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STUDIES ON ANTIULCER ACTIVITY OF ROOTS OF *Solanum Melanoxylon*

G Abhilash*, A. Anil kumar, K Raja Sheker, B. Naveen, C.R. Akila

Department of Pharmaceutical Sciences, Scient Institute of Pharmacy, Ibrahimpatnam, Hyderabad-501506, Telangana, India.

ABSTRACT

Humans find food and medicines from nature which were used to treat and heal many ailments. The anti-ulcer activity of methanolic extract of roots of *Solanum melanoxylon* (solanaceae) was investigated in Pyrolus ligation ulcer and Ethanol induced ulcer models in Wistar albino rats. The methanolic extract of *Solanum melanoxylon* at doses of 200 mg/kg p.o, 400 mg/kg p.o, showed dose dependant significant inhibition of the gastric lesions in both the models. The extract showed significant ($P<0.01$) reduction in gastric content volume, free acidity and ulcer index when compared to control. Results prove that methanolic extract was found to possess anti-ulcerogenic as well as ulcer healing properties, which might be due to its anti-secretory activity.

KEY WORDS: Melanoxylon, Ethanol induced, Pylorus.

INTRODUCTION

Gastric ulcer, one of the most widespread, is believed to be due to an imbalance between aggressive and protective factors. Ulcer is caused due to the continuously exposure of gastric mucosa to potentially injurious agents such as acid, pepsin, bile acids, food ingredients, bacterial products (*Helicobacter pylori*) and drugs. These agents have been implicated in the pathogenesis of gastric ulcer, including enhanced gastric acid and pepsin secretion [1], inhibition of prostaglandin synthesis and cell proliferation growth, diminished gastric blood flow and gastric motility. Drug treatment of peptic ulcers is targeted at either counteracting aggressive factors (acid, pepsin, active oxidants [2], platelet aggravating factor "PAF", leukotrienes, endothelins, bile or exogenous factors including NSAIDs) or stimulating the mucosal defences [3] (mucus, bicarbonate, normal blood flow, prostaglandins (PG), nitric oxide). The goals of treating peptic ulcer disease are to relieve pain, heal the ulcer and prevent ulcer recurrence. Currently there is no cost-effective treatment that meets all these goals. Hence, efforts are on to find a suitable treatment from natural product sources.

Solanum melanoxylon belongs to family solanaceae. The berries of the plant are used a vegetable for food in Southern India. It has been reported to contain Solasodine glycosides, Solasonine, Solamargine, Khasianine and Solakhasoside (1) have been isolated from berries of *Solanum khasianum*, the structure of Khasianine, Tomatine and Solasonine has been elucidated[20]. Many pharmacological activities had been reported from the plant. The leaves were proven to show antidiabetic activity, hepatoprotective activity. In the present research, the antiulcer activity of *Solanum melanoxylon* had been studied.

MATERIALS AND METHODS

Plant material

The fresh roots of *Solanum melanoxylon* was collected from Tirumala hills, Chittore district, Andhra Pradesh during the month of November. The fresh roots of *Solanum melanoxylon* were shade dried and ground to coarse powder. The powdered material was then subjected to Soxhletion using methanol in a soxhlet extractor. The extract obtained was dried at 45°C to get a semisolid mass named (MESM) was used for further studies.

Animals

Wistar albino rats weighing 170-190g were taken and made them to acclimatize to the lab environment at 28^0c

Corresponding Author:- **G Abhilash** Email: gujarathiabhilash@gmail.com

in polypropylene cages. Animals were fed with standard rodent feed and water *ad labitum.* Experiments on animals have been performed after procuring approval from institutional ethics committee.

Screening of Antiulcer activity

Ethanol induced gastric ulcer model

Albino wistar rats were divided into four groups of six animals each. Group-I–Control (received 60% (v/v) ethanol 1ml in oral administration), Group-II – Standard (received Sucralfate suspension (100mg/kg p.o), Group-III – methanolic extract of *Solanum melanoxylon,* (200mg/kg p.o.) and Group-VI – methanolic extract of *Solanum melanoxylon,* (400mg/kg p.o.). Thirty minutes after drugs administration, each rat was given orally solution of in 60% (v/v) ethanol. The animals were sacrificed one hour later. The stomach was then excised and cut along the greater curvature, washed carefully with 5.0 ml of 0.9% NaCl and ulcer score was determined [4]. The tissues were subjected to Histopathological studies. Ulcer index was calculated as per the formula given below [5].

Pylorus ligation ulcer model

Animals are divided into four groups, each consisting of six rats [6]. Control group were received distilled water orally. Omeprazole, in the dose of 20 mg/kg was being administered orally for Group two as a reference drug. Third & Fourth Groups received methanolic extract of *Solanum melanoxylon* in a dose of 200 and 400 mg/kg. After 45 min of drug treatment, pyloric ligation was be done by ligating the pyloric end of stomach of rats of respective groups under ether anaesthesia. Ligation was done without causing any damage to the blood supply of the stomach. Animals were allowed to recover and stabilize in individual cages and were deprived of water during postoperative period. After 4 h of surgery, rats were sacrificed and ulcer scoring was done. Gastric juice was collected and gastric secretion studies were performed.

Statistical analysis

The values are represented as mean ± S.E.M, and statistical significance between treated and control groups was analyzed using of one way ANOVA, followed by Dunnet's test where $P \geq 0.01$.

RESULTS AND DISCUSSION

Ethanol induced model

In control animal, oral administration of absolute ethanol produced characteristic lesions in the glandular portion of rat stomach which appeared as elongated bands of thick, black & dark red lesions. MESM has shown significant protection index of 41.07% and 60.83% with the dose of 200 and 400 mg/kg respectively in comparison to control (table 1), Sucralfate suspension (100 mg/kg) as reference standard drug was reduction of ulcer 45.5%.

Table 1: Antiulcer activity of *Solanum melanoxylon* in ethanol induced model

S. No.	Group	Ulcer index	% inhibition
1	Control	24.63±7.92	No inhibiton
2	Standard	25.34±8.41	47.82
3	MESM (200mg/kg)	24.71±7.12	60.23
4	MESM (400mg/kg)	25.85±8.43	74.59

Table 2: Antiulcer activity of *Solanum melanoxylon* in pylorus ligation induced model

S. No.	Group	Ulcer index	%inhibition	Volume of gastric juice (mL)	Free acidity (MEQ/L)	Total acidity (MEQ/L)
1	Control	11.6±0.73		9.82±0.35	91.5±3.69	126.4±3.95
2	Standard	3.69±0.48*	76.57	3.94±0.42	37.12±4.74	42.46±4.39
3	MESM (200mg/kg)	6.91±1.4*	45.29	7.13±0.54	79.6±4.35	109.7±3.98
4	MESM (400mg/kg)	4.9±0.40*	**73**.34	4.6±0.67	38.79±2.86	49.90±2.57

Pylorus ligation model

In control animal, ligation produced characteristic lesions in the glandular portion of rat stomach and the lesions appeared to as red bands yielding in blood. MESM has shown significant protection index of 44.12% and 72.19% with the dose of 200 and 400mg/kg respectively in comparison to control (table 2), Omeprazole (20 mg/kg) as reference standard drug was reduction of ulcer 75.42%.

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