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ANTIULCER EFFECT OF *MIRABILIS JALAPA* BYUSING DIFFERENT PARADIGMS ON RAT MODELS

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ABSTRACT

In this narrative review, we have comprehensively reviewed the plant sources used as antiulcer agents. From traditional uses as herbal remedies, we have moved on to preclinical evidence, critically discussing the in vitro and in vivo studies focusing on plant extracts and even isolated phytochemicals with antiulcerogenic potential. A particular emphasis was also paid to mirabilis jalapa activity, with emphasis on involved mechanisms of action. Lastly, the issue of safety profile of these plant products has also been addressed.

KEYWORDS: Antiulcer agents, preclinical evidence, mirabilis jalapa etc.

INTRODUCTION

- An ulcer is an erosion in the lining of the stomach or duodenum an ulcer in the stomach is called gastric ulcer. An ulcer in the duodenum is called duodenal ulcer. Together, ulcers of the stomach and duodenum are referred to as peptic ulcers.
- A peptic ulcer is a round ovale store where the lining of a stomach or duodenum has been eaten away by stomach aids and digestive juices.
- Ulcers penetrate into the lining of the stomach or duodenum, gastritis may develop into ulcers.

CAUSES OF ULCERS

- Ulcers develop when the lining of the stomach or duodenum is chronically inflamed or exposed to irritants, such as excess stomach acid, and digestive enzymes such as pepsin.
- People who normally secrete more acid have a greater tendency to develop peptic ulcers than those who secrete less acid.
- As far, the two most common causes of peptic ulcers are; infection with Helicobactor pylori bacteria and use of certain drugs. Many drugs, especially aspirin, other non steroidal anti inflammatory drugs and corticosteroids, irritate the stomach lining and can cause ulcers.
- A rare cause of ulcers is cancer. The symptoms of cancerous ulcers are very similar to those of non cancerous ulcers usually do not respond to the treatments used for non cancerous cells.

CLINICAL SYMPTOMS

- The typical ulcers tend to heal and recur, thus it may occur for days or weeks and then wane or disappear. Symptoms can vary with the location of the ulcer and the person's age.
- The symptoms of gastric, marginal, and stress, unlike those of duodenal ulcers, do not follow any pattern.
- Only about half of the people with duodenal ulcers have the typical symptoms of gnawing, aching, soreness, an empty feeling and hunger.

WHAT ARE THE COMPLICATIONS OF PEPTIC ULCERS

- Most ulcers can be cured without complications. however, in some cases, peptic ulcers can develop potentially life threatening complication, such as
- Penetration
- Perforation
- Bleeding
- Obstruction

DIAGNOSIS

- A doctor suspects an ulcer when a person has characteristic stomach pain.
- Sometimes the doctor simply treats the person for an ulcer to see whether the symptoms resolve, which suggests that the person had an ulcer that has healed.
- Tests may be needed to confirm the diagnosis, especially when symptoms do not resolve after a few weeks of treatment, or when they first appear in a person who is over age 45

or has other symptoms such as weight loss, because stomach cancer can cause similar symptoms.

- Endoscopy is usually the first diagnostic procedure ordered by a doctor. Endoscopy is more reliable than barium contrast x-rays for detecting ulcers in the duodenum and on the back wall of the stomach; endoscopy is also more reliable if the person has stomach surgery.

TREATMENT

- Because infection with *H.PYLORI* bacteria is a major cause of ulcers, antibiotics are often used.
- Sometimes bismuth subsalicylate is used in combination with antibiotics.
- Neutralizing or reducing stomach acid by taking drugs that directly inhibit the stomach's production of acid promotes healing of peptic ulcers regardless of the cause.

OBJECTIVES AND PLAN OF STUDY

Study Objective

The herbal medicines are effective in the treatment of various ailments. Very often these drugs are un scientifically exploited and are improperly used. Therefore these plant drugs deserve detailed studies in the light of modern sciences. The detailed investigation and documentation of plants used in total health traditions and pharmacological evaluation can lead to the development of invaluable plant drugs for many dreaded diseases. Therefore based on the facts, the present study has been undertaken with the main objective of evaluating the methanolic extracts of mirabilis Jalapa for anti ulcer activity using albino wistar rats as experimental animal body by using different paradigms.

Plan of the study

1. Collection
2. Extraction of the dried mirabilis jalapa flowers with methanol by soxhlation
3. Preliminary phytochemical screening
4. Evaluation of anti ulcer activity using experimental model like aspirin induced ulcer in albino wistar strain rats Cap.

PLANT DESCRIPTION

Botanical name : *Mirabilis jalapa*

Family : Nyctaginaceae

Common name : beauty of the nightTelugu : chandrakanth

Synonym : jalapa

DESCRIPTION

This is a very fast-growing tree of slender proportions, reaching 1-2m in height, with spreading, nearly horizontal branches. The leaves are evergreen, alternate, lanceolate or oblong, long-pointed at the apex, oblique at the base; 2 to 5 in (5-12.5 cm) long, dark- green and minutely hairy on the upper surface, gray- or brown-hairy on the underside; and irregularly toothed. The flowers, borne singly or in 2's or 3's in the leaf axils, are 1/2 to 3/4 in (1.25-2 cm) wide with 5 brown sepals and 5 pink petals and many prominent yellow stamens. They last only one day, the petals falling in the afternoon. -

Major Constituents

Glycosides, proteins, saponins, phenol compounds, tannins, resins, flavonoids, alkaloids, 3-hexenyl acetate, (z)-ocimene, benzyl benzoate, monoterpene (E)-ocimene.

Medicinal Uses

The flowers are said to possess antioxidant properties. An infusion of the flowers is valued as an antispasmodic. It is taken to relieve headache and the first symptoms of a cold.

MATERIALS AND METHODS

Drugs and Materials

The following drugs and chemicals used for experimental study were, MATERIALS: Ascorbic acid.

PLANT MATERIALS

Plant collection and Identification

The basic plant material of a flower used for the investigation was collected from the botanical garden of Acharya Nagarjuna University. The plant material was identified and authenticated by Mrs.sandhya (H.O.D department of botany).

PREPARATION OF EXTRACT

The shade dried coarsely powdered flower of was extracted using methanol as solvent by continuous hot extraction process using soxhlet apparatus the extraction was till the completion. After completion of extraction the extract was stored in an airtight container in refrigerator below 10C.

Experimental animals

Colony inbred albino wistar strain rats (either sex) weighing 150-200 gms were used. The animals were maintained in a well ventilated room. Temperature with natural day night cycle in polypropylene cages. They were fed with a balanced rodent pellet diet and tap water ad libitium throughout the experimental period. The animals were housed for one week prior to the experiments to acclimatize to laboratory conditions. The animals were randomly distributed into 5 groups with six animals in each group.

Acute toxicity studies

By using OECD guidelines (organization of economic cooperation and development) for the study.

Acute toxic class method

The acute toxic class method is a step wise procedure with three animals of a single sex for step. Depending on mortality and/or moribund status of the animals on the average 2 to 4 steps may be necessary to allow judgments on the acute toxicity of the test substance. This procedure results in the use of a minimal number of animals while allowing for acceptable data for scientificconclusion.

The method used defined doses (5, 50, 300, 2000 mg/kg body weight) and the results allowed a substance to be ranked and classified according to the globally harmonized system (GHS) for the classification of chemicals which cause acute toxicity.

The aqueous extract of a flower starting dose 200 mg/kg body weight P.O. was used (as most of the crude extracts possess LD 50 value more than 2000 mg/kg body weight P.O.)

Body weight of the rats before and after termination was noted and any changes in skin, fur, eyes and mucous membrane and also respiratory, circulatory, autonomic and central nervous system and vasomotor activity and behavior pattern were observed and also sign of tremors, convulsions, salivation, diarrhea, lethargy, sleep and coma were noted. The onset of toxicity andsigns of toxicity were also noted if any.

METHODOLOGY

Evaluation of anti ulcer activity-stress induced ulcer method Five groups of each six numbers

Group	Description
Group - 1	Normal control
Group-II	Test control
Group-III	Standard (ascorbic acid)
Group-IV	mirabilis jalapa (250 mg/kg
Group-V	mirabilis jalapa (500 mg/kg)

Procedure

The animals were placed in cages with a grating floor to avoid coprophagy and divided into five groups viz., Group I receiving Normal saline as vehicle control, Group II also Normal Stress. Group IV and V received the methanolic extract of mirabilis jalapa at doses of 250 Mg /kg and 500 mg/kg respectively by oral route group III received Ascorbic acid 150 Mg /kg orally serving as standard drug. All the extracts and reference drugs were suspended in Normal stress for animal administration Ascorbic acid and extracts were administered 30 min before stress induction. On day 15 after the last day the same extract was given as does the rates were kept for 18 hours fasting. Rotating and standard Ascorbic acid was given 1 hour prior to force stress induction for 2 hours. Stomachs were dissected and the greater cavatina was cut open to know the extension induction of ulcer in the stomach. were collected in tubes for estimation of biochemical parameters.

LITERATURE REVIEW

Anti-ulcer activity of mirabilis jalapa flower extract on rats

Oral administration of an methanolic extract of modpaELC) demonstrated dose related anti ulcer activity (AIA) in carrageenan and dextran induced oedema and adjuvant induced arthritis in rats. ELC reduced the pleural exudate volume and inhibited leukocyte migration in carrageenan-induced pleurisy in rats. It lacked analgesic, antipyretic or ulcerogenic effect and failed to exhibit any effect in cotton pellet granuloma. It did not prolong the gestation period,

parturition time in pregnant rats or the onset time of diarrhoea in rats induced by castor oil.

Hypotensive Activity of madis jalapa flower Extract

A methanol extract of flower (ELC) showed hypotensive activity in anaesthetized dogs and rats. On intravenous administration (i.v.) at a dose range of 5- 1000mg/kg in dogs and 1-250mg/kg inrats it produced a mild to marked decrease in the arterial blood pressure in a dose dependent manner. The effect did not alter after cholinergic, histaminergic, adrenergic and ganglion receptor blockade. The hypotension was also unchanged in vagotomized and eviscerated dogs,whereas there was a slight increase in hypotension in the spinal preparation. It produced dose related decreases in heart rate, without any effect on respiratory rate.

Wound healing and anti-microbial activity of mirabilis jalapa

Methanol and acetone extract of mirabilis jala in the form of simple ointments screened for wound- healing activity by incision and excision wound on male Wisterrats. In excision wound model, more than 95% wound healing was recorded treated groups by 16 days of post surgery, whereas only 85.40% was observed in control group. Significant ($P<0.01$) epithelialization was observed in the groups treated with both methanol and acetone extract ointments. In incision wound model higher breaking strength were observed 82.43%, 63.77% in methanol and acetone extracts treated groups respectively suggested higher collagenre-deposition than the control group Framycetinsulphate (1%) was used as standard in both incision and excision wound models.

Finally, histopathological studies confirmed the wound healing properties. The results shown that miras Jalapa extract has potent wound healing activity by interms of significant wound contraction and increased tensile strength. Since wound healing is severely influenced by microbial linfection, this study was extended to evaluate antimicrobial activity apart from wound healing activity. The antimicrobial activity was determined by disc diffusion method.

RESULT

Data showing the extractive value of flowers of *mirabilis jalapa*

Plant	: *mirabilis jalapa*
Part used	: flowers
Method of extraction	: continuous hot extraction
Yield in percentage	: 75%w/v
Solvents used	: methanol (90%)

PRELIMINARY PHYTOCHEMICAL SCREENING

The methanolic extract of *mirabilis jalapa* flowers were subjected to preliminary phyto chemical screening.

EVALUATION OF ANTI ULCER ACTIVITY

The result of the effect of methonolic extract of flowers of mirabilis jalapa on gastric secretion, ulcer index, free acidity and pH are shown in table oral administration of test extract of Albino rats caused significant decrease in ulcer index and the percentage 17.31% (standard), 78.69% (positive control), 33.17% of gastric protection was (250mg/kg) 62.28% (500mg/kg). When compared to control there was also significant decrease in volume of gastric juice and increase in PH. The acidity was also decreased to a significant extent, the statically analysis was carried out by using one-way ANOVA.

Table: Phytochemical analysis of different extract of *mirabilis jalapa.*

S.NO	Name of the test	procedure	Observation	Result
1	alkaloids	Drug + Dragendrofftsreagent Drug +mayers Hagers reagent	Brown colour Cream color Yellow colour	+ve +ve +ve
2	Tannins/phenolic compounds	5% of Fecl3 testlead acetate testbromine water Acetic acid	Blue to blackWhite ppt Dis colorationRed color	+ve +ve +ve +ve
3	Flavanoids	Shinodaws test Alkaline reagenttest	Yellow colorYellow to colourless	+ve +ve
4	Carbohydrates	Molischs testFehlings test	Violet ringRed ppt	+ve +ve

Table: Florescence characteristic of flowers extract of *mirabilis jalapa.*

S.NO	EXTRACT	UNDER ORDINARY LIGHT	UNDER U.V LIGHT
1	Pet.ether	Yellowish brown	Pink
2	Benzene	Yellowish brown	Pink
3	Chloroform	Yellowish brown	Pink
4	Acetone	Greenish brown	Pink
5	Methanol	Dark green	Dark pink
6	Water	Yellowish brown	Pink

Table: Preliminary Phyto -Profile for Leaves of *Mirabilis Jalapa.*

S.No	Solvent used	Colour	Consistency	% yield w/w
1	Petroleum ether(40-60°c)	Yellowish brown	Sticky	*19.3*
2	Benzene	Yellowish green	Sticky	*5.5*
3	Chloroform	Yellowish brown	Sticky	*8.6*
4	Acetone	Greenish brown	Sticky	*4.2*

DISCUSSION

The flowers of mirabilisjalapa were found to be rich in phyto constituents which may have a variety of pharmacological actions. The literature: revealed the presence of alkaloids, tannins, proteins in the entire plant. The result of the present study indicates that methonolic extracts of flowers of midis Jalapa exhibited antiulcer activity against force swimming stress induced ulcer in rats. Table no.7 show the results obtained from methanolic extract of flowers of miradi jalapa on albino wistar arts at doses 250 mg, 500 mg/kg body weight and had shown a significant graded and dose dependent decrease in ulcer index, gastric acid secretion, Free acidity and total acidity and there was significant increase in pH of gastric juice of stress induced ulcer, pyloric lygated rats. The histo- pathological studies reveal that the 500mg/kg jalape flowers prevented ulcer formation where as the has shown low effect in protecting ulcer formation.

CONCLUSION

The methonolic extracts of flowers of Jashowed significa and dose dependent anti ulcer activity in force stress induced ulceration in rats.

In stressing induced ulcer model, themethonolic extract of flowersofmadilis ja at doses of 250mg/kg and 500mg/kg P.O were found to be having significant, graded and dose dependent anti ulcer and anti oxidant activity when compared to control group using ascorbic acid 150mg/kg as standard. Thus from the present study it can be concluded that the methonolic extract of flowers of mirabilis Jalapa anti- ulcerogenic and anti oxidant activity in plus pylorus ligation induced ulceration in rats.

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