Chapter 7

Exploring the Phytoconstituents of leaves of *Centratherum punctatum* Cass. (Asteraceae)

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ABSTRACT

Present study examined the phytochemical composition of *Centratherum punctatum* leaf using different extracts (n-hexane, ethanol, and aqueous). Qualitative analysis indicated the existence of diverse bioactive compounds in the leaf extracts. The results emphasize the promise of *C. punctatum* leaves as a source of biologically active compounds, demonstrating considerable pharmacological potential that may be beneficial for the development of novel pharmaceuticals.

Keywords: Bioactive compounds, emphasize, pharmaceutical

INTRODUCTION

Medicinal plants have long been recognized as a rich source of bioactive compounds that play significant roles in health care, particularly in traditional medicine systems (Sofowora et al., 2013). Among such plants, *Centratherum punctatum* is commonly known as the Brazilian button (Aswathi and Thomas, 2023), belongs to Asteraceae family. *C. punctatum* is a fragrant bushy perennial herb has been investigated for its essential oil constituents, has drawn attention towards its traditional applications in treating wounds, infections, and inflammatory conditions (Gbolade et al., 2009).



Figure 1: Leaves and flower of *C. punctatum*

Despite its ethnobotanical significance, the phytochemical profile of this plant remains underexplored. Phytochemical screening is a preliminary yet essential step in evaluating the therapeutic potential of plant species (Shaikh and Patil, 2020). Therefore, present study aims to analyse the presence of key

phytochemicals such as tannins, saponins, phenols, alkaloids, and reducing sugars in the leaf extracts. The identification of these constituents helps to other students, researchers and pharmacists to establish a scientific basis for the plant's traditional uses and may guide further pharmacological and phyto Pharmacognostic research for the future healthcare practices and sustainable utilization.

METHODOLOGY

The leaves of *C. punctatum* were collected from Khordha, Bhubaneswar, Odisha, India. The plant species was identified by the authors (Figure 1). The Soxhlet extraction was adopted using three different extracts (n-hexane, ethanol and aqueous) for phytochemical screening. Detection of nine secondary metabolites were conducted using standard methods (Jena et al., 2025; Rani et al., 2025; Sharma et al., 2025; Thakur et al., 2025).

Test for tannin: About 1 ml of the leaf extract was added with 4-5 drops of 10% lead acetate solution. Then the formation of gelatinous precipitate confirmed the presence of tannin.

Test for saponin: About 1 ml of the leaf extract was added to 1 ml of distilled water and shaken well. The formation of persistent froth was observed confirming the presence of saponin.

Test for flavonoids: About 1 ml of the leaf extract was taken. Added 2 ml of NaOH solution and 4-5 drops of dilute HCl to it. The colour initially turned to an intense yellow colour with NaOH solution and later became colourless which confirmed the presence of flavonoids.

Test for terpenoids: To 1ml of the leaf extract, added 5-6 drops of concentrated sulphuric acid. Then the reddish-brown interface confirmed the presence of terpenoids.

Test for phenols: About 1 ml of the leaf extract was taken. A few drops of 5% ferric chloride solution were added. The dark bluish-black appearance confirmed the presence of phenolic compounds.

Test for reducing sugars: About 1 ml of the leaf extract was taken. 2 drops of Fehling's solution A followed by Fehling's solution B were added and kept in the water bath for few minutes.

Test for steroids: To 1 ml of the leaf extract, added 1 ml of chloroform followed by 1 ml of concentrated sulphuric acid into it. The appearance of upper red and lower yellow with green fluorescence provides the presence of steroids.

Test for alkaloid: About 1 ml of the leaf extract was taken. Added 3-4 drops of Dragendroff's reagent to it. The formation of a reddish-brown precipitate confirmed the presence of alkaloids.

Test for carbonyl compounds: About 1 ml of the leaf extract was taken in a test tube. Added 3-4 drops of 2,4- Dinitrophenylhydrazine (DNPH) reagent. The formation of yellow crystal confirmed the presence of carbonyl compounds.

RESULTS AND DISCUSSION

The phytochemical screening of *Centratherum punctatum* revealed that saponins and reducing sugars were universally present in all extracts, indicating potential as key constituents of the plant (Table 1; Figure 2-4).

Phenolic compounds were detected only in the ethanol and aqueous extracts (Figure 3 & 4). The aqueous extract showed the greatest diversity of bioactive compounds, including tannins and alkaloids. Present findings support the potential medicinal value of *C. punctatum*.

Table 1: Qualitative phytochemical screening of *C. punctatum* leaves using different extracts

Bioactive compounds	Extracts		
	n-hexane	Ethanol	Aqueous
Tannin	Absent	Absent	Present
Saponin	Present	Present	Present
Flavonoid	Absent	Absent	Absent
Terpenoid	Absent	Absent	Absent
Phenols	Absent	Present	Present
Reducing sugar	Present	Present	Present
Steroid	Absent	Absent	Absent
Alkaloid	Absent	Absent	Present
Carbonyl compounds	Absent	Absent	Absent



Figure 2: Detection of secondary metabolites of *C. punctatum* leaves using n-hexane extract

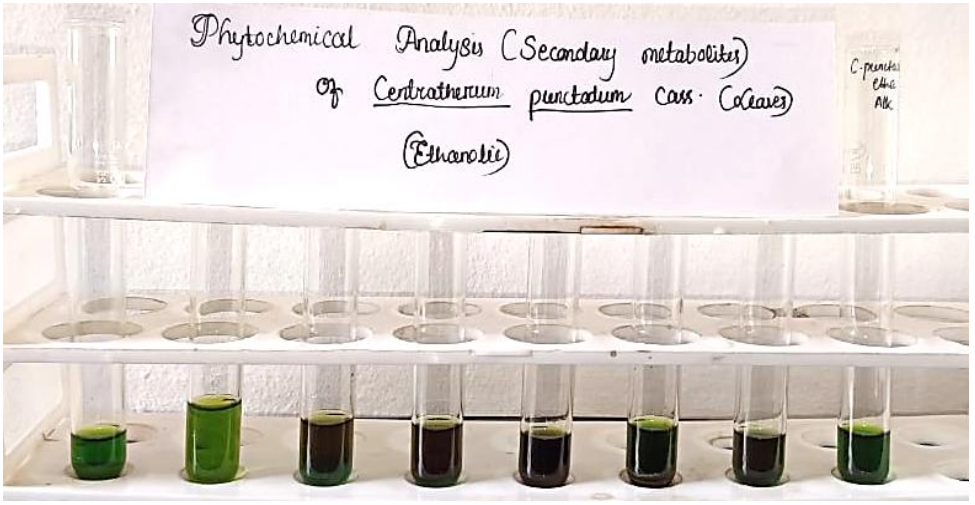


Figure 3: Detection of secondary metabolites of *C. punctatum* leaves using ethanolic extract

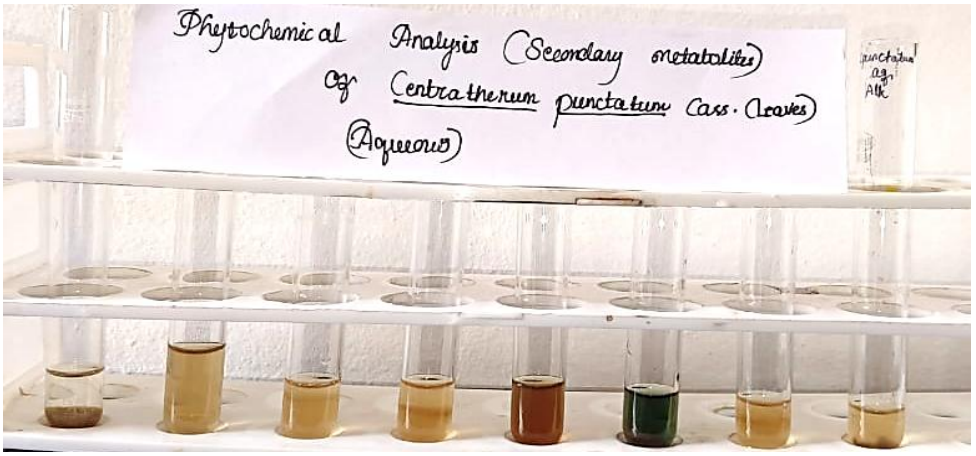


Figure 4: Detection of secondary metabolites of *C. punctatum* leaves using aqueous extract

CONCLUSION

Present study successfully identified a variety of phytoconstituents in the leaves of *Centratherum punctatum*, including flavonoids, alkaloids, tannins, saponins, phenolics, and terpenoids, which are known for their significant medicinal properties. These findings validate the ethnobotanical use of the

plant and suggest its potential as a source of natural therapeutic agents. The presence of these bioactive compounds provides a foundation for further pharmacological investigations and the development of plant-based remedies. Future studies focusing on the isolation, characterization, and biological evaluation of individual compounds will be essential to fully explore the medicinal potential of *C. punctatum*.

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