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Evaluation of Gastro-Protective Activity of Methanolic Extract of 'Portulaca Oleracea' Whole Plant

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Abstract: Portulaca oleracea is a small shrub belongs to a family portulacacea and is found throughout India, growing to a height of 5 to 7cm and spreads 30 to 40 cm. the flowers are yellow or golden colored usually blooming in the summer and late spring season. The root and bark powder of Portulaca oleracea is found to be effective against gastric acidity. The gastro-protective activity of Methanolic fraction of root of Portulaca oleracea plant was tested by using screening technique of anti-ulcer activity. Administration of Methanolic extract of Portulaca oleracea shows significant Anti-ulcer activity in a dose dependent manner (100mg/kg and 200mg/kg), when compared to control which is evident by decrease in ulcer index. This result suggests that Methanolic extract of root and bark of Portulaca oleracea whole plant possess gastro protective (anti-ulcer) activity.

Keywords: Phytochemical, Antioxidant, Antiulcer, Portulaca Oleracea., Portulacacea.

I. INTRODUCTION

Peptic ulcer is the most common gastrointestinal disorder in clinical practice [1]. A number of factors such as stress, chemical agents, bile salts, hyperosmolar Nacl, NSAIDs, may lead the gastro duodenal ulcer [2]. Ulcers are caused due to imbalance between aggressive and defensive factors of gastric mucosa [3].

A recent review reported that the anti-ulcerogenic potential of many plant remedies worldwide have been investigated experimentally so far and diverse molecules have been determined as the active ingredients [4]. Ulceration occurs when there is disturbance of the normal equilibrium caused by either enhanced aggression, due to excessive acid secretion or diminished mucosal resistance [5]. At the same time, each of these drugs confers simpler to severe side effects like arrhythmias, gynaecomastia, hematopoietic changes. [6]. A number of drugs are available in the world for the treatment of peptic ulcer. Such as anti-histamines, proton pump inhibitors, anti-cholinergic, prostaglandins analogues, ulcer protective and ulcer healing drugs, but their clinical evaluation has shown incidence of various adverse drug reaction. [7].



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II. MATERIALS AND METHOD

Collection and extraction of plant material

The The Portulaca oleracea whole plant were collected from Bidar Forest area. An herbarium specimen is deposited in our college museum identification and authentication was done by Prof. D sandhya madam of pharmacognosy department of RRKSamithi College of Pharmacy Bidar. The powder obtained was subjected to successive soxhelt extraction with the solvents with increasing polarity i.e., petroleum ether, chloroform, methanol and water.

Extraction:

The authenticated whole plant of Portulaca oleracea were dried in shade and powdered coarsely. Extraction was done according to standard procedure using analytical grade solvents. The coarse powder of the whole plant was Soxhlet extracted with the solvents with increasing order of polarity i.e., petroleum ether (60-800 C), chloroform (59.5 - 61.50 C), Methanolic (64.5 - 65.50 C), and distilled water. After defeating with petroleum ether, Methanolic extract was also prepared. The extracts so obtained were concentrated under reduced pressure.

III. INVESTIGATION OF GASTROPROTECTIVE MECHANISM

A. 1. Pylorus Ligation Ulcer Model

Albino wistar rats of either sex weighing between 150-200gm were divided into four groups of 6 animals each. Group: I: Control

Group: II: Standard (Lansoprozole 8mg/kg)

Group: III: Methanolic Extract of portulaca oleracea 100 mg/kg

Group: IV: Methanolic Extract of portulaca oleracea 200 mg/kg

In this method albino rats were fasted in individual cages for 24hrs. care was being taken to avoid coprophagy. Methanolic extract and standard drugs were administered 30 minutes prior to pylorus ligation as mention above. Rats were sacrificed by an over dose of anaesthetics ether after 4 hrs of pyloric ligation, the abdomen was opened, cardiac end of stomach was dissected out and the contents were drained in centrifuge tube. The volume of gastric was measured and centrifuged at 2000rpm for 10 min. from the supernatant aliquots were taken for determination of mean volume of gastric juices PH, total, and free acidity.

A. 2. Aspirin Induced Ulcer Model

Albino wistar rats of either sex weighing between 150-200gm were divided into four groups of 6 animals each Group: I: Control

Group: II: Standard (Lansoprozole 8mg/kg)

Group: III: Methanolic extract of Portulaca oleracea (100 mg/kg)

Group: IV: Methanolic extract of Portulaca oleracea (200 mg/kg)

The animal is fasted for 24 hrs. the test drugs are administered orally 30 min prior to asprin at the dose of 100 mg/kg. after four hours the rats are sacrificed by using anaesthetic ether and examined the gastric ulcer.

The test drugs are administered orally in 2% gum acacia suspension 30 minutes prior to aspirin at dose of 200 mg/kg. After four hours the rats are sacrificed by using anesthetic ether and examined the gastric ulcer.

B. Statistical Analysis:

The results were expressed as mean \pm SEM. Statistical analysis were performed with one way analysis of variance (ANOVA) followed by Tukey-Kramer Multiple Comparisons Test by using Graph pad Instat software. P value less than 0.05 was considered to be statically signification *P<0.05, **<0.01, and ***<0.0001, when compared with control.

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IV. RESULTS AND DISCUSSION

Preliminary phytochemical investigation

Table 1: The phytochemical study that Alkaloids, Glycosides, Flavanoids, Tannins and Saponins are present in ethanolic extract. Glycosides and steroids are present in chloroform and petroleum ether extract is given below.

Constituents	Petroleum Ether Extract.	CHCL ₃ Extract.	Methanolic extract.	
Alkaloids	+	+	+	
Carbohydrates +		+	+	
Glycosides	ycosides		+	
Steroids	-	+	-	
Flavanoids	+	+	+	
Saponins	+	-	+	
Fixed oil and Fats	-	-	-	
Tannins	-	-	+	
Protein & Amino acids	-	-	+	
Mucilage	-	-	-	

+= PRESENT and -= ABSENT

Table 2: Effect of methanolic extract of Portulaca oleracea whole plant in pylorus ligation induced ulcer in rats.

The methanolic extract shows significant anti-ulcer activity in a dose dependent manner, when compared to control which is evident by decrease in ulcer index.

The ulcer index of methanolic extract of Portulaca oleracea at a dose of 100 mg/kg is 4.91 ± 0.327 and 200 mg/kg is 2.91 ± 0.538 .

Whereas standard (lansoprozole) mean is 1.58 ± 0.396 . The extract found to be most potent at 200 mg/kg dose level. Similarly pre-treatment of methanolic extract has significantly reduced the volume of gastric juice, total acidity and free acidity and significantly enhance the gastric Ph.

Table 2:Effect of methanolic extract of Portulaca oleracea on pylorus ligation induced gastric ulcer in rats.

Groups	Treatment	Mean vol.of gastric juice (ml) ± SEM	Mean free acidity (meq/L/100g) ± SEM	Mean total acidity (meq/L/100g) ± SEM	Mean gastric PH±SEM
Ι	Control	7.6 ±0.206	87.83±0.417	109.1±0.72	2.25 ± 0.185
II	Standard (lansoprazole 8mg/kg)	1.95±0.196***	28.50 ± 1.78***	37.33 ± 0.22***	7.21 ± 0.095***
III	MEPO 100mg/kg	4.6± 0.316***	70.8 ± 0.278 **	80.3 ± 0.033**	3.35 ± 0.164 ***
IV	MEPO 200 mg/kg	3.83± 0.230***	58.8 ± 0.090 ***	67.5 ± 0.388***	4.05 ± 0.230***

Values are the mean \pm S.E.M., n=6. *P<0.05, **P<0.01, and ***P<0.001 (vs. control).

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Figure 1.Effect methanolic extract of whole plant of Portulaca oleracea, on mean value of gastric juice followed by pylorus ligation.



Figure 2. Effect of methanolic extract of whole plant of Portulaca oleracea on mean value of free acidity followed by pylorus ligation method.





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Figure 3.Effect of methanolic extract of whole plant of Portulaca oleracea on mean value of total acidity followed by pylorus ligation method.



Figure 4.Effect of methanolic extract of whole plant of Portulaca oleracea on mean value of gastric PH followed by pylorus ligation method.

Table 3.Effect of methanolic extract of Portulaca oleracea whole plant in pylorus ligation induced ulcer in rats. The methanolic extract shows significant anti-ulcer activity in a dose dependent manner, when compared to control which is evident by decrease in ulcer index.

The ulcer index of methanolic extract of Portulaca oleracea at a dose of 100 mg/kg is 4.91 ± 0.327 and 200 mg/kg is 2.91 ± 0.538 .

Whereas standard (lansoprozole) mean is 1.58 ± 0.396 . The extract found to be most potent at 200 mg/kg dose level. Similarly, pretreatment of methanolic extract has significantly reduced the volume of gastric juice, total acidity and free acidity and significantly enhance the gastric pH.

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Result of ulcer index of pylorus ligation induced gastric ulcer of Methanolic extract of whole plant Portulaca oleracea.

Group	Treatment	Dose mg/kg	Mean ulcer index ± SEM	% Protection
Ι	Control		5.16 ± 0.166	
II	Standard	8mg/kg	1.58 ± 0.396***	69.38
III	POME	100	4.91 ± 0.327**	4.84
IV	POME	200	2.91 ± 0.538***	43.6





Table 4. Effect of methanolic extract whole plant of Portulaca oleracea Aspirin induced ulcer in rats:

The methanolic extract of whole plant of Portulaca oleracea shows significant anti-ulcer activity in a dose dependent manner, when compared to control which is evident by decrease in ulcer index.

The ulcer index of methanolic extract of whole plant of Portulaca oleracea at dose of 100 mg/kg is 3.16 ± 0.600 and 200mg/kg is 1.91 ± 0.396 . Whereas standard (lansoprozole) mean ulcer index is 1.83 ± 0.459

Result of ulcer index of aspirin induced gastric ulcer of Methanolic extract of whole plant of Portulaca oleracea.

Group	Treatment	Dose mg/kg	Mean ulcer index ± SEM	% Protection
Ι	Control		5.41 ± 0.271	
II	Standard	8 mg/kg	$1.83 \pm 0.459 ***$	66.17
III	POME	100	3.16 ± 0.600**	41.59
IV	POME	200	1.91 ± 0.396***	64.70

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Figure 6: Effect of methanolic extract of whole plant Portulaca oleracea on followed by aspirin induced method

V. CONCLUSION

The results suggest that Methanolic extract of whole plant Portulaca oleracea shows significant gastro-protective (antiulcer) activity. These results support the traditional belief about the beneficial effects. Thus the study has justified the claim of native herbal practitioner that the whole plant possess anti-ulcer activity.

VI. ACKNOWLEDGEMENTS

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