymarin on %SGPT levels in Paracetamol induced hepatotoxicity in rats

Treatment	Dose	SGPT (%)
Normal	1 ml/kg, p.o.	152.0 ± 2.0
Paracetamool	50 mg/kg, p.o.	314.0 ± 3.50
*Ficus elastic*leaves	100 mg/kg p.o.	196.0 ± 4.0***
*Ficus elastic*leaves	200 mg/kg p.o.	174.0 ± 3.50***
Silymarin	2.5 mg/kg p.o.	156.0 ± 3.50***

Table 15: Effect of *Ficus elastic*leaves and Silymarin on % serum bilirubin levels in Paracetamol induced hepatotoxicity in rats

Treatment	Dose	Serum Bilirubin (%)
Normal	1 ml/kg, p.o.	120.0 ± 5.50
Pacetamol	50 mg/kg, p.o.	290.0 ± 3.50
*Ficus elastic*leaves	100 mg/kg p.o.	155.0 ± 4.81***

*Ficus elastic*leaves	200 mg/kg p.o.	131.0 ± 1.50***
Silymarin	2.5 mg/kg p.o.	125.0 ± 4.50***

Table 16: Effect of *Ficus elastic* leaves and Silymarin on % ALP levels in Paracetamol induced hepatotoxicity in rats

Treatment	Dose	ALP (%)
Normal	1 ml/kg, p.o.	162.0 ± 3.20
Paracetamol	50 mg/kg, p.o.	331.0 ± 5.57
*Ficus elastic*leaves	100 mg/kg p.o.	227.0 ± 4.30***
*Ficus elastic*leaves	200 mg/kg p.o.	172.0 ± 3.78***
Silymarin	2.5 mg/kg p.o.	165.0 ± 5.40***

CONCLUSION

Hepatic damage is the main obstacle to drug development and a major factor in the reason why pharmaceutical companies have stopped selling their products. Liver ailment caused by medication might be either exceptional (low frequency and probably dosage related) or unsurprising (high rate and measurement related). Responses that are eccentric, often referred to as unusual, can be classified as non-immune or resistive to extreme touchiness.Since ancient times, people have turned to plants as a source for healing illnesses, providing long-lasting excellent health, relieving severe suffering, and adding flavor and fragrance to food. India and China have been using a human services framework centered on plants for more than 5,000 years. Up until about 50 years ago, botanicals were used as common medications in Europe. Ancient advances from China, India, and Greece were independently incorporated into the pharmacological systems of the Arabic countries.

However, the Ayurvedic framework is the most unparalleled in terms of study breadth profundity.

This framework, which is said to have started approximately 6000 BC, is one of the oldest prescription frameworks.In many countries, medicinal plants have become an integral element of traditional medical frameworks. Documentation of the examination work done on conventional medications is required. These investigations aid in the identification of plant material.When synthetic analgesics and antimicrobial drugs were not yet widely available in the middle of the 20th century, natural drugs dominated the therapeutic landscape. People began to switch to this framework when allopathic pharmaceutical arrangements for manufactured drugs gained rapid traction and faster symptomatic relief.

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