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Preliminary Phytochemical analysis of leaf extract of *Blumea lacera* DC at Gaya District

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ABSTRACT

Blumea lacera DC. is a wild herb belonging to Asteraceae family. It is commonly found in wastelands and agricultural fields of India. The plant has been used in traditional medicine for treating wounds, skin diseases, boils and inflammation. The main reason for medicinal use is presence of secondary metabolites like alkaloids, flavonoids, phenols and tannins. However, the amount of these compounds can vary with geographical location, soil type and climatic condition.The present study was designed to evaluate the phytochemical profile of leaf extracts of B. lacera collected from five different locations of Gaya District, Bihar. The locations selected were Gaya City, Belaganj, Bodhgaya, Tekari and Dobhi. The leaves were extracted using three solvents: methanol, ethanol and distilled water. Both qualitative and quantitative phytochemical tests were performed. Results indicated that methanol extract gave the highest yield compared to other solvents. Qualitative analysis showed presence of alkaloids, flavonoids, phenols, tannins and saponins in all samples. Quantitative analysis revealed that Dobhi and Tekari samples had significantly higher total phenol and flavonoid content. The highest phenol content 78.9 mg GAE/g and flavonoid content 61.4 mg QE/g was recorded in Dobhi sample. Belaganj sample showed lowest values. This study concludes that geographical variation affects the chemical composition of B. lacera. Plants from Dobhi and Tekari are better in terms of phytochemical content. The high amount of phenols and flavonoids supports the traditional use of this plant for antimicrobial and wound healing purpose. Further work is needed to isolate and identify the active compounds responsible for medicinal activity.

Keywords: Blumea lacera, Phytochemical analysis, Leaf extract, Gaya District, Geographical variation, Phenols, Flavonoids

1. Introduction:

Plants have been the backbone of traditional medicine system since ancient times. According to WHO, about 80% of people in developing countries depend on plants for primary health care. India is rich in medicinal plant biodiversity. Many wild plants are used by local people for treatment of common ailments.

Blumea lacera DC. is an annual herb belonging to family Asteraceae. It is locally called "Kukronda" or "Jangli muli". The plant grows up to 60-90 cm height and is found

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throughout India in open places, road sides and crop fields. The leaves are lance shaped and have strong aromatic smell.In traditional system of medicine, leaf paste of B. lacera is applied on cuts, wounds, boils and skin infections. Leaf juice is also used for stomach problems and fever. The plant is reported to have anti-inflammatory, antimicrobial and antioxidant properties.

The therapeutic property of any medicinal plant is due to presence of secondary metabolites. Major groups include alkaloids, flavonoids, phenols, tannins, saponins and terpenoids. Phenols and flavonoids are especially important because they show antioxidant and antimicrobial activity.It is well known that chemical composition of a plant is not fixed. It changes with place of collection. Factors like soil nutrients, rainfall, temperature and sunlight affect the production of secondary metabolites. This is called geographical variation.

Gaya District is located in South Bihar. It has diverse agro-climatic zones. B. lacera is common in this district. However, till date no scientific work has been done to compare the phytochemical content of B. lacera from different areas of Gaya. Keeping this in mind, the present study was undertaken with following objectives:

a) To collect B. lacera leaves from five different locations of Gaya District.
b) To prepare extracts using different solvents and compare yield.
c) To perform qualitative and quantitative phytochemical analysis.
d) To find out which location gives best quality plant material.

2. Material And Methods:

2.1 Plant Material and Study Area

Fresh leaves of Blumea lacera were collected from five locations of Gaya District during the period of November 2024 to February 2025. The locations were: Gaya City, Belaganj Block, Bodhgaya, Tekari and Dobhi. The plant was authenticated with the help of "Flora of Bihar" and herbarium of Botany Department.

2.2 Preparation of Plant Material

The collected leaves were washed thoroughly with tap water to remove dust. Then they were shade dried at room temperature for 15 days. Dried leaves were ground into coarse powder using electric grinder. The powder was stored in airtight container for further use.

2.3 Extraction Procedure

10 grams of leaf powder was taken and extracted with 100 ml of three solvents: methanol, ethanol and distilled water separately. Hot continuous extraction was done using Soxhlet apparatus for 6 hours. After extraction, the extract was filtered through Whatman filter paper No.1. The filtrate was concentrated and dried. Percentage yield was calculated using formula:

Yield % = (Weight of dry extract / Weight of dry powder) x 1002.

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2.4 Qualitative Phytochemical Screening

The methanol extract of all five locations was subjected to qualitative tests for detection of alkaloids, flavonoids, phenols, tannins, saponins and terpenoids using standard procedures described by Harborne and Khandelwal.

2.5 Quantitative Phytochemical Analysis

1. Total Phenolic Content: Total phenol was estimated by Folin-Ciocalteu method. Gallic acid was used as standard. Result was expressed as mg Gallic acid equivalent per gram of extract.
2. Total Flavonoid Content: Total flavonoid was estimated by Aluminum chloride method. Quercetin was used as standard. Result was expressed as mg Quercetin equivalent per gram of extract. All experiments were done in triplicate and average value was taken.

3. Result and Discussion:

3.1 Extraction Yield

The percentage yield of extract was different for different solvents and locations. Among the three solvents, methanol gave highest yield followed by ethanol and water. This is because methanol is able to extract both polar and moderately polar compounds. Among locations, Gaya City and Dobhi gave higher yield while Bodhgaya gave lowest yield. This may be due to difference in leaf thickness and moisture content.

3.2 Qualitative Analysis

Qualitative screening of methanol extract showed presence of alkaloids, flavonoids, phenols, tannins and saponins in all samples. However, the intensity of test was different. Dobhi and Tekari showed strong positive test for most of the compounds. Belaganj showed weak reaction.

3.3 Quantitative Analysis

The data for quantitative analysis is given in Table 1.

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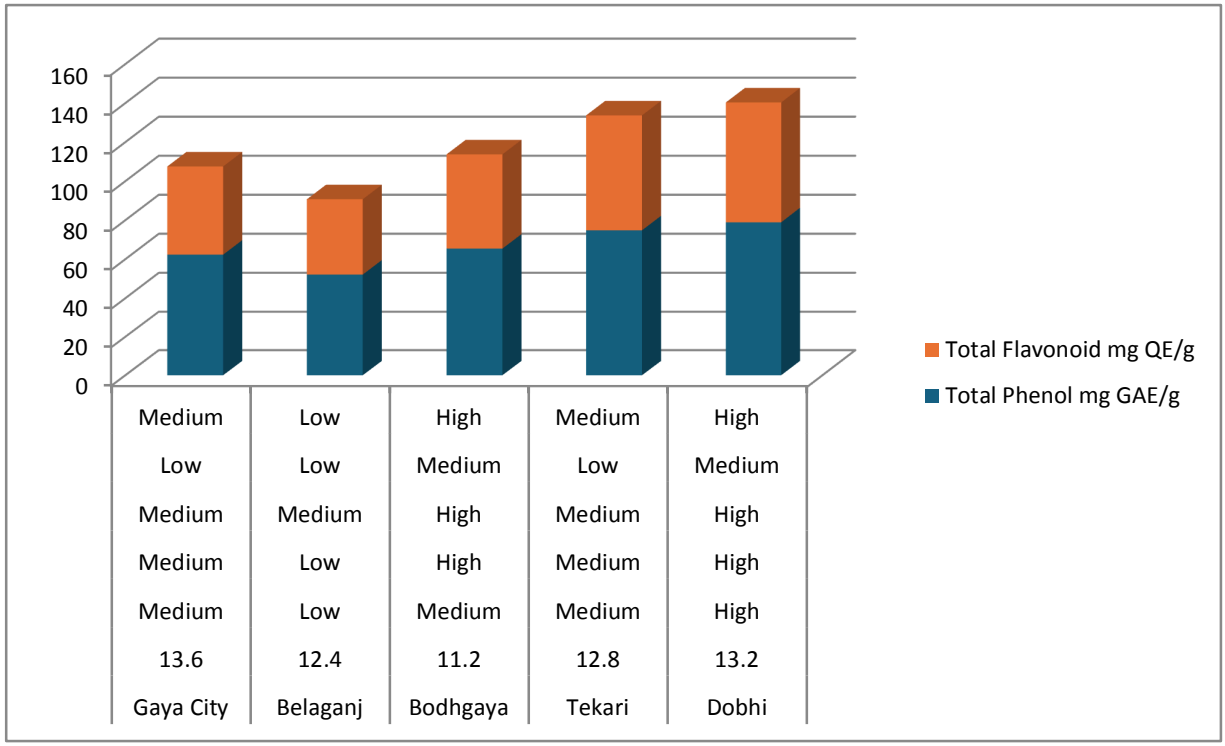
Table 1: Phytochemical and quantitative analysis of methanol leaf extract of B. lacera from Gaya District.

Location	Yield %	Alkaloids	Flavonoids	Phenols	Tannins	Saponins	Total Phenol mg GAE/g	Total Flavonoid mg QE/g
Gaya City	13.6	Medium	Medium	Medium	Low	Medium	62.3	45.2
Belaganj	12.4	Low	Low	Medium	Low	Low	52.1	38.6
Bodhgaya	11.2	Medium	High	High	Medium	High	65.4	48.3
Tekari	12.8	Medium	Medium	Medium	Low	Medium	74.8	58.9
Dobhi	13.2	High	High	High	Medium	High	78.9	61.4



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4. Discussion of Results:

From Table 1 it is clear that there is geographical variation in phytochemical content. Dobhi location recorded maximum total phenol 78.9 mg GAE/g and total flavonoid 61.4 mg QE/g. Tekari was second with 74.8 mg/g phenol. Belaganj showed minimum values 52.1 mg/g phenol and 38.6 mg/g flavonoid.The high content of phenols and flavonoids in Dobhi and Tekari may be due to fertile soil and better climatic condition of that area. Phenolic compounds are known to protect plants from stress. Flavonoids are also produced more under good growing condition.

The presence of alkaloids, flavonoids and phenols supports the medicinal use of B. lacera. Many research papers have reported that these compounds have antibacterial, anti-inflammatory and antioxidant activity. This explains why local people use this plant for wound healing and infection.

Methanol was found best solvent because it extracted maximum amount of phytochemicals. Similar results were reported by Singh et al and Ghosh et al in their work on Blumea species.Our study suggests that for collection of B. lacera for medicinal purpose, Dobhi and Tekari areas are better. Standardization of plant material should consider geographical source.

5. Conclusion:

The present investigation shows that Blumea lacera leaf is a rich source of phytochemicals. The study revealed that chemical composition varies with location. Methanol extract showed presence of alkaloids, flavonoids, phenols, tannins and saponins. Quantitative analysis proved that Dobhi and Tekari samples are superior in terms of phenol and flavonoid content. High amount of these compounds indicates good antioxidant and antimicrobial potential.

Based on this study we can conclude that B. lacera has good potential for development of herbal medicine. However, further study is needed to isolate pure compounds and test their biological activity. Also, seasonal variation should be studied in future.

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