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EVALUATION OF ANTIULCER ACTIVITY OF ETHANOL EXTRACT OF *AGANOSMA CYMOSA* BY PYLORUS LIGATION METHOD

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ABSTRACT

Objective: The current study set out to determine whether an ethanolic extract of Aganosma Cymosa (EEAC) had an anti-ulcer properties. **Materials and Methods:** Rats were given 150 and 300 mg/kg of EEAC, and the effects on acute toxicity and pyloric ligation tests were examined. **Results:** Up to 2000 mg/kg, p.o. body weight in rats, EEAC was determined to be safe and to cause no mortality or behavioural abnormalities. The current study's findings demonstrated that Aganosma cymosa has a clear pro healing effect. The ethanolic extract of Aganosma cymosa plant leaves significantly increased the percentage of peptic ulcer closure in the pylorus ligation ulcer model. The increased collagen synthesis caused by aganosmacyamosa may be the cause of the epithelization. **Conclusion:** EEAC may be helpful in the conventional treatment of ulcers since it showed anti-ulcer action, This could be brought on by the existence of saponins and flavonoids.

KEYWORDS: Pyloric ligation, Ulcer, Aganosma cymosa, Ranitidine, epithelisation.

INTRODUCTION

Plants are more potent healers because they encourage the repair mechanisms in a natural way, and For the treatment of ulcers, herbal remedies are rapidly emerging as a competitive alternative to synthetic drugs.

This could be because they are more affordable, readily available, have less side effects, and are thought to be more successful. Acid-induced gastrointestinal tract lesions within the lining

of the stomach are referred to as gastric ulcers. Exposed mucosa and defects in the submucosa or muscularis propria are the disease's defining features.[5] Cleaning of deceased, inflammatory tissue is a characteristic of ulcers, which are open sores of the outer layer of skin or mucous membrane.[10]

An imbalance between defensive elements (prostaglandins, gastric mucus, bicarbonate secretion, and the innate resistance of mucosal cells) and aggressive forces (acid, pepsin, and Helicobacter pylori) results in peptic ulcers, a disease of the gastrointestinal tract.[18]

At the moment, the objectives of peptic ulcer treatment are to reduce discomfort, heal the ulcer, and stop it from coming back. Peptic ulcers are treated with a variety of drug classes, such as antibiotics (clarithromycin and metronidazole), proton pump inhibitors (omeprazole and esoprazole, Rabeprazole), antagonists of the H2-receptor (cimetidine and famotidine), and drugs that disrupt the bacterial cell wall (bismuth salt).

The majority of these medications have serious drug-drug interactions that limit their potential usage, as well as unfavorable side effects such as hypersensitivity, impotence, arrhythmia, hematopoietic alterations, and kidney disease.[4] Because they are more affordable and are thought to be more effective and less harmful than manufactured pharmaceuticals, medicinal plants have been used to treat serious illnesses, especially in impoverished nations. Since the basic pathophysiology includes mucosal prostaglandin generation and stomach acid secretion, Non steroidal anti inflammatory medication and ethanol-induced ulcers are significant in assessing the possible utility of anti-secretory and protective of cells medicines.[13] The main causes of peptic ulcers are Helicobacter pylori, NSAIDS medications, emotional stress, alcohol misuse, and smoking. Between the mucous layer and the gastric epithelium, the Gram-negative bacterium Helicobacter pylori persists and is purposefully made to thrive in the harsh environment of the stomach. Helicobacter pylori first inhabits the antrum but gradually moves toward the stomach's more proximal sections.[19]

The genus Aganosma is a member of the Apocynaceae family and its subfamily, Apocynoideae. Its name is a combination of the words osme, which means smell, and aganos, which means mild, signifying the aroma of flowers.[1] Aganosma cymosa is a woody climbing tree that is semi-evergreen. For a brief time, it is a huge bloomer. The blooms have a

unique pollinating mechanism that is suited for cross-pollination, and they are white, nectariferous, fragrant, and hermaphrodite.[1]

Ranitidine

This is non imidazole H2 blocker has several desirable features compared to cimetidine By competitively blocking histamine's binding to H2 receptors on stomach wall cells, ranitidine, a strong histamine H2 receptor antagonist, efficiently suppresses the production of gastric acid. Regulating the concentration of ranitidine is crucial in practical applications because of its excellent efficacy in treating duodenal and stomach ulcers with quick and enduring effects.[19]

MATERIALS AND METHODS

Plant Collection

Aganosma cymosa leaves were gathered in Thirupathi, Andhra Pradesh, India. Prof. K. Madhava Chetty of Sri Venkateshwara University's Department of Botany identified and verified the leaves.

Preparation of the Extract

Using a Soxhlet device and 500 milliliters of 96% ethanol as a solvent, the leaves of Aganosma cymose were extracted. The leaf was dried at 60 degrees Celsius prior to the extraction procedure. A dry leaf sample was crushed and chopped until it formed a coarse powder. Filter paper containing 25 grams of powdered Aganosma cymosa leaves was put inside the Soxhlet device. The extraction duration was adjusted at 60, 120, 240, 360, and 480 minutes, while the working temperature remained constant at 70°C under atmospheric pressure. The extract's ethanol concentration was eliminated by purifying it at 80°C using a distillation device. The extract was kept in the refrigerator in an airtight container.

Animals

The institutional animal ethics committee (IAEC) gave its approval to the entire study protocol. PO/a/11/CPCSEA (1533) The animals were purchased from Hyderabad's Sainath Labs. The animals were kept under laboratory conditions (temperature 24-28°C, humidity ranged from 60-70%, and a 2-hour light-dark cycle) in cages with bedding made of paddy husk, in groups of six, fed a regular commercial pellet diet, and given unlimited water. They were acclimated for at least seven days prior to the experiment.

Pylorus ligation method

To prevent cannibalism, animals were kept apart in cages and starved for 36 hours before to pylorus ligation procedure. All animals were given open access to water during the fast and received two daily oral doses of 1 milliliter per rat of normal saline. A midline incision was made to access the abdomens while under ketamine anesthesia. To prevent damage to the stomach's blood flow, the pyloric portion was carefully drawn out and tied off. The abdominal walls were sutured, and the stomachs were carefully repositioned.[3] The animals were killed at the conclusion of the experiment by cervical dislocation while under ketamine anesthesia, The stomachs were removed, cut open along the heart, and the contents were gathered. The volume was then determined, and the stomachs were centrifuged for 10 minutes at 2000 rpm. The supernatant's pH, ulcer index were measured.[8]

Table 1: Preliminary phytochemical analysis of the Ethanolic Extract of *Aganosma cymosa.*

S.no	Phytochemicals	EEAC
1.	Triterpenoids	Positive
2.	Steroids	Positive
3.	Glycosides	Positive
4.	Flavonoids	Positive
5.	Carbohydrates	Negative
6.	Amino acids	Negative
7.	Alkaloids	Positive
8.	Tannins	Positive

Acute toxicity study

The acute toxicity study of Ethanolic Extract of Aganosma Cymosa has observed that it is non-toxic at a dose of 2000 mg/kg, b.w. p.o. in rats and EEAC was observed to be sage. Based on literature study and based on the acute toxicity study we have selected 150 and 300 mg/kg b.w. of the EEAC for further studies.[16]

Statistical Analysis

The mean ± standard error of the mean (SEM) is used to express data values. Using GraphPad Prism 5, ANOVA and Tukey's test were used for statistical analysis when comparing more than two groups. When $P < 0.05$, differences were deemed statistically significant.

Effect of EEAC on Gastric pH on pyloric ligation model

A important increase in gastric pH value was observed with a high dose of EEAC and standard drug groups ($P < 0.001$) compared to the negative control group. Whereas a low dose of EEAC did not show any significant increase in gastric pH value when compared to the negative control group.

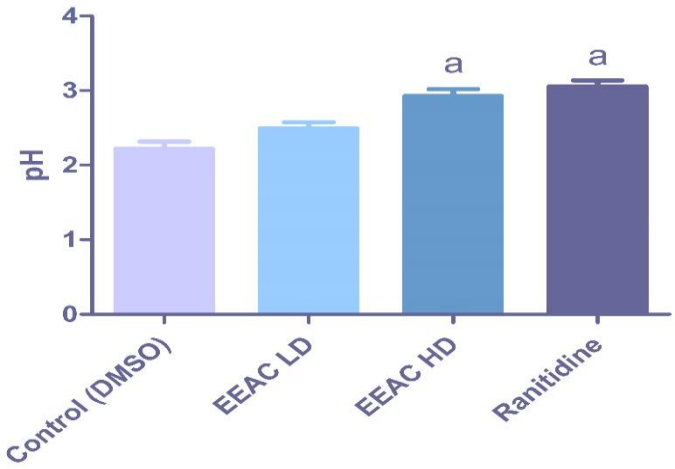


Fig 1: Effect of EEAC on gastric pH value.

[a]$P < 0.001$ when compared with the control (DMSO) group.

Effect of EEAC on ulcer index on pyloric ligation model

A significant decrease in ulcer index score was observed with high and low doses of EEAC and standard drug groups ($P < 0.001$) opposite to the negative control group.

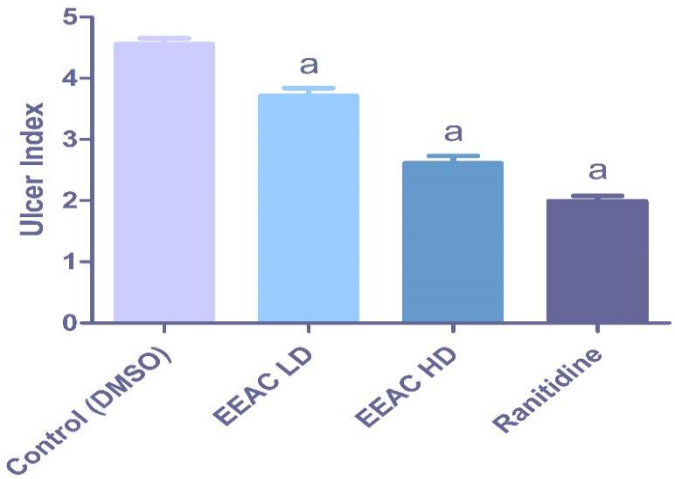


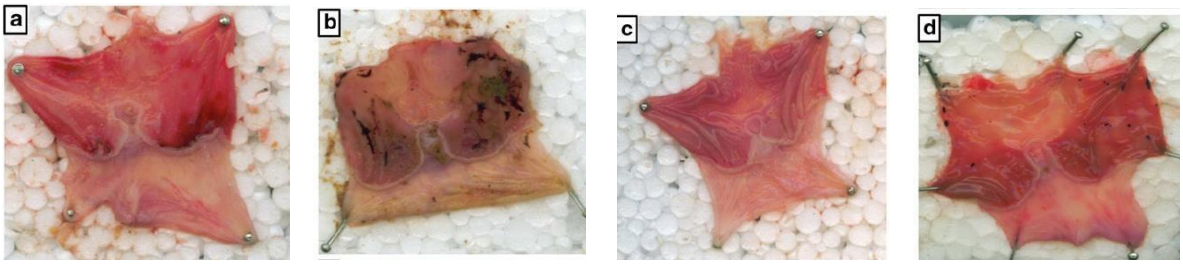
Figure 2: Effect of EEAC on pylorus ligation-induced rats ulcer index score.

[a]$P < 0.001$ opposite to the control (DMSO) group.

Table 2: Effect of EEAC on Gastric Parameters.

Groups	Gastric pH value	Ulcer index score
Control (DMSO)	2.2 ± 0.095	4.6 ± 0.092
EEAC LD	2.5 ± 0.084	3.7 ± 0.12[a]
EEAC HD	2.9 ± 0.095[a]	2.6 ± 0.12[a]
Ranitidine	3.1 ± 0.081[a]	2.0 ± 0.082[a]

[a]$P < 0.001$ when compared with the control (DMSO) group.



a. Control (DMSO); b. EEAC LD; c. EEAC HD; d. Ranitidine

DISCUSSION

The extract had a semi-solid consistency, a green color, and a 62% yield percentage. Initial phytochemical analyses of EEAC gave the presence of phenols, saponins, flavanoids, triterpinoids, and steroids.

According to the acute toxicity research, EEAC was safe up to 2000 mg/kg, p.o. body weight in rats and up to 1000 mg/kg, p.o., with no mortality or behavioral abnormalities. Therefore, two dosages—150 and 300 mg/kg body weight—were chosen to assess the activity of wound healing. The current study outlines some special characteristics of the plant Aganosmacymosa leaf extract in relation to its possible ability to prevent ulcers in rats. Because of their widespread availability, non-toxicity, lack of unintended side effects, and efficacy as crude formulations, plant products are often favored as prospective anti-ulcer medicines. The experimental animals' peptic ulcers were positively affected by the Aganosmacymosa extract, as evidenced by the treated group's early dermal and epidermal regeneration, and the ulcerated condition reduced the levels of offensive elements like ulcer index and overall acidity.

The current study's findings demonstrated that Aganosma cymosa has a clear prohealing effect. The ethanolic extract of Aganosmacymosa plant leaves significantly increased the percentage of peptic ulcer closure in the ulcer model. The increased collagen synthesis caused by aganosma cymosa may be the cause of the epithelization.

CONCLUSION

The current study's findings unequivocally demonstrate that the ethanolic extract of Aganosmacymosa leaves has a strong anti-ulcer effect on rats and exhibits ulcer index acid secretion characteristics in comparison to controls. The pharmacological analysis will assist to project this plant as an option for treatment in ulcers and other disorders and will clearly clarify the mechanism of action. When compared to the normal group, wounds treated with Aganosmacymosa extract showed a better degree of wound healing activity.

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