Research Article
CODEN (USA): IJPLCP

ISSN: 0976-7126
Mishra, 16(5):6-9, 2025

International Journal of Pharmacy & Life Sciences
Open Access to Researcher

Phytochemical analysis of *Plectranthus scutellarioides* (*Coleus*)

Ranjana Roy Mishra

Department of Botany, Kalindi College, University of Delhi, India

Article info

Received: 23/02/2025

Revised: 28/03/2025

Accepted: 13/04/2025

© *IJPLS*

www.ijplsjournal.com

Abstract

Medicinal plants have been used for centuries in various traditional systems of ethno-medicine to treat and prevent diseases. These plants contain a diverse range of chemical compounds, such as alkaloids, flavonoids, terpenoids, glycosides etc. which contribute to their medicinal properties. Phytochemical analysis is a field of study that focuses on the identification, isolation, and characterization of the bioactive compounds present in plants with potential therapeutic properties. In the present study, phytochemical analysis of *Plectranthus scutellarioides* (*Coleus*) growing in Kalindi College campus was done. *Plectranthus scutellarioides* (Coleus) is a medicinal plant which has antibacterial, antioxidant, antifungal, anti-inflammatory, anti-diabetic and anti-cancer properties. It is also used for the treatment of many diseases and is a part of folk medicine in many regions in world.

In the present investigation, phytochemical analysis was done on fresh aqueous leaf extracts of this plant. Aqueous extraction was chosen because it is simple, fast, economical and eco-friendly. The procedure used in the study is very rapid and eco-friendly. Phytochemical analysis revealed strong presence of alkaloids, saponins, flavonoids and sterols in this plant.

Keywords: Phytochemicals, *Coleus*, Medicinal plants, Drugs, Therauptic, Kalindi College

Introduction

Qualitative phytochemical analysis involves the identification of different phytochemicals present in plant. This analysis helps in determining the chemical composition and medicinal properties of the plants. It helps in the development of new drugs or natural product-based therapeutics.

Plectranthus scutellarioides (*Coleus*) is a medicinal plant of importance. The plant is used traditionally in treatment of diaorrhea, abdominal pain, constipation, fever, and menstrual pain (Kowalczyk et al. 2024) The leaves of the plant is used to treat pulmonary tuberculosis by the Toraja ethnic group in Indonesia. Leaf extracts have antibacterial and anti-inflammatory properties (Kowalczyk et al. 2024). Every part of the plant has immense medicinal properties and used in folk medicines throughout the world. It has also mild relaxing and hallucinogenic effects on consumption (Wikipedia 2025). Traditionally, it is used by the Mexican people to treat gastrointestinal diseases and as a hallucinogen. In India, it was used in Lohit region in Arunachal Pradesh to treat people stung by a scorpion. In Indonesia, it is used to treat ulcers, ear and eye infections. The roots of the plant is used to cure diabetes (Kowalczyk et al. 2024). The plant is easily available and leaves are found in large numbers on plant. The present study was focused on preliminary investigation of phytochemicals present in leaves of plants growing in Kalindi college campus of University of Delhi.

***Corresponding Author**
E.mail: ranjanaroymishra@kalindi.du.ac.in

Phytochemical tests were done in aqueous leaf extracts for the presence of alkaloids, tannins, saponins, flavonoids, sterols and terpenoids. Aqueous extraction was chosen because it is simple, fast, economical and eco-friendly. The procedure used in the study is very rapid and eco-friendly.

Materials and Methods

Fresh leaves of *Plectranthus scutellarioides* were collected from the campus of Kalindi College, University of Delhi campus. All the experiments were carried out in the months of April-November 2023. The experiments were repeated thrice to confirm the results.

Plant extract: 20 gm of fresh and clean Leaves were taken and washed in running tap water to remove any dirt. Leaves were grinded in the pestle and mortar to crush thoroughly to make fine and uniform paste.100 ml of distilled water was added and filtered the extract with the help of muslin cloth.

Phytochemical analysis

Test for Alkaloids (Salehi-Surmaghi 1992)

3ml of the extract was taken in a test tube containing 5ml of 1.5% HCl. Filtered and filtrate was used for alkaloid detection by Hager's method:

Hager's Test: 2 ml of filtrate was taken and add few drops of Hager's reagent in a test tube. Formation of yellow colour precipitate indicated the presence of alkaloids.

Test for Saponins (Kapoor et al. 1969)

Foam Test: 2ml of extract taken and added 10 ml of distilled water in a test tube and shaken vigorously. Formation of foam indicated saponin.

Test for Terpenoids (Harborne 1973)

Terpenoids Test: Dissolved 2 ml of the extract in 2 ml of chloroform and evaporated to dryness. Added 2 ml of concentrated sulphuric acid and heated for about 2 minutes. Development of a greyish colour indicated the presence of terpenoids.

Test for Tannins (Salehi-Surmaghi 1992)

Ferric Chloride Test: 2 ml of the extract was taken and added 2 ml of distilled water in a test tube. Added a few drops of 5% ferric chloride ($FeCl_3$) solution (in 90% alcohol). Formation of green precipitate indicated of the presence of tannins.

Test for Flavonoids (Salehi-Surmaghi 1992)

Lead acetate Test: 1 ml of extract was taken, added 1 ml of 10% lead acetate solution. The formation of a yellow precipitate indicated presence of flavonoid**s.**

Test for Sterols (Gibbs 1974)

Salkowski's Test: Evaporated 2 ml of extract to dryness and dissolved the residue in 2 ml of chloroform. Added 2 ml of concentrated sulphuric acid from the side of the test tube. Shaken and allowed to stand for few minutes. The development of red colour in the chloroform layer indicated the presence of sterols.

Results and Discussion

The phytochemical tests done on *Plectranthus scutellarioides (Coleus*) are summarized in the table 1. From the table and figure 1 it could be seen that terpenoid and tanninn were absent in aqueous leaf extracts while alkaloid, saponins, flvanoid and sterols were present.

Table1: Phytochemical constituent of *Plectranthus scutellarioides* (*Coleus*)

Plant	Saponin	Alkaloid	Flavonoid	Tannin	Sterols	Terpenoid
Plectranthus scutellarioides	+++	+	++	-	+++	-

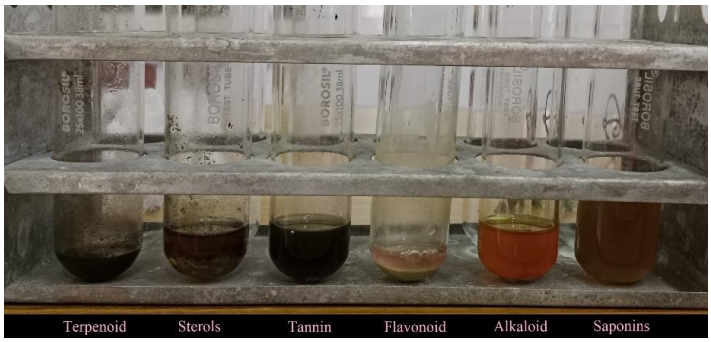

Figure 1: QualitativePhytochemical analysis of *Plectranthus scutellarioides* (*Coleus*)

Plectranthus scutellarioides (*Coleus*) is a medicinal plant which has antibacterial, antioxidant, antifungal, anti-inflammatory, anti-diabetic and anti-cancer properties. It is also used for the treatment of ulcers, ear and eye infections (Kowalczyk T et al. 2024). Coleus eye drops are used to treat glaucoma (Vitiello et al. 2023)**.**

Phytochemical analysis conducted on the leaf extract of *Plectranthus scutellarioides* (*Coleus*) revealed the presence of constituents which are

known to exhibit medicinal as well as physiological activities. Analysis of the leaf extracts revealed the presence of phytochemicals such as flavonoids, saponins, steroids and alkaloids while tannins and terpenoids were absent.

Alkaloids test showed positive result in the present study. Alkaloids are one of the largest components produced by plants. They are present in approximately 20 % of higher plants (Teoh 2015). *Alkaloids* are associated with many medicinal properties like analgesic, antispasmodic and antibacterial. *Alkaloids* are used in the treatment of diseases like malaria, diabetes etc (Kurke, 2019).

Aqueous leaf extracts showed positive test for saponins. *Saponins* are known for anti-inflammatory properties. *Saponins* are natural compounds that can form stable foam when shaken with water. *Saponins* are involved in defense against diseases and herbivores and are used as natural detergents as they have soap like properties (Kregiel et al., 2017, Mishra 2024).

Flavonoid test was also positive in our study. Flavonoids are a diverse group of plant compounds that often show vivid colours. They are hydroxylated phenolic substances synthesized by plants in response to microbial infection. Flavonoids have antioxidant properties and synthesized in response to microbial infection in plants.(Agidew 2022; Savithramma et al. 2011)

Sterol test was also positive in our study. Sterols are a class of lipids present in cell membranes. *Sterols* have been reported to have antibacterial properties (Mishra 2024). Sterols controls the fluidity and stability of cell membranes. They are also precursors for the synthesis of various hormones and play a vital role in cell signalling (Vaghasiya et al. 2022). Phytosterol is the main sterol in plants.

The results obtained in this study confirms the presence of different phytochemicals present in *Coleus* plant (Dasari et al. 2018). It suggest that identified phytochemical compounds are be the bioactive constituents and the Coleus plants can be explored further for isolating purified bioactive compounds of medicinal importance.

Conclusion

In this study, phytochemical analysis revealed the presence of medicinally important constituents in *Plectranthus scutellarioides* (*Coleus*). Several earlier studies have confirmed that these phytochemicals contribute medicinal as well as physiological properties in the treatment of different ailments. Therefore, extracts from this plants could be seen as a good source for useful drugs. It is recommended to use this plant for traditional folk medicine practice and further work is required to isolate, purify, and characterize the active constituents responsible for medicinal properties of this plant.

Acknowledgements

The author is grateful to Department of Botany, Kalindi college for the laboratory facilities and Laboratory staff for assistance during investigation. All the experiments were carried out as a part of Generic Paper Ethno-Botany in Kalindi College, University of Delhi.

References

1. Agidew, M G (2022) Phytochemical analysis of some selected traditional medicinal plants in Ethiopia. *Bull Natl Res Cent* 46, 87.
2. Dasari P, Baburao N, Chekuri S, Rani AR (2018). Evaluation of Phytochemical screening of Coleus forskohlii L. leaf extract. J Phytopharmacol: 7(5):437-439.
3. Gibbs RD (1974)Chemotaxonomy of Flowering Plants. Vol.1, McGill Queen's University Press, Montreal and London.
4. Harborne JB (1973) Phytochemicals Methods. Chapman and Hall Ltd., London, pp. 49-188.
5. Kapoor JD, Singh A, Kapoor SL, Srivastava SN (1969) Survey of Indian Medicinal Plants for saponins, alkaloids and flavanoids. Lloydia 32: 297-302
6. Kowalczyk T, Sikora J, Merecz-Sadowska A, Kukula-Koch W, Synowiec E, Majda A, Juda D, Śliwiński T, Sitarek P. (2024) Biological Properties of Extracts Obtained from In Vitro Culture of *Plectranthus scutellarioides* in a Cell Model. Int J Mol Sci. 15;25(2):1043. doi: 10.3390/ijms25021043.
7. Kurek, J (2019). Introductory Chapter: Alkaloids - Their Importance in Nature and for Human Life. Alkaloids - Their Importance Nat. *Hum. Life*, 1–7.

8. Kregiel D, Berlowska J, Witonska, I, Antolak H, Proestos, C, Babic M, Babic, L. & Zhang, B. (2017) Saponin-Based, Biological-Active Surfactants from Plants. *Appl. Charact. Surfactants.*
9. Mishra, R R (2024) Phytochemical analysis and comparison of some selected plants. *Vegetos*
10. Salehi-Surmaghi, MH; Aynehchi M H Y; Amin GH and Mahhmoodi (1992) Survey of Iranian plants for saponins, alkaloids, flavanoids and tannins IV. DARU 2: 1-11.
11. Savithramma N, Linga Rao M, Suhrulatha D. Screening of Medicinal Plants for Secondary Metabolites, Middle-East J Sci Res, 2011, 8(3): 579-584.
12. Teoh E S (2015) Secondary Metabolites of Plants. Medicinal Orchids of Asia 59–73.
13. Vaghasiya Y; Dave R; Chanda S (2011) Phytochemical Analysis of Some Medicinal Plants from Western Region of India. Res Jour of Medicinal Plant 5 (5): 567-576.
14. Vitiello L, Capasso L, Cembalo G, De Pascale I, Imparato R, De Bernardo M.(2023) Herbal and Natural Treatments for the Management of the Glaucoma: An Update. Biomed Res Int. 2023 Nov 17; 2023:3105251.
15. Wikipedia (2025) *Coleus scutellarioides* https://en.wikipedia.org/wiki/Coleus_scutellarioides accessed on 21.2.2025

Cite this article as:
Mishra R. R. (2025). Phytochemical analysis of *Plectranthus scutellarioides* (Coleus). *Int. J. of Pharm. & Life Sci*., 16(5): 6-9.

Source of Support: Nil
Conflict of Interest: Not declared
For reprints contact: ijplsjournal@gmail.com