

## CHAPTER-15

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### QUALITATIVE PHYTOCHEMICAL ANALYSIS OF MEDICINAL PLANTS OCCURRING IN LOCAL AREA OF ACHALPUR REGION

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**P. G. Khapekar<sup>1</sup>, S.G. Hate<sup>2</sup>, S. S. Deshbhratar<sup>1</sup>, K. G. Bhore<sup>1</sup>**

<sup>1</sup>Jagadamba Mahavidyalaya, Achalpur Dist Amravati- 444806 (M.S.) India

<sup>2</sup>DRB Sindhu Mahavidyalaya, Nagpur - 440017 (M. S.) India

Email: [pradbnayakhapekar76@gmail.com](mailto:pradbnayakhapekar76@gmail.com); [hatesandeep@gmail.com](mailto:hatesandeep@gmail.com); [savitadbok83@gmail.com](mailto:savitadbok83@gmail.com); [kajalbore2000@gmail.com](mailto:kajalbore2000@gmail.com)

#### Summary

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Phytochemicals are secondary metabolites produced by all the plants in which some has traditional medicinal uses. Many of the natural products are derived from plants which can be biological active compound. *Holoptelea integrifolia* and *Bauhinia variegata* are common drug of the ayurvedic system of medicine used in different ayurvedic formulation for treatment of various ailments. The dried leaves were subjected to successive Soxhlet extraction by taking the solvents like petroleum ether and acetone. These solvent extracts were subjected to a phytochemical evaluation to detect the different chemical principles present i.e. protein, carbohydrates, steroids, alkaloids, terpenoids, flavonoids, saponin, phenolic compound in medicinally important plants of *Holoptelea integrifolia* and *Bauhinia variegata* were studied. In this investigation, both of the plants in different solvents shows majorly active biocompounds.

**Keyword:** Phytochemical, H. Integrifolia, B. Variegata, Leaf powder, Solvent

#### Introduction

Traditional therapeutic system gives knowledge about a lot of locally available medicinal plants (Devi et. al., 2023). Unfortunately, the population of local medicinal plant is declined due to the population hike of invasive species and lack of awareness among the population of regions. Subspecies are lot in number in different part of India and world. Among them, *Holoptelea integrifolia* and *Bauhinia variegata* are popular medicinal agent in Indian Ayurveda, Unani and Siddha. *Holoptelea integrifolia* (Roxb) is a multipurpose medicinal plants from

the Ulmaceae family, commonly known as Indian Elm. The plant is a huge deciduous tree can reached a height of 25m, white to whitest gray bark and 6 to 8 mm thick, smooth bark, simple, alternating, stipulate, ovate or elliptic and acuminate are the characteristic of the leaves. When the leaves are crushed unpleasant smell is released. Small, greenish purple, polygamous flowers are found in axillary, fascicle or short raceme. Fruits are single seeded and small pale and kidney shaped seeds (Ragula, et. al.). Decoction of leaves is used to regulate fat metabolism, treat ring- worms, Eczema and cutaneous diseases.

*Bauhinia variegata* also known as kanchanar belong to family Leguminaceae. It is used traditionally as medicine for the treatment of various diseases like infection, diabetes, pain and inflammation edema, leprosy, wounds etc. due to presence of many phytochemicals. *Bauhinia variegata* balance all the three (Doshas, Kapha, Pitta and Vata) and beneficial diseases like chronic, lymphadenitis, goiter, worms infection and wound healing. It is a species of flowering plant, deciduous medium size tree, bark is extremely grayish brown in colour and pale in internally and outer surface is rough due to presence of large number of longitudinal fissures and cracks, leaves are 10 to 15cm in length and in width, broad and subcurious and deeply cordate. Flowers are white, purplish, and five irregular, overlapping fragrant petals.



**Fig. 1. Hicokia integrifolia (Roxb.)**

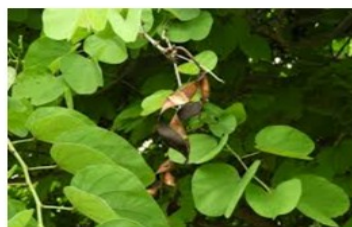


**Fig. 2. Bauhinia variegata (L.) Bauhinia**

Phytochemical screening is the scientific process of analyzing, examining, extracting, experimenting, and thus identifying different classes of phytoconstituents present in various parts of the base for the discovery of drugs, the active components could be further taken for investigation and research. The process was qualitative which is termed phytochemical screening. The outcome of the research could be fruitful in developing potent drugs against various diseases. Phytochemicals are chemicals produced by plants through primary or secondary metabolites. Primary metabolites (amino acids, nucleotides, sugars, acyl lipids) are compound that are directly involved in the growth and development and in process of photosynthesis, respiration, solute transport, translocation, protein synthesis, nutrient assimilation, formation of carbohydrates, proteins and lipids. Secondary metabolites are very specific and found great in numerous among the several group of plants. The secondary metabolites such as alkaloids, tannins, flavonoid, saponin, terpenoids, steroids, etc., Medicinal plants are important species of plants that according to the

traditional medicinal practices and also from modern scientific studies are useful for medicinal purposes to alleviate diseases, make human health more invigorating. These plants are contemplated as rich sources of ingredients that can be used in the synthesis and production of drugs (Oladeji et. al. 2019).

Plants consist of various kinds of chemical constituents known as phytoconstituents (Mercy, et. al. 2017). Phytoconstituents serve the plants by contributing some secondary functions like; helps in plant growth, safe guarding the plants by activating defense mechanism, imparting color, odour, and flavour to the plants (Molyneux et. al. 2007). Natural products and their derivatives exhibit minimal side effects and improved efficacy than other synthetic counterparts (Batiha et al. 2020). These plant-derived components like flavonoids, quinine, terpenoid, etc conduct certain biological functions that enhance therapeutic activities such as anti-carcinogenic, anti-mutagenic, anti-inflammatory, and antioxidant properties (Batiha et. al., 2020).

## Materials and Method

### Collection of plant samples and preparation of extracts

The leaves *Holoptelea integrifolia* and *Bauhinia variegata* were collected from the roadsides of Achalpur in December 2024. The soxhlet method of extraction was adapted using different solvent for phytochemical analysis (Devi et. al., 2023 and Valigatha et. al., 2024). Detection of nine secondary metabolites was carried out using standard methods.

#### *Qualitative phytochemical analysis*

##### *Test for carbohydrates:*

Fehlings test- 1 ml of extract was boiled on water bath with 1ml each of fehling solution A and B. The colour change was observed. A red precipitates indicate the presence of sugar (Ramakrishnan et al., 2013).

##### *Test for saponin:*

About 1 ml of the filtrate of flower extract was taken and mixed with 1 ml of distilled water and allowed to shake it vigorously. The persistent froth formation after shaking confirmed the presence of saponin (Chandra, et. al., 2024).

##### *Test for terpenoids*

About 2 ml of the filtrate of flower extract was added with 6 drops of chloroform and placed in the water bath for a few minutes. Then 6 drops of concentrated H<sub>2</sub>SO<sub>4</sub> were added. The appearance of a reddish-brown interface confirmed the presence of terpenoids (Landge, et.al., 2024).

**Test for Tannin:** Ferric chloride test- The extract was dissolved in 5ml of water and few drops of neutral 5% ferric chloride solution were added. The formation of blue green color indicated the presence of tannins (Ramakrishnan., et. al., 2013).

**Test for flavonoids:** About 1 ml of the filtrate of flower extract was taken and 2 ml of 2 % NaOH solution followed by H<sub>2</sub>SO<sub>4</sub> was added to it. The colour

initially turned to an intense yellow colour with the addition of NaOH solution and later became colourless with sulphuric acid. This colour change confirmed the presence of flavonoids (Kumar, et. al., 2013).

**Test for steroids:** About 1 ml of the filtrate of flower extract was taken. 1 ml of chloroform and 1 ml of concentrated sulphuric acid was added to it. The appearance of upper red and lower yellow with green fluorescence provides a positive result for the presence of steroids (Kumar and Jena, 2014).

**Test for Alkaloids:** Wagner's test- To a 1ml of filtrate, few drops of wagner's reagent are added by the side of test tube. The color change was observed. A reddish brown precipitate confirms the test as positive.(Ramakrishnan, et. al., 2013)

**Test for Proteins:** Xanthoproteic test- The extract was treated with few drops of Concentrated Nitric acid. Boil the solution and cool the solution after that add 40 % of NaOH. If the solution turns yellow then proteins are present and if yellow turns into orange then aromatic amino acid present.

**Test for Phenol:** Lead acetate test- The extract was dissolve in distilled water 3ml of 10% lead acetate solution was added. A bulky white precipitate indicated the presence of phenol. (Ramakrishnan, et al.,2013)

**Table 1.** Phytochemical components of leaves of *Holoptelea integrifolia*

| Sr. No. | Bioactive compounds | Petroleum ether | Acetone |
|---------|---------------------|-----------------|---------|
| 1       | Carbohydrate        | -ve             | +ve     |
| 2       | Saponin             | +ve             | -ve     |
| 3       | Terpenoids          | -ve             | +ve     |
| 4       | Tannin              | -ve             | -ve     |
| 5       | Flavonoids          | +ve             | -ve     |
| 6       | Steroids            | +ve             | +ve     |
| 7       | Alkaloids           | +ve             | -ve     |
| 8       | Proteins            | +ve             | +ve     |
| 9       | Phenol              | +ve             | +ve     |

(-ve: Negative; +ve: Positive)

## Results and Discussion

The phytochemical screening are carried out and found that in *Holoptelea integrifolia* petroleum ether extract showed saponin, flavonoids, steroids, alkaloids, proteins and phenol. However, in acetone extract, Carbohydrates, terpenoids, flavonoids, steroids, proteins and phenol were observed (Table 1). In leaves of *Bauhinia variegata* plant, the petroleum ether extract showed that saponin, flavonoids, steroids, alkaloids and phenol. Instead of that in acetone extract, saponin, terpenoids, proteins and phenol (Table 2).

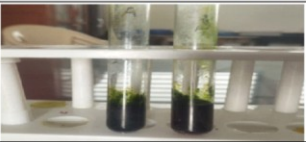
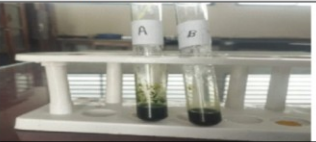
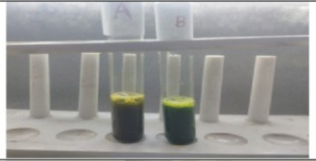
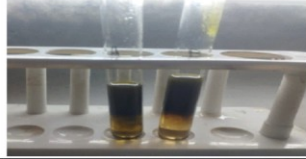
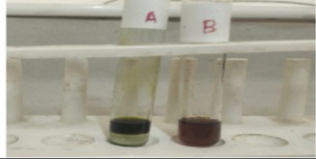
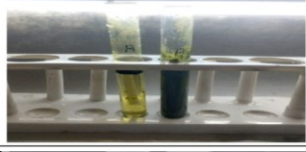
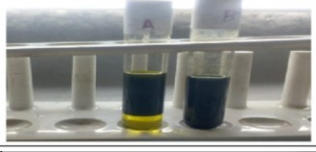
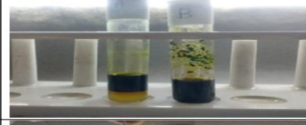
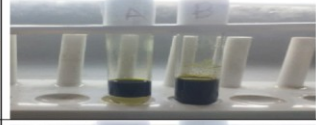
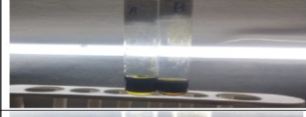
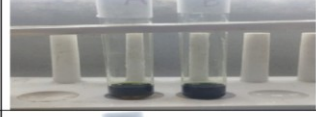
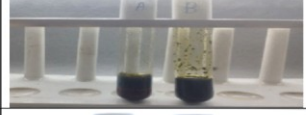
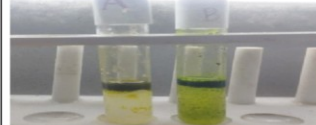
**Table 2.** Phytochemical components of leaves of *Bauhinia variegata*

| Sr.No | Bioactive compounds | Petroleum ether | Acetone |
|-------|---------------------|-----------------|---------|
| 1     | Carbohydrate        | -ve             | -ve     |
| 2     | Saponin             | +ve             | +ve     |
| 3     | Terpenoids          | -ve             | +ve     |
| 4     | Tannin              | -ve             | -ve     |
| 5     | Flavonoids          | +ve             | -ve     |
| 6     | Steroids            | +ve             | -ve     |
| 7     | Alkaloids           | +ve             | -ve     |
| 8     | Proteins            | -ve             | +ve     |
| 9     | Phenol              | +ve             | +ve     |

(-ve: Negative; +ve: Positive)

## Conclusion

The present study validates the medicinal claims of *Holoptelea integrifolia* and *Bauhinia variegata* plants through phytochemical screening. The phytochemical study revealed the presence of proteins, carbohydrates, alkaloids, phenols, saponin, terpenoids, steroids and flavonoids which are compounds capable of causing varied physiochemical and pharmacological effects. The detected compounds might be responsible for curing many health problems. Therefore, there is a need to do more experimental work in ethno-pharmacological aspects.

| Sr. no | Bioactive compounds | Figure <i>Holoptelea integrifolia</i>                                               | Figure <i>Bauhinia variegata</i>                                                    |
|--------|---------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|        |                     | Test tube (A: Petroleum ether; B: Acetone)                                          |                                                                                     |
| 1      | Carbohydrate        |    |    |
| 2      | Saponin             |    |    |
| 3      | Terpenoids          |    |    |
| 4      | Tannin              |    |    |
| 5      | Flavonoids          |    |    |
| 6      | Steroids            |   |   |
| 7      | Alkaloids           |  |  |
| 8      | Proteins            |  |  |
| 9      | Phenol              |  |  |

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