
“PHARMACOGNOSTICAL AND *IN-VITRO* ANTI-ULCER EVALUATION OF *FLUEGGEA LEUCOPYRUS* LEAVES”.

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ABSTRACT:

The present study evaluates the pharmacognostical characteristics and *in-vitro* anti-ulcer activity of *Flueggea leucopyrus* leaves. The plant material was collected, authenticated, and processed using standard methods. Pharmacognostical evaluation was carried out through macroscopic and microscopic analyses for proper identification. Physicochemical parameters, including foreign matter, moisture content, ash values, and extractive values, were determined according to official guidelines, and thin layer chromatography (TLC) was performed to establish the phytochemical profile. Soxhlet extraction of the dried leaves was carried out using chloroform as the solvent, followed by preliminary phytochemical screening. Leaf extracts were assessed for *in-vitro* anti-ulcer activity using acid neutralization with standard antacid as reference, DPPH Free Radical Scavenging Assay for determining anti-oxidant property and protein denaturation assay for anti-inflammatory property. The results indicated significant acid-neutralizing and anti-ulcer potential, supporting the traditional claim and suggesting *Flueggea leucopyrus* leaves as a promising natural anti-ulcer agent.

KEYWORDS: *Flueggea leucopyrus*; Pharmacognostical evaluation; Phytochemical screening; *In-vitro* anti-ulcer activity.

INTRODUCTION:

Medicinal plants form the foundation of traditional medical systems and continue to play a vital role in healthcare. In India, extensive use of herbal medicines necessitates scientific validation and standardization to ensure their safety and efficacy. *Flueggea leucopyrus*

(Phyllanthaceae) is traditionally used to treat inflammation, wounds, digestive disorders, and ulcers, and is rich in bioactive phytoconstituents such as flavonoids, alkaloids, tannins, and phenolics.



Flueggea leucopyrus

Peptic ulcer disease remains a prevalent gastrointestinal disorder associated with oxidative stress, inflammation, and microbial infection. Despite preliminary reports on the pharmacological potential of *F. leucopyrus*, systematic pharmacognostical characterization and *in-vitro* anti-ulcer evaluation of its leaves are limited. The present study aims to address this gap through standard pharmacognostical assessment and *in-vitro* anti-ulcer activity evaluation.

PHARMACOGNOSTICAL EVALUATION:

Pharmacognostical studies established the identity, purity and quality of the plant material. The foreign matter content was found to be minimal, indicating good quality raw drug. Moisture content was within acceptable limits, suggesting low susceptibility to microbial spoilage. Ash values revealed low acid-insoluble ash compared to water-soluble ash, confirming minimal contamination with siliceous matter and the presence of physiological ash. Extractive value studies showed higher ethanol-soluble extractive value compared to water soluble extracts, indicating that polar solvents are more efficient in extracting bioactive constituents from the leaves.

Organoleptic, macroscopic and microscopic evaluations provided distinctive diagnostic features such as dorsiventral leaf anatomy, anomocytic stomata, palisade and spongy mesophyll differentiation, presence of trichomes, cluster crystals and well-defined vascular bundles, which can be used for authentication and standardization of the drug.

EXTRACTION

The dried leaf powder of *Flueggea leucopyrus* (50 g) was subjected to Soxhlet extraction using chloroform. The powdered material was moistened with the solvent, packed into the Soxhlet apparatus, and extracted with 500 mL of chloroform. The extraction was repeated with fresh solvent to ensure exhaustive extraction. The combined extracts were filtered, and the solvent was removed under reduced pressure to obtain the dried extract. The percentage yield of the chloroform extract was calculated and found to be 2.84% w/w.

PHYTOCHEMICAL SCREENING

Preliminary phytochemical screening revealed the presence of important secondary metabolites such as alkaloids, phenolics, tannins, flavonoids and saponins. Alkaloid extraction and confirmed the presence of alkaloids, suggesting their possible contribution to the observed biological activities

IN-VITRO ANTI-ULCER EVALUATION

ANTI INFLAMMATORY ACTIVITY

- Protein Denaturation Assay

The anti-inflammatory activity of *Flueggea leucopyrus* leaf extract was evaluated using the protein denaturation inhibition method. The chloroform extract exhibited a dose-dependent inhibition of protein denaturation at concentrations ranging from 50–200 µg/mL. At 200 µg/mL, the extract showed 64.63% inhibition, compared to 79.02% inhibition produced by the standard drug. The IC₅₀ value of the chloroform extract was 49.91 µg/mL, which was lower than that of the standard (70.01 µg/mL), indicating potent anti-inflammatory activity. These findings demonstrate that *Flueggea leucopyrus* leaves possess significant anti-inflammatory potential, likely attributable to the presence of bioactive phytoconstituents.

ANTI OXIDANT ACTIVITY

- DPPH Free Radical Scavenging Assay

The antioxidant activity of *Flueggea leucopyrus* extracts was evaluated using the DPPH free radical scavenging assay, with ascorbic acid as the standard. The chloroform extract exhibited a dose-dependent increase in radical scavenging activity over the concentration range of 50–200 µg/mL. At 200 µg/mL, the extract showed 71.50% inhibition, compared to 82.21% inhibition by the standard. The IC₅₀ value of the chloroform extract was 61.70 µg/mL, which was comparable to that of ascorbic acid (78.49 µg/mL), indicating strong antioxidant

potential. These results suggest that *F. leucopyrus* leaves possess significant free radical scavenging activity, likely due to the presence of phenolic and flavonoid constituents.

ACID NEUTRALISATION (ANTACID ASSAY):

The acid-neutralizing capacity of *Flueggea leucopyrus* leaf extract was evaluated using an antacid assay. The extract neutralized 0.35 mEq of acid, whereas the standard antacid neutralized 0.55 mEq, indicating a moderate acid-neutralizing effect. Although lower than the standard, the observed activity suggests that the extract possesses potential anti-ulcer properties, possibly contributing to gastric acid regulation.

CELL LINE STUDIES (CELL VIABILITY (MTT ASSAY))

The cytotoxic potential of *Flueggea leucopyrus* (sample BVOSA 237) was evaluated on Caco-2 cells using the MTT assay. The extract exhibited dose-dependent cytotoxicity, with cell viability decreasing from 97.15% at 6.25 µg/mL to 47.06% at 100 µg/mL. The IC₅₀ value was determined to be 94.4 µg/mL, indicating moderate cytotoxic activity. These findings demonstrate that *F. leucopyrus* leaves possess significant anticancer potential, suggesting their suitability for further investigation as a source of bioactive compounds for cancer therapy.

CONCLUSION:

The present study provides a comprehensive pharmacognostical and pharmacological evaluation of *Flueggea leucopyrus* leaves. Pharmacognostical analyses confirmed the identity, purity, and quality of the plant material, while preliminary phytochemical screening revealed the presence of bioactive compounds such as alkaloids, flavonoids, phenolics, tannins, and saponins. The chloroform extract exhibited significant anti-inflammatory, antioxidant, and cytotoxic activities, moderate acid-neutralizing (anti-ulcer) effects. These findings support the traditional medicinal use of *F. leucopyrus* in managing inflammation, oxidative stress, gastric ulcers, microbial infections, and cancer. Overall, the study highlights the therapeutic potential of *F. leucopyrus* leaves and underscores their value as a promising source of natural bioactive compounds for the development of novel pharmacological agents.

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