AMERICAN JOURNAL OF PHARMTECH RESEARCH
Journal home page: http://www.ajptr.com/

Evaluation of Anti-Ulcer Activity of *Ficus Carica* Linn Leaf

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ABSTRACT

The preparation was to be started with the preparation of successive extract of plant leaves of *Ficus Carica* Linn. (Moraceae) in petroleum ether and ethanol respectively followed by pharmacological investigations including Organoleptic property and photochemical investigation i.e. test for triterpenoids, Glycosides, Alkaloids, Flavonoids, and Tannins. The % yield values for ethanolic leaves extract and petroleum ether leaves extract were found to be 3.6 & 5.4%. The anti-ulcer effect of ethanolic leaves extract of *Ficus Carica Linn.* Studied in Pylorus ligation and chemical (HCl-Alcohol) induced ulcer in albino rats. The extract at dose of 250, 500 mg/kg produced significant inhibition of gastric lesion by chemical and Pylorus ligation induced ulcer in rats and omeprazole and Sucralfate used as a standard drug. The extract reduced ulcerative lesion, gastric volume, free and total acidity but raised the P^H of gastric juice in Pylorus ligation& chemical induced model. The obtained result for the anti-ulcer activity of ethanolic leaves extract were confirmed, and reduced ulcerative lesion, gastric volume, free acidity and total acidity with the comparison of standard drug. The all significant were shows the ulcerative index, free & total acidity, percentage of protection, hemorrhage, streaks, as compared to control and also p^H raised up to 3.5 respectively.

Keywords: Anti-ulcer, *Ficus Carica* L., Albino Rats, Sucralfate, Omeprazole.

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Received 14 August 2017, Accepted 28 August 2017

Please cite this article as: Singh R *et al*., Evaluation of Anti-Ulcer Activity of Ficus Carica Linn Leaf. American Journal of PharmTech Research 2017.

INTRODUCTION

Peptic Ulcer

The peptic ulcer refers to a spectrum of disorders that includes gastric ulcers, duodenal ulcers or near the site of surgical gastrointestinal anastomosis[1].

Basic Gastrointestinal Physiology:

The stomach is divided into three regions: fundus, body, and antrum (pylorus) anatomically. The proximal part made of fundus and body acts as a reservoir for undigested material whereas the antrum is the main site for mixing motions & act as a pump for gastric empty by propelling action.

Physiology of Stomach:

The stomach is a digestive tube between the esophagus and small intestine. The stomach wall is structurally similar to the other parts of the digestive tube. The physiologically normal stomach mucosa maintains a balance between agrrasive & protective factors[2]. These are image to four types of secretary epithelial cells that cover the surface of the stomach, andextend down into gastric pits & glands. **Mucous cells**: Secrete alkaline mucus that protects the epithelium against shear stress and acid, **Parietal cells**: secrete hydrochloric acid. **Chief cells**: secrete pepsin, a proteolytic enzyme & **G cells**: secrete the hormone gastrin.

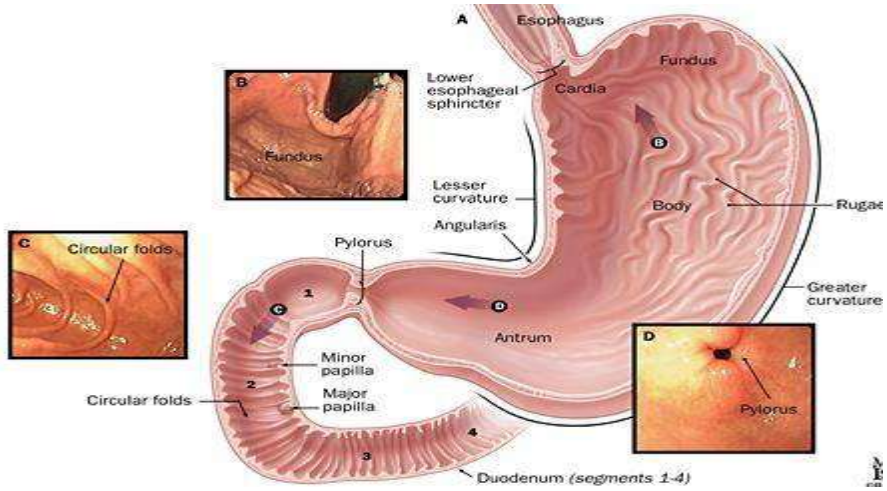


Figure 1: Physiology of stomach

Gastric motility:

Gastric motility is controlled by a complex set of hormonal& neuronal signals. Nervous control originates from the enteric nervous as well as parasympathetic or cholinergic effect (predominantly vagus nerve) and sympathetic systems (adnergic effect). A large battery of hormones has been shown to influence gastric motility. The liquid readily pass through the pylorus in spurts, but solids must be reduced to a diameter of less than 1-2 mm before passing pyloric gatekeeper. The resting

gastric juice volume of the stomach is from 25 to 50 ml. The pH of fasting stomach is 1.2 to 2.0 & in fed condition it rises from 2.0 to 6.0[3].

Plant profile:

It consists of leaves of plant *Ficus Carica* belonging to the family Moraceae. Commonly the fig production either located around the Mediterranean sea or is realized in countries possessing climate in case of Japan, South-west Asia and the Eastern Mediterranean region, from the Turkey in the East to Spain and Portugal in the West. It is also grow to native of India, China, & Chile. It is cultivated in India commonly Maharashtra, Andhra Pradesh, Punjab, Uttar Pradesh and Mysore etc. **Synonyms**[4] **Hindi**- Angir, **Sanskrit**- Angira, **English**- Ficus, **Bengali**- Angir, **Kannad**- Anjura, **Tamil**- Tenatti, **Telgu**- Anjuru, **Marathi**- Anjra, **Punjabi**- Fagari. **Classification**[5]: **Kingdom**- Plantae, **Subkingdom**- Tracheobionta, **Super division**-Spermatophyte, **Division**- Magnoliphyta, **Class**- Maghnoliopsida, **Subclass**- Hamamelididae, **Order**- Urticales, **Family**- Moraceae, **Genus**- Ficus, **Species**- Carica.

Morphology:

Plant of *Ficus Carica* is generally 10 to 12 fit tall, with spreading branches and a trunk rarely more than 7 fit in diameter. The latex of the plant is milky white. The Fruits is pear shaped, auxiliary, and variable in size and color. The fig is juicy and sweet. Leaves are green, odourless with slight bitter taste. Leaves are 6-8 cm long and 4-5 cm wide in shape, surface is rough on upper and pale green at lower surface. **Traditional Use:** Different parts of the plant is used leprosy, nose bleeding, antipyretic, hair nutative, paralysis, inflammation, liver disease, chest pain, piles, anaemia, and anti-diabetic etc.**. Modern Use**: Modern uses areas, poultice, eating, gargle, fumigation, rubbed externally, liniment, on sponge, enema, chow for animal kingdom, Home owners preserve the whole fruits in sugar syrup or prepare them as jam, marmalade, or paste etc. **Toxicology**: The milkey fluid of *Ficus Carica* toxic for eyes.

MATERIALS AND METHOD

Selection and Collection of plant material:

The leaves of plant of *Ficus Carica* were selected of the exhaustive literature survey and collected from Meerut, U.P. India in the month of November 2014.

Authentication:

The leaves of plant of *Ficus Carica* were authenticated by a senior Botanist **Dr. D.C Kasana;** Head of Department of Botany, I.P College of science, Bulandshahr (U.P), India.

Preparation of Extraction

The powdered drug (around 250 gm) was subjected to continuous hot extraction with the solvents of increasing polarity in soxhlet apparatus, i.e., Petroleum ether (35-40^{0}C), Chloroform & Ethanol. Each time before extracting with the next solvent the plant material was dried in hot air oven at 50^{0}C for one hour. After the effective extraction, the solvent were off the extract were then concentration of water bath to dryness. The obtained extract with each solvent was weighed and stored in an air tight container. The percentage extractive yield of different extracts was calculated petroleum ether & ethanolic extract (5.4 & 3.83 %) respectively.

Evaluation of Experimental Animals

Swiss albino rats (150 gm) of either sex, used in the present study, were obtained from the central Animal House facility of TMCOP, TMU, Moradabad (U.P). All animal protocols were approved by Institutional Animal Ethical committee (IAEC) of the organization (Reg. No. 1205/PO/C/21/04/08/CPCSEA).All animals were maintained under standard conditions of humidity (50±10 %), temperature (22±2^{0}c) & light (12 hours light & 12 hours dark).

Treatment model for anti-ulcerogenic activities:

Ulcer Lesion Index Method:

Chemical (HCl - Ethanol induced ulcer): Swiss albino rats were divided into 4 groups (n=6). The first group received vehicle only, third & fourth group was treated with standard drugs (20 mg/ kg Sucral fat) & extract (500 mg/kg). But second group was use as a control.

After 1 hour all the animals were treated with 0.2 ml of HCl - Ethanol mixture p.o (0.3 M Hydrochloric acid and 60% ethanol) to induce gastric ulcer. After 1 hour, animals were sacrificed by cervical dislocation. The stomach was excised and lesion index was determined by measuring each lesion in mm along its greater length[6].

Pylorus ligation-induced ulcer in rats

Pylorus ligation technique was adopted for the determination of antiulcerogenic activity. The pylorus ligation was performed according to the (**Dinesh K Patidar, et.al)**[7] Gastric ulcers were produced by pylorus ligation, the rats were fasted for 24 h before ligation but water were allowed ad. libitum. These are animals divided into five groups (n=6). The Ist group received vehicle only, IIIrd, IVth & Vth group was treated with standard drugs (20 mg/ kg Omeprazole) & extract (each 250 & 500 mg/kg). But second group was use as a control.1 Hr after administration of the drugs/ vehicle, the animals were anesthetic with ketamine (80mg/kg) and a middle incision was made just below the xiphoid process. The stomach was lifted out, ligated at the level of the pylorus and the abdomen wall was closed by interrupted sutures. Animals were housed separately and deprived of the water was withheld for a duration of 4 h following which they were scarified by a cervical

dislocation. The stomach was then dissected out, gastric contents were collected & boundary of ulcerated area was traced[8,9]. The gastric content was titrated against 0.01 N NaOH to find out the free acidity and total acidity[10].

Macroscopic evaluation of stomach

The abdomen was opened, cardiac end of the stomach was dissected out & the content was drained into the glass tube. The volume of the gastric juice was measured and its p^H was determined. The isolated abdomen was examined by a 10X magnifier lens to assess the formation of ulcer. The numbers of ulcers were counted[11].

Scoring of ulcer[12]

- 0 = Normal coloured stomach
- 0.5 = Red colouration
- 1 = Spot ulcer
- 1.5 = Haemorrhagic streaks
- 2 = Ulcers ≤ 3 but ≤ 5
- 3 = Ulcers > 5

Calculation of ulcer index[13]

- $U_1 = U_N + U_S + U_P \times 10^{-1}$
- U_1 = Ulcer index
- U_N = Average of number of ulcer per animal
- U_S = Average of animal severity score
- U_P = Percentage of animal with ulcer

Determination of acid

$$\text{Acidity} = \frac{\text{Volume of NaOH} \times \text{Normality of NaOH} \times 100}{0.1}$$

Determination of percentage protection[14]

$$\% \text{ Protection} = \frac{\text{Control mean ulcer index-test mean ulcer index} \times 100}{\text{Control mean ulcer index}}$$

RESULTS AND DISCUSSION:

Chemical (HCl- Ethanol induced ulcer):

Oral administration of absolute (0.3 M hydrochloric acid and 60% ethanol) ethanol produced distinguishing lesion in control group animal. Standard and extract treated groups. The glandular portion of rat stomach which appeared as shows the bands of thick, dark red and black lesions.

EFC has shown protection index of 66.83% with the dose of 500 mg/kg respectively in the comparison the control, Sucral fate as reference standard drug and protection of 70.39%. (Result are tabulated in Table 1)

Table 1 Effects of *ficus carica* leaves extracts on various parameters chemical (HCl-Ethanol) Induced ulcer in rats

S.No.	Groups	Dose (mg/kg)	Ulcer index	Protection (%)	P^H of gastric juice
1.	Control	-	13±1.16	-	3.4±.03*
2.	Sucral fate	20mg/kg	4.2±0.06**	70.39%	5.2±.01*
3.	Ethanolic extract	500 mg /kg	5.3±0.01*	66.83%	4.6±0.03*

Values are express as mean ±S.E.M. (n=6) observations, statistical comparison as follows: significant at p*<0.01 p**< 0.05 when compared to control group.

(a) Control **(b) Standard** **(c) Test**

Figure 1: (a) Control (treated with HCl- Ethanol induce ulcer), (b) Standard (treated with Sucral fate 20mg/kg and shows protected mucosal layer), (c) Test (treated with ethanolic extract of *ficus carica*, 500mg/kg and shows protected mucosal layer)

(a) Control **(b) Standard**

(c)Test$_1$ **(d) Test$_2$**

Figure 2: (a) Control (pylorus ligated group), (b) Standard (treated with Omeprazole 20mg/kg), (c) Test$_1$ (treated with ethanolic extract of *Ficus Carica* leaf, 250mg/kg), (d) Test$_2$ (treated with ethanolic extract of *Ficus Carica* leaf, 500mg/kg)

Pylorus ligation induced gastric ulcer

The modal of pylorus ligation induced ulcer, oral administration of EEFC in two different dose showed reduction in ulcer index, collection of gastric juice, free acidity, total acidity, and also shows the p^H of gastric juice and all parameters compared with the control group. It was showing protection index of 62.33% and 66.45% at the dose of 250 mg/kg and 500mg/kg respectively. Omeprazole as reference standard drug and showing protection index of 76.70% at the dose of 20mg/kg respectively (Result are tabulated in Table 3.2).

Macroscopical and histopathological Evaluation

Histopathological changes on pylorus ligation model showed the oedematous, inflammation, degeneration, haemorrhage, appearance of the gastric tissue, where as EEFC (250 & 500mg/kg) treated groups shows regeneration and prevents the formation of haemorrhage and edema and those are show' figure. (2a, 2b, 2c &2d,).

Table 2: Effects of *ficus carica* leaves extracts on various parameters for pylorus ligation induced gastric ulcer in rats

Treatment Group	Ulcer index	Protection (%)	P^H of gastric juice	Gastric Juice (ml)	Free acidity Meq/ltr	Total Acidity Meq/ltr
Control	16.10±1.5	-	2.9±.8	5.8 ± 0.01*	40.01%	46.00%
Omeprazole (20 mg/kg)	03.75±0.05**	76.70%	3.3±.12***	3.05±0.05**	12.30%	15.50%
EEFC (250mg/kg)	06.10±0.06**	62.33%	3.9±.10***	4.10±0.03*	19.08%	24.5%
EEFC (500mg/kg)	05.40±0.06**	66.45%	3.5±.10***	3.9±0.05**	17.50%	22.5%

Values are express as mean ±S.E.M. (n=6) observations, statistical comparison as follows: significant at p*<0.01 p**< 0.05 when compared to control group.

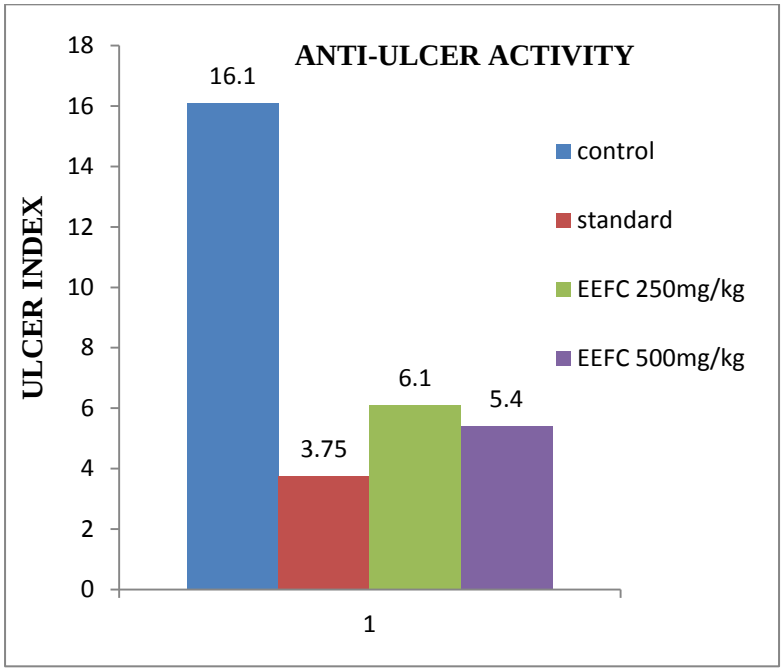


Figure 3: Graph representing ulcer index in various groups

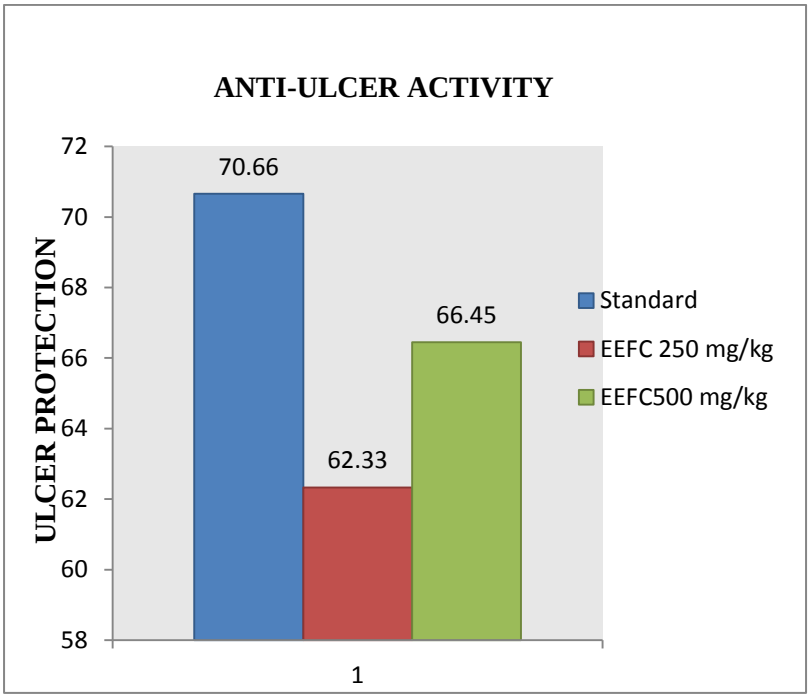
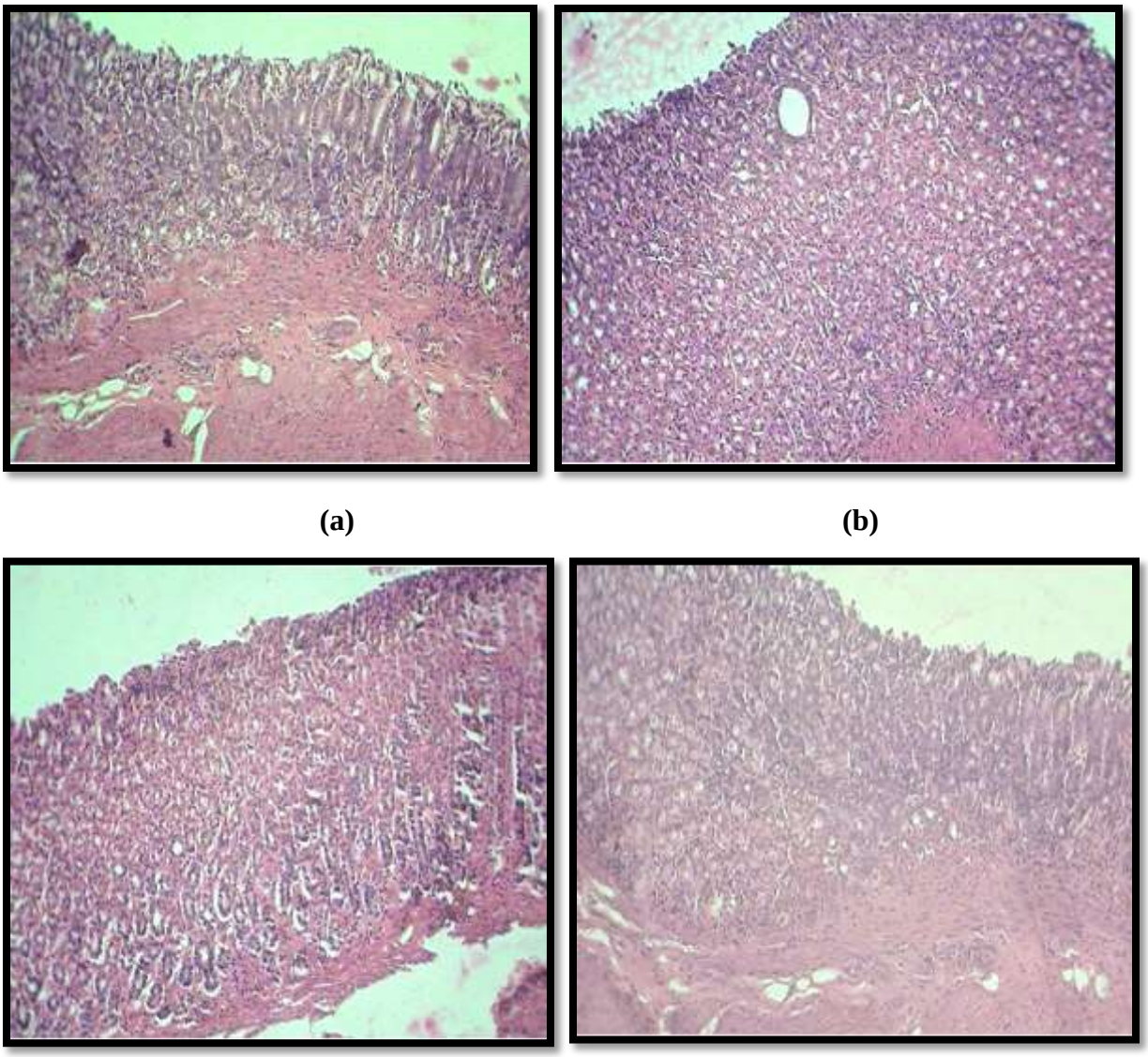


Figure 4: Graph representing ulcer protection in various groups



(a) **(b)**

(c) **(d)**

Figure 5:(2a) Pylorus ligation methods shows inflammation & mucosal ulceration control, (2b) Standard drug omeprazole (20mg/kg) shows no singnifance change in histopathology almost normal appearance, (2c) EEFC test$_1$ (250mg/kg) shows some significance change in histopathology, (2d) EEFC (500mg/kg) shows no singnifance change in histopathology almost normal appearance.

CONCLUSION:

Ficus Carica has been traditionally used for a number of disorders. The literature survey on the plant described that the plant possessed various traditional medicinal properties. The purpose of this research work was to study anti-ulcer activity of *Ficus Carica* leaves extract and established the pharmacological characteristic of the leaves of *Ficus Carica* plant.

The research work was started with the preparation of successive extract of plant in petroleum ether and ethanol respectively followed by pharmacological investigations.

The obtained plant extract were subjected to pharmacological studies by deferent experimental animal models to be used.

Ficus Carica ethanolic leaves extract and exhibited better anti-ulcer activity using chemical (HCl-Alcohol) & Pylorus ligation induced ulcer, comparable to standard Omeprazole & Sucral fate.

Hence it was concluded that the *Ficus Carica* leaves extract revealed more significant effect for anti-ulcer rather than individual ethanolic leaf extract when compared to the standard. Therefore it seems worthy to develop the formulation containing the ethanolic extract optimized affects in ulcer.

REFERENCE:

1. Gupta S.K "drug screening methods" Jaypee brothers' medical publisher (p) LTD, first edition (2004) pp. 175
2. Banker GS, Rhodes CT "Modern Pharmaceutics" Marcel Dekker, New York 1996; 3: pp. 125-128.
3. Hoffmann A "Pharmacodynamic aspects of sustained release preparations" Adverse Drug Delivery. Rev 1998; 33: pp. 185-199.
4. Bakshi, DNG, Sensarma, P. & Pal, D.C "A lexicon of medicinal plants in India" Naya Prakash, Calcutta, 1999, pp. 424-425
5. Bakshi, DNG, Sensarma, P. & Pal, D.C "A lexicon of medicinal plants in India" Naya Prakash, Calcutta, 1999, pp. 424-425
6. Yesilada E, Gurbutz I, Ergun E. "Effect of *Cistus laurifolius L*. flowers on gastric and duodenal lesions" J Ethnopharmacol 1997; 55: 201-110.
7. Dinash K Patidar "anti-ulcer activity of aqueous extract of *Murraya Koenigh* in albino rat" International Journal of Pharma and Bio Science vol 2 (2011) pp. 525
8. Vinod Nair "Evaluation of the anti-ulcer activity of NR-ANX-C (a polyherbal) formulation (2010)" Indian J Med Res 132, pp. 218-223.
9. Raju. D., Ilango. K., Chitra. V., Ashish. K. "Evaluation of Antiulcer activity of Methanolic extract of *Terminalia Chebula* fruits in experimental rats" Journal of Pharmaceutical Sciences and research (2009), 1(3):101-107.
10. S.K Kulkarni "Hand book of experimental pharmacology" Vallabh Prakashan New Delhi, 2002 pp. 149-150.

11. N.L. Dashputure "Evaluation of anti ulcer activity of methanolic extract of Abitilon indicum Linn leaves in Experiments Rats (2011) international Journal of pharmacological science and Drug Research 3 (2) pp. 97-100
12. H.Gerhard Vogel. "Drug Discovery and evaluation" Springer-Verlag Berlin Heidelberg, New York 2002 pp.86
13. S.K Kulkarni "Hand book of experimental pharmacology" Vallabh Prakashan New Delhi, 2002 pp. 149-150.
14. Hojage M.G., Hriprassanna R.C., Patil K.S., Matha Pati. S., Wadkar G. and Rao K.P. "Antiulcer effect of alcoholic extracts of Murus Alba L. Leaves in rodents" Indian Drugs (2010) 47(6): pp.64-68.