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RESEARCH ARTICLE

EFFECT OF METHANOLIC ROOT EXTRACT OF *CLERODENDRUM SERRATUM* ON ANTIULCER ACTIVITY IN PYLORUS LIGATION INDUCED ULCER IN ANIMAL MODEL: HISTOPATHOLOGICAL STUDY

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ABSTRACT

Ayurvedic science has propagated the use of *Clerodendrum serratum* as effective treatment against asthma, body ache, cholera, eye disorder, ulcers, snake-bite, wound, tuberculosis and epilepsy. The present research work is aimed at evaluating antiulcer potential of the plant data and establish scientific basis for the same. The standardized methanolic extract of *Clerodendrum serratum* were orally administered as aqueous solution, in the doses of 50, 100 and 200 mg/kg, *p.o*. treatment. Rabeprazole (20mg/kg, *p.o*) was used as the standard. Control rats were treated with the distilled water. In pylorus ligation induced ulcer model, various parameters like gastric volume, pH, total acidity, free acidity and ulcer index and percentage inhibition of ulceration were studied. Rabeprazole at 20mg/kg, p.o was used as the standard drug. Pretreatment of methanol root extract of *C. serratum* in a dose dependent manner showed significant ($p \leq 0.001$) decrease in the gastric volume, total acidity and free acidity of the gastric secretion but increased the pH of the gastric secreation only at higher dose, 200mg/kg, p.o. It showed also significant ($p \leq 0.01$) decrease in number of ulcers, ulcer score and ulcer index in pylorus ligation ulcer.

Key words: *Clerodendrum serratum;* methanolic extract; pylorus ligation ulcer; Rabeprazole

1. INTRODUCTION:

An ulcer is a local defect, or excavation of the surface of an organ or tissue that is produced by shedding of inflammatory necrotic tissue. Inflammatory necrosis of mouth mucosa, stomach, intestine and lower extremities are reported in elder persons who have circulatory disturbance (Stanley et al., 2002). Peptic ulcer disease is a group of disorders characterized by the presence of ulcer in portion of the GI tract exposed to acid in sufficient duration and concentration (Herfindal, 2006).When a peptic ulcer occurs in stomach or duodenum it is called gastric or duodenal ulcer. When a peptic ulcer occurs in first part of small intestine (duodenum) it is called a duodenal ulcer (Beradi and Welage, 1987).

Degeneration of pylorus permits bile refluxe into the stomach, creating an environment that favours ulcer formation (Shargel, 2004). Patients with PUD should eliminate or reduce psychological stress, cigarette smoking, and the use of nonselective NSAIDs (including aspirin). Although there is no "antiulcer diet," the patient should avoid foods and beverages (e.g., spicy foods, caffeine, and alcohol) that cause dyspepsia or that exacerbate ulcer symptoms (Kenneth and Quaid, 2000).

In Ayurveda peptic ulcer mostly refers to *Amlapitta (amlapitta* literally means, pitta leading to sour taste.) or *Parinamasula.* Ayurveda is based on the hypothesis that everything in the universe is composed of five basic elements viz. space, air, energy, liquid and solid. They exist in the human body in combined forms like vata (space and air), pitta (energy and liquid) and kappa (liquid and solid). Vata, pitta and kappa together are called tridosha (three pillars of life) (Kokate et al., 2002). .

Medicinal plants, since times immemorial, have been used in virtually all cultures as a source of medicine. Hence, the search for an ideal anti-ulcer drug continues and has also been extended to herbal drugs in search for new and novel molecules, which afford better protection and decrease the incidence of relapse and side effects which comes under the allopathic treatment.

1.1 *Clerodendrum serratum:*

Plants and plant derived agents have long history as source of potential chemotherapeutic agents in

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Ayurvedic and Unani system of medicine. *Clerodendrum serratum* (Linn), Ban-Bakri is commonly known as Bharangi in Hindi and Bhargavi in Sanskrit. It is found from 1000 to 1800 meters above mean sea level. It is distributed in warmer regions of Deccan and Carnatic, West Coast districts of Tamil Nadu, Kumaon, Sikkim, and Assam.*Clerodendrum serratum* is one of the important plants from traditional system of medicine found all over the world. They are lianas, and small trees, usually growing to 1-12 m tall, with opposite or whorled leaves (Shah, 2003).

Clerodendrum serratum is cultivated on July 2006 in Pratapgarh forest Chittorgarh district Rajasthan Rajasthan during biodiversity study. *Clerodendrum serratum* was growing wild in the ravinea of Sivaa River near Sanoti village. Locally this species is called furedetu. *Clerodendrum serratum* is a common shrub and grows along with *Lantana caora*, *Acacia nilotica* (Sharma and Katewa, 1993).

The genus is native to tropical and warm temperate regions of the world, with most of the species occurring in tropical Africa and southern Asia but with a few in the tropical Americas and northern Australasia, and a few extending north into the temperate zone in eastern Asia. Common names include glorybower, bagflower and bleeding-heart (Sharma and Katewa, 1993). A Linna habit is uncommon in verbenaceae but is found in Petrea and Halmskioldia the letter cultivated in Mesomrican region (Rueda, 1993).

Lateral roots measuring about 3.8 mm thick. Root roughly circular in cross sectional outline with shallow fissures and thin membranous peelings phellem tissue (Narayanan et al., 2002). Old roots, ranging in thickness from 3-7cm were examined. Wood hard, heavy, light brown, fine-grained smooth texture; no taste, no odour. Pores minute, not visible to the naked eye; growth rings fairly distinct and visible to the naked eye (Narayanan et al., 2002).

The leaves are simple decussate opposite, ternate or apically clustered and variable in size. The leaves are opposite oblong or elliptic, acute, coarsely and acute base (Rueda, 1993).

Glucose and D-mannitol, Oleanolic acid, Queretaroic acid and Serratagenic acid are present in root bark of *Clerodendrum serratum* (Shah, 2003) whereas Stimasterol, α-spinasterol, luteolin, luteolin-7-0 glucuronide, apigenin, baicalin and scutellarin 7-0 glucuronide are found in leaf (Krishna et al., 2007).

Root is pungent, bitter, acrid, dry, heating, anti-inflammatory, digestive, carminative, depurative, expectorant, antispasmodic, stimulant, appetizer and anthelmintic. It is used clinically in treatment of bronchitis, asthma, fevers, blood disease, tumours, inflammations, burning sensation, epilepsy, malaria, ulcer and wounds (Shah, 2003; Krishna et al., 2007*)*. Leaves are used in fever and hiccough. Its boiled leaves are used in cephalgia and opthalmia where as its boiled seeds in butter milk is used as aperients, in dropsy and in catarrhal affection of lungs (Shah, 2003).

It has been reported to possess potent pharmacological properties like anti-inflammatory antipyretic and antinociceptve, wound healing, hepatoprotective, immunomodulatory, antihistaminic, antibacterial, Malaria, anti-asthmatic, anti-allergic activity (Krishna et al., 2007)

Traditional medicine is very important and well accepted part of health care. Most population in developing countries still relies on indigenous and traditional medicine for satisfying their primary health care needs. Different parts of plant contain different constituents, which vary in activity, concentration or purity. Ayurvedic science has propagated the use of *Clerodendrum serratum* as effective treatment against asthma, bodyache, cholera, eye disorder, ulcers, snake-bite, wound, tuberculosis and epilepsy. It has antibacterial, antihistaminic, hepatoprotective, antipyretic, antinociceptive and anti-inflammatory. The therapeutic potential of *Clerodendrum serratum* especially antiulcer activity is documented in traditional books and literature. As till date there is no scientific data on antiulcer activity of roots of *Clerodendrum serratum.* Therefore, the present research work is aimed at evaluating antiulcer potential of the plant data and establish scientific basis for the same.

2.0 MATERIAL AND METHODS:

2.1 Collection and Authentication of Plant:

Air dried roots of *Clerodendrum serratum* were collected from Jagdamba, Pharmacy, Haridwar, Uttrakhand and authenticated by Dr. H.B. Singh Scientist F and Head, Raw Materials Herbarium and Museum at National Institute of Science Communication and Information Resources, (NISCAIR) New Delhi. Reference number NISCAIR/RHMD/Consult/-2009-10/1294/97 was given to the plant sample. The roots were air dried in the shade at School of Pharmaceutical Sciences, Shobhit University, Meerut, India.

2.2 Extraction

Air dried roots of *Clerodendrum serratum* were coarsely powdered in a grinder. Extraction is a process of extracting active principles from powdered crude drug by using suitable solvents. For extraction procedure, the nature of the desired phytoconstituent and the part of the plant has to be known precisely. Only then the method to be used and choice of solvent can be

determined (Kokate et al., 2002). Successive extraction is made by using different nonpolar to polar solvent to extract out active principles according to their solubility. In this procedure, mainly pure solvents are used in case of mixed solvents; the individual components get distilled at different temperatures thus the drug gets enriched in the solvent containing the lowest boiling point. In this process apparatus used is called the Soxhlet apparatus. It consists of a central compartment with a siphoning device and a side arm both opening to a lower common tube connecting to the lower compartment consisting of the round bottom flask which is heated by a mantle. The upper compartment is the condenser which is connected to the central compartment. The three compartments are detachable from each other. An advantage of it is exhaustive, automatic and continuous, less time consuming process. But it is not suitable for thermo-labile substances like carotenoids (Mukherjee et al., 2002).

100 gm of air dried root powder of *Clerodendrum serratum* was placed in a Soxhlet apparatus (Perfit, India) and subjected to successive extraction using petroleum ether (40-60°C) and methanol. Subsequently, the extracts were filtered. The filtrate was evaporated using rotatory vacuum evaporator (Perfit, India).The extracts obtained after evaporation were stored in a desiccators. Petrolium ether 60-80 ^{0}C was used to remove fatty substances.

2.3 Pharmacological screening techniques for evaluation of Antiulcer Activity:

2.3.1 Animals used:

Wister rats weighing 150-240gm of either sex were obtained from Indian Vetenary Research Institute (IVRI), Bareilly. They were kept in the departmental animal house at 26 ± 2°C and relative humidity 30-35% in 12 hours light and 12 hours dark cycle respectively for 1 week before and during the experiments. Animals were provided with standard rodent pellet diet (procured from Ashirwad industries, Ropar) and water *adlibitum*. The experimental protocol to explore antiulcer potential of *Clerodendrum serratum* was approved by the Institutional Animal Ethical Committee (IAEC) 1279/ac/09/CPCSEA.

2.3.2 Drug and Chemicals Used:

Gift sample of Rabeprazole was obtained from Khandelwal lab, Rudrapur India. Petroleum ether, methanol, chloroform, ammonia, sulphuric acid, Fehling solution B, Sulphur, glacial accetic acid, butanol, fuming nitric acid, mercury and hydrochloric acid were purchased from Rankem, New Delhi, India. Resorcinol and pyridine were procured from Qualikems, Fine Chemicals Pvt. Ltd. New Delhi, India. Gelatin powder, Topfer's reagent and accetate were purchased from the Central Drug House, New Delhi, India. Sodium nitroprusside and Iodine were procured from E-Merck, Mumbai, India. Zinc dust, magnesium turnings, fehling solution A, potassium iodide, α-nepthol, phenophthalein and ferric chloride were purchased from Qualigens, Fine chemicals, and Glaxo India Ltd. Mumbai, India. Bismuth carbonate was procured from S.D.

2.3.3 Pylorus ligation induced gastric ulceration:

Wistar rats were fasted for 36 hours before the study but had free acess to water. The standardized methanolic extract of *Clerodendrum serratum* were orally administered as aqueous solution, in the doses of 50, 100 and 200 mg/kg, *p.o*. treatment. Rabeprazole (20mg/kg, *p.o*) was used as the standard. Control rats were treated with the distilled water. After one hours of drug treatment, animals were anaesthetized with ether anesthesia; the abdomen was opened by a small mid line incision below the xiphoid process. The stomach was replaced carefully and pyloric portion of the stomach was ligated. The abdomin was closed by suture. Rats were sacrified by an overdose of ether anesthesia after four hours of pylorus ligation.The stomach were opened along the greater curvature, rinsed with saline to remove gastric contents and blood clots and examined by a×5 magnifier lens to assess the formation of ulcers (Archana and Sachin., 2009). The numbers of ulcer were counted by using below mentioned grade as per intensity of ulcer in antrum portion of ulcer.

0 = Normal coloured stomach
0.5 = Red colourations
1 = Spot ulcers
2 = Deep ulcers
3 = Perforated ulcers

Ulcer index was measured by using following formula (Vogel et al, 2008)

$$\mathbf{U_1 = U_N + U_S + U_P \times 10^{-1}}$$

Where-

U_1 = Ulcer index
U_N = Average number of Ulcer per animal
U_S = Average number of severity score
U_P = Percentage of animal with Ulcer

Percentage inhibition of Ulceration was calculated as below:

% Inhibition of Ulceration = (Ulcer index $_{Control}$- Ulcer index $_{Test}$) ×100/ Ulcer index$_{Control}$

The gastric content was centrifuged at 2000 rpm for 10 minutes and volume supernatant was measured (Archana and Sachin., 2009). An aliquot of 1ml of gastric juice was diluted with the 1ml of distilled water and pH of the solution was measured using digital pH meter. For total acidity an aliquot of 1ml of gastric juice was diluted with the 1ml of distilled water contained in to 50 ml of conical flask, two drops of phenolphthalein indicator was added to it and titrated with 0.01 N NaOH until a permanent

pink color was observed (Archana and Sachin., The volume of 0.01 N NaOH consumed was noted. The total acidity is expressed as meq/l by the following formula-

Total acidity= n×36.45×1000

Where n is volume of NaOH consumed, 36.45 is molecular weight of NaOH, and 1000 is the factor (to be represented in litre).

For free acidity, instead of phenolphthalein indicator, the Topfer's reagents are used. An aliquot of 1ml of gastric juice was titrated with 0.01 N NaOH until a canary yellow colour was observed. The volume of 0.01 N NaOH consumed was noted. The free acidity was calculated by the same formula used for total acidity (Archana and Sachin., 2009).

2.3.4 Histopathological study:

From each group small pieces of stomach were embedded in paraffin wax. Section of 5µm thick were cut in a microtome and mounted on glass slides using standards techniques (Sairam pathology, Meerut). After staining the tissue with hematoxylin-eosin stain, the slides were viewed under a light microscope equipped for pathology (Kalashelavan et al., 2009).

2.4 Statistical Analysis:

All results were expressed as mean ±SEM and data was analysed using one way ANOVA followed by Post-hoc Dunnet test. $p \leq 0.05$ was considered to be statistically significant.

3.0 Result and Discussions:

Successive extraction was carried out on the roots of *Clerodendrum serratum*. Percentage yield of successive extraction were found as 1.65 and 44.27 for petroleum ether and methanol solvent respectively. The results so obtained were shown in **table 1.**

Table 1: Percent yield of the powderd root extract of *Clerodendrum serratum*

Solvent	Extraction period (hrs)	Colour	Weight	Average % yield
Petroleum ether (60-80° C)	32	Dark greenish	i- 1.2 gm ii- 1.1 gm iii- 2.6 gm	1.65
Methanol	32	Light brownish	i- 39.4 gm ii- 52.8 gm iii- 40.5 gm	44.27

The phytoconstituents were identified by chemical tests, which showed the presence of various phytoconstituents such as carbohydrates, tannins, terpenoids in methanolic roots extract of *Clerodendrum serratum*.

Effect of distilled water in pylorus ligation induced ulcer:

The distilled water at a dose 10 ml/kg, p.o was administered one hour before ligation of pylorus end of rat stomach in control group. The pylorus ligation has caused the accumulation of gastric secretion 2.4 ml. but pH 3.4 in control group shown in figures1 and 2. The total acidity and free acidity of gastric secretions were found to be 4891.5 and 3359.7 meq./l respectively shown in figures 3 and 4.The ulcer score, number of ulcer and ulcer index were found to be 2.3 , 5.664 and 18 respectively shown in figures 5, 6 and 7.

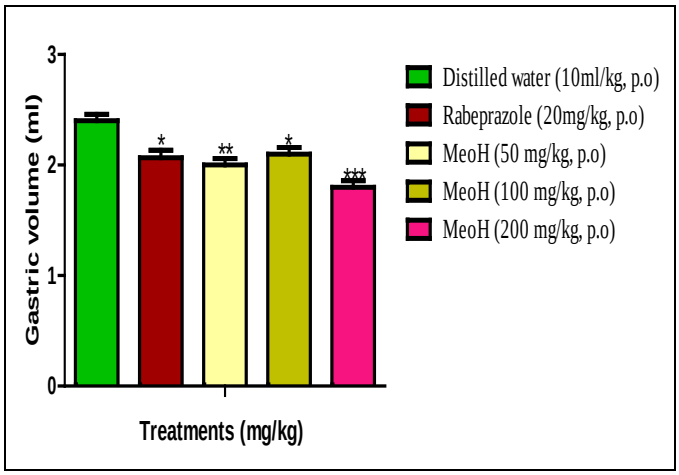

Figure 1: Effect of methanolic root extract of *Clerodendrum serratum* on gastric volume in pylorus ligation induced ulcer

(The distilled water (10 ml/kg, p.o), Rabeprazole, a standard drug (20mg/kg, p.o) and methanolic root extract of *Clerodendrum serratum* (50, 100 and 200mg/kg, p.o) were respectively administered one hour before ligation of pylorus end of rat stomach in control, standard and extract treated groups. *p<0.05, **p<0.01 and*** p≤ 0.001 were considerd to be significantly different in comparison with control group).

Effect of Rabeprazole in pylorus ligation induced ulcer:

The Rabiprazole at a dose (20 mg/kg, p.o), was administered one hour before ligation of pylorus end of rat stosmach in standard group. Pretreatment with the Rabiprazole, significantly (p<0.05) reduced the volume of gastric secretions 2.1ml as compared to control group shown in fig 1. The pH of gastric fluid was significantly (p<0.01) elevated up to 6.23 as compared to control group shown in fig 2.In addition, total acidity free acidity ulcer score, number of ulcer and ulcer index were also reduced significantly (p<0.01) as compared to control group shown in figures 3, 4, 5, 6 and 7.

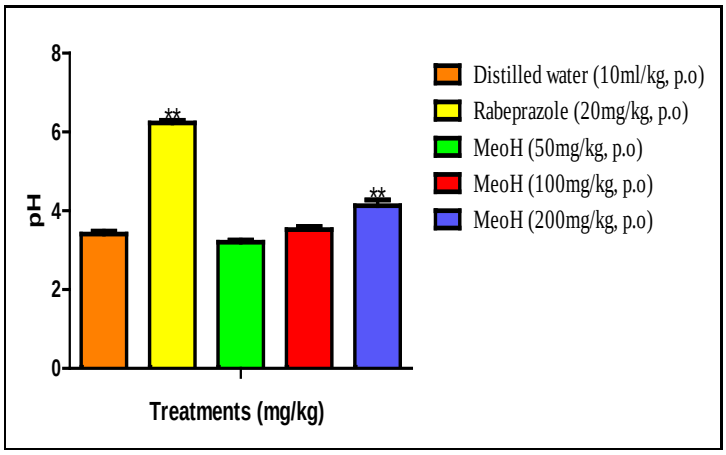

Figure 2: Effect of methanolic root extract of *Clerodendrum serratum* on pH in pylorus ligation induced ulcer

(The distilled water (10 ml/kg, p.o), Rabeprazole, a standard drug (20mg/kg, p.o) and methanolic root extract of *Clerodendrum serratum* (50, 100 and 200mg/kg, p.o) were respectively administered one hour before ligation of pylorus end of rat stomach in control, standard and extract treated groups. **p<0.01was considered to be significantly different in comparison with control group).

Effect of Methanolic roots extract of *Clerodendrum serratum* in pylorus ligation induced ulcer:

The pretreatment with root extract of *Clerodendrum serratum* at a dose (50,100 and 200mg/kg, p.o) one hour before ligation of pylorus end of rat stomach significantly (p <0.01) reduced the volume of gastric secretions 2.0, 2.1 and 1.8 ml as compared to control group shown in figure 1. pH of the gastric fluid was significantly (p<0.01) elevated up to 4.13 only at higher dose as compared to control group shown in figure 2. The total acidity and free acidity were also reduced significantly (p<0.01) respectively in a dose dependent manner as compared to control group shown in figures 3 and 4. The extract of *Clerodendrum serratum* at 100 and 200mg/kg, p.o among three doses shows significant (p<0.01) reduction in the number of ulcer, ulcer score and ulcer index shown in figures 5, 6 and 7.

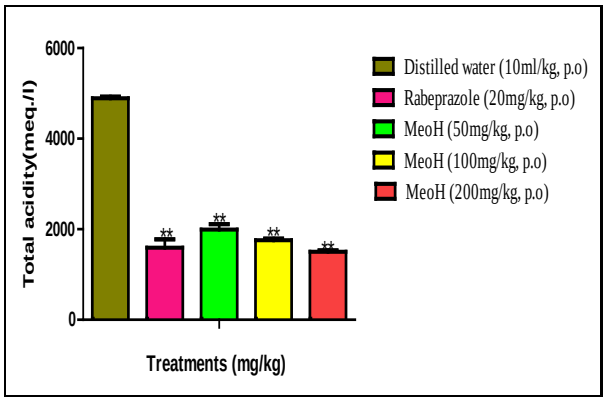

Figure 3: Effect of methanolic root extract of *Clerodendrum serratum* on total acidity in pylorus ligation induced ulcer

(The distilled water at a dose (10 ml/kg, p.o), Rabeprazole, a standard drug (20 mg/kg, p.o) and methanolic root extract of *Clerodendrum serratum* (50, 100 and 200 mg/kg, p.o) were respectively administered one hour before ligation of pylorus end of rat stomach in control, standard and extract treated groups. **p<0.01 was considered to be significantly different in comparison with control group).

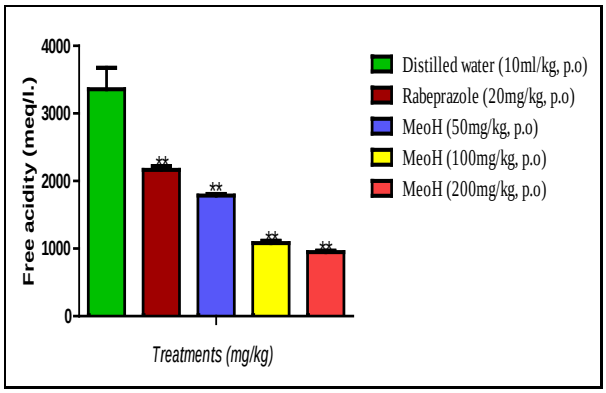

Figure 4: Effect of methanolic root extract of *Clerodendrum serratum* on free acidity in pylorus ligation induced ulcer

(The distilled water (10 ml/kg, p.o), Rabeprazole, a standard drug (20 mg/kg. p.o) and methanolic root extract of *Clerodendrum serratum* (50, 100 and 200 mg/kg, p.o) were respectively administered one hour before ligation of pylorus end of rat stomach in control, standard and extract treated groups. **p<0.01 was considered to be significantly different in comparison with control group).

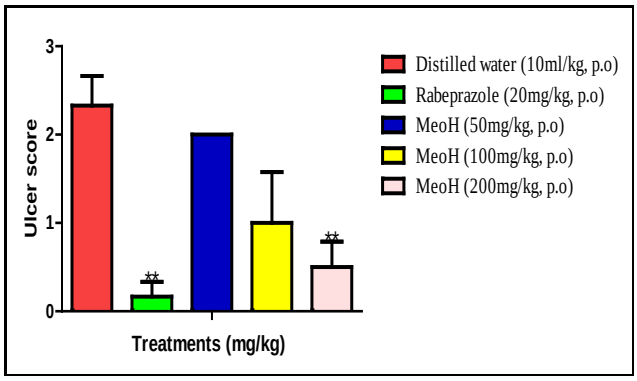

Figure 5: Effect methanolic root extract of *Clerodendrum serratum* on Ulcer score in pylorus ligation induced ulcer

(The distilled water (10 ml/kg, p.o), Rabeprazole, a standard drug (20 mg/kg, p.o) and methanolic root extract of *Clerodendrum serratum* (50, 100 and 200 mg/kg, p.o) were respectively administered one hour before ligation of pylorus end of rat stomach in control, standard and extract treated groups. **p<0.01 was considered to be significantly different in comparison with control group).

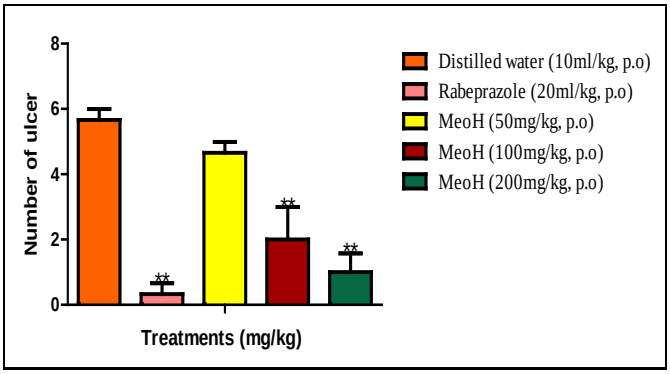

Figure 6: Effect of methanolic root extract of *Clerodendrum serratum* on number of ulcer in pylorus ligation induced ulcer

(The distilled water (10 ml/kg, p.o), Rabeprazole, a standard drug (20 mg/kg, p.o) and methanolic root extract of *Clerodendrum serratum* (50, 100 and 200 mg/kg, p.o) were respectively administered one hour before ligation of pylorus end of rat stomach in control, standard and extract treated groups. **p<0.01 was considered to be significantly different in comparison with control group).

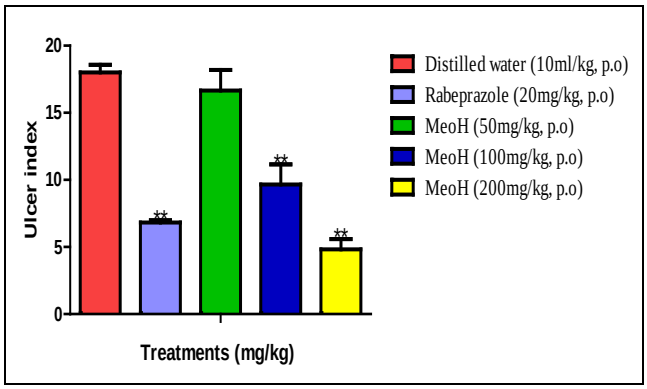

Figure 7: Effect of methanolic root extract of *Clerodendrum serratum* on Ulcer index in pylorus ligation induced ulcer

(The distilled water (10 ml/kg, p.o), Rabeprazole, a standard drug (20 mg/kg, p.o) and methanolic root extract of *Clerodendrum serratum* (50, 100 and 200 mg/kg, p.o) were respectively administered one hour before ligation of pylorus end of rat stomach in control, standard and extract treated groups. ** p<0.01 was considered to be significantly different in comparison with control group).

The present study was carried out to investigate antiulcer activity of methanolic extract of *Clerodendrum serratum* roots in pylorus ligatated and alcohol induced ulceration in the wistar rats. Pylorus ligation induced ulcer is one of the most widely used methods for studying the effect of drug on gastric secretion. Effect of distilled water in pylorus ligation has caused the accumulation of gastric sectretion and decreased the pH. The total acidity, free acidity, ulcer score, number of ulcer and ulcer index of gastric secretions were increased (Souccar et al., 2008), (Sachin et al., 2009), (Sanmugapriya et al., 2007). Similar studies support our results. Rabeprazole and roots extract of *Clerodendrum serratum* significantly decreased the gastric volume, total acidity, free acidity, ulcer score, number of ulcer and ulcer index and raise the pH. Similar studies support our results.

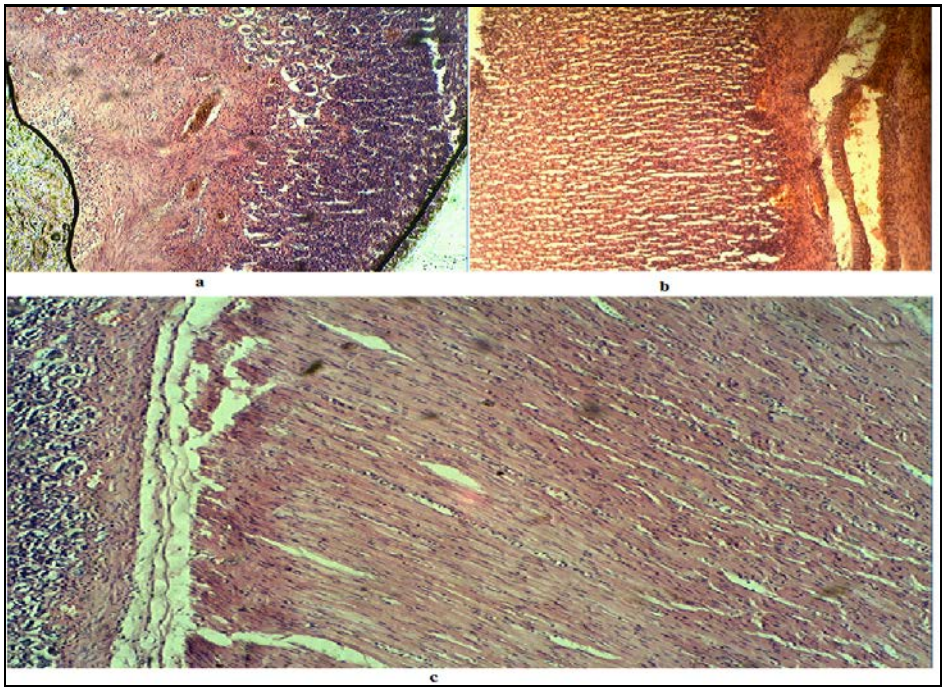

Figure 8: Histopathological section of stomach mucosa in wistar rat using pylorus ligation induced ulcer (a, b and c), [(a)

Transverse section of stomach mucosa of animals treated with distilled water 10 ml/kg, p.o shows hemorrhage and discontinuity in the lining epithelium hyperplastic mucosal glands, **(b**) Transverse section of stomach mucosa of animals treated with Rabeprazole standard drug (20 mg/kg, p.o)– No ulcer formation, mild hyperplastic mucosa without any edema formation, **(c)** Transverse section of stomach mucosa of animals treated with methanolic roots extract of *Clerodendrum serratum* 200 mg/kg, p.o – No ulcer formation, small atrophic glands, thick muscularis and edematous sub-mucosa with inflammatory infiltrate].

Histopathological section of stomach mucosa in wistar rat using pylorus ligation induced ulcer are given in figure 8. Methanolic root extract of *Clerodendrum serratum* at a dose of 100 and 200mg/kg. p.o showed significant inhibition of ulcerative lesion by 46.33% and 54.66%, respectively, as compared to the control value. The methanol root extract of the plant possess significant antiulcer properties in a dose dependent manner. The antiulcer activity exhibited by the extract are probably responsible for the synthesis of mucus, phospholipid, bicarbonate and prostaglandins as well as reduced acid and pepsin outputs, consequently promoting the inhibition of gastric-acid secretion (Toma et al., 2005). Pylorus ligation induced ulcers are due to autodigestion of gastric mucosa and breakdown of the gastric mucosal barrier. These factors are associated with the development of upper gastrointestinal damage including lesions, ulcers and life threatening perforation and hemorrhage. Prostaglandin E_2 and I_2 are predominantly synthesized by the gastric mucosa and are known to inhibit the secretion of gastric acid and stimulate the secretion of mucus and bicarbonate. Hydrophobic surfactant-like phospholipids secretion in the gastric epithelial cells is also stimulated by the prostaglandin (Sachin et al., 2009)

The phytoconstituents were identified by chemical tests, which showed the presence of various phytoconstituents (carbohydrate, tannin, terpenoid) in methanolic roots extract of *Clerodendrum serratum*. Amongst these secondary compounds triterpenoids are referred as antiulcer activity (Roldao et al., 2008*)* Tannins are one of most important botanical compounds with anti-ulcer and gastroprotective activities (Wahida et al., 2007). Antioxidant effects of methanolic extract roots of *Clerodendrum serratum* (CSR) at various concentrations in the DPPH radical scavenging assay FRAP assay (ferric reducing antioxidant power) and the hydrogen peroxide radical scavenging assay (Bhujbal et al., 2009). Antioxidants are known to inhibit lipid peroxidation and scavenge free radicals (Sannomiya et al., 2005). The protection from ulcer produced by the extract likely suggests the ability of extracts to enhance cytoprotective mechanism and inhibhit reactive species mediated lesion in mucosa. Antiulcer activity of methenolic root extract of *Clerodendrum serratum* is attributed cytoprotective and antioxidant mechanism and presence of tannins and triterpenoids which may improve.

4.0 CONCLUSIONS:

Pylorus ligation induced ulcer is due to autodigestion of gastric mucosa and breakdown of the gastric mucosal barrier. These factors are associated with the development of upper gastrointestinal damage including lesions, ulcers and life threatening perforation and hemorrhage. In pylorus ligation induced ulcer model, various parameters like gastric volume, pH, total acidity, free acidity and ulcer index and percentage inhibition of ulceration were studied. Rabeprazole at 20mg/kg, p.o was used as the standard drug. Pretreatment of methanol root extract of *C. serratum* in a dose dependent manner showed significant ($p \leq 0.001$) decrease in the gastric volume, total acidity and free acidity of the gastric secretion but increased the pH of the gastric secreation only at higher dose, 200mg/kg, p.o. It showed also significant ($p \leq 0.01$) decrease in number of ulcers, ulcer score and ulcer index in pylorus ligation ulcer. The methanol extract of *Clerodendrum serratum* roots possess significant antiulcer property in a dose dependent manner by improving gastric mucosal defence mechanism.

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