

Chapter 6

PHYTOCHEMICAL ANALYSIS OF SEINA (*Lagerstroemia parviflora* ROXB.) FLOWERS

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Abstract: The qualitative phytochemical screening of *Lagerstroemia parviflora* (Seina) flowers was carried out using aqueous, methanol, and ethanol extracts. The results showed that tannin, saponin, flavonoids, phenolic compounds, and alkaloids were detected in all three selected extracts of flowers. Qualitative phytochemical analysis recommends evaluating these bioactive compounds in percentage quantity for prediction of their pharmacological potential.

Key words: Phytochemical screening, secondary metabolites, forest trees, future drugs

INTRODUCTION

Lagerstroemia parviflora is a forest tree of Sal (*Shorea robusta*) associated vegetation in Eastern India (Kumar et al. 2022; Nayak and Kumar 2023). It is commonly known as Seina and in Odisha, it is popular tree with the name of Sidha (Kumar et al. 2022; Nayak and Kumar 2023). It has very good population in Jharkhand and Odisha states. The tree is ecologically very important and has lot of medicinal uses (Kumar et al. 2022; Nayak and Kumar 2023). The dried parts are used as fire wood and in furniture industry. The wood is also used to make domestic and agricultural utensils. The demand of medicinal agents is increasing day-by-day due to climatic changes, microbial resistance, drug failures and natural mutation in pathogenic microbes (Kumar et al. 2012; Kumar et al. 2013; Kumar and Jena 2014; Devi et al. 2023; Bhat et al. 2024). In this aspect, work on flowers of *L. parviflora* is suitable. The pharmacological activities of leaves and stem are reported but no or less works have been carried out on the flowers of *L. parviflora* (Mazumder et al.

2002; Mazumder et al. 2004; Mazumder et al. 2005; Mazumder et al. 2007). Therefore, the flowers are selected for primary phytochemical analysis using three extracts (aqueous, methanol and ethanol).



Figure 1: Whole plant of *L. parviflora* in wild

The present study highlights the importance of forest trees and their parts in pharmacological investigations and to fight against climatic changes, microbial resistance, drug failures and natural mutation in pathogenic microbes.

METHODOLOGY

Collection of plant parts

Flowers of *L. parviflora* were collected from Sundargarh district of Odisha state, India. One plant specimen is also collected and herbarium specimen (APRFH-96) was deposited in the Herbarium unit of Ambika Prasad Research Foundation, Odisha. Plant was identified by the corresponding author. The collected flowers are air dried and powder is made using mechanical devices. The powder of dried flowers is kept for phytochemical analysis in closed container (Kumar et al. 2017; Lama et al. 2022; Naik et al. 2022; Devi et al. 2022; Devi et al. 2023).



Figure 2: Flowers of *L. parviflora* in wild

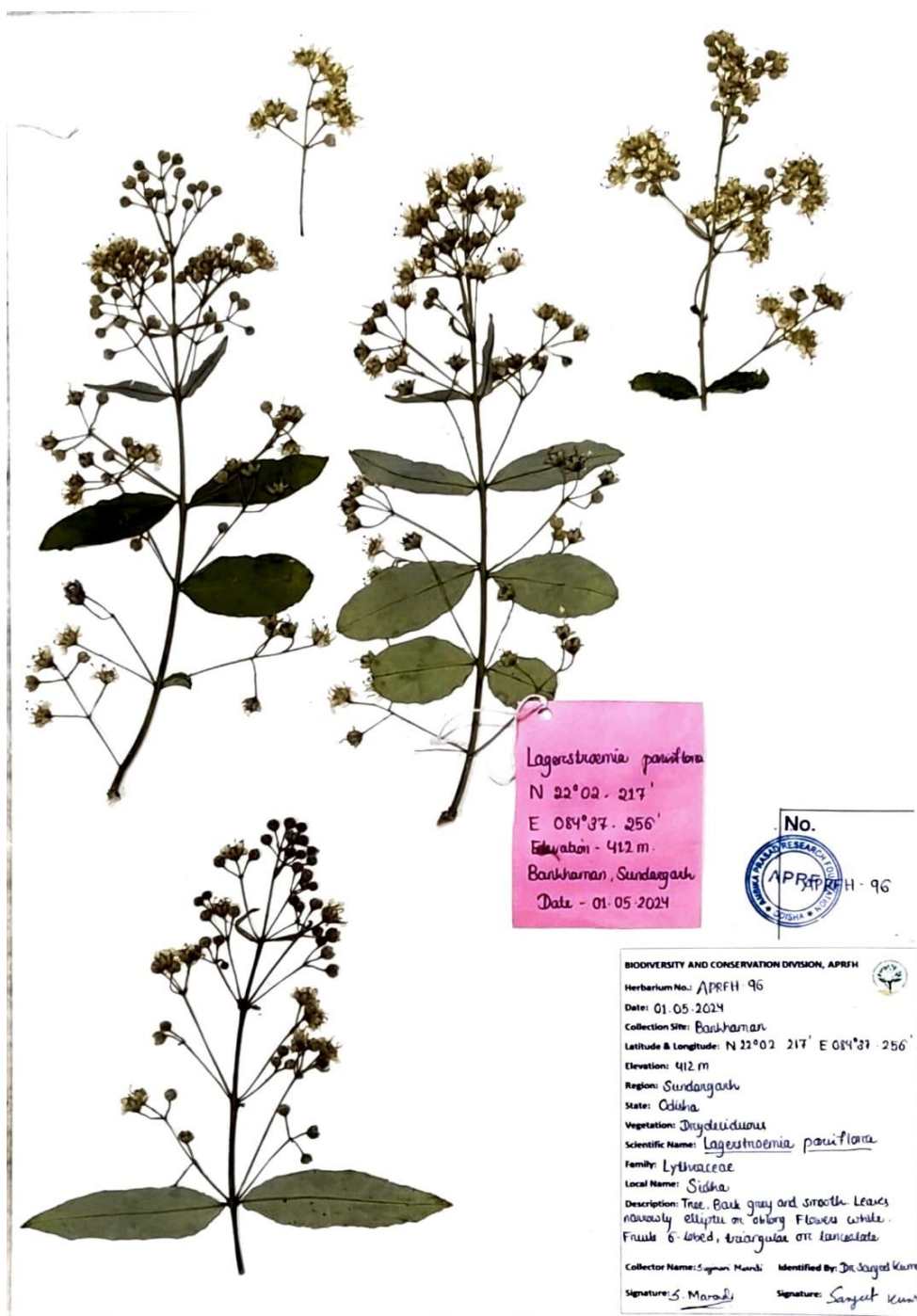


Figure 3: Herbarium specimen of *L. parviflora*

Extraction of plant extracts

The Soxhlet method of extraction was adopted for the phytochemical screening of bioactive compounds (Sharma et al. 2024). Detection of nine secondary metabolites were carried out using standard methods (Misra et al. 2012; Kumar et al. 2017; Behera et al. 2022; Singh et al. 2022; Devi et al. 2023).

Qualitative phytochemical analysis

Test for tannin

1 ml of the filtrate of flower extract was taken. Added 3-5 drops of 10% lead acetate solution into it. The gelatinous precipitate formation confirmed the presence of tannins.

Test for saponin

1ml of the filtrate of flower extract was taken. About 1 ml of distilled water was added into it and allowed to shake well. The persistent froth formation after shaking confirmed the presence of saponin.

Test for flavonoids

1 ml of the filtrate of flower extract was taken and added 2 ml of NaOH solution and 3 drops of dilute HCL. The colour initially turned to an intense yellow colour with NaOH solution and later become colourless. This colour change confirmed the presence of flavonoids.

Test for terpenoids

1 ml of the filtrate of flower extract was added with 6 drops of chloroform and placed it in water bath for few minutes. Added 6 drops of concentrated H₂SO₄ were added. The reddish-brown interface confirmed the presence of terpenoids.

Test for phenolic groups

1 ml of the filtrate of flower extract was taken. Few drops of 5% Ferric chloride solution were added into it. The bluish black colour formation confirmed the presence of phenolic compounds.

Test for reducing sugars

1 ml of the filtrate of flower extract was taken and added 2 drops of Fehling's solution A followed by Fehling's solution B into it. The test tube was kept in water bath for some time. The formation of red orange precipitate confirmed the presence of reducing sugars.

Test for steroids

1 ml of the filtrate of flower extract was taken. 1 ml chloroform and 1 ml sulphuric acid were added into it. The appearance of upper red and lower yellow with green fluorescence confirmed the presence of steroids.

Test for alkaloids

1 ml of the filtrate of flower extract was taken. Few drops of Dragendorff's reagent were added into it. The formation of reddish-brown precipitate confirmed the presence of alkaloids.

Test for carbonyl compounds

1 ml of the filtrate of flower extract was taken and added 3 to 4 drops of 2,4-Dinitrophenylhydrazine reagent into it. The formation of yellow crystal confirmed the presence of carbonyl compounds.

RESULTS AND DISCUSSION

Table 1: Qualitative phytochemical analysis of aqueous, methanol and ethanol extracts of *L. parviflora* flowers

Phytochemicals	Aqueous	Methanol	Ethanol
Tannin	+ve	+ve	+ve
Saponin	+ve	+ve	+ve
Flavonoids	+ve	+ve	+ve
Terpenoids	-ve	+ve	-ve
Phenolic compounds	+ve	+ve	+ve
Reducing sugar	+ve	+ve	+ve
Steroids	-ve	+ve	-ve
Alkaloids	+ve	+ve	+ve
Carbonyl compounds	-ve	-ve	-ve

(+ve: positive; -ve: negative)

The phytochemical analysis revealed that tannin, saponin, flavonoids, phenolic compounds, reducing sugars, and alkaloids were detected in three selected extracts (aqueous, methanol and ethanol) of *L. parviflora* flowers (Table 1; Figure 4-6). It was observed that steroids and terpenoids were only present in methanol extract (Table 1). The above present bioactive compounds reflect its pharmacological potential.

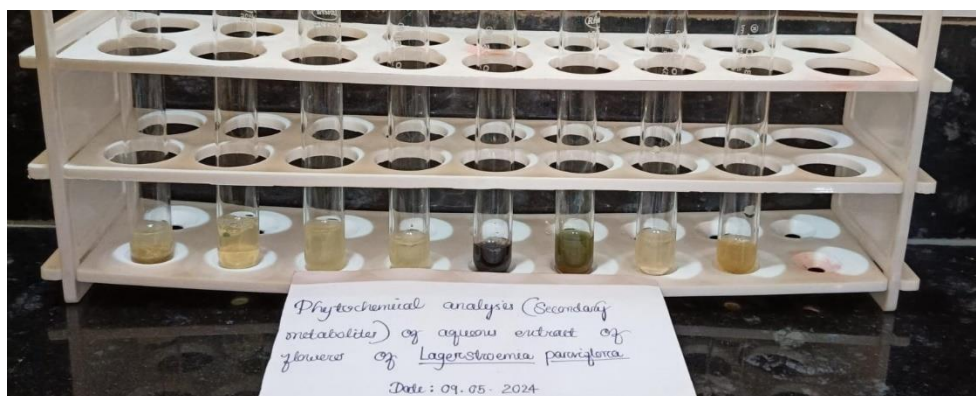


Figure 4: Phytochemical analysis of *L. parviflora* flowers (Aqueous extract)

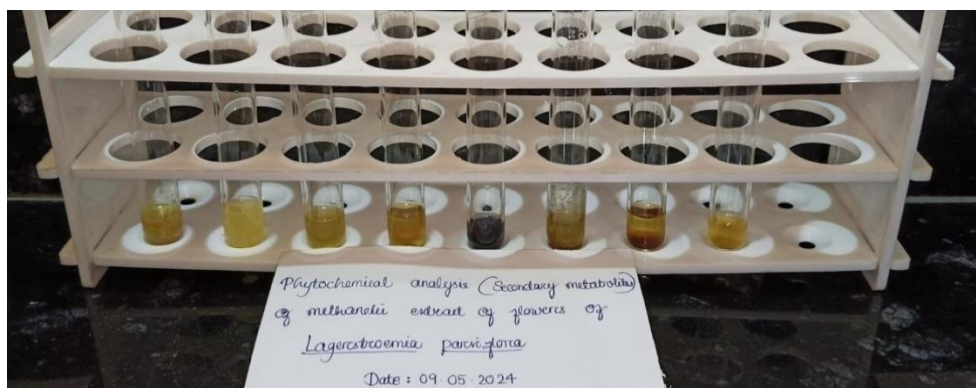


Figure 5: Phytochemical analysis of *L. parviflora* flowers (Methanol extract)



Figure 6: Phytochemical analysis of *L. parviflora* flowers (Ethanol extract)

Tannin, saponin and phenolic compounds present in the three extracts of *L. parviflora* flowers. Therefore, flowers could be an antibacterial agent (Maddox et al. 2010; Khan et al. 2020; Kaczmarek 2020). It was noticed that flower extracts showed presence of flavonoids, hence it could have anti-inflammatory activity (Ysrafil et al. 2023). It was observed that terpenoids and steroids are detected in methanol extract. Therefore, it could be useful to reduce pain and could be an agent to formulate the analgesic drugs (Palit et al. 2016). The above-mentioned facts showed its future pharmacological potentials.

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