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Research Article

Pharmacological evaluation of extract of *Lannea coromandelica(Linn)* for its anti-ulcer activity in rodents

N. Santhi Priya*, M. Santhosh Aruna, D. Eswar Tony, Rama Rao Nadendla
Chalapathi Institute of Pharmaceutical Sciences, Lam, Guntur, Andhra Pradesh, India

***Corresponding author**
N. Santhi Priya
Email: santhipriyampharm@gmail.com

Abstract: Peptic ulcer disease (PUD) encompassing gastric and duodenal ulcer is the most prevalent gastro intestinal disorder the pathophysiology of PUD involves imbalance between an offensive (acid, pepsin, H . pylori) and defensive factors (mucin, prostaglandin, bicarbonate, nitric oxide and growth factors) an estimated 15,000 deaths occupy each year as a consequence of PUD. In India PUD is common in the Indian pharmaceutical industry, antacid and antiulcer drugs share 6.2 billion rupees and occupy 4.3% of the market share. Today, here are two main approaches for treating peptic ulcer .The first deals with the production of gastric juice and the second with re-enforcing gastric mucosal protection. The present study has been undertaken with the main objective of evaluating the extracts of *Lannea coramandelica* for anti ulcer activity using albino wistar rats as experimental animal body.
Keywords: *Lannea coramandelica*, Peptic ulcer disease (PUD), duodenal ulcer.

INTRODUCTION

An ulcer is erosion in the lining of the stomach or duodenum (the duodenum is the first part of the small intestine, which connects to the stomach.) 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 ulcer. Most ulcers are erosions of the first layer of the inner lining. If the hole goes all the way through, this is called a perforation of the intestinal lining and could turn in to medical emergency [1].

A Peptic ulcer is a round ovale sore where the lining of stomach or duodenum has been eaten away by stomach acids and digestive juices. Ulcers penetrate in to the lining of the stomach or duodenum (the first part of the small intestine) gastritis may develop into ulcers. The names given to specific ulcers identify their anatomic locations or the circumstances under which they developed. Duodenal ulcers are the most common type of peptic ulcer, occur in the duodenum, the first few inches of the small intestine just below the stomach gastric ulcers, which are less common, usually occur along the upper curve of the stomach. Marginal ulcer can develop when part of the stomach has been removed surgically, at the point where the remaining stomach has been reconnected at the intestine. As with acute stress gastritis, stress ulcer can occur under the stress of severe illness, skin burns, or trauma. Stress ulcers occur in the stomach and duodenum [2].

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 enzyme such as pepsin. Almost everyone produces stomach acid, but only one out of ten people develops ulcer at some point during his or her life time. Different people generate different amounts of stomach acid and a persons pattern of acid secretion tends to persist throughout life. People who normally secrete more acid (high secretors) have a greater tendency to develop peptic ulcers than those who secrete less acid (low secretors). However, other factors besides acid secretion are involved, because most people who are high secretors never develop ulcers, and some people who are low secretors do develop them. In addition, ulcers are common among older people, even though less acid is produced with age [3].

As far, the two most common causes of peptic ulcer are; infection with Helicobactor pylori bacteria and use of certain drugs. Many drugs, especially asprin, other non steroidal anti inflammatory drugs and corticosteroids, irritate the stomach lining and can cause ulcers. However, most people who take N.S.A.I.Ds or corticosteroids do not develop peptic ulcer. Regardless, some experts suggest that people at high risk of developing peptic ulcers should use a new type of N.S.A.I.Ds called a coxib (cox2 inhibitor) rather than one of an older type of N.S.A.I.Ds, because coxibs are less likely to irritate the stomach. However, recent

studies have shown that coxibs appear to increase the risk of heart attack and stroke with long term use and therefore, caution should be taken with their use. People who smoke are more likely to develop a peptic ulcer than people who do not smoke, and their ulcers heal more slowly, although psychological stress can increase acid production, no link has been found between psychological stress and peptic ulcers.

NEED FOR STUDY

Recently, there has been a rapid progress in the understanding of the pathogenesis of peptic ulcer. Most of the studies focus on newer and better drug therapy. These have been made possible largely by the availability of the proton pump inhibitors, histamine receptor blockers, drugs affecting the mucosal barrier and prostaglandin analog. However, the clinical evaluation of these drugs showed development of tolerance and incidence of relapses and side effects that make their efficacy arguable. This has been the rationale for the development of new antiulcer drugs, which includes herbal drugs. Indian Medicinal plants and their derivatives have been an invaluable source of therapeutic agents to treat various disorders including PUD. An indigenous drug possessing fewer side effects is the major thrust area of the present day research, aiming for a better and safer approach for the management of PUD.

PLANT DESCRIPTION [4, 5]

Fig-1: L*annea coromandelica(Linn)*

Botanical name: Lannea coromandelica
Family : Anacardiaceae (Cashew family)
Common name: Indian Ash Tree, Moya, Wodier
Hindi : Mohin
Tamil : Oti
Telugu : Ajasrngi
Sanskrit : Jhingini
Synonym : Dialium coromandelicum, Lannea grandis,

Description

Indian Ash Tree is a deciduous tree, growing up to 14 m tall. Branchlets are minutely covered with starry hairs. Alternately arranged leaves are pinnate, with a single terminal leaflet (pinnae) at the end. The spine carrying the leaflets is up to 7 cm long. Leaflets are usually 5, each laterals opposite, ovate, base rounded, densely velvet-hairy when young. Flowers are unisexual, greenish, the male in compound and female in simple racemes. Sepals 4, about 1 mm long, broad ovate. Petals 4, 2 mm long, oblong, green yellow. Fruit is ovoid, compressed, in panicles, at the end of leafless branches. Flowering: January-March.

Major constituents[6]

(2*R*,3*S*)-(+)-3',5-dihydroxy-4',7-dimethoxydihydroflavonol, (2*R*,3*R*)-(+)-4',5,7-trimethoxydihydroflavonol, (2R,3R)-(+)-4',7-di-O-methyldihydroquercetin, (2R,3R)-(+)-4',7-di-O-methyldihydrokaempferol, (2R,3R)-(+)-4'-O-methyldihydroquercetin, Quercetin-3-arabinoside, The dihydroflavonols, (2R,3S)-(+)-3',5-dihydroxy-4',7-dimethoxydihydroflavonol and (2R,3R)-(+)-4',5,7-trimethoxydihydroflavonol were isolated from the stem bark of Lannea coromandelica, along with the known (2R,3R)-(+)-4',7-di-O-methyldihydroquercetin, (2R,3R)-(+)-4',7-di-O-methyldihydrokaempferol. All five compounds were isolated for the first time from the genus Lannea; furthermore, (2R,3S)-(+)-3',5-dihydroxy-4',7-dimethoxydihydroflavonol, was a rare cis-type isomer.

METHODOLOGY FOR ANTI-ULCER ACTIVITY

Aspirin Induced Gastric Ulcer

In the aspirin-induced ulcer experiments, three groups of albino rats (150–200 g), with each group consisting of six animals were used. The first group served as a control group, the second group served as positive control and the third group served as the test group. The second and third groups were treated respectively with standard drug and test drug orally for 8 days. Control animals received normal saline (2 ml/kg) for 8 days. After 8 days of treatment, animals were fasted for 24 h. Ulcer was produced by administration of aqueous suspension of aspirin (a dose of 200 mg/kg orally) on the day of sacrifice. The animals were sacrificed 4 h later and stomach was opened to calculate the ulcer index by Kunchandy method [7].

EVALUATION OF ANTI – ULCER ACTIVITY

The result of the effect of methanolic extract of leaves of *Lannea coromandelica*(linn) 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 of gastric protection was 17.3% (standard), 78.29% (positive control), 30.57% (low dose) 62.76% (high dose). When compared to control there was also significant decrease in volume of gastric juice and increase in $_{P}$H. The acidity was also decreased to a significant extent, the stastical analysis was carried out by using one-way ANOVA followed by DUNNETS TEST using SSPS Software version.

RESULTS AND DISCUSSION

The leaves of *Lannea coramandelica* were found to be rich in phytochemical constituents which may have a variety of pharmacological actions. The literature survey revealed the presence of ALKALOIDS, TANNINS, PROTEINS in the entire plant. The result of the present study indicates that methanolic extracts of leaves of *Lannea coramandelica* exhibited anti ulcer activity against aspirin induced ulcer in rats. Table no.1 show the results obtained from methanolic extract of leaf of *Lannea coramandelica* on albino wistar arts at doses 200 mg, 400 mg/ kg body weight and had shown significant increase in pH of gastric juice of aspirin induced ulcer in rats.

Table-1 Effect of methanolic extract of *Lanea coromandalica* (Linn) leaves on gastric secretion of aspirin Induced ulceration in rats.

Group No	Bodywt gms	Treatment	Volume of gastric juice(ml)	Free acidity (Eq/l)100g	Total acidity (Eq/l)100g	pH
1 Control	150.83±16.55	control	2.95±0.22	11±2.5	20.83±3.06	3.27±0.27
2 Positive control	162.5±12.94	Positive control (aspirin)	3.3±0.4	28.66±4.88	58.16±5.49	2.75±0.37
3 Standard	160.83±12.41	Standard (aspirin + Ranitidine)	3.13±0.43**	19.83±1.83**	10±2.44**	4.28±0.37**
4 Low dose	152.5±11.29	Methanolic extract of leaves of *Lanea coromandalica* (200mg/kg)	2.03±0.44*	7.16±1.72*	15.33±2.73*	4.28±0.31*
5 High dose	161.66±18.61	Methanolic extract of leaves of *Lanea coromandalica* (400mg/kg)	1.65±0.20**	5.5±1.87**	10.5±1.87**	4.86±0.10**

***P<0.05, **P<0.01 Dunnets test (vs control)**

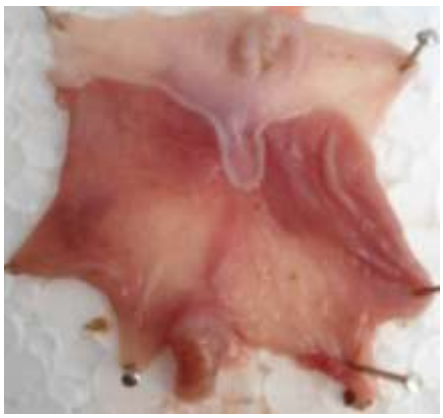

Fig: 2 Effect of vehicle on aspirin induced method in rats

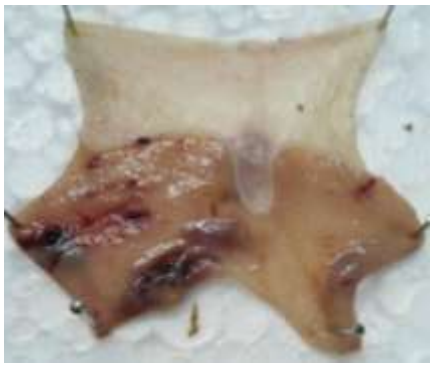

Fig: 3 Effect of positive control on aspirin induced method in rats

Fig: 4 Effect of methanolic extract of Lannea coromandelica leaf (200mg/kg P.o)

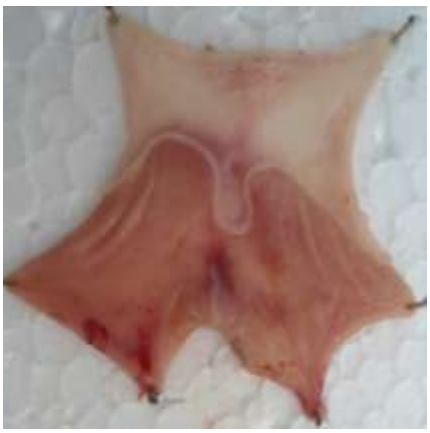

Fig: 5 Effect of methanolic extract of Lannea coromandelica leaf (400mg/kg P.o)

Fig: 6 Effect of standard drug (Ranitidine) on aspirin induced method in rats

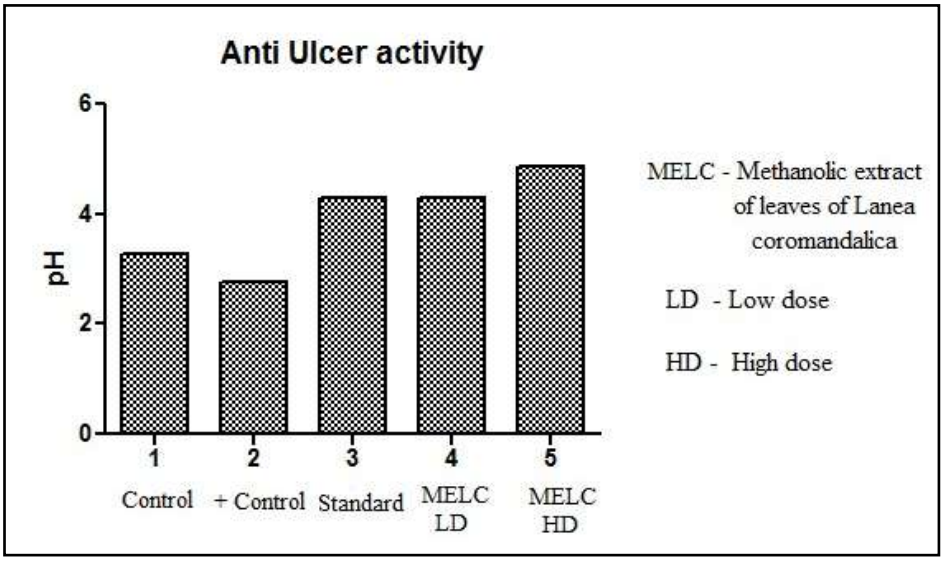

Fig: 7 Graph plotted on anti- ulcer activity treatment on X-axis and pH on Y-axis

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