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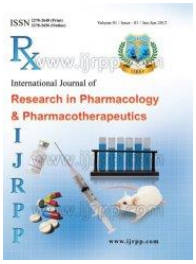

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# Gastroprotective activity of ethanolic bark extract of prunus persica against expreimentally induced gastric ulcer in rats

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## ABSTRACT

The aim of the study is to evaluate the gastroprotective activity of ethanolic bark extract of *Prunus persica* (EBPP) against NSAID plus pylorus ligation induced gastric damage in rats. 10 to 20% of world population trust medicinal herbs for treating the diseases as they believe to have less side effects. *Prunus persica* is a rich source for flavonoids and various parts of the plant are used as medicinal agents in traditional medicine. Ethanobotanical survey reveals the antiulcer property of *Prunus persica* bark. The rats were divided into four groups as control, reference control (Misoprostol), EBPP 200 and 400mg/kg with six rats in each group. Gastric lesions were induced by oral administration of indomethacin (20 mg/kg) followed by pylorus ligation. Standard group of animals were treated with misoprostol and test group of animals were treated with EBPP at doses of 200 and 400 mg/kg. Gastroprotective activity of extract was determined by mean Gastric volume, Ulcer index, Free acidity and Total acidity. Gastric volume, Ulcer index, Free Acidity and Total Acidity were significantly decreased by both the doses of EBPP as compared to control group. From the result it was concluded that, the ethanolic bark extract of *Prunus persica* showed gastroprotective activity in dose dependant manner against NSAID plus pylorus ligation induced gastric ulcer in rats.

**Keywords:** *Prunus persica*, Gastroprotective activity, Ulcer Index and Misoprotol.

## INTRODUCTION

Peptic ulcers occur due to an imbalance between gastroduodenal mucosal defense mechanisms and the damaging forces, particularly gastric acid and pepsin. Hyperacidity is not a prerequisite for duodenal ulcers. Failure of mucosal defenses against gastric acid and

pepsin results in ulceration [1]. The prevalence of Peptic ulcer is nowadays increasing among the population due to the unhealthy food habits of the people. Incidence is high among people who take NSAIDS, also high among smokers and alcoholic [2]. The recurrence rate is also high as 60% [3]. Although western drugs are effective, they produce adverse effects like $H_2$ blockers causes diarrhoea, dizziness, muscle pain and headache, which limit their usage. Both clinical and experimental studies have demonstrated that herbal. *Prunus persica* L. (Peach) named as *Amygdalus persica* is a perennial and deciduous tree of the subfamily Prunoideae of the family Rosaceae. The leaves are insecticidal, sedative, diuretic, demulcent, expectorant, vermicidal and are used in leucoderma, and in piles [4]. Leaf paste is used to kill worms in wounds, and fungal infections. The treatment of gastritis, whooping cough, and chronic bronchitis is carried out internally with leaves [5]. The bark is used in leprosy, and jaundice. Leaves of *Prunus persica* have been investigated for their antioxidant [6], and anti-inflammatory activities in the past [7]. *Prunus persica* screened for the treatment of Alzheimer's disease [8]. Fruits of *Prunus persica* reported for the hypoglycemic effect for the prevention of Type-2 diabetes [9]. *Prunus persica* seeds showed the good results in the treatment of the degenerative disorders, such as hypermenorrhea, and dysmenorrheal [10]. Studies have shown that *Prunus persica* is wealthy source for various active constituents, including flavonoids, phenolic compounds and tannins, which have medicinal uses because of their antioxidant. As the bark of *Prunus persica* believed to manage gastritis, the study is focused to evaluate the antiulcer activity of ethanolic bark extract of *Prunus persica* on various experimentally induced ulcer in rats.

## MATERIALS AND METHODS

### Plant Material

The bark of *Prunus persica* was collected from Ooty, in the month of September. The plant were identified as *Prunus persica* and authenticated by the botanist, Botanical Survey of India, Agricultural University, Coimbatore. The voucher specimen (BSI/SRC/11/72/2017-18/Sci/01284) had been deposited in the herbarium for future reference.

### Preparation of Extract

The collected barks were washed in running water to remove the adhering foreign matter and shade dried. The dried plant materials were coarsely powdered by mechanical blender. The coarse powder of *Prunus persica* bark was soaked in 70% ethanol for 24 h followed by cold maceration for further 48 h with occasional shaking. The mixture was filtered using muslin cloth followed by removal of excess of solvent by rotatory evaporator. The dried extract of *Prunus persica* bark was used for further pharmacological studies.

### Animals

Wistar albino rats of either sex weighing between 180 – 200 gms of 8 weeks were used in this study. The animals were obtained from animal house, Chengalpattu Medical College, Chengalpattu. On arrival, the animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of 24±2$^{o}$C and relative humidity of 30 – 70 %. A 12:12 light: day cycle was followed. All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/s. Hindustan Lever Ltd, Mumbai). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics Committee and were in accordance with the Institutional ethical guidelines.

### Gastric Lesions Induced by Indomethacin and Pylorus Ligation Model

Albino rats weighing 160-180 g. were selected and divided into four groups of six animals each. Animals were abstain for 24 hours before the study, but had free access to water. Group I treated as control, received 0.1% CMC; Group II and III treated as treatment groups, administered with EBPP at the dose of 200 mg/kg and 400 mg/kg respectively, and Group IV as standard group, received misoprostol 100 mcg/kg.

Gastric lesions were induced to all groups of rats by oral administration of Indomethacin (20 mg/kg suspension in 0.1% CMC) for three successive days followed by pylorus ligation under pentobarbitone (45 mg/kg i.p.) anaesthesia on 4th day [11]. The standard drug misoprostol (100 mcg/kg i.p.) was administered immediately after oral indomethacin administration for three successive days. In the same

manner, test compounds (EBPP dose 200 mg/kg and 400 mg/kg) were administered orally, after oral indomethacin administration for three successive days [12].

### Determination of Ulcer Index

The rats were sacrificed after four hours of pylorus ligation; abdomen was opened by making an incision. Gastric contents were collected for the determination of gastric volume, total acid output and the stomach was washed with water. Ulcer index was calculated with the help of ulcer score scale.

Normal stomach without any red colouration=0

- Red colouration=0.5
- 1 Ulcer spot=1
- Haemorrhagic streaks=1.5
- 3-5 ulcer spots=2
- More than 5 ulcer spots=3

Mean ulcer score for each group was calculated and recorded as Ulcer index [13]. **Determination of Total Gastric**

### Output

Gastric contents of all groups of rats were collected and centrifuged at 2000 rpm for five minutes. Supernatant clear fluid was pipetted out. 1 ml of this fluid was mixed with 9 ml of distilled water, titrated with 0.01 N sodium hydroxide and phenolphthalein being used as an indicator. Titre value was recorded at the end point (Pink to orange colour) which was expressed as free acid. Titration was continued till the reappearance of pink colour and the titre value was recorded again which was expressed as total acid [14].

### Statistical Analysis

Results were expressed as mean ± SEM. The data were analyzed by using one way analysis of variance (ANOVA) followed by Dunnett's *t* test. P values < 0.05 were considered as significant.

## RESULTS AND DISCUSSION

**Table 1. Effect of Ethanolic Bark Extract of *Prunus Persica* (EBPP) on Gastric Volume, Ulcer Index, Free Acidity and Total Acidity in NSAID Plus Pylorus Ligation Induced Ulcer in Rats**

| Drug Treatment | Gastric Volume (ml) | Ulcer Index | % Protection | Free Acidity | Total Acidity |
|---|---|---|---|---|---|
| Control | 9.65 ± 0.46 | 6.75 ± 0.53 | -- | 47.27±1.43 | 55.64±1.54 |
| Misoprostol 100 mcg/kg | 6.75 ±0.15* | 0.95 ±0.03*** | 85.93 | 12.22±0.95*** | 21.04±1.15*** |
| EBPP 200 | 3.74 ±0.15** | 2.25 ±0.16** | 66.67 | 22.13±1.02** | 32.86±1.36* |
| EBPP 400 | 3.04 ±0.02** | 1.25 ±0.01*** | 81.48 | 16.54±0.87*** | 23.43±1.18*** |

Values are in mean ± SEM (n=6),
*P<0.05, **P<0.01, ***P<0.001 Vs Control

The results of EBPP on Gastric Volume, Ulcer Index, Free Acidity and Total Acidity in NSAID Plus Pylorus Ligation Induced Ulcer in rats was shown on table 1. Gastroprotective activity of EBPP was studied against Indomethacin plus pylorus ligation induced ulcer in rats. The groups administered with EBPP 200mg/kg and 400mg/kg showed significant (P<0.01) decrease in gastric volume compare to control groups. The antisecretary effect produced by both the doses of EBPP was more significant than that of the reference control Misoprostol. The animals treated with EBPP at 200 mg/kg (P<0.01) and 400 mg/kg (P<0.001) showed significant as well as dose dependent inhibition of ulcer index when compared with control group. The reference control Misoprostol also showed significant (P<0.001) decrease in the ulcer index. EBPP at 200 and 400mg/kg showed 66.67% and 81.48% protection respectively against indomethacin plus pylorus ligation induced ulcer and exhibited dose dependent percentage protection of ulcer. Moreover, free acidity and total acidity also significantly decreased (P<0.001) in the animals treated with EBPP at 400 mg/kg when compared with control group and the effect was comparable as the effect produced by the reference control Misoprostol.

In this modern era also 75–80% of the world populations still use herbal medicine mainly in developing countries, for primary health care because of better cultural acceptability, better compatibility with the human body, and lesser side effects [15]. Currently lot of medicinal plants were studied for its antiulcer activity and reported. Still some of the ethnobotanical and traditional claim of medicinal plants for gastroprotective property was unrevealed. Based on that, effort was taken to evaluate the gastroprotective activity of ethanolic bark extract of *Prunus Persica* against NSAID and Pylorus Ligation induced ulcer model in rats. NSAIDs were known to cause ulcer by inhibiting prostaglandin synthesis and induces gastric ulcer. Prostaglandin synthesis is inhibited by Cyclooxygenase (COX) enzyme inhibitors like indomethacin and induces gastric damage [16]. Pylorus Ligation enhances the accumulation of gastric juice, which leads to gastric lesion. Previous studies show that, *Prunus Persica* reported to have antioxidant property [6].

## CONCLUSION

From the results it was concluded that, EBPP reduces the gastric volume and gastric mucosal damage, against Indomethacin plus Pylorus Ligation induced ulcer which indicates the antisecretary and mucoprotective property of ethanolic bark extract of *Prunus Persica*. Additional antioxidant potential of EBPP might also be responsible for its gastroprotective activity.

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