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Phytochemical Investigation of Phyllanthus Maderaspentesis and Biophytum Sensitivum Used by the Pawara Tribe of Dhule District

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Abstract:
Tribal communities in India have a long history of using traditional medicinal plants as primary healthcare. In Dhule District of Maharashtra state of India, tribal people use many indigenous plants to solve various health-related problems in remote areas where no medical facilities are available for them. *Phyllanthus maderaspatensis* (family Phyllanthaceae) and *Biophytum sensitivum* (family Oxalidaceae) are plants used as remedies to cure digestive issues, fever, wounds, and inflammatory conditions by the Pawara tribe. This research study aims to investigate phytochemical analysis of two traditional medicinal plants used by the Pawara tribe which can be useful to create novel drugs. Primary phytochemical analysis reveals the presence of alkaloids, flavonoids, tannins, phenols, and terpenoids, within the genus *Phyllanthus* and *Biophytum* species. Primary phytochemical investigation is very important for identifying plant compounds, validating traditional medicine and discovery of novel drugs. These findings show a scientific basis for further bioactivity testing and isolation of active compounds.

Keywords: Traditional medicine, Phytochemical analysis, Phyllanthus maderaspentsis, Biophytum sensitivum, Active compounds.

1. Introduction:

The research study of *Phyllanthus maderaspentensis*, phytochemical analysis reveals that the aqueous extracts of *Phyllanthus maderaspatensis* possess antibacterial activity. These activities may be due to the presence of phytochemicals such as saponins, carbohydrates, proteins, and tannins which could serve as a lead to the isolation of chemotherapeutic agents. The isolation, identification, characterization and elucidation of bioactive compounds in this plant are ongoing and will be communicated later (Leelaprakash & Dass., 2011). The research study reveals a potential application of *P. maderaspatensis* leaves for the treatment of Ophthalmia, Griping, Liver Affections, Cough, Ascites, Earache, Headache, Incipient Blindness and further investigations should be conducted in order to explore their applications (Karthikeyan et al., 2012). The study reveals that hepatoprotective activity was found in all the three

extracts (water, alcohol and *n*-hexane) of the Indian traditional medicinal plant, *Phyllanthus maderaspatensis*, it is higher in *n*-hexane extract. This extract is found to be superior to silymarin in its efficacy against acetaminophen-induced hepatotoxicity. This extract also showed antioxidant and choleretic activities. It is an attractive material for drug development (Asha, V. V., et al.,2004).
B. sensitivum (L.) has been used for the treatment of various health aliments by various traditional systems of medicine. Phytochemical investigation reveals that *B. sensitivum* contains a different of bioactive content like phenolic and polyphenolic compounds, saponins, tannins, essential oils, carbohydrates etc. These phytoconstituents are thought to contribute to the plant's various medicinal effects (Pawar & Vyawhare.,2014). A literature review revealed that the *Biophytum sensitivum* Dc., which is used in Ayurvedic practice for several remedies like root decoction is used for gonorrhea, fever, and urinary disorders. The leaf part is used for antiexcitement, antifertility, antiseptic, bilious fever, burns, convulsions, cramps, asthma, and wounds as a hemostat, fever, decreasing sexual vigor, diarrhea, headache, malaria, and muscular and rheumatic pain (Roopa D., et al., 2022). In this scientific study the plant *Biophytum sensitivum* and its active ingredients can be used in the maintenance of health as well as the prevention, treatment, or improvement of a variety of diseases. *B. sensitivum* pharmacological potential has been established, and it has been determined to be generally safe in research thus far. Further investigation into the potential involvement of this plant extract and its chemical ingredients in a range of disorders in human models is required (Roopa et al., 2025)

2. Materials and Methods:

2.1. Ethnobotanical Survey:

An ethnobotanical survey is important to preserve traditional knowledge of medicinal plants. It also helps to identify and document of plant pharmacological importance. Field visits were conducted from August 2025 to October 2025, via interviews with tribal healers and elders in selected villages of Shirpur taluka, Dhule District, Maharashtra. Their local names, use of plant parts, preparation method, and therapeutic claims were recorded.

2.2. Plant Collection and Authentication:

Fresh plant material of *P. maderaspatensis* and *B. sensitivum* was collected from Pawara tribe inhabited villages in Shirpur taluka of Dhule District. Botanical identification was confirmed by an expert angiosperm taxonomist with the help of flora.

2.3. Preparation of Extracts:

1. Collection: Healthy disease-free plant specimens were collected and washed to remove dirt.
2. Drying: Plants were shade dried to prevent any loss of active compounds.
3. Grinding: To prepare fine powder, a mortar and pestle and grinder were used.
4. Solvent extraction: 10 gm dried extract powder with 100 ml alcohol kept in a closed container for 24–72 hours and shaken occasionally
5. Filtration: With the help of a filter, paper extraction was filtered and excess solvent evaporated.

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2.4. Qualitative test for detection of secondary metabolites:
1. Dragendorff's test for alkaloids: 2–3 ml of plant extract added to a test tube. After that, a few drops of Dragendorff's reagent were added. Formations of red-brownish precipitate were observed. It indicates the presence of alkaloids.
2. Shinoda test for flavonoids: 2 ml of plant extract added to the test tube with a small piece of magnesium ribbon and con. Hcl after that, red brownish precipitates were observed. It indicates the presence of flavanoids.
3. Ferric chloride test for phenolics: 2 ml of plant extract and a few drops of 5% FeCl3 were added to the test tube. Dark brownish precipitate was observed. It indicates the presence of phenolics
4. Foam test for saponins: 5 ml plant extract sample added to the test tube and the test tube shaken for 30 seconds. After that, it kept for 10 minutes and foam was observed. It indicates the presence of saponin.
5. Salkowski test for terpenoids: 2 ml of plant extract sample in the test tube were added with 2 ml chloroform and 1-2 ml conc. Sulfuric acid. Reddish brown precipitates were observed. It indicates the presence of terpenoids.
6. Keller–Killiani test for glycosides: 2 ml of plant extract added to the test tube with a few drops of glacial acetic acid containing ferric chloride and conc. H_2SO_4 were added. Reddish-brown ring precipitate were observed. It indicates presence of glycosides.

3. Results:
3.1. Ethnomedicinal Uses:
Tribal communities use various parts of plants like stems, roots, leaves and flowers as remedies in the form of paste, decoction and syrup to treat various health-related problems like fever, wounds, digestive problems, diabetes and respiratory problems. The Pawara tribe has traditionally used the following two medicinal plants in their healthcare.
1. ***Phyllanthus maderaspatensis***: Leaf decoction used to treat fever and stomach issues.
2. ***Biophytum sensitivum***: Fever and diarrhoea are treated with an aqueous leaf extract.

3.2. Phytochemical screening of leaf extract of *P. maderaspatensis* and *B. sensitivum*:

Phytochemical Class	*P. maderaspatensis*	*B. sensitivum*
Alkaloids	+	+
Flavonoids	+	+
Phenolics	+	+
Saponins	+	+
Terpenoids	+	+
Glycosides	+	+

Observation table: Chemical reaction recorded as presence (+) or absence (-) of secondary metabolites.

4. Discussion:
Phytochemical analysis is necessary to create novel drugs to fight against different types of chronic disea-

ses and infections. Phytochemicals are produced by plants to protect themselves against pathogens and stress and also benefits humanity due to their medicinal properties. Secondary metabolites such as alkaloids, flavonoids, phenolics, saponins, terpenoids, and glycosides are present in *P. maderaspatensis* and *B. sensitivum*. Antioxidant, anti-inflammatory, and antibacterial qualities depend on the presence of flavonoids and phenolic chemicals. To verify traditional plant use and provide evidence for the development of novel drugs, further phytochemical research is needed.

5. Conclusion:

The traditional use of *P. maderaspatensis* and *B. sensitivum* among the Pawara tribe of Dhule District is supported by primary phytochemical research. Further advanced study is needed on detailed phytochemical analysis and bio-profiling of both plants to evaluate their antioxidant, antibacterial and anti-inflammatory properties.

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