

ANTI ULCEROGENIC MODELS OF SOPHORA INTERRUPTA SOLANUM PUBESCENS AND TABEBUIA ROSEA LEAVES ON INVIVO TEST MODEL IN RATS

K.HEMAMALINI*, A. SAMBASIVA RAO¹

*H.O.D, Pharm.D, Department of Pharmacology, Research scholar, Bhagawant university, Ajmer, ¹Principal, Sri Indu Institute of Pharmacy, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy (Dist), Hyderabad 501510.
Email: rkhemamalini@gmail.com

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ABSTRACT

Objective: To establish the pharmacological properties of the *Sophora interrupta Solanum pubescens* and *Tabebuia rosea* different plants with their phytochemical study the antiulcer activity.

Method: The study was carried by using the cold stress induced gastric lesions in rats. Ethanomedical information leads to new drug discovery from the herbal medicine and shows potential results for the treatment of gastric ulcers.

Results: Study has shown a reduction in gastric juice, total acidity and increase in the P^H. for all the three plants but their efficacy differs for all the *Sophora interrupta Solanum pubescens* and *Tabebuia rosea* leaves.

Conclusion: among all the three plants *Tabebuia rosea* showed significant antiulcer activity.

Keywords: Antiulcer, Cold stress induced model, Rats, *Sophora interrupta Solanum pubescens* and *Tabebuia rosea*.

INTRODUCTION

The major gastrointestinal disorders caused by human suffering today are Peptic ulcer and gastric hyperacidity. Peptic ulcer occurs mainly due to imbalance between mucosal defensive factors such as bicarbonate, prostaglandin, nitric oxide, peptides, growth factors and injurious factors like acid, pepsin. Gastric ulcer is often a chronic disease and may continue for 2-10 years characterized by recurring episode of healing and reexacerbations. Anxiety, emotional stress, hemorrhagic surgical shock, burns and trauma are also known to results severe gastric irritation. Free radicals have been implicated in the pathogenesis of peptic ulcer and a wide variety of clinical disorders and physical, chemical and psychological factors also contribute in this regards. Therefore reduction of gastric acid production as well as protection of gastric mucosa has been the major approaches for treatment of peptic ulcer¹.

Sophora interrupta belongs to the family fabaceae which is commonly called as edwarria madarasapatna wight, pili Girgoli. There are approximately 219 species in this genus sophora. *Sophora interrupta* bedd which is available exclusively in seshachalam hill ranges of tirumala. This plant is woody perrineal shrub with pinnate leaves, broadly ovate and golden yellow flowers. It has multifarious medicinal properties including antibacterial, anticancer and anti-inflammatory. From the preliminary phytochemical studies it was identified that it has constituents like alkaloids flavonoids, glycosides, phenols, carbohydrates and proteins².

Solanum pubescens belong to the family solanaceae was commonly used in india by tribal people for the treatment of liver disorders, diarrheal diseases and cancer. It is commonly called as pajarito. The extract has been already proved with some phytoconstituents like flavonol-B-o-methyl ethers, solanopubamine a steroidal alkaloid and with different pharmacological property³.

Tabebuia rosea (bertol) D.C, belong to the family bignoniaceae⁴ commonly known as pink trumpet Tree, grow upto 15 meter and well known for its beautiful flowers. Tea made from the leaves and bark is known to have a fever reducing effect. The herbal products obtained from th bark of tabebuia trees are called Taheebo, lapacho, pandarco and iperoxo. Traditionally, it has been used for treating ulcers, syphilis, gastrointestinal problems, candidiasis, cancer, diabetics, prostatitis, constipation and allergies.

MATERIALS AND METHODS

Plant materials

The leaves of *Sophora interrupta*, *Solanum pubescens* and *Tabebuia rosea* were collected in October 2013 from Trupathi, andhrapradesh and were authenticated by Dr. Madhavachetty, A voucher specimen was deposited in Department of Phytopharmacy and Phytomedicine, Sri Indhu, College of Pharmacy, Ibrahimpatnam, Hyderabad, India.

Preparation of extract

The leaves of *Sophora interrupta Solanum pubescens* and *Tabebuia rosea* were dried under shade and then made into a coarse powder. Air dried powdered material apparatus. Marc was dried and extracted again with methanol for 18 hrs till the solvent become colourless. Extract obtained was concentrated in vacuum under reduced pressure using rotary flask evaporator. It was further concentrated and dried in the dessicator for further studies.

Preliminary phytochemical investigation

The methanol extract was subjected to qualitative chemical test for the identification of different phytoconstituents like sterols, glycosides, saponins, carbohydrates, alkaloids, flavonoids, tannins, proteins, triterpenoids.

Test animals

Wistar albino rats of either sex weighing between 150 -250 g (6 weeks old) were used for the study. They were kept in the departmental animal house at 25±2°C and relative humidity 44- 56%, light and dark cycles of 10 and 14 h, respectively for one week before and during the experiments. Animals were provided with standard rodent pellet diet and the food was withdrawn 18-24 h before the experiment though water was allowed *ad libitum*. All animal procedures have been approved and prior permission from the Institutional Animal Ethical Committee was obtained as per the prescribed guidelines.

Cold restraint stress induced ulcers

Animals were divided into 5 groups and subjected to drug treatment Group I was treated with control (Normal saline), Group II was treated with Methanolic extract of *Sophora interrupta* Group III was treated with Methanolic extract of *Solanum pubescens*, Group III was

treated with Methanolic extract of *Tabebuia rosea*, Group IV was treated with standard drug omeprazole (20 mg/kg). One hour after the drug treatment, the rats were immobilized by strapping the limbs and kept for 2 hrs at temperature of 33°C for three consecutive days. The animals were fasted for 24 hrs on final day in steel cages to avoid coprophagy and the animals were killed by cervical dislocation and ulcers were examined on the dissected stomach after induction of stress⁵.

Measurement of gastric secretion and pH

The stomach of aspirin induced ulcer rats was carefully excised keeping oesophagus closed and opened along greater curvature and luminal contents were removed. The gastric juice thus collected was centrifuged at 3000 rpm for 10 min and expressed in terms of ml/100 g of body weight. The pH of the supernatant was measured using digital pH meter. Free and total acidity were determined by titrating with 0.01N NaOH using Topfer's reagent and phenolphthalein respectively as indicators and were expressed as meq/l per 100 g.

Measurement of ulcer index

Stomach mucosa was flushed with saline and lesions in glandular portion were then exposed and examined under a 10x magnifying

glass. Ulcer index of each animal was calculated by adding the values and their mean values were determined by the following scoring system.

- (i) Normal coloured stomach- 0
- (ii) Red colouration - 0.5
- (iii) Spot ulceration - 1
- (iv) Haemorrhagic streak- 1.5
- (v) Ulcers - 2
- (vi) Perforations - 3.

Percentage inhibition was calculated using the following formula:

$$\% \text{Inhibition} = \frac{\text{UI ulcer control} - \text{UI treated}}{\text{UI ulcer control}} \times 100$$

Statistical analysis

All the values are expressed as mean \pm S.E.M for groups of six animals each. Analyzed by one way ANOVA. The values are statistically significant at three levels, *** P <0.001, ** P <0.01, * P <0.05.

Table 1: Antiulcer activity of Methanolic extract of leaves of *Solanum pubescens*, *Sophora interrupta* and *Tabebuia rosea* on Cold stress test in mice

| S.No | Ulcer index | Volume of gastric juice | PH | Total acidity |
|----------|---------------------|-------------------------|---------------------|--------------------|
| Control | 4.5 \pm 1.26 | 3.5 \pm 0.925 | 2.3 \pm 0.193 | 66.16 \pm 1.647 |
| Standard | 0.85 \pm 0.269*** | 1.5 \pm 0.186** | 3.73 \pm 0.203*** | 42.6 \pm 1.75*** |
| MESI | 1.9 \pm 0.36** | 2.78 \pm 0.293* | 3.4 \pm 0.224*** | 49.5 \pm 2.19*** |
| METR | 0.96 \pm 0.25*** | 2.9 \pm 0.37* | 3.46 \pm 0.216*** | 47.5 \pm 1.36*** |
| MESP | 1.56 \pm 0.24** | 1.93 \pm 0.58* | 3.75 \pm 0.196*** | 45.3 \pm 1.59*** |

Each value is the mean \pm SEM for 6 mice, * P <0.5, ** P <0.01, *** P <0.001. Compared with control, data were analysed by using one-way ANOVA followed by Dunnet's test, standard (Diazepam 10mg/kg, of B.W), METR- Methanolic extract of *Tabebuia rosea*, dose (500mg/kg of B.W), MESI- Methanolic extract of *Sophora interrupta* (300mg/kg of B.W), MESP- methanolic extract of *Solanum pubescens* (300mg/kg, B.W).

DISCUSSION

Cold restrained stress provides both emotional stress as well as physiological stress to the animal. Omeprazole was used here to study the proton pump inhibitor mechanism. Cold restrained stress induced ulcers are result of auto digestion of gastric mucosal barrier, accumulation of HCl and generation of free radicals⁶. MESI, MESP and METR showed a significant ulcer curative ratio in cold restrained stress induced ulcers. The ulcer inhibition percentage of extracts was not closer to the standard drug omeprazole, but the extract significantly scavenged free radicals. Therefore, it may be concluded that all the three plants may not follow the proton pump inhibitory mechanism. Stress induced ulcers are probably mediated by histamine release with enhancement in acid secretion, a reduction in mucus production and generation of free radicals etc. mast cell activation, alternation in prostaglandin generation, cytokine liberation and breakdown of normal cytoprotective mechanism ulcers due to cold stress are both due to physiological and psychological factors. Flavonoidal compounds were proved to have antisecretory and cytoprotective properties due to free radical scavenging activity during lipid peroxidation. Tannins terpenoids which have vasoconstructive and protein precipitating effects, precipitation of protein at ulcer sites forms impervious layer over the lining that hinders gut secretions and protects the underlying mucosa from toxins and other irritants. The action of terpenes includes reduction of mucosal prostaglandin metabolism and gastric vascular permeability. Stress induced vagal activity has been suggested as the main factor in stress induced ulceration vagus nerve stimulates stomach acid secretion via interaction of its chemical mediator (acetylcholine) with the muscarinic receptor. The

activation of the muscurinic receptor gives rise to sequential events that result in creased gastric acid secretion. Stress induced ulcers also involve damage by reactive oxygen species (ROS) apart from acid and pepsin related factors.

REFERENCE

- Hoogerwerf WA, Pasricha PJ. Pharmacotherapy of gastric acidity, peptic ulcers, and gastroesophageal reflux disease. In: Brunton LL, Lazo JS, Parker KL, editors. Goodman & Gilman's The pharmacological basis of Therapeutics. 11th ed. New York: McGraw-Hill Medical Publishing Division; 2006. p. 967-81.
- M.Deena Dalith, S.Mohana Lakshmi, A.Saravana Kumar, G.Avinash Kumar, D.Jamal basha, R.Naganjaneyulu, "Antioxidant activity of *Sophora interrupta* Bedd", international journal of phytopharmacology, 2(2), 2011, 43-47.
- Krishna kumara G.N, Rao. L.J.M, Rao. K.V.R, Rao N.S.P, Kaneko.K, Mitsubashi.H, "Solanopubamine, a steroidal alkaloid from *Solanum pubescens*", Phytochemistry, 1985, (6), 24, 1369-71.
- Chung.T.H, Kim JC and Kim MK, "Investigation of Korean plant extracts for potential Phytotherapeutic agents against Hepatitis B-Virus", Phytotherapy Research 1995, (9), 429-34.
- Nguelefack TB, Feumebo CB, Ateufack G, Watcho P, Tatsimo S, Atsamo AD. "Anti-ulcerogenic properties of the aqueous and methanol extracts of leaves of *Solanum torvum* Swartz (Solanaceae) in rats". J Ethnopharmacol 2008;119:135-40.
- Dharmani P, Kuchibhotla VK, Maurya R, Srivastava S, Sharma S, Palit G. "Evaluation of anti-ulcerogenic and ulcer-healing properties of *Ocimum sanctum* Linn". J Ethnopharmacol 2004;93:197-206.