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Qualitative Phytochemical Analysis of *Muehlenbeckia Platyclada*: A Study on Leaf Extract

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Abstract: ***Phytochemical tests are the first step in understanding the chemical compounds that a plant contains and their potential health benefits. Phytochemical screening of MuehlenbeckiaPlatyclada leaf extract was carried out using water as the extraction solvent to identify the presence of bioactive secondary metabolites. The study focused on detecting compounds such as alkaloids, flavonoids, tannins, saponins, glycosides and phenolic using standard qualitative tests. The aqueous extract revealed the presence of several phytoconstituents, such as flavonoids, sterols, anthraquinone, proteins, phenolic compounds, carbohydrates, glycosides and coumarins indicating that MuehlenbeckiaPlatyclada leaves are a rich source of biologically active compounds. These findings support the potential use of MP in traditional medicine and provide a basis for further pharmacological and therapeutic investigations.***

Keywords: MuehlanbeckiaPlatyclada, Phytochemical Screening, Bioactive Compounds, Aqueous Leaf Extract.

I. INTRODUCTION

Medicinal plants are an important source of natural bioactive compounds and have been widely used in traditional systems of medicine for the treatment of various diseases [1]. Phytochemicals such as alkaloids, flavonoids, tannins, saponins, phenolic compounds and glycosides are responsible for the therapeutic properties of plant materials [2]. Hence, phytochemical analysis serves as a preliminary and essential step in identifying these biologically active constituents [3]. *MuehlenbeckiaPlatyclada* is a medicinally significant plant belonging to the family Polygonaceae and is traditionally used for its antioxidant, anti-inflammatory, and antimicrobial properties. The leaves of *MuehlenbeckiaPlatyclada* are rich in secondary metabolites that may contribute to its pharmacological activities [4]. However, systematic scientific evaluation of its phytochemical constituents is necessary to validate its medicinal potential. Distilled water is commonly used as an extraction solvent due to its safety, eco - friendly nature and relevance to traditional herbal preparations [5]. Aqueous extracts are particularly important as they reflect the form in which plant materials are most often consumed in folk medicine [6]. Therefore, phytochemical analysis of the aqueous leaf extract of *MuehlenbeckiaPlatyclada* was carried out to qualitatively identify the presence of major phytoconstituents and to provide a scientific basis for its therapeutic applications and further pharmacological investigations.

II. MATERIALS AND METHODS

A. Materials

1) Collection of Plant Materials

Fresh and healthy leaves of *MuehlenbeckiaPlatyclada* leaf (Fig.1.) were collected fromBisalavadiVillage, Chamrajnagar district, Karnataka, India. The leaf were collected and washed with tap water for 2 – 3 times and were shade dried and powdered and stored in air tight container [7].



Fig. 1. MuehlenbeckiaPlatycladaPlant

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2) Plant Description

Muehlenbeckia Platyclada is an unusual ever green shrub characterized by its flattened, ribbon like green stems that resemble tapeworm segments. The stems are jointed at intervals, giving the plant a segmented appearance. Leaves are small, scale like and often inconspicuous or shed early, making the plant appear almost leafless. It produces small, brownish white flowers in the leaf axils, followed by tiny fruits. This plant typically grows up to 1 – 2 feet in height and spreads laterally, forming a dense, wiry mass of stems. It thrives in warm, humid climates, prefers partial shade to bright indirect light and is drought tolerant once established. It is commonly grown as an ornamental plant for its unique architectural form.

TABLE I.
SCIENTIFIC CLASSIFICATION OF *MUEHLENBECKIAPLATYCLADA*

Kingdom	Plantae
Division	Angiosperm
Clade	Eudicots
Order	Caryophyllales
Family	Polygonaceae
Genus	Muehlenbeckia
Species	*MuehlenbeckiaPlatyclada*

3) Preparation of Leaf Extract

5g of dried and powdered *MuehlenbeckiaPlatyclada* leaf (Fig. 2.) was dissolved in 250 mL of distilled water taken in 400 mL beaker and boiled for about 2 h in water bath and filtered using filter paper. The filtered extract was collected and used fresh for further studies[8] (Fig. 3.).



Fig. 2. Dried Powder of *MPL*



Fig. 3. *MPL*Extract

B. Methods

1) Phytochemical Studies

Preliminary phytochemical screening of the aqueous *MP* leaf extract was carried out using standard qualitative methods by Kokate (1999) and Harborne (1984) (Table 2) to identify the presence of major secondary metabolites [9] (Table 2).

TABLE II
STANDARD PROCEDURE TO IDENTIFY PHYTOCHEMICAL GROUPS PRESENT IN *MPL* EXTRACT

S.No.	Group	Test Performed	MethodofIdentification	Inference
1	Alkaloids	Dragendorff'sTest	Extracts were treated withMayer's reagent.	Formation of whiteor yellow colouredprecipitate.
2	Flavonoids	Alkaline Reagent Test	The plant extract was dissolved in dilute sodium hydroxide and treated with dilute HCl.	Appearance of yellow colour.
3	Terpenoids	LibermannTest	The plant extract was dissolved in chloroform, treated with acetic anhydride, and addition of con. H_2SO_4.	Formation of blue, green or reddish brown colour.
4	Anthraquinone	Borntrager'sTest	The plant extract was boiled with dilute H_2SO_4,cooled,extractedwith chloroform and the chloroform layer was shaken with dilute ammonia.	Appearance of pink, red or violet colour.
5	Phenolic compounds	Xanthoproteic Test	To 2 mL of the sample solution, 1 mL of concentrated nitric acid was added, gently heated, cooled and treated with excess sodium hydroxide or ammonia solution.	Formation of yellow to orange colour
6	Quinones	Concentrated HydrochloricAcid Test	The plant extract was treated with a few drops of HCL.	Formation of red or violet colour.
7	Carbohydrates	Fehling's Test	2 mL of the extract were added to Fehling's solution and boiled for 5 minutes.	Formation of a brick red precipitate.
8	Tannins	Gelatin Test	A few drops of ferric chloride solution were added to 2 mL of the plant extract.	Appearance of a greenish black or bluish black colour.
9	Saponins	Shaken with water	2 mL of the extract were diluted to 10 mL with distilled water and shaken for 15 minutes.	Formation of froth

10	Glycosides	Alkaline Reagent Test	2 mL of plant extract was taken in test tube, 2 – 3drops of aqueous sodium hydroxide (NaOH) was added and mixed well.	Appearance of yellow colour
11	Coumarins	Alkaline Chloroform Test	The plant extract was dissolved in chloroform, treated with a few drops of dilute sodium hydroxide and exposed to UV light.	Appearance of yellow fluorescence.
12	Proteins	Xanthoproteic Test	2 mL of the plant extract was taken in a test tube. 1 – 2 mL of concentrated nitric acid (conc. HNO_3) was added carefully and heated gently in a water bath.	Formation of yellow / orange colour.
13	Sterols	Libermann Test	2 mL of the plant extract was taken in a dry test tube and 2 mL of acetic anhydride was added and mixed gently. Then 1 – 2 drops of concentrated sulphuric acid (H_2SO_4) was added along the side of the test tube.	Appearance of blue or green colour.

III. RESULTS AND DISCUSSION

A. PhytochemicalAnalysis

Phytochemical screening of *MPL* extract (Table III) revealed the presence of flavonoids,anthraquinone, phenoliccompounds, carbohydrates, glycosides, proteins, sterols and coumarins (Fig.4).

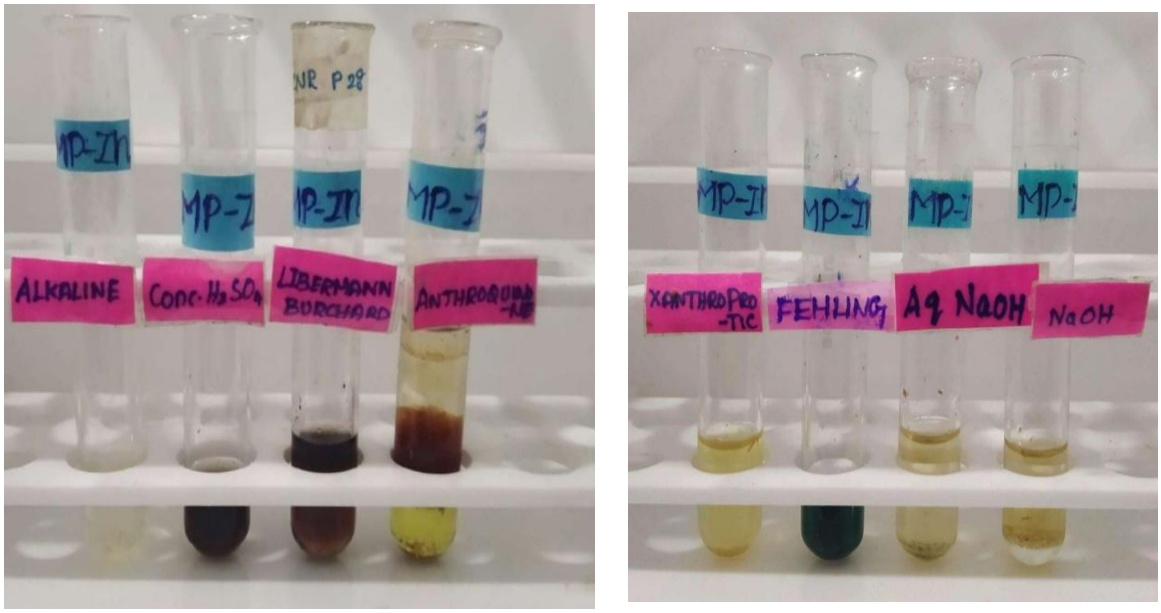


Fig. 4. Phytochemical Analysis of *MuehlenbeckiaPlatyclada* Leaf Extract

TABLE III
PHYTOCHEMICAL CONSTITUENTS PRESENT IN *MPL* EXTRACT

1	Alkaloids	-
2	Flavonoids	+
3	Terpenoids	-
4	Anthraquinone	+
5	Phenolic compounds	+
6	Quinones	-
7	Carbohydrates	+
8	Tannins	-
9	Saponins	-
10	Glycosides	+
11	Coumarins	+
12	Proteins	+
13	Sterols	+

KEYWORDS:'+' PRESENT, '-' ABSENT

IV. CONCLUSIONS

The phytochemical analysis of the aqueous leaf extract of *MuehlenbeckiaPlatyclada*revealed the presence of various bioactive secondary metabolites, such as flavonoids,anthraquinone, phenolic compounds, carbohydrates, glycosides, coumarins, proteins and sterols. The detection of these phytoconstituents indicates the medicinal potential of the plant and supports its traditional use. The use of water as an extraction solvent highlights an eco-friendly and safe approach, closely resembling traditional herbal preparations. Overall, the results suggest that *MuehlenbeckiaPlatyclada* leaves are a valuable source of natural phytochemicals and may serve as a promising candidate for further pharmacological studies, isolation of activecompoundsand development of plant-based therapeutic agents.

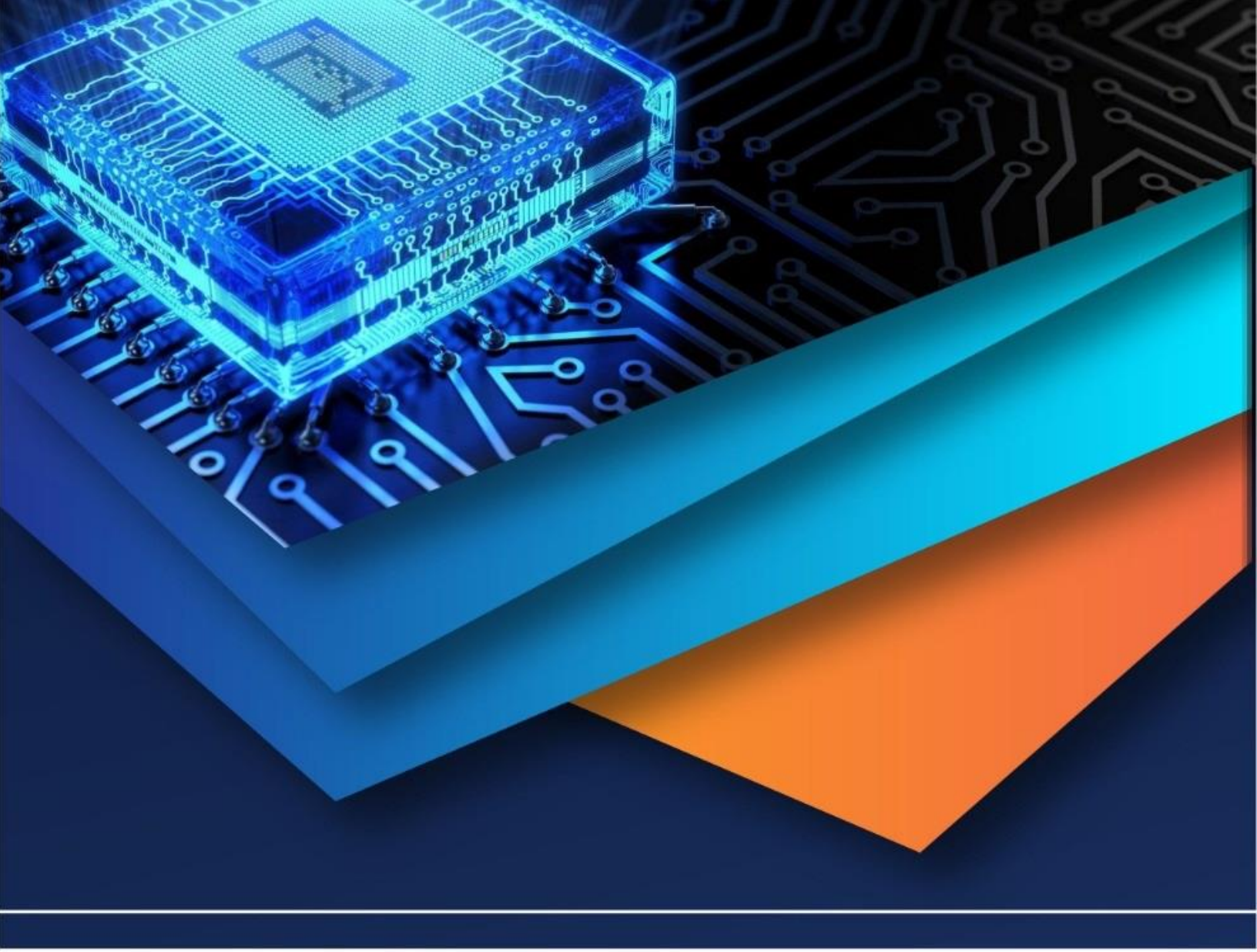
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REFERENCES

[1] H. O. Edoga, D. E. Okwuand B. O. Mbaebie.Phytochemicals constituents of some Nigerian medicinal plants. AfricanJournalofBiotechnology. 4(7), 685 – 688, 2005
[2] K. Sahira Banuand L. Cathrine.General techniques involved in phytochemical analysis. Internationaljournalofadvancedresearchinchemicalscience. 2 (4), 25-32, 2015.
[3] Vishnu Balamurugan, Sheerin Fatima and Sreenithi Velurajan. A guide to phytochemical analysis. Internationaljournalofadvancedresearchinchemicalscience. 5(1), 236-245, 2019.
[4] Abdul Wadood, Mehreen Ghufran, S Babar Jamal, Muhammad Naeem, Ajmal Khan and R Ghaffar. Phytochemical analysis of medicinal plants occurring in local area of Mardan.Biochem anal biochem 2 (4), 1-4, 2013.
[5] Min Yang, Jianghao Sun, Zhiqiang Lu, Guangtong Chen, Shuhong Guan, Xuan Liu, Baohong Jiang, Min Ye and De-An Guo. Phytochemical analysis of traditional Chinese medicine using liquid chromatography coupled with mass spectrometry. JournalofChromatography A 1216 (11),2045-2062,2009.
[6] Pinal Patel, Nivedita Patel, Dhara Patel, Sharav Desai and Dhananjay Meshram.Phytochemical analysis and antifungal activity of Moringa oleifera. InternationalJournalofPharmacyandPharmaceuticalSciences 6 (5), 144-147,2014.
[7] Vikrant Arya, Narender Thakurand C.P. Kashyap. Preliminary phytochemical analysis of the extracts of Psidium leaves.JournalofPharmacognosyandPhytochemistry 1 (1), 1-5, 2012.
[8] Jigna Parekh and Sumitra Chanda. In vitro antimicrobial activity and phytochemical analysis of some Indian medicinal plants. Turkish journal of biology 31 (1), 53-58, 2007.
[9] Teresa Carbonara, Rossana Pascale, Maria Pia Argentieri, Paride Papadia, Francesco Paolo Fanizzi, Luciano Villanova and Pinarosa Avato. Phytochemical analysis of a herbal tea from Artemisia annua L.Journal of pharmaceutical and biomedical analysis 62, 79-86,2012.

[10] Alba Tor-Roca, Mar Garcia-Aloy, Fulvio Mattivi, Rafael Llorach, Cristina Andres-Lacueva, Mireia Urpi–Sarda. Phytochemicals in legumes: a qualitative reviewed analysis. Journal of Agricultural and Food Chemistry 68 (47), 13486-13496, 2020.
[11] P. Ancy, V Padmaja, M. A. Kuriachan, P. S. Shijikumar, R Nithin Manohar. Muehlenbeckiaplatyclada (Polygonaceae) an Overview. World Journal of Pharmaceutical Research,6(11),195 – 199,2017.
[12] Jenson Jacob and Meenu John.Phytochemical screening, in-vitro antioxidant and anti-protease activities of various solvent extracts of Muehlenbeckia platyclada root (F. Muell.) Meisn.International Journal of Herbal Medicine 10, 23-28, 2022.
[13] Sneha Nawale, M Sindhu Bhargavi and K Prasanna Laxmi. Development, Characterization and Evaluation of Nano Formulation of Abrus Precatorius Root Extract for Anti Inflammatory Activity.Journal of Research in Medical and Dental Science .9 (4), 149-156, 2021.
[14] Ahlem Karbab, Noureddine Charef and Lekhmici Arrar .Phenolic contents, in vitro antioxidantand in vivo anti-inflammatory studies of aqueous extract from Pituranthos scoparius growing in Algeria.Iran Journal of Pharmacol, 17, 1-5, 2019.
[15] Tristania Magdalena Dumatubun and Senda Kartika Rakainsa.Antibacterial Activity Test of Guava Leaf Ethanol Extract against Staphylococcus epidermidis and its Formulation as Anti-Acne Serum. Journal of Science and Technology Research for Pharmacy 4 (2), 1-17, 2024.



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