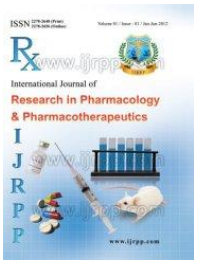
International Journal of Research in Pharmacology & Pharmacotherapeutics



ISSN Print: 2278-2648 ***IJRPP |Vol.4 | Issue 4 | Oct – Dec - 2015***
ISSN Online: 2278-2656 ***Journal Home page: www.ijrpp.com***

Research Article ***Open Access***

Ulcer Protective Activities of Bark of *Artocarpus Heterophyllus* Lam

Chiranjib Bhattacharjee*[1], Amitsankar Dutta[2]

[1]*Dept of Pharmacology, Srikrupa Institute of Pharmaceutical Sciences, VilI. Velkatta, Kondapak, Dist. Medak, Siddipet. Telengana –502277, India*

[2]*BCDA College of Pharmacy & Technology Campus-2. 52/C/10 Ghoshpara road, Udayrajpur, Madhyamgram, Kolkata-700129*

***Corresponding Author: Chiranjib Bhattacharjee**

Email: chiranjibcology@gmail.com

ABSTRACT

Artocarpus heterophyllus Lam commonly known as jack fruit widely distributed in north east India, West Bengal and south Karnataka. *Artocarpus heterophyllus* containing polyphenolic compound like flavonoids and tannins and these components are known to possess anti-oxidant properties. In addition there are reports that, free radicals are involved in causation of ulcers. In the present studies the effect of methanolic and aqueous extracts of *Artocarpus heterophyllus* bark, were studied on hard liquor (90% ethanol), and Pylorus ligation induced ulcer in rats. 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 of *Artocarpus heterophyllus* proving its anti-ulcer activity.

KEYWORDS: *Artocarpus heterophyllus,* Ulcer protective, Pylorus ligation.

INTRODUCTION

The uses of herbs for treating the human aliments are not new. The primitive man started locking the surroundings for the remedies to his suffering. Therefore he has developed a rich knowledge about the therapeutic utility of herbs by experience. This traditional knowledge was developed empirically by trail and error. And this knowledge was transferred to next generation traditionally. In most of the cases the traditional rich knowledge was found to be correct and usage of particular herb for particular human aliments was justifiable. Peptic ulcer is one disease, which required treatment for chronic period. The usage of allopathic drugs for such a long time may results in adverse effect, adverse reaction, drug interactions etc. Therefore several traditionally used drugs are being verified for this purpose and are available in the market for the purpose Since the tribal native practitioner of Manipur claimed that the bark of *Artocarpus heterophyllus* are highly useful as antiulcer and we were in search for an alternative medicine for the treatment of ulcer, this claim has attracted our attention and selected the plant for present study On the basis of current literature survey[1,2] of the plant *Artocarpus heterophyllus* Lam, we are studying with methanolic and aqueous extract of *Artocarpus heterophyllus* Lam bark on their different ulcers models.

MATERIAL AND METHODS

PLANT MATERIAL

Barks of *Artocarpus heterophyllus* Lam were collected from the forest of Manipur. The plant was authenticated by Dr. Biseshwori Thongam, Scientist, Plant Taxonomy, Medicinal plants and

Horticultural resources division, IBSD, Dept. of biotechnology, Govt. of India, Imphal-795001, Manipur (IBSD/MPHRD/M/1008). The shade-dried bark were course powdered and this powder were packed in soxhlet column and extracted successively with petroleum ether, chloroform, methanol and aqueous. The extracts were concentrated under reduced pressure (bath temperature 50°C). The dried extracts were stored in air tight container in refrigerator below 10°C.

EXPERIMENTAL ANIMALS

Albino rats (150-200gms) and albino mice (20-30gm) of either sex were procured from Sri Venkateshwara enterprises, Bangalore. After procuring the animals were acclimatized for 10 day's under standard husbandry conditions as follows;

Room temperature - 27 ± 3°C
Relative humidity - 65 ± 10 %
12 hours light / dark cycle - The animals were fed with feed gold mohr, Lipton India Ltd., Bangalore and water was given ad libitum under strict hygienic conditions (IAE/SKIPS/ 2011/MAY15/I/12/RATS-96/MICE-36).

DETERMINATION OF ACUTE TOXICITY[3]

The acute toxicity for methanolic and aqueous extracts of bark of *Artocarpus heterophyllus* was determined in albino mice, maintained under standard conditions. The animals were fasted overnight prior to the experiment. Fixed dose (OCED Guideline No. 420) method of CPCSEA was adopted for toxicity studies. There were no sign of toxicity for first 48 hours and no animal died on 14 day of study at a dose of 2000 mg/Kg.

PHARMACOLOGICAL EVALUATION

Determination of antiulcer activity Carried out by 2 models, ethanol induced ulcer, and pyloric ligation method.

ETHANOL INDUCED ULCER[4,5]

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

Group A: Control (Distilled water)
Group B: Standard (Omeprazole 30mg/kg)
Group C: Methanolic extract (100 mg/kg)
Group D: Methanolic extract (200 mg/kg)
Group E: Aqueous extract (100 mg/kg)
Group F: Aqueous extract (200mg/kg)

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.

PYLORIC LIGATION METHOD[6]

Albino rats of either sex weighing 150-200 gms were selected, they were maintained on standard diet and water. The animals were divided into six 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.

RESULT AND DISCUSSION

The reduction in ulcer index dose dependently in hard liquor induced ulcer (table 1 & fig.no 1) and in pylorus ligation induced ulcer (table 2 & fig no 2) by 100 and 200mg/kg body weight both the extracts of *Artocarpus heterophyllus* bark. 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 phytochemical studies reveal the presence of flavonoids and polyphenolic compound in the bark extract[7,8]. These polyphenolic compounds are responsible for antioxidant

activity[9]. The plant also posses the anti oxidant activity[10] which may be responsible for anti ulcer activity.

Table No.1: Effect of aqueous and methanolic extract of Bark of *Artocarpus heterophyllus* Lam Ethanol induced ulcer in rats

Group No	Treatment	Ulcer index Mean ± SEM	% inhibition
I	Control	5.42 ±0.30	- -
II	Standard Lansoprazole (8mg/kg)	1.33 ± 0.21***	75.46
III	Bark methanolic extract(100mg/kg)	3.00 ± 0.18***	44.64
IV	Bark methanolic extract(200mg/kg)	2.08 ± 0.15***	61.62
V	Bark aqueous extract(100mg/kg)	3.33 ± 0.11***	38.56
VI	Bark aqueous extract(200mg/kg)	2.25. ± 0.11***	58.48

Values are the mean ± S.E.M., n=6. ***P <0.001, **P <0.01, *P <0.005 (vs. Control)

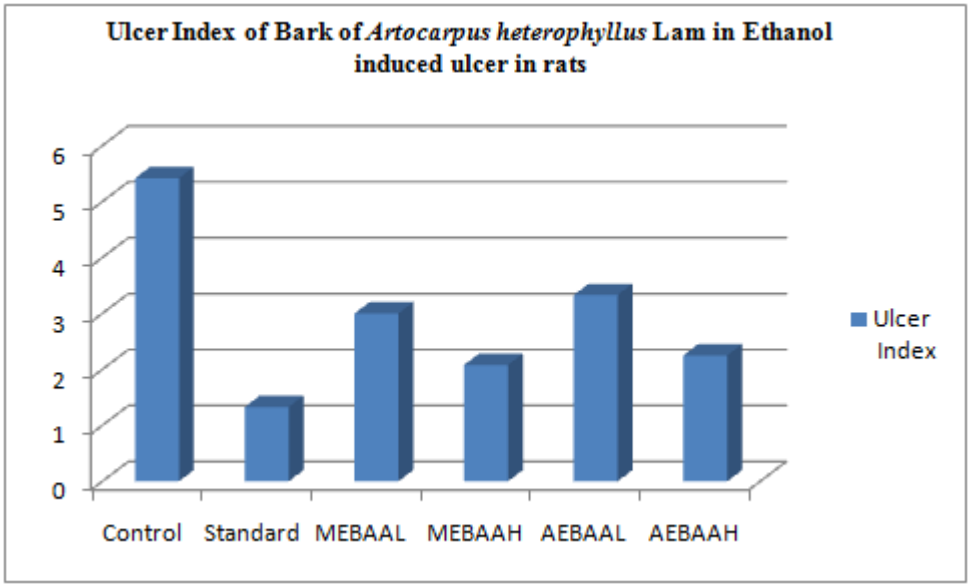


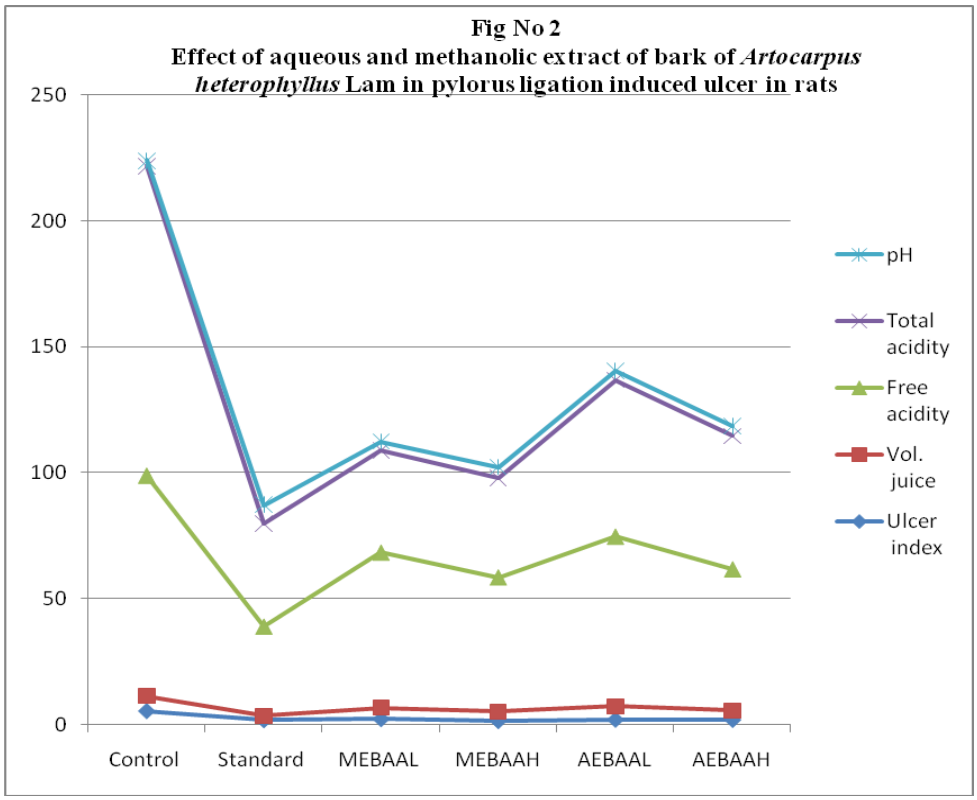
Fig No 1

MEBAAL: Methanolic Extract of Bark of *Artocarpus heterophyllus* (100mg/Kg)
MEBAAH: Methanolic Extract of Bark of *Artocarpus heterophyllus* (200mg/Kg)
AEBAAL: Aqueous Extract of Bark of *Artocarpus heterophyllus* (100mg/Kg)
AEBAAH: Aqueous Extract of Bark of *Artocarpus heterophyllus* (200mg/Kg)

Table No.2: Effect of aqueous and methanolic extract of bark of *Artocarpus heterophyllus* Lam in pylorus ligation induced ulcer in rats

Group No	Treatment	Ulcer index Mean ± SEM	Vol. of Gastric Juice (ml)	Free Acidity (Eq./L) 100 gm	Total Acidity (Eq./L) 100gm	pH
I	Control	5.5±2.09	5.9± 0.2	87.3± 2.1	123 ± 3.9	2.3 ± 0.1
II	Standard Lansoprazole (8mg/kg)	1.18± 0.19***	1.6± 0.12***	35.3 ± 1.9***	41 ± 2.1***	7.3 ± 0.04
III	Bark methanolic extract(100mg/kg)	2.3± 0.21***	4.38± 0.15**	61.5 ± 1.6***	40.6 ± 1.4***	3.5 ± 0.07***
IV	Bark methanolic extract(200mg/kg)	1.5± 0.13***	3.55± 0.12***	53.3 ± 2.2***	39.6 ± 1.1***	4.3 ± 0.11***
V	Bark aqueous extract(100mg/kg)	2.07± 0.21***	5.16± 0.32	67.3 ± 2.52***	62.3 ± 2.2***	3.5 ± 0.01***
VI	Bark aqueous extract(200mg/kg)	2.0± 0.18***	3.55± 0.12	56 ± 2.7***	53 ± 0.85***	3.9 ± 0.06***

Values are the mean ± S.E.M., n=6. ***P <0.001, **P <0.01, *P <0.005 (vs. Control)



MEBAAL: Methanolic Extract of Bark of *Artocarpus heterophyllus* (100mg/Kg)
MEBAAH: Methanolic Extract of Bark of *Artocarpus heterophyllus* (200mg/Kg)
AEBAAL: Aqueous Extract of Bark of *Artocarpus heterophyllus* (100mg/Kg)
AEBAAH: Aqueous Extract of Bark of *Artocarpus heterophyllus* (200mg/Kg)

REFERENCES

[1]. Vaidyaratnam PS. Indian medicinal plants a compendium of 500 species. Orient Longman Ltd, 1993(1): 208.
[2]. Asima Chatterjee, Satyesh Chandra Pakrashi. Vol 2. The treatise on Indian Medicinal Plants, New Delhi: Publications and Information Directorate, 1995 (1): 37.
[3]. Mrs. Prema Veeraraghavan. Expert consultant, CPCSEA, OECD guideline No. 420
[4]. Siddhartha Pal, Nag Chaudhuri AK. Studies on the anti-ulcer activity of *Bryophyllum pinnatum* leaf extract in experimental animals. J Ethnopharmacol 1991; 33: 97-102.
[5]. Akilandeswari S, Sivakami Sundari P, Ganapaty S. Anti-ulcer activity of *Elephantopus scaber* Linn. Ad Pharmacol Toxicol 2001; 2(2): 39-40.
[6]. Mahendran P, Sabitha KE, Shyamal Devi CS, Prevention of HCl-ehtanol induced gastric mucosal injury in rats by *Garcinia cambogia* extract and its possible mechanism of action. J Expl Biol 2002: 58-62.
[7]. Mei-Ing Chung, Chai-Ming Lu, Pao-Lin Huang, Chun-Nan Lin. Prenylflavonoids of *Artocarpus heterophyllus*. Phytochem 1995; 40(4): 1279-82.
[8]. Chai-Ming Lu, Chun-Nan Lin. Two 2',4',6'-trioxygenated flvonones from *Artocarpus heterophyllus*. Phytochem 1993; 33(4): 909-11.
[9]. Sannomiya M, Vitor B Fonseca, da Silva MA, Rocha LRM, dos Santos LC, Hiruma-Lima CA, et al. Flavonoids and antiulcerogenic activity from *Byrsonima crassa* leaves extracts. J Ethnopharmacol 2005; 97: 1-6.
[10]. Feng N Ko, Zhi J Cheng, Chun N Lin, Che M Teng. Scavenger and antioxidant properties of prenylflavones isolated from *Artocarpus heterophyllus*. Free Radl Biol Med. 1998; 25(2): 160-68.