



E: ISSN 2278-4136  
P: ISSN 2349-8234  
JPP 2014; 3 (3): 39-49  
Received: 06-08-2014  
Accepted: 17-08-2014

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## Pharmacognostical phytochemical and anti-ulcer activity of *Andrographis echioides* (Acanthaceae)

R. Ramasubramania Raja, K. Jeevanreddy

### Abstract

The present studies to determine the antiulcer activity of the ethanol extract from the leaves of *Andrographis echioides*. The preliminary phytochemical investigation showed the presence of alkaloids, flavonoids, terpenoids, tannins, cardiac glycosides, gums and phytosteroids. The pharmacological and acute toxicity studies of ethanol extract were performed by following, OECD-423 guidelines (Acute toxic class method). No mortality or acute toxicity was observed (3 days) up to 2000 mg/kg of body weight. The phytoconstituents like flavonoids, tannins and terpenoids, have been reported in several anti-ulcer literatures as possible gastroprotective agents. Flavonoids, tannins and triterpenes are among the cytoprotective active materials for which antiulcerogenic efficacy has been extensively confirmed [1]. The ethanol extract of *Andrographis echioides* showed the presence flavonoids and their glycosides, tannins and triterpenoids. These phytoconstituents present in the extract could be the possible agents involved in the prevention of gastric lesions induced by pylorus ligation. *Andrographis echioides* showed a dose dependent curative ratio compared to ulcer control groups. The extracts exhibited an inhibition percentage of 26.50 and 53.06 at doses of 200 and 400 mg/kg doses respectively. The ulcer protective action of extracts at 400 mg/kg was good to that of standard drugs, Ranitidine, which exhibited an inhibition percentage of 77.50.

**Keywords:** *Andrographis echioides*, Flavonoids, Terpenes, Gastroprotective agents, Ranitidine

### 1. Introduction

Peptic ulcer disease refers to painful sores or ulcers in the lining of the stomach or the first part of the small intestine, called the duodenum. No single cause has been found for ulcers. However, it is now clear that an ulcer is the end result of an imbalance between digestive fluids in the stomach and duodenum. Ulcers can be caused by: Infection with a type of bacteria called *Helicobacter pylori* (*H. pylori*), Use of painkillers called nonsteroidal anti-inflammatory drugs (NSAIDs), such as aspirin, naproxen, ibuprofen (Motrin, Advil, Midol, and others), and many others available by prescription. Even safety-coated aspirin and aspirin in power form can frequently cause ulcers.

An ulcer may or may not have symptoms. When symptoms occur, they may include: A gnawing or burning pain in the middle or upper stomach between meals or at night, bloating, heartburn, nausea or vomiting. In severe cases, symptoms can include: dark or black stool (due to bleeding), vomiting blood, weight loss, severe pain in the mid to upper abdomen, though ulcers often heal on their own, you shouldn't ignore their warning signs. If not properly treated, ulcers can lead to serious health problems, including: bleeding, perforation, gastric outlet obstruction from swelling or scarring that blocks the passageway leading from the stomach to the small intestine. In the present study, an attempt has been made to enrich the knowledge of anti-ulcer activity of ethanolic leaf extract of *Andrographis echioides*.

#### 1.1 Scientific classification

Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants
Superdivision	Spermatophyta – Seed plants
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Subclass	Asteridae
Order	Scrophulariales

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Family Acantheaceae-Acanthus family  
 Genus Andrographis Wall. Ex Nees- false waterwillow  
 Species *Andrographis echioides* (L) Nees- false waterwillow

**a. Common name:** False Water willow

**b. Vernacular names:**

Gujarati	Kalukariyatun
Malayalam	Pitumba
Marathi	Ranchimani
Oriya	lavalata
Tamil	Gopuram tangi
Telugu	Chalavala puri kada

**Synonyms:** *Justicia echioides*, *Indoneesiella echioides*

## 2. Materials and methods

### 2.1 Plant material

The plant of *Andrographis echioides* was collected from Thirumalaisamudram 7 km away from Thanjavur (Tamil Nadu) in the month of January 2013. The plant was identified by local people of that village and authenticated by Dr. N. Ravichandran, Asst. professor, drug testing Laboratory, CARISM, SASTRA University Thanjavur, and the Voucher specimen is preserved in laboratory for future reference.

### 2.2 Chemicals

All the reagents used were of analytical grade obtained from S.D fine chemicals, Ltd, and Hi media, Mumbai.

### 2.3 Pharmacognostical Screening of plant

Macroscopic characters, Microscopic characters and Physiochemical Parameters of *Andrographis echioides* and leaf powder: The macroscopic evaluation was carried out for shape, size, colour, odour, taste and fracture of the drug. The microscopic evaluation was performed the transverse section of midrib and lamina region of the leaf. Different physio- chemical values (Table 1) such as Ash values, extractive values, loss on drying, foreign organic matter, crude fibre content, were determined. Crude powder subjected to carried out the chemical test (Table 2) based upon the colour reaction.

#### a. Florescence analysis study of *Andrographis echioides* leaves powder

Florescence analysis study (Table 3) of powdered drug material with different reagents was carried out observe the reactions.

#### b. Preparation of Extracts from *Andrographis echioides* leaves powder

Both the leaves were dried under shade, powdered and passed through 40 meshes and stored in closed vessel for further use. The dried powder material (20 gm) was subjected to soxhlet extraction with ethanol for continuous hot extraction for 6hrs. The extracts were concentrated under reduced pressure to obtain the extracts solid residues. The percentage value of the extracts was 9.35%w/w.

#### c. Phytochemical Evaluation of Ethanolic Leaf Extract of *Andrographis echioides*

The Ethanolic extract of *echioides* (leaf) was subjected to preliminary phytochemical test followed by the methods of Harbome (1998) [2], and Trease and Evans (1983) [3] and the phytoconstituents reported in table no 4.

#### d. Screening of Thin Chromatography:

Thin layer chromatography reported in the table no 5 based upon determining the  $R_f$  value using the difference chemical mobile phase and detecting reagents.

##### TLC for Alkaloids

Stationary phase	Silicagel G
Mobile phase	Butanol: Acetic acid: Water (4:5:1) Chloroform: Methanol: Ammonia (8:4:1:5) Chloroform: Di ethyl amine (9:1)
Detecting reagent	Dragendorff's reagent

##### TLC for Terpenes

Stationary phase	Silicagel G
Mobile phase	Toluene: Chloroform: Ethyl alcohol (4:5:4:5:1)
Detecting Reagent	Iodine chamber

##### TLC for Saponins

Stationary phase	Silicagel G
Mobile phase	Chloroform: Methanol: Water (7:4:1) Chloroform: Acetate acid: Methanol: Water (6:4:3:2:1:0:8) Ethylacetate: Mathanol (9:7:0:3)
Detecting Reagent	Iodine Chamber

##### TLC for flavonoids:

Stationary Phase	Silicagel G
Mobile phase	Chloroform: Ethylacetate (6:4) Toluene: Ethylacetate: Formic acid (5:4:1) Toluene: Ethyl acetate (9.5:0.5)
Detecting Reagent	Iodine chamber

##### TLC for phenolic compounds

Stationary phase	Silicagel G
Mobile Phase	Butane-2-ol: Acetic acid:water (14:1:5)
Detecting Reagent	Ammonia Vapour

##### TLC for amino acids

Stationary Phase	:Silica Gel G
Mobile Phase	:Butane-2-ol: Acetic acid:water (14:1:5)
Detection reagent	:Ninhydrine reagents

**Flavonol glycosides**

Stationary phase	Silica gel
Mobile phase	Chloform: benzene: ethanol: acetic acid: water (11:4:2:1:2)
Detection reagent	Spraying with 8% AlCl <sub>3</sub> in ethanol

**3. Evaluation of Anti-Ulcer Activity** <sup>(4) (5) (6)</sup>**3.1 Animals**

Male Albino rats, weighing 150-200 g were used in the present study. All the rats were kept at room temperature (22 °C) in the animal house. All the animals were housed and treated as per the internationally accepted ethical guidelines for the care of laboratory animals. Prior to the experiments, rats were fed with standard food and were acclimatized to laboratory conditions. All the experimental procedures were reviewed and approved by Institutional Animal Ethics Committee and in accordance with the recommendations for the proper care and use of laboratory animals.

**3.2 Experimental Procedure****a. Pylorus Ligation Induced Ulcer Formation**

Male Albino rats were divided into five groups of six animals per group and animals were fasted for 24 hrs prior to the experiment in perforated steel cages to avoid coprophagy. Five groups were made as below.

**Group I** -received 1% Acacia (1.0 ml/kg p.o) as normal control.

**Group II** -received 1% Acacia (1.0 ml/kg p.o) as vehicle control. .

**Group III** -received (200 mg/kg, p.o) ethanol extract of *Andrographis echioides*

**Group IV** - received (400 mg/kg, p.o) ethanol extract of *Andrographis echioides*

**Group V** - received (50 mg/kg, p.o) Ranitidine as standar the pyloric ligation was carried out 1h after the drug administration in each group animals. Under light ether anesthesia, the abdomen was opened and the pylorus was ligated. The abdomen was then sutured. After 4 hrs of pyloric ligation, the animals were sacrificed with excess of anesthetic ether, and the stomach was dissected out. The gastric juice thus collected was centrifuged and the volume of gastric juice, pH of gastric juice was noted .The stomach was opened along the greater curvature and the severity of hemorrhagic erosions in the acid secreting mucosa was assessed on a scale (table 6) of 0 to 3 as given below.

**b. Biochemical Parameters**

The stomach was carefully excised keeping oesophagus closed and opened along greater curvature and luminal

contents were removed. The gastric contents were collected in a test tube and centrifuged. The gastric contents were analyzed for gastric juice volume, pH. The results are given in table 7.

**c. Measurement of gastric juice volume and pH**

Gastric juice was collected from pylorus lygated rats. The gastric juice thus collected was centrifuged at 3000 rpm for 10 min. The volume of supernatant was measured and expressed as ml/100 g body weight. The pH of the supernatant was measured using digital pH meter <sup>[7]</sup>.

**d. Ulcer index (UI)**

The mucosa was flushed with saline and stomach was pinned to frog board. The lesion in glandular portion was examined under a 10x magnifying glass and length was measured using a divider and scale and gastric ulcer was scored. Ulcer index of each animal was calculated by adding the values and their mean values were determined.

- 0 – Normal coloured stomach
- 0.5 – Red colouration
- 1 – Spot ulceration
- 1.5 – Haemorrhagic streak
- 2 – ulcers
- 3 – Perforations

**e. Percentage inhibition**

Percentage inhibition was calculated using the following formula.

$$\% \text{inhibition} = \frac{\text{UI}_{\text{ulcer control}} - \text{UI}_{\text{ulcer treated}}}{\text{UI}_{\text{ulcer control}}} \times 100$$

**f. Statistical Analysis**

All the values are expressed as mean ± S.E.M for groups of six animals each. Analyzed by one way ANOVA and compared by using Tukey- Kramer multiple comparison test. The values are statistically significant at three levels, \*\*\*p<0.001. \*\*p<0.01. \*p<0.05. But non significant if p > 0.05.

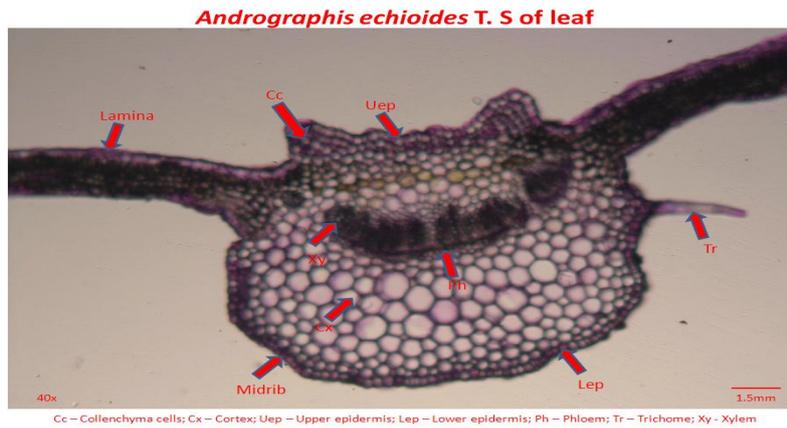
**4. Results****4.1 Macroscopic characters of *Andrographis echioides***

Annual dense herb grows up to 50 cm, stems are angular, densely hairy, leaves oblong to oblanceolate 3-5 x 0.7 -1 cm in size hairy on both the sides. Racemes are 3-5 cm long, the length of the raceme does not exceeds length of leaves. Racemes are scarcely branched. Calyx lobes are 5, linear, hairy 6 mm long. Corolla white with brown tinged, 2 lips, upper lib is oblong 5-5.5x2 mm, upper one is with two lobes, lower lib 7 mm long oblong to lanceolate with three lobes. Filaments are flattened. Capsule 1-2 x 0.5 cm in size.

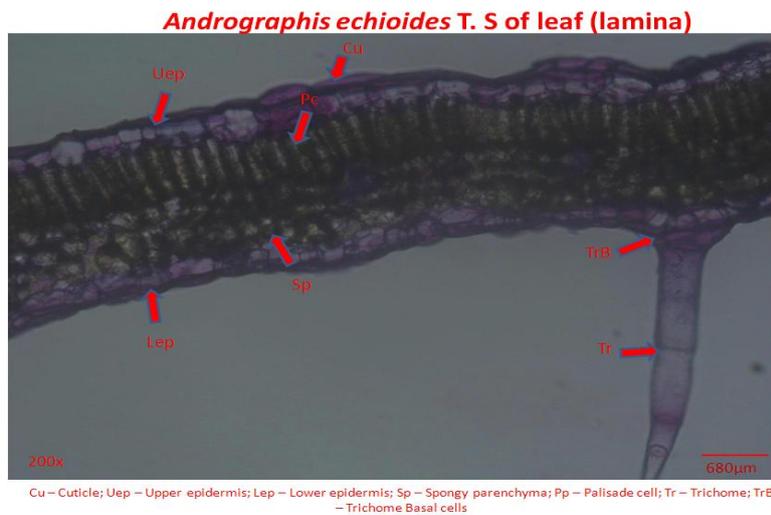
#### 4.2 Microscopic studies on *Andrographis echioides*



**Fig 1:** *Andrographis echioides*

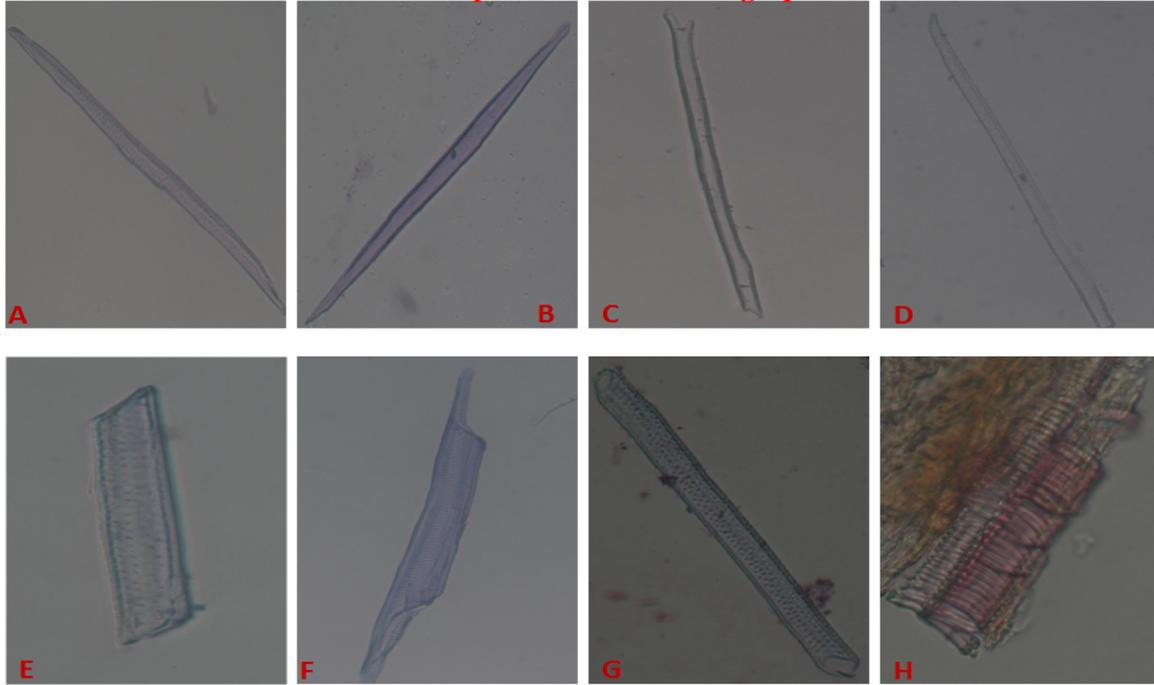


**Fig 2:** *Andrographis echioides* T.S of leaf (Midrib)



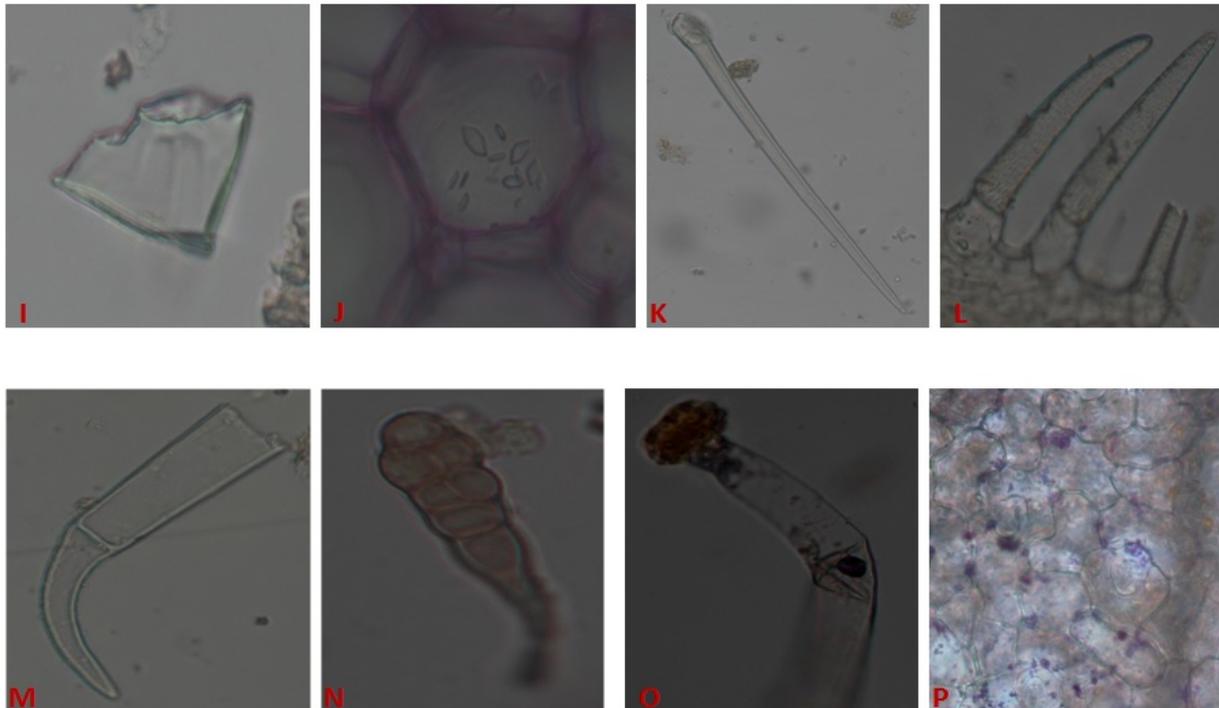
**Fig 3:** *Andrographis echioides* T.S of leaf (lamina)

**Powder microscopic studies of *Andrographis echioides***



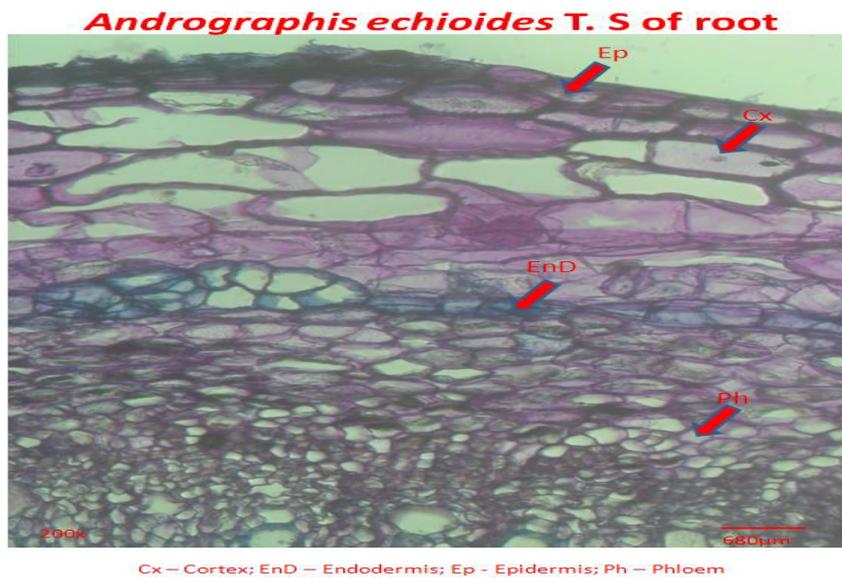
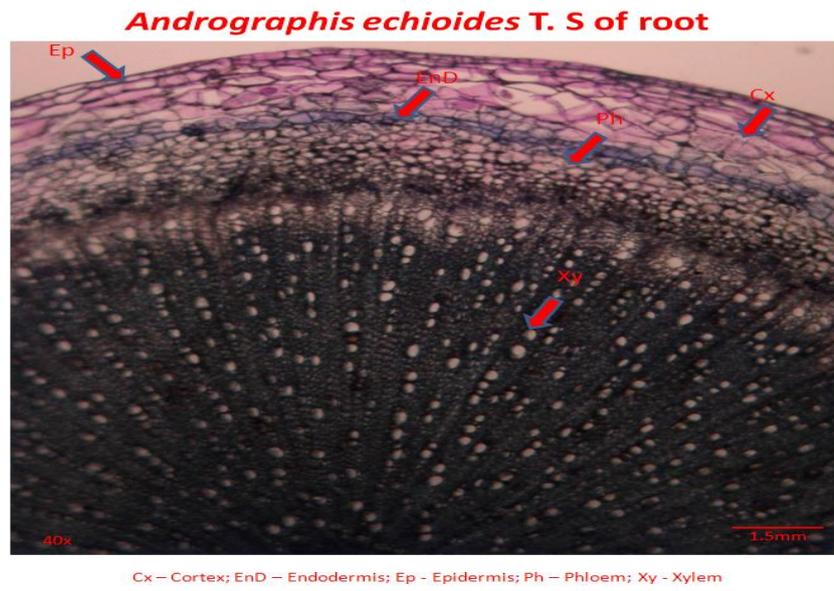
**A. Fibre with blunt end; B. Fibre with tapering end; C. Fibre with peg like out growth; D. Fibre with pits; E. Sclerenchyma cell; F. Tailed xylem vessel; G. Xylem vessel with pits; H. Vessel with spiral thickening**

**Powder microscopic studies of *Andrographis echioides***

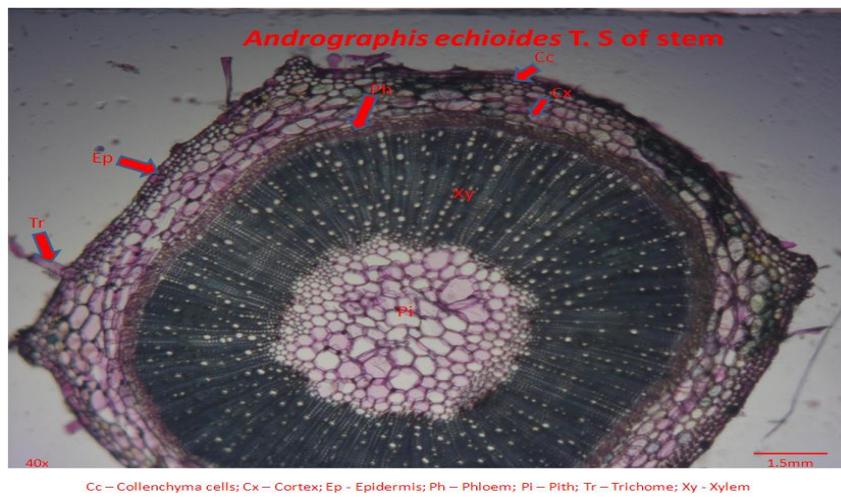


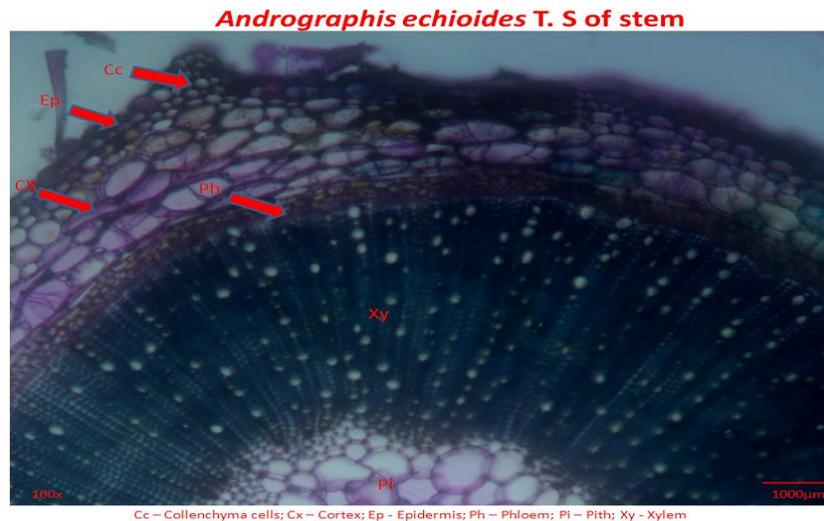
**I. Prismatic calcium crystal; J. Parenchyma cells prismatic crystals; K. Unicellular trichome; L. Uniseriate multicellular trichome; M. Curved trichome; N. Multicellular headed glandular trichome; O. Glandular trichome; P. Diacytic stomata**

**Fig 4:** Powder microscopy of *Andrographis echioides*

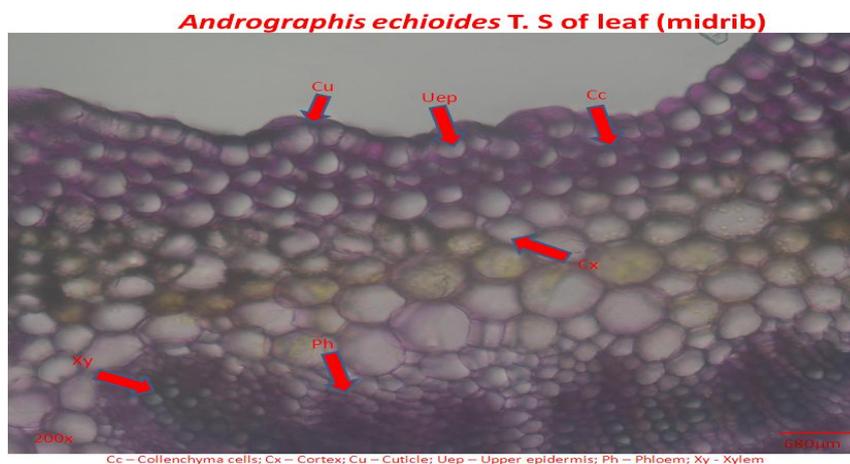


**Fig 5:** *Andrographis echioides* T.S of root





**Fig 6:** *Andrographis echioides* T.S of stem



**Fig 7:** *Andrographis echioides* T.S of leaf (midrib)

#### 4.3 T. S of stem

The T. S. of stem shows angular with trichomes and consists of epidermis, collenchymas, cortex, phloem, xylem and pith regions. Epidermal cells are longitudinally elongated narrow cells with oblique and radial cross walls, outer cell wall consists of striated cuticle. Collenchyma followed by epidermis made up of 2-3 layered irregularly thick walled ovoid and elongated cells. Cortex 4-5 cell layered with thin walled large ovoid or irregular parenchyma cells with oblique cross walls. Phloem made up of 3-4 layered irregular cells followed by 2 cells layered cambium cells. 1/2 of the stem portions occupied by continuous endarch xylem ring which consist of xylem vessels, tracheids, xylem fibres and xylem parenchyma cells. Pith region present in the central portion of the stem, made up of large polygonal parenchyma cells contains prismatic and acicular calcium oxalate crystals and starch grains.

#### 4.4 T.S. of leaves

Leaves consists of midrib and lamina, midrib made up of single layered upper and lower epidermis rectangular or large round cells with striated cuticle on outer surface of the cells and some of the epidermal cells modified into as

single cellular, uniseriate and as glandular trichomes. The upper epidermis shows two horns like appendages consists of collenchymas cells. The epidermis followed by 2-3 layered collenchymas cells and 2-3 cells layered globular chlorenchyma cells. The cortex made by several layered large globular and small polygonal parenchyma cells, some of these cells contains starch grains and prismatic calcium crystals. 3-5 distinct vascular bundles are present, two small bundles towards peripheral regions and three 2-3 three large bundles in centre of the midrib. Xylem cells are surrounded by phloem cells and xylem parenchyma cells are distinct and 2-4 wide. Cortex regions of the lower side made up of large globular cells towards outer, small globular cells in middle and polygonal cells in inner side.

#### 4.5 Lamina

The lamina contains upper and lower epidermis with a striated cuticle in cell wall, single cell layered palisade cells and 2-3 cell layered spongy tissue and bundle sheaths. Some of the epidermal cells modified into unicellular, uniseriate, and glandular trichomes. The glandular trichomes are sessile, stalked and stalked with multicellular head. Non glandular trichomes are straight unicellular trichomes, uniseriate multicellular straight and curved

trichomes are present.

#### 4.6 T.S. of Root

The T.S of root shows the presence of single cell layered epidermis, cortex, endodermis, pericycle, phloem and xylem. Epidermis are made up of single cell layered rectangular and barrel shaped cells. The Cortex consist of several cells layered ovoid and irregular and shaped large thin walled oblique or straight cross walls followed by 1-2 cell layered endodermis. The endodermis followed by 6-7 cells layered pericycle made by irregular compactly arranged parenchyma cells. Phloem is several cells layered with smaller cells medullary rays are single cell wide. The xylem regions occupied more than half of the root, xylem is exarch. The xylem consists of xylem vessels, xylem fibre, tracheids and xylem parenchyma cells.

#### 4.7 Powder microscopy

Powder microscopy shows the presence of fibres with blunt end, fibre cells with tapering ends, fibres with peg like outgrowths and also fibres with simple pits. Tracheids are seen with pitted thickening. Xylem vessels are with bordered pitted thickening and spiral thickenings. And also the powder microscopic studies show the presence of Prismatic and acicular calcium oxalate crystals. Simple and compound round and oval shaped starch grains are present.

**Table 1:** Physiochemical Parameters

S. No	Parameters	%w/w
1.	Pet ether Soluble extractives	6
2.	Chloroform Soluble extractives	8
3.	Acetone soluble extractives	2
4.	Ethanol soluble extractives	18
5.	Methanol soluble extractives	16
8.	Water soluble extractives	30
9.	Foreign organic matter	1
10.	Loss on drying	14.9
11.	Crude fiber content	20
12.	Total Ash	3
13.	Acid insoluble ash	1.2
14.	Sulphated ash	2.3

**Table 2:** Preliminary Phytochemical screening of *Andrographis echioides* crude drug powder

Phytoconstituents	<i>Andrographis echioides</i>
Amino acid	+
Volatile oils	+
Carbohydrates	+
Proteins	+
Phenol	+
Saponins	+
Steroids	+
Flavonoids	+
Alkaloids	-
Glycosides	+

+ Present - Absent

**Table 3:** Fluorescence analysis study of *Andrographis echioides* Leaf powder

Treatment for leaf powder	Visible light	Short UV 265 nm	Long UV 365 nm
Powder	Pale green	Green	Green
Powder+ 1 N Hydrochloric acid	Brown	Green	Dark green
Powder+ 50% Sulphuric acid	Pale brown	Green	Green
Powder +10% Sodium hydroxide (aqueous)	Slight brownish green	Green	Yellowish green
Powder+10% Sodium hydroxide (alcoholic)	Green	Green	Light purple
Pet ether	Yellowish	Light green	Green
chloroform extract	Light green	Green	Deep orange
Acetone extract	Light green	Light green	Greenish brown
Alcoholic extract	Light green	Green	Orange
Aqueous extract	Light brown	Light green	Green

#### 4.8 Preparation of Extracts from *Andrographis echioides* leaf:



**Fig 8:** Extract preparation by using soxhlet apparatus

The leaves were dried under shade, powdered and passed through 40 meshes and stored in a closed vessel for further use. The dried powder material (100gram) was subjected to soxhlet extraction with Ethanol for continuous hot extraction for 6 hours. The extracts were concentrated under reduced pressure to obtain the extracts solid residues. The percentage value of the extracts was 23.64%w/w.

**Table 4:** Phytochemical Evaluation of Ethanolic extract of *Andrographis echioides*

Phytoconstituents	<i>Andrographis echioides</i>
Alkaloids	-
Protein	+
Flavonoids	+
Saponin glycoside	+
Volatile oils	-
Amino acid	+
Phenolic compounds	+
Steroids	-
Carbohydrate	+
Bitter glycoside	-
Fats and oils	-

+ Present - Absent

**Table 5:** Thin layer chromatography of ethanol extract of *Andrographis echioides*

Constituents	R <sub>f</sub> Value
Amino acids	0.65
Flavonol glycosides	0.46
Flavonoids	0.45
Saponins	0.42, 0.61
Phenolic compounds	0.44, 0.67
Terpenes	0.28, 0.66

**Table 6:** Effect of EEAE on Ulcer Index in pylorus ligated rats

Group	Ulcer index (UI)	Percentage inhibition (%)
Normal Control	00.00 ± 0.00	-
Ulcer Control	12.25 ± 0.95	-
EEAE (200 mg/kg)P.O.	9 ± 0.81**	26.53
EEAE (400 mg/kg)P.O.	5.25 ± 0.95***	53.06
Ranitidine (30 mg/kg) i.p.	2.75 ± 0.50***	77.5

All values are expressed as mean ± S.E.M.; (n=6) animals in each group. Significant as compared to control P\*\*\* < 0.001, P\*\* < 0.05.

#### 4.9 Anti-ulcer screening - Pylorus ligation induced ulcer in Rats

Effects of ethanol extract of *Andrographis echioides* on ulcer index by using pylorus ligation induced ulcer method in rats are shown in Table. Pylorus ligation induced gastric damage showed gross mucosal lesion, including long haemorrhage bands and petechial lesion. Animals pretreated with ethanol extract of *Andrographis echioides* and standard drug Ranitidine showed very mild lesions and sometimes no lesion at all, when compared to ulcer control group. *Andrographis echioides* showed a dose dependent curative ratio compared to ulcer control groups. The extracts exhibited an inhibition percentage of 26.53 and 53.06 at doses of 200 and 400 mg/kg doses respectively. The ulcer protective action of extracts at different doses was better as that of standard drugs, Ranitidine, which exhibited an inhibition percentage of 77.5. Pylorus ligated

rats showed severe gastric haemorrhagic lesions. The pathogenesis of pylorus ligation induced gastric damage in rats is complicated and involves superficial aggressive cellular necrosis as well as the release of tissue derived mediators such as histamine and leukotriene C4. These mediators act on gastric microvasculature, triggering a series of events that lead to mucosal and sub mucosal damage. So the cytoprotective mechanism of the *Andrographis echioides* extract may therefore include mechanisms other than simple acid neutralization.



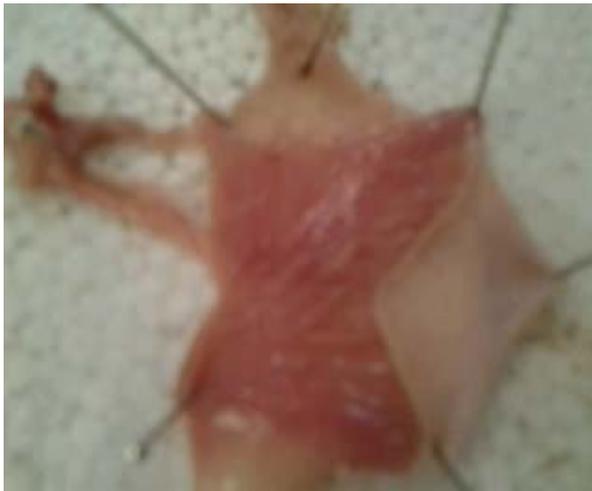
1. Normal Control



2. Ulcer Control



3. EEAE (200 mg/kg)

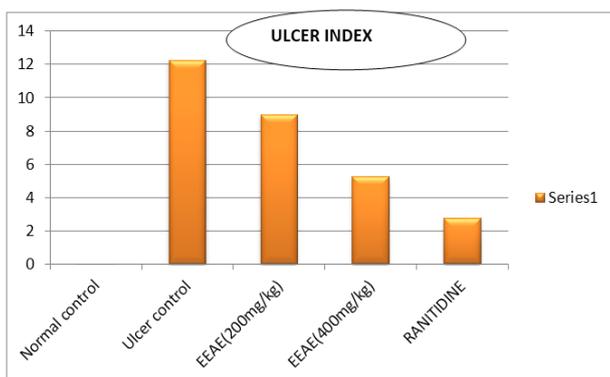


4. EEAE (400 mg/kg)



5. Ranitidine (20 mg/kg)

**Fig 9:** Effect of EEAE on Ulcer Index in pylorus ligated rats



**Graph 1:** Effect of EEAE on Ulcer Index in pylorus ligated rats

#### 4.10 Ulcer index (UI) and acid parameters

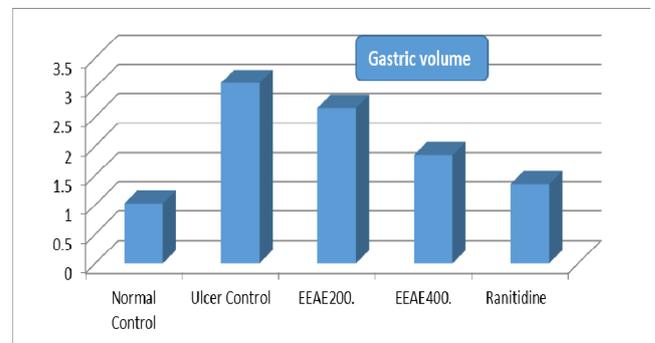
The effects of ethanolic extract of *Andrographis echiodides* on acid parameters showed significant effect at 200 mg/kg dose compared to ulcer control animals. The volume of acid secretion, total and free acidity was decreased and pH of the gastric juice was increased compared to ulcer control group. But, in this gastric environment also able to induce

ulcer, so it can be thought that the antisecretory activity might not be the main mechanism of action of these extracts.

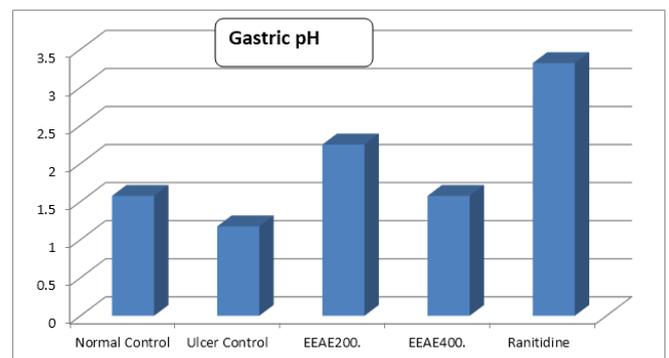
**Table 7:** Effect of EEAE on Gastric secretion, pH in pylorus ligated rats

Group	Gastric volume (ml/100 g)	pH of gastric juice
Normal Control	1.025±0.29	1.575±0.22
Ulcer control	3.075 ± 0.206	1.175±0.095
EEPS (200 mg/kg) P.O.	2.65±0.208***	2.25±0.129**
EEPS (400 mg/kg) P.O.	1.85 ± 0.129***	2.575 ± 0.125***
Ranitidine (30 mg/kg) I.P.	1.35 ± 0.2***	3.32 ± 0.309***

All values are expressed as mean ± S.E.M.; (n=6) animals in each group. Significant as compared to control P\*\*\* < 0.001, P\*\* < 0.05.



**Graph 2:** Effect of EEAE on Gastric secretion in pylorus ligated rats



**Graph 3:** Effect of EEAE on Gastric pH in pylorus ligated rats

#### 5. Discussions

The present study was undertaken to determine the antiulcer activity of the ethanol extract from the leaves of *Andrographis echiodides*. The preliminary phytochemical investigation showed the presence of alkaloids, flavonoids, terpenoids, tannins, cardiac glycosides, gums and phytosteroids. The pharmacological and acute toxicity studies of ethanol extract were performed by following, OECD-423 guidelines (Acute toxic class method). No mortality or acute toxicity was observed (3 days) up to 2000 mg/kg of body weight.

The phytoconstituents like flavonoids, tannins and terpenoids, have been reported in several anti-ulcer literatures as possible gastroprotective agents. Flavonoids, tannins and triterpenes are among the cytoprotective active materials for which antiulcerogenic efficacy has been extensively confirmed. It is suggested that these compounds will be able to stimulate mucus, bicarbonate and prostaglandin secretion, and counteract with the deteriorating effects of reactive oxidants in gastrointestinal lumen. Tannins may prevent ulcer development due to their protein precipitating and vasoconstriction effects. Their astringent action can help precipitating micro proteins on the ulcer site, thereby forming an impervious layer over the lining that hinders gut secretions and protects the underlying mucosa from toxins and other irritants.

Similarly, the ethanol extract of *Andrographis echiooides* showed the presence flavonoids and their glycosides, tannins and triterpenoids. These phytoconstituents present in the extract could be the possible agents involved in the prevention of gastric lesions induced by pylorus ligation. *Andrographis echiooides* showed a dose dependent curative ratio compared to ulcer control groups. The extracts exhibited an inhibition percentage of 26.50 and 53.06 at doses of 200 and 400 mg/kg doses respectively. The ulcer protective action of extracts at 400 mg/kg was good to that of standard drugs, Ranitidine, which exhibited an inhibition percentage of 77.50.

## 6. Conclusions

The ethanol Leaf extract of *Andrographis echiooides* showed the presence flavonoids and their glycosides, tannins and triterpenoids. These phytoconstituents present in the extract could be the possible agents involved in the prevention of gastric lesions induced by pylorus ligation. *Andrographis*

*echiooides* showed a dose dependent curative ratio compared to ulcer control groups. The extracts exhibited an inhibition percentage of 26.50 and 53.06 at doses of 200 and 400 mg/kg doses respectively. The ulcer protective action of extracts at 400 mg/kg was good to that of standard drugs, Ranitidine, which exhibited an inhibition percentage of 77.50.

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