International Journal of Biomedical and Advance Research
ISSN: 2229-3809 (Online); 2455-0558 (Print)
Journal DOI: https://doi.org/10.7439/ijbar
CODEN: IJBABN

Original Research Article

Ulcer protective activity of ethanolic extract of *Baccaurea ramiflora* and *Microcos paniculata* on experimental animals

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***Article History:**
Received: 24/11/2017
Revised: 30/11/2017
Accepted: 30/11/2017
DOI: https://doi.org/10.7439/ijbar.v8i11.4517

Abstract

The current study was planned to evaluate the ulcer protective activity of the leaves of *Baccaurea ramiflora* and *Microcos paniculata*. Dried and crushed leaves of *Baccaurea ramiflora* and *Microcos paniculata* were defatted with petroleum ether and then extracted with alcohol. The alcoholic extract at the doses of 100 mg/kg and 200 mg/kg body weight was subjected to evaluation of ulcer protective activities in experimental animal models. The reduction in ulcer index dose dependently in hard liquor induced ulcer and in pylorus ligation induced ulcer, by 100 and 200mg/kg body weight doses respectively by the extracts proving its anti-ulcer activity.

Keywords: *Baccaurea ramiflora, Microcos paniculata,* Pylorus ligation.

1. Introduction

Peptic ulcer is worldwide problem and its prevalence is quite high in India. Several field studies from different part of our country suggest its occurrence in 3-10 per thousand populations. Peptic ulcer is a condition where benign lesions of gastric or duodenal mucous occur at a site where the mucosal epithelium is exposed to acid and pepsin. Gastric ulcers are caused due to imbalance between offensive factors like acid, pepsin, *Helicobacter pylori* and defensive factors like bicarbonate secretion, prostaglandins, gastric mucus, innate resistance of the gastric mucosa.[1] The major factors that disrupt the equilibrium between aggressive factors and defensive factors are *Helicobacter pylori,* acid–pepsin hyper secretion, non-steroidal anti-inflammatory drugs, sometimes idiopathic due to usage of tobacco, psychological stress, rapid gastric emptying and Zollinger-Ellisson syndrome where there is a high and uncontrollable production of acid also leads to ulcer formation. [2] Synthetic drugs such as proton pump inhibitors, H_2 receptors, cytoprotectants, demulcents, anti cholinergics, antacids and prostaglandin analogues are used for the treatment of ulceration but these drugs produce several side effects.

So herbal medicines are considered as better alternatives for the treatment of peptic ulcer. For example, proton pump inhibitors (omeprazole, lansoprazole) may cause nausea, abdominal pain, constipation, diarrhoea and H_2 receptor antagonists (cimetidine) may cause gynaecomastia, loss of libido. Due to the occurrence of many side effects by use of synthetic drugs for many diseases, medicinal plants are considered as the main source of new drugs as they have less or no side effects. As herbal medicines are considered as safe for the treatment of ulcers with lesser adverse effects, economical, effective, relatively less toxic, extensive research is carried out in search for potent antiulcer agents of plant origin. [3]

In the present study we have selected two plants namely *Baccaurea ramiflora* and *Microcos paniculata* belongs to the family Euphorbiaceae. These plants used by the tribes and native medical practitioners to treat various ailments including skin diseases, antiphlogistic and anodyne against rheumatoid arthritis, cellulitis, abscesses to treat injuries, flavoring agent, constipation, indigestion, eczema, itch, small-pox, typhoid fever, dysentery, jaundice and syphilitic ulceration of the mouth.[4,5] From the literature survey, *Baccaurea ramiflora* and *Microcos paniculata* possess anti-tumour, anti-tubercular, protective effect, hepatoprotective and anti-oxidant activity. Hence an effort was made to investigate the anti-ulcer activity of ethanolic leaf extracts of *Baccaurea ramiflora* and *Microcos paniculata.*

2. Materials and methods

2.1 Collection of plant materials

The leaves of *Baccaurea ramiflora* and *Microcos paniculata* belonging to family Euphorbiaceae were collected from local market of Belonia, Tripura, India during May – July and authenticated (ID No. Is BOT/HEB/AC23072011 and BOT/HEB/AC23072512) by Dr. B. K. Datta, Professor of Botany, Plant Taxonomy and Biodiversity Laboratory, Department of Botany, Tripura, India.

2.2 Preparation of Extracts

After collection of the plants, the leaves of both the plants were rinsed thoroughly in tap water and dried in shade for about 20 days under controlled temperature (25 ± 2°C). Then the crude material was powdered, passed through a 40 mesh sieve and stored in a well closed container for further usage. Coarsely powdered and dried leaves were successively soxhlated using petroleum ether, chloroform, ethanol and water for 72h. The extracts were filtered and the solvents were evaporated to dryness under reduced pressure in a rotary evaporator at 40 °C to 45 °C. A brown residue was recovered from flask with 12% yield of ethanol extract.

2.3 Animals

Wistar rats (150–250 gm) and Swiss albino mice (20–25 gm) of either sex, brought from Sainath Agencies, Hyderabad, Telangana, India. The rats were acclimatized to the laboratory conditions for a week before the start of the experiments; they were maintained as per the Institutional ethical committee (IAEC) norms. Animals were housed at standard conditions of temperature (22 ± 1°C) and 12/12 h light/dark cycle. They were fed with standard pellet diet and had free access to water. Six animals are used in each group. Permission for conduct of these experiments were obtained from, Institutional Animal Ethics Committee (IAEC) Regd. No. 1662/PO/Re/S/12/CPCSEA.

2.4 Pharmacological Evaluation

Determination of antiulcer activity carried out by two models such as ethanol induced ulcer and pyloric ligation method.

2.4.1 Ethanol induced ulcer [6, 7]

Albino wistar rats of either sex weighing between (150-200 gms) were divided into seven groups of six animals each:

Group A: Normal Control (Distilled water)
Group B: Toxic control (alcohol 1ml/200gm)
Group C: Standard (Lansoprazole 8 mg/Kg)
Group D: Rats orally received ethanolic extract *Baccaurea ramiflora* (EEBR1) (100 mg/kg b. wt / day)
Group E: Rats orally received ethanolic extract of *Baccaurea ramiflora* (EEBR2) (200 mg/kg b. wt / day)
Group F: Rats orally received ethanolic extract of *Microcos paniculata* (EEMP1) (100 mg/kg b. wt / day)
Group G: Rats orally received ethanolic extract of *Microcos paniculata* (EEMP2) (200 mg/kg b. wt / day)

The incidence of ethanol-induced ulcers is predominant in the glandular part of stomach and reported to stimulate the formation of leukotrienes C (LTC), mast cell secretary products and reactive oxygen species resulting in the damage of rat gastric mucosa. Administration of the extracts or standard was done. After 1 h the Absolute alcohol was administered at the dose of 1ml/200g. After 1 h of administration of ethanol animals were sacrificed, the stomach was removed and opened along the greater curvature. Lesions were examined under an illuminated magnifier.

2.4.2 Pyloric ligation method [8]

Albino rats of either sex weighing 150-200 gms were selected, they were maintained on standard diet and water. The animals were divided into seven groups each having six animals as in ethanol induced models. In this method albino rats were fasted for 24hours. Distilled water, standard drug, various doses of extracts was administered 30 min. prior to pyloric ligation. Under light ether anesthesia, gave an incision of 1cm long in the abdomen just below the sternum. Exposed the stomach pass a thread around the pyloric sphincter and applied a tight knot while putting the knot care was taken so that no blood vessels are tied along the knot abdomen was sutured and cleaned from any blood spot . Abdomen was sutured and cleaned from any blood spot. Animals were allowed to recover and stabilize in individual cages and were deprived of water during postoperative period. 4 h after ligation all the animals were sacrificed with excess of anesthetic ether and the stomach were dissected out. The various parameters like Vol. of Gastric Juice, Free Acidity, Total Acidity and pH of gastric content were measured**.** Ulcer scores were observed under magnifying lance.

3. Result and discussion

The reduction in ulcer index dose dependently in hard liquor induced ulcer (Table 1 & Figure 1 & 2) and in pylorus ligation induced ulcer (Table 2 & Figure 3-7) by 100 and 200mg/kg body weight of both the extracts of different plants. In case of pylorus ligation induced ulcer there is decrees in vol. of gastric juice, free acidity, total acidity and increases in pH of gastric content by both the extracts. The result of ulcer protective activity can also observed by the open stomach (Figure 8 & 9). The phytochemical studies reveal the presence of flavonoids and polyphenolic compound in the both plant extracts [9]. These polyphenolic compounds are responsible for ulcer protective activity.

Table 1: Antiulcer activities of EEBR and EEMP in Alcohol induced ulcer

Group	Dose	Ulcer index	% protection
Normal control		.303±0.035	--
Alcohol	1ml/200gm	3.58±0.07	--
Lansoprazole	8mg/kg	1.66±0.11***	53.63
EEBR1	100mg/kg	1.78±0.18***	50.27
EEBR2	200mg/kg	1.69±0.19***	52.79
EEMP1	100mg/kg	2.03±0.21***	43.29
EEMP2	200mg/kg	1.92±0.17***	46.36

Figure 1: Ulcer Index of EEBR and EEMP in Alcohol induced ulcer

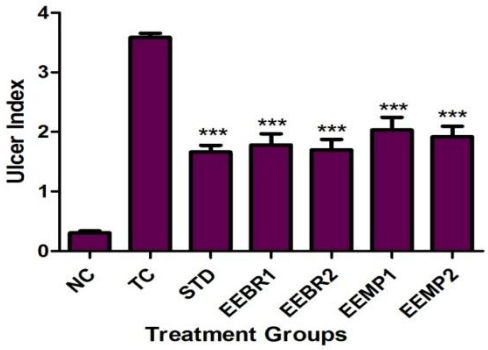


Figure 2: Percent protection of EEBR and EEMP in Alcohol induced ulcer

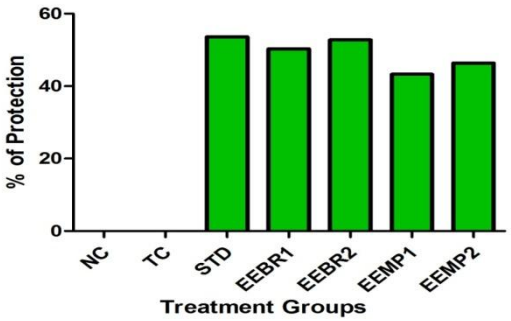


Table 2: Antiulcer Activities of EEBR and EEMP in Pylorus Ligated ulcer

Group	Dose	Ulcer score (I-1)	pH (I-2)	Gastric volume (I-3)	Free acidity (I-4)	Total acidity (I-5)
Normal control		0.27±0.022	3.628±0.10	0.594±0.077	50.95±2.88	56.07±3.40
Toxic control		3.46±0.03	2.635±0.19	5.272±0.127	87.48±2.66	105.2±5.74
Lansoprazole	8mg/kg	1.27±0.11***	3.376±0.24***	1.726±0.050***	36.33±1.69***	57.18±2.48***
EEBR1	100mg/kg	1.52±0.076***	4.586±0.21***	3.179±0.0335***	51.93±1.91***	66.48±2.58***
EEBR2	200mg/kg	1.40±0.15***	5.808±0.14***	2.308±0.053***	49.49±2.55***	61.17±2.85***
EEMP1	100mg/kg	1.73±0.12***	4.190±0.23***	4.358±0.052***	54.08±2.60***	70.14±5.35***
EEMP2	200mg/kg	1.54±0.073***	4.613±0.18***	3.216±0.0611***	51.23±2.79***	65.65±5.16***

Figure 3: pH of EEBR and EEMP in Pylorus Ligated ulcer

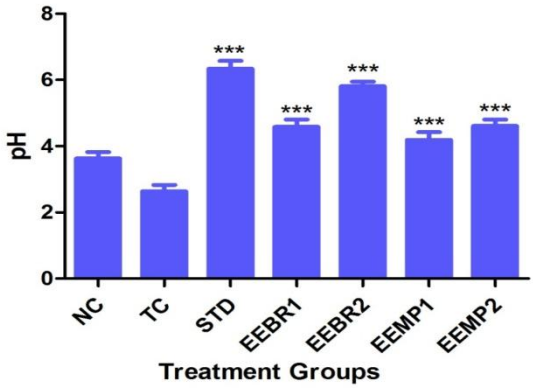


Figure 4: Ulcer Index of EEBR and EEMP in Pylorus Ligated ulcer

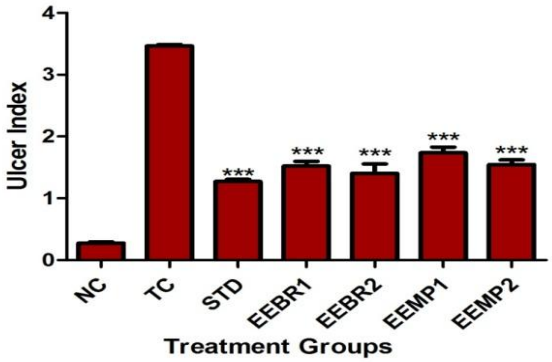


Figure 5: Free acidity of EEBR and EEMP in Pylorus Ligated ulcer

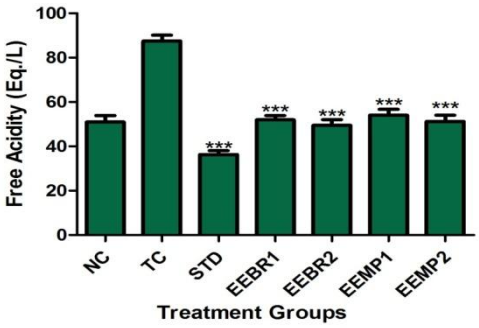


Figure 6: Volume of gastric juice of EEBR and EEMP in Pylorus Ligated ulcer

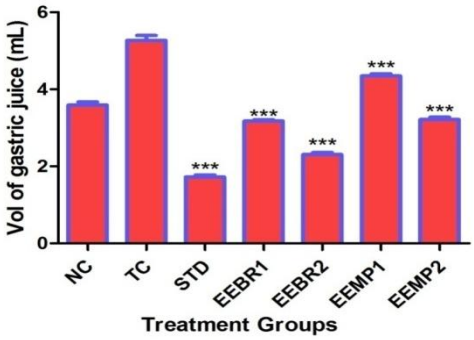


Figure 7: Total acidity of EEBR and EEMP in Pylorus Ligated ulcer

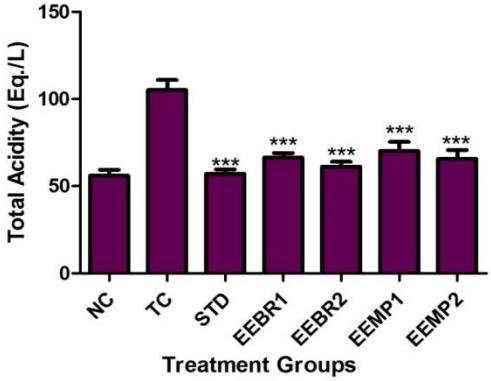
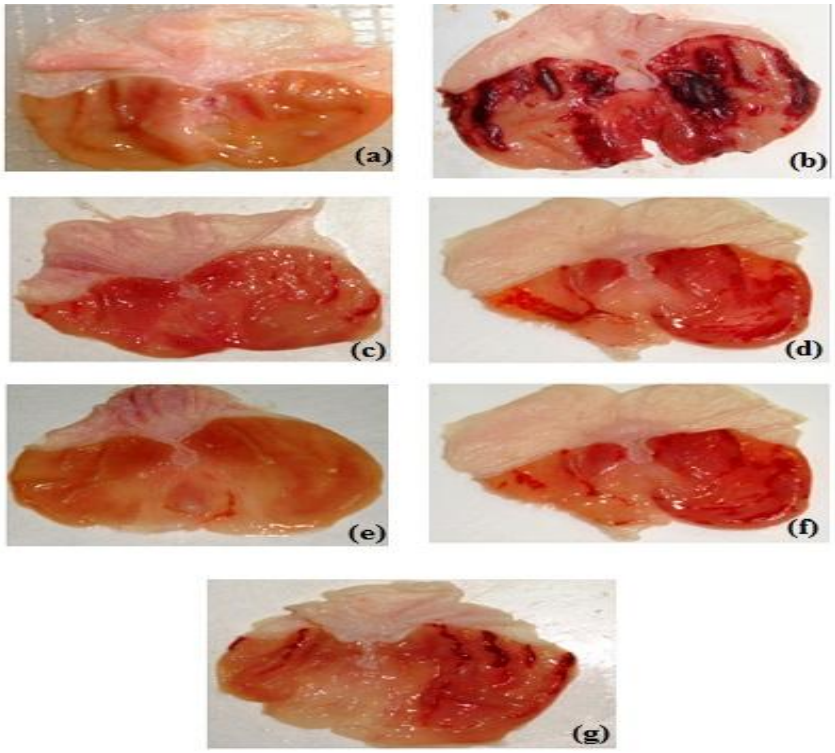
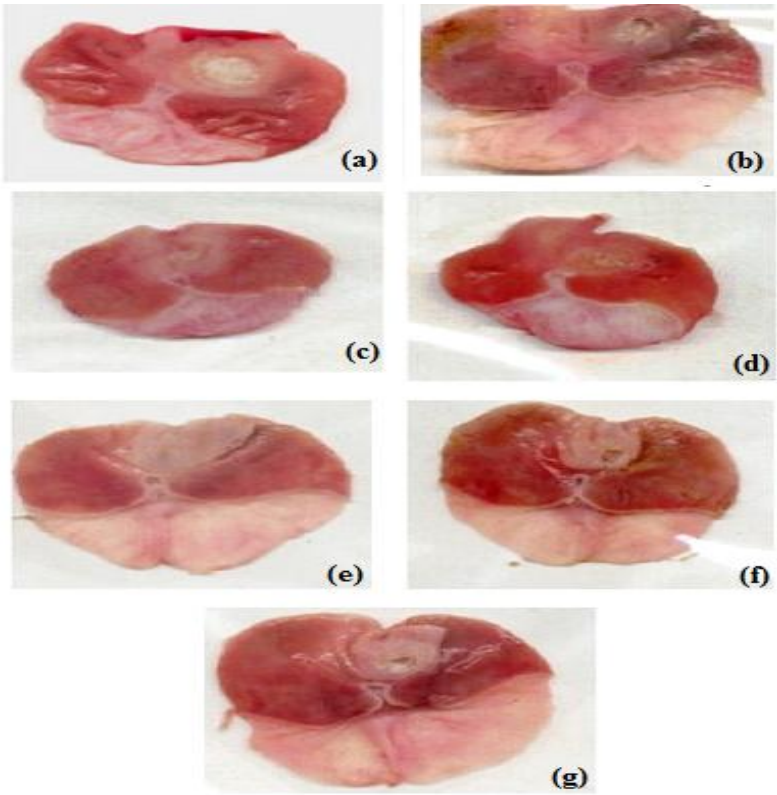


Figure 8: Photographs of open stomach of alcohol induced gastric ulcer



(a) Normal control (b) Alcohol 1ml/200gm (c) Lansoprazole 8mg/kg (d) EEBR 100mg/kg (e) EEBR 200 mg/kg (f) EEMP 100mg/kg (g) EEMP 200mg/kg

Figure 9: Photographs of open stomach of Pylorus ligation induced gastric ulcer



(a) Normal control (b) Toxic control (c) Lansoprazole 8mg/kg (d) EEBR 100mg/kg (e) EEBR 200 mg/kg (f) EEMP 100mg/kg (g) EEMP 200mg/kg

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