



# Evaluation of the Anti-ulcerogenic Activity of *Cullen corylifolium* Seed Extract

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## Abstract

Peptic ulcer disease (PUD) is a significant gastrointestinal disorder caused by an imbalance between aggressive factors like gastric acid and pepsin, and defensive factors such as mucosal barrier and blood flow. The prevalence of PUD has decreased due to effective *Helicobacter pylori* eradication treatments, but the widespread use of non-steroidal anti-inflammatory drugs (NSAIDs) continues to cause gastrointestinal complications. This study investigates the anti-ulcerogenic potential of an ethanolic seed extract of *Cullen corylifolium*, a plant known for its traditional medicinal uses and rich phytochemical composition. The research involved preliminary, quantitative estimation of phenols and flavonoids, and an *in vivo* study using an indomethacin-induced ulcer model in Wistar rats. The results indicate that the extract possesses significant anti-ulcer properties, which may be attributed to its high content of phenols and flavonoids.

## Keywords

Peptic ulcer disease, *Helicobacter pylori*, non-steroidal anti-inflammatory drugs, phytochemical screening

## 1. Introduction

An ulcer is a break in a bodily membrane that impairs the normal function of an organ. Peptic ulcer disease (PUD) is a common gastrointestinal disorder that affects the lining of the stomach or duodenum due to gastric acid secretion or pepsin. Contributing factors include *H. pylori* infection, long-term use of NSAIDs, and increased gastric acid secretion. Current treatments for PUD, such as proton pump inhibitors and H<sub>2</sub> receptor antagonists, are effective but can have side effects and lead to a risk of recurrence(1-9).



Figure 1. Peptic ulcer

Medicinal plants are gaining attention as alternative therapeutic agents for managing ulcers due to their safety, efficacy, and lower cost. Their anti-ulcer activity is often attributed to various phytochemicals, including tannins, flavonoids, alkaloids, and terpenoids.

*Cullen corylifolium* is a plant traditionally used for various medicinal purposes and is known to contain flavonoids, coumarins, and alkaloids, which are associated with anti-inflammatory and antioxidative properties. This study aims to evaluate the anti-ulcer activity of a hydroalcoholic extract of *Cullen corylifolium* seeds against indomethacin-induced gastric ulcers in a rat model (10-19).

**Figure 2. Seed of *Cullen corylifolium***



## 2. Materials and Methods

The research was conducted using seeds of *Cullen corylifolium*. The seeds of *Cullen corylifolium* were collected from local area of Bhopal in the period of January, 2025.

### 2.1. Plant Material and Extraction

Seeds of *Cullen corylifolium* were collected, dried, and powdered. The extraction was performed using the maceration method with a hydroalcoholic solvent (80:20 v/v Water: Ethanol). The percentage yield of the extract was calculated.

### 2.2. Phytochemical Analysis

A preliminary phytochemical screening was conducted to identify the presence of various compounds, including alkaloids, glycosides, carbohydrates, tannins, flavonoids, resins, steroids, proteins, phenols, saponins, and diterpenes. Quantitative estimations were performed to determine the total phenolic content using the Gallic acid method and total flavonoid content using the aluminum chloride colorimetric method (18-32).

### 2.3. Anti-ulcer Activity

The *in vivo* anti-ulcer activity was evaluated using an indomethacin-induced gastric ulcer model in Wistar albino rats. The rats were divided into five groups (n=6) (20-28):

- **Group I:** Control group, received 0.5% carboxy methylcellulose (CMC).
- **Group II:** Ulcer group, received indomethacin (60 mg/kg).
- **Group III:** Famotidine-treated group, received famotidine (10 mg/kg) followed by indomethacin.
- **Group IV:** *Cullen corylifolium* extract treated group, received 100 mg/kg of the extract followed by indomethacin.

- **Group V:** *Cullen corylifolium* extract treated group, received 200 mg/kg of the extract followed by indomethacin. The experiment included the evaluation of ulcerogenic effects by measuring the number of ulcers, ulcer index, and gastric pH.

### 3. Results and Discussion

The preliminary phytochemical screening confirmed the presence of flavonoids, phenols, saponins, and diterpenes. The study also estimated the total phenolic and flavonoid content, with the specific values mentioned in tables within the original document.

The *in vivo* results showed that the *Cullen corylifolium* seed extract exhibited a dose-dependent anti-ulcer effect against indomethacin-induced gastric damage in rats. The extract significantly reduced the number of ulcers and the ulcer index compared to the ulcer group. It also helped maintain the gastric pH. These results were comparable to the effects of the standard drug, famotidine. The anti-ulcerogenic activity of the extract is likely due to the presence of flavonoids and phenols, which have antioxidative properties that can protect the gastric mucosa from damage induced by indomethacin.

Table 1: Preliminary phytochemical screening of *Cullen corylifolium*

S.N.	Phytoconstituents	Test Name	Hydroalcoholic Extract
1	Alkaloids	Mayer's Test	-ve
		Dragendorff's Test	-ve
		Wagner's Test	-ve
		Hager's Test	-ve
2	Glycosides	Raymond's Test	-ve
		Killer Killani Test	-ve
		Legal Test	-ve
3	Carbohydrates	Molisch's Test	-ve
		Fehling's Test	+ve
		Benedict's Test	-ve
4	Tannins	Vanillin- HCl Test	-ve
		Gelatin Test	+ve
5	Flavonoids	Lead acetate Test	+ve
		Alkaline Reagent Test	-ve
6	Resins	Turbidity Test	-ve
7	Steroids	Libermann- Bur chard Test	-ve
		Salkowski Reaction	-ve
		Biuret Test	-ve

8	Proteins & Amino acids	Precipitation test	-ve
9.	Phenols	Ferric chloride test	+ve
10.	Saponins	Froth Test	-ve
11.	Diterpenes	Copper acetate Test	-ve

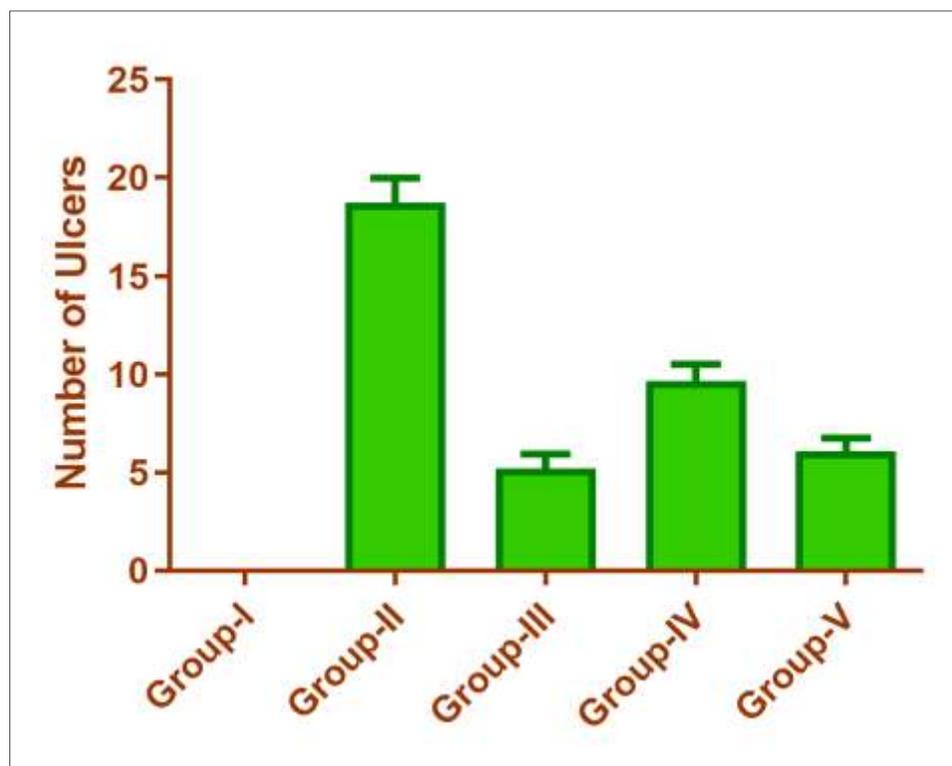


Figure 3: Anti-ulcerogenic effect of Cullen corylifolium seed extract against ulcerogenic agents in rats (Number of Ulcers)

Indomethacin administration led to a notable increase in the ulcer index to  $28.60 \pm 1.35$ , reflecting significant gastric mucosal damage compared to the control group, which reported no ulcers ( $0.00 \pm 0.00$ ). Famotidine treatment at a dose of 10 mg/kg offered considerable protection, lowering the ulcer index to  $7.40 \pm 0.62$ . Likewise, Cullen corylifolium seed extract at 100 mg/kg and 200 mg/kg showed protective effects, decreasing the ulcer index to  $13.85 \pm 0.74$  and  $9.20 \pm 0.59$ , respectively. These findings indicate a dose-dependent anti-ulcerogenic ability of Cullen corylifolium extract, with famotidine showing the most significant protective effect among all treatment groups (Table 7.8 and Figure 7.5).

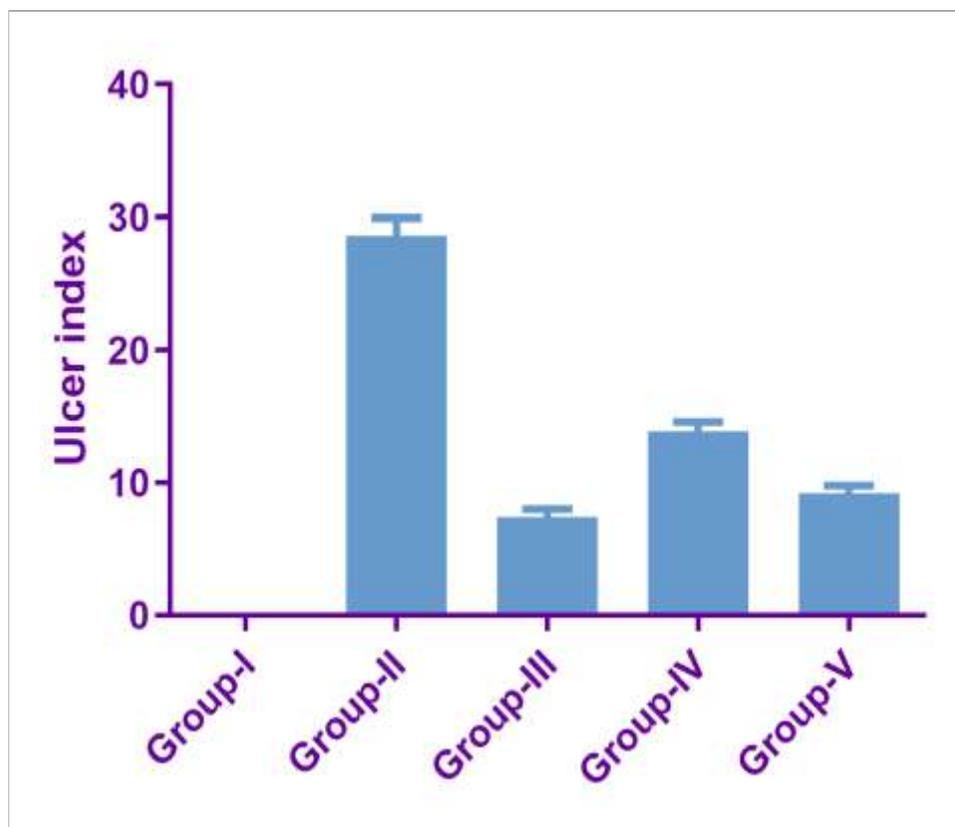


Figure 4: Anti-ulcerogenic effects of Cullen corylifolium seed extract against ulcerogenic agents in rats (Ulcer index

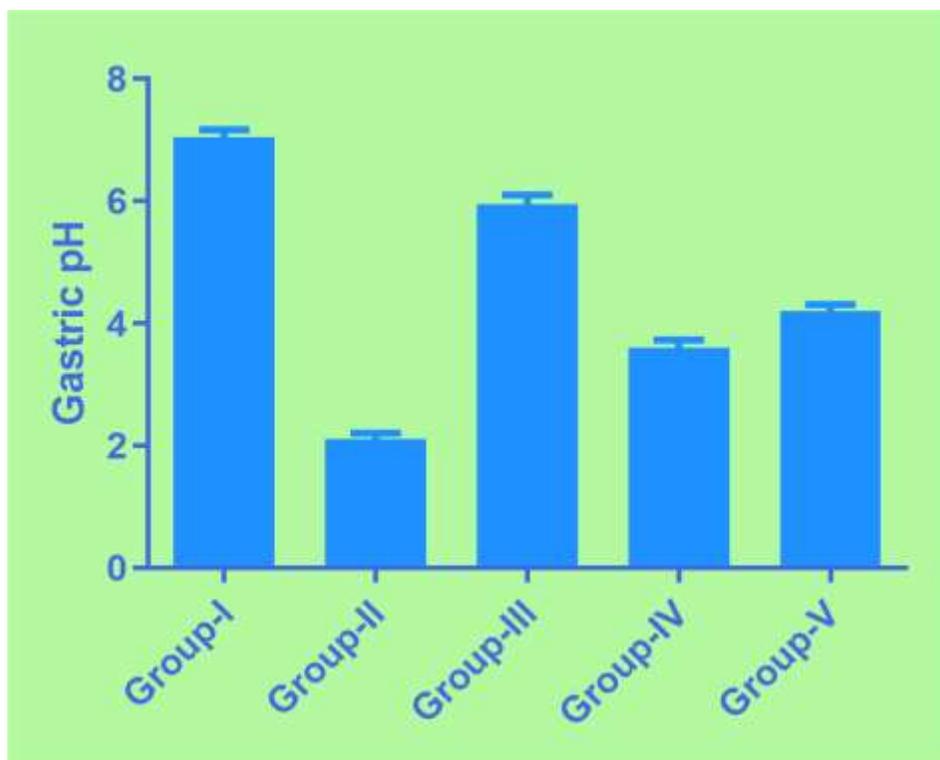
Based on the data, indomethacin administration significantly decreased the gastric pH in rats ( $2.10 \pm 0.10$ ) compared to the normal control group ( $7.05 \pm 0.12$ ), indicating enhanced gastric acidity and ulcerogenic potential. Treatment with famotidine (10 mg/kg) markedly increased the pH to  $5.95 \pm 0.15$ , demonstrating its potent acid-suppressing activity. Similarly, Cullen corylifolium seed extract at doses of 100 mg/kg and 200 mg/kg elevated the gastric pH to  $3.60 \pm 0.13$  and  $4.20 \pm 0.11$ , respectively, suggesting a dose-dependent gastroprotective effect. These findings highlight the potential of Cullen corylifolium seed extract in ameliorating indomethacin-induced gastric acidity (Table 7.9 and Figure 7.6).

**Table 2: Anti-ulcerogenic effect of Cullen corylifolium seed extract against ulcerogenic agents in rats (pH)**

Group	Treatment	Gastric pH (Mean)	S.E.M.
I	Vehicle (0.5% CMC, 1 mL/rat, oral)	7.05	0.12
II	Indomethacin (60 mg/kg, oral) + Vehicle	2.10	0.10#
III	Famotidine (10 mg/kg) + Indomethacin	5.95	0.15***
IV	Cullen corylifolium extract (100 mg/kg) + Indomethacin	3.60	0.13*
V	Cullen corylifolium extract (200 mg/kg) + Indomethacin	4.20	0.11**

Values are expressed as mean  $\pm$  S.E.M. (n = 6).

$P < 0.001$  vs Group I;  $***P < 0.001$ ,  $**P < 0.01$ ,  $*P < 0.05$  vs Group II (One-way ANOVA followed by Tukey's post hoc test).



**Figure 5: Anti-ulcerogenic effect of *Cullen corylifolium* seed extract against ulcerogenic agents in rats (pH)**

#### 4. Summary and Conclusion

This study successfully demonstrated the anti-ulcerogenic activity of a hydroalcoholic extract of *Cullen corylifolium* seeds. The extract, rich in phytochemicals such as phenols and flavonoids, effectively mitigated indomethacin-induced gastric ulcers in rats. The significant reduction in the number of ulcers and the ulcer index suggests that the plant extract has potent gastroprotective properties. This research provides scientific evidence supporting the traditional use of *Cullen corylifolium* and highlights its potential as a natural therapeutic agent for managing peptic ulcer disease. Further studies are needed to isolate the specific compounds responsible for this activity and to elucidate their precise mechanisms of action.

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