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Gastroprotective activity of *opuntia ficus indica* linn. in wistar rats

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ABSTRACT

The purpose of the present study is to evaluate the anti ulcer activity of the fresh juice obtained from the fruits of *opuntia ficus indica* Linn. in rats. The fresh juice extracted from the fruits of *opuntia ficus indica* Linn. were evaluated for the antiulcer activity by using the ethanol induced model in rats, water immersion model in rats at a doses of 25mg/kg and 50mg/kg respectively. Biochemical parameters like ulcer index, volume of gastric secretion, pH of the gastric secretions, free acidity and total acidity were studied. The *opuntia* fruit will contains the phytochemical constituents like the flavonoids. The fresh juice of *opuntia* fruit showed the significant reduction in the gastric volume, pH, free acidity and the total acidity and the ulcer index at the doses of 25mg/kg and 50mg/kg. The results suggest that the fruit juice of the *opuntia* possess antiulcer effect. The observed effect may be due to the presence of bioactive constituents.

Keywords: Gastro-protective, ethanol induced ulcers, water immersion model, volume of gastric juice, pH of gastric juice, gastric acidity.

INTRODUCTION

Numerous plants and herbs are used to treat gastrointestinal disorders in traditional medicine. Peptic ulcer is the most common gastrointestinal disorder in clinical practice. Considering the several side effects of modern medicine indigenous drugs with fewer side effects should be looked for as a better alternative for the treatment of peptic ulcer.

Opuntia ficus Indica Linn. (Cactaceae) is also known as cactus. The genus *opuntia* will contains more than 400 species, which are native to the America and Canada. The pulp, stem, seeds of the cactus will contains ethanol soluble carbohydrates. It contains the alkaloids like Indica xanthin and neobentanonin and flavonoids like isohamentin, quacertin, kaemferol, dihydro kaemferol, dihydro quacertin. A number of different betacyanins also exists in the plant. It is used as an antioxidant agent, recent studies shows that it shows the antiproliferative effects of the bentanian on k-562 cells.

It also shows the effects like anti inflammatory and hypoglycemic effects.

MATERIALS AND METHODS

Plant collection and authentication

The fresh juice of *opuntia ficus indica* Linn. Was collected from the local market and they are authenticated.

Preparation of fresh Extracts

The plant material (leaves) were dried for several days and powdered with the help of an electric grinder. It was dried and was extracted with alcohol (90%). The yield obtained if the extract was 11.31%.

Weigh 500g of fresh fruits of *opuntia ficus indica* and they are washed with sterile distilled water. They are made into juice. The juice was filtered to remove the residue and the extraneous matter.

Animals

Wistar albino rats are either sex weighing 150-200gms were used for the present study. They were maintained under standard environmental conditions and were fed with standard pellet diet and water *ad libitum*. The experiments were performed followed by approval from animal ethical committee of the establishment.

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Methods

Ethanol induced method

The animals were fasted for 12 hours and then they were ulcer induced with ethanol. After 2 hours of the induction of ethanol the animals were sacrificed the stomachs of rats were cut open along the greater curvature and parameters were checked.

Method 2

Water immersion stress induced ulcer in rat

Stress ulcers were induced by forced swimming in the glass cylinder (height 45 cm, diameter 25 cm) containing water to the height of 35cm maintained at 25°C for 3hr. Animals are treated with the extracts for 7 days. After the drug treatment animals were allowed to swim in this water for 3hr. The stomach of each animal was removed and the extent of gastric damage was assessed.

Parameters for anti-ulcer activity

Determination of ulcer index, volume of gastric juice, pH of gastric secretions

Ulcer index

The dissected stomachs of the sacrificed rats were opened along the greater curvature and the ulcer index was calculated from the glandular portions of the stomach.

The ulcer index was calculated as

$$\text{Ulcer index} = 10/x$$

Where x = total mucosal surface / total ulcerated surface.

Volume and pH of gastric juice

The contents of the dissected stomachs of the rats were taken in graduated test tubes and allowed to centrifuge at 200rpm for 10min. The supernatant fluid was measured for volume of gastric juice and expressed as ml/4hrs and pH of the gastric juice was measured.

The healthy wistar rats were taken for the study. The rats were to be administered with the vehicle and extracts for about 7 days. After 7 days of dosing was

Gastric acidity

The supernatant liquid of the gastric juice was taken in a conical flask and 2 drops of toppers reagent was added. 0.01N NaOH was taken in a burette and allowed to titrate till the flask changed to yellow colour. Then 2 drops of phenolphthalein was added and titrate till orange colour was reached.

RESULTS AND DISCUSSION

Ethanol induced lesion formation is multifactorial. The factors involved in the formation of ulcers using ethanol are described by (Lange *et al.*, 1985) and (Koo *et al.*, 1986) suggested that the gastric wall mucous depletion induced by ethanol is one of the pathogenic mechanisms responsible for the gastric lesions. The number of lesions present in the gastric mucosa for the indicative of the severity of the ulcer disease. The diameters of the lesions are used for the determination of the ulcer index a measure of the ulcers in the gastric mucosa.

In stress induced model, stress increases histamine release with enhanced acid secretion which causes ulcer and reduces mucous production. Stress induced ulcers can be prevented partly or fully by vagotomy. Vagal over activity is suggested as the principle effectors in stress induced ulcers.

The observed decreases in the ulcer index in opuntia fruit juice extract may be due to ant secretory and cyto protective property of it.

The decrease in the ulcer index, volume of gastric juice pH of the gastric juice indicates the increasing mucous thereby protecting the gastric mucosa from both the models.

Mean and SD of ulcer index, volume of gastric juice, pH of gastric juice, gastric acidity for ethanol induced model

Treatment	Dose mg/kg	Ulcer index	Volume of gastric juice	pH of gastric juice	Gastric acidity
Extract-1	25mg/kg	2.2±0.83	7.22±0.24	5.48±0.39	0.542±0.03898
Extract-2	50mg/kg	2.8±0.44	6.34±0.18	5.10±0.48	0.496±0.10639
Ethanol induced control	0.0mg/kg	4.2±0.83	6.64±0.56	8.08±0.58	0.63±0.03286
Ranitidine	80mg/kg	2.6±0.54	6.94±0.47	5.24±0.27	1.14±0.0158

Mean and SD of ulcer index, volume of gastric juice, pH of gastric juice, gastric acidity for water immersion model

Treatment	Dose mg/Kg	Ulcer Index	Volume of Gastric juice	pH of gastric juice	Gastric acidity
Un Induced Control	0.0mg/kg	Nil	6.54±0.5	7.94±0.59	0.454±0.02073
Extract-1	25mg/kg	1.6±0.54	7.08±0.29	6.86±0.32	0.534±0.03286
Extract-2	50mg/kg	1.8±0.89	6.06±0.21	5.82±0.19	0.438±0.03834
Ranitidine	80mg/kg	1.2±0.45	6.7±0.55	6.5±0.55	0.924±0.0328

CONCLUSION

The ulcer index, volume of gastric juice, pH of gastric juice and gastric acidity are decreased which

indicates the increase in the mucous by protecting the gastric mucosa from both the models of extracts are seen. The opuntia extract showed promising results in both the models of anti ulcer activity.

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