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Research Article

### QUALITATIVE AND QUANTITATIVE STUDY OF PHYTOCHEMICALS IN PLANT EXTRACT (LAGERSTROEMIA SPECIOSA)

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**Abstract:**

Medicinal herbs or plants have been known to be an important potential source of therapeutics or curative aids. The use of medicinal plants has attained a commanding role in health system all over the world. Many countries in the world, that is, two-third of the world's population depends on herbal medicine for primary health care. One such plant is *Lagerstroemia speciosa* (L.) Pers. (Synonyms: *Adambea glabra* Lam., *Lagerstroemia major* Retz., *Munchausia speciosa*) is locally known as Jarul or Banaba (Family: Lythraceae). It is a small to medium sized or rarely large deciduous or semi-deciduous tree that grows abundantly in tropical and subtropical regions. Leaves of the species have been traditionally used over thousands of years as folkloric treatment by the native Indians and Japanese for illness, ailments particularly for lowering blood sugar levels and weight loss. The flower extracts of the species has some pharmacological properties like antioxidant and antimicrobial activities, whereas fruit extracts reported anti-nociceptive, anti-diarrhea and cytotoxic activities. Research on leaf extracts reveals that anti-bacterial, anti-viral, anti-inflammatory, anti-obesity, antifibrotic, anti-diabetic and xanthine oxidase inhibition, diuretic, decongestant activities and roots are applied for treating mouth ulcers. In addition to that bark is used to relieve the abdominal pains. The aim of this work is to study Qualitative and quantitative parameters of Phytochemicals from plant extract of *lagerstroemia speciosa*. The leaves of plant were collected and subjected to extraction. Further phytochemical test and quantitative estimation of phenol & flavonoid was performed. The results showed that the yields were found to be (13.51 % w/w of crude drug) of Methanolic extract with orange black colour semisolid mass for *Lagerstroemia speciosa* Leaves. The phytochemical test revealed the presence of Alkaloids, Carbohydrates, Flavonoids, Proteins & Amino acids, Phenols, Diterpenes. Saponins. Total phenolic content in methanolic extract of *Lagerstroemia speciosa* Leaves was observed to be  $18.24 \pm 0.154$  mcg/ml while the total flavonoid content was noticed to be  $28.45 \pm 0.121$  mcg/ml. From these outcomes it can be understood that the leaves of *Lagerstroemia speciosa* posses appreciable amount of phenol & flavonoids.

**Keywords:** *Lagerstroemia speciosa*, Phytochemicals, Flavonoids, Phenol**Corresponding author:****Vivekanand Katare,**

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**INTRODUCTION:**

Medicinal plants are considered as rich resources of ingredients which can be used in drug development pharmacopoeial, non-pharmacopoeial or synthetic drugs. A part from that, these plants play a critical role in the development of human cultures around the whole world. Plant is an important source of medicine and plays a key role in world health. Medicinal herbs or plants have been known to be an important potential source of therapeutics or curative aids. The use of medicinal plants has attained a commanding role in health system all over the world. This involves the use of medicinal plants not only for the treatment of diseases but also as potential material for maintaining good health and conditions. Many countries in the world, that is, two-third of the world's population depends on herbal medicine for primary health care. The reasons for this is because of their better cultural acceptability, better compatibility and adaptability with the human body and pose lesser side effects (Sandberg and Corrigan,2001)

The use of herbs to treat diseases is almost universal among non-industrialized societies. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including opium, aspirin, digitals and quinine. The use of medicinal plants is increasing worldwide, in view of the tremendous expansion of traditional medicine and a growing interest in herbal treatments. Plants are used in medicine to maintain and augment health-physically, mentally and spiritually as well as to treat specific conditions and ailments. In industrialized countries, adaptation of traditional medicines is termed “complimentary” or “alternative” medicine. Traditional medicine has maintained its popularity in all regions or the developing world and its use is rapidly spreading in industrialized countries (Garg AK, Singh,2021)

*Lagerstroemia speciosa* (L.) Pers. (Synonyms: *Adambea glabra* Lam., *Lagerstroemia major* Retz., *Munchausia speciosa*) is locally known as Jarul or Banaba (Family: Lythraceae). It is a small to medium sized or rarely large deciduous or semi-deciduous tree that grows abundantly in tropical and subtropical regions Banaba is a medicinal tree traditionally used to lower blood sugar in the body. Its high content of corosolic acid makes it an effective antidiabetic drug. Banaba is also recommended for kidney, bladder problems and hypertension (Sharmin *et al.*, 2018).

Leaves of the species have been traditionally used over thousands of years as folkloric treatment by the native Indians and Japanese for illness, ailments

particularly for lowering blood sugar levels and weight loss. The flower extracts of the species has some pharmacological properties like antioxidant and antimicrobial activities, whereas fruit extracts reported anti-nociceptive, anti-diarrhea and cytotoxic activities. Research on leaf extracts reveals that anti-bacterial, anti-viral, anti-inflammatory, anti-obesity, antifibrotic, anti-diabetic and xanthine oxidase inhibition, diuretic, decongestant activities and roots are applied for treating mouth ulcers. In addition to that bark is used to relieve the abdominal pains (Koduru *et al.*, 2017).

The species also has essential metals like sodium, potassium, iron, zinc and magnesium which were clinically proved. The whole banaba tree from root to leaves and flower had a glucose lowering effect and could be used to fight against diabetes, obesity, kidney diseases, hypertension and others. Further research is needed to isolate new active principles and to screen pharmacological activities of the phytoconstituents. This work deals with analysis of Qualitative and quantitative estimation of Phytochemicals in plant extract of *lagerstroemia speciosa* (Mousa *et al.*, 2019).

**Experimental:****Materials:****Collection of Plant Material:**

To identify crude drugs, organoleptic characteristics, morphological characteristics, and microscopic investigation were used. Herbariums and renowned botanical gardens are very useful for identifying unknown medications. The Leaves of chosen plant were collected local market, Bhopal (M.P.) The Leaves of the, *Lagerstroemia speciosa* were identified by expert botanist of Barkatullaha University, Bhopal.

**Methods:****Extraction:**

The Collected (Leaves) was cleaned properly and washed with distilled water to remove any kind of dust particles. Cleaned and dried plant drug was converted into moderately coarse powder in hand grinder. Powdered plant drug was weighed (100gm) and packed in air tight glass container.

The plant Material (Leaves) was extracted with methanol for about 24 hrs with randomly shaking. Shaking of the drug during maceration is essential in order to replace the saturated layers around the drug with fresh menstruum. The liquid extract was collected in a tarred conical flask. The solvent removed by evaporating the solvent using hot plate. The dry extract obtained was weighed to calculate the percentage yield (Kokate,1994).

**Phytochemical Analysis:**

Preliminary phytochemical screening means to investigate the plant material in terms of its active constituents. In order to detect the various constituents present in the methanolic extract of leaves of *Lagerstroemia speciosa* it was subjected the phytochemical tests as per standard methods (Harborne,1973; Olufunmiso and Afolayan, 2011).

**Total phenol content estimation:**

**Principle:** The total phenol content of the extract was determined by the modified folin-ciocalteu method.

**Preparation of Standard:** 10 mg Gallic acid was dissolved in 10 ml methanol, various aliquots of 10-50µg/ml was prepared in methanol

**Preparation of Extract:** 10 mg of dried extract was dissolved in 10 ml methanol and filter. Two ml (1mg/ml) of this extract was for the estimation of phenol.

**Procedure:** 2 ml of extract and each standard was mixed with 1 ml of Folin-Ciocalteu reagent (previously diluted with distilled water 1:10 v/v) and 1 ml (7.5g/l) of sodium carbonate. The mixture was vortexed for 15s and allowed to stand for 10min for colour development. The absorbance was measured at 765 nm using a spectrophotometer (Ojewunmi *et al.*, 2014).

**Total flavonoids content estimation:**

**Principle:** Determination of total flavonoids content was based on aluminum chloride method

**Preparation of standard:** 10 mg quercetin was dissolved in 10 ml methanol, and various aliquots of 5- 25µg/ml were prepared in methanol.

**Preparation of extract:** 10 mg of dried extract was dissolved in 10 ml methanol and filter. Three ml (1mg/ml) of this extract was for the estimation of flavonoids.

**Procedure:** 1 ml of 2% AlCl<sub>3</sub> solution was added to 3 ml of extract or each standard and allowed to stand for 15min at room temperature; absorbance was measured at 420 nm.

**RESULTS & DISCUSSION:**

The yields were found to be 13.51 % w/w of crude drug of Methanolic extract with orange black colour semisolid mass for *Lagerstroemia speciosa* Leaves. The phytochemical test revealed the presence of Alkaloids, Carbohydrates, Flavonoids, Proteins & Amino acids, Phenols, Diterpenes. Saponins. Total phenolic content in methanolic extract of *Lagerstroemia speciosa* Leaves was observed to be 18.24± 0.154 mcg/ml while the total flavonoid content was noticed to be 28.45 ± 0.121 mcg/ml.

**Table 1: Extractive values obtained from *Lagerstroemia speciosa* Leaves**

S. No.	Solvent	Time of extraction (Hours)	Color of extract	% Yield
1.	Methanol: Water	28	Orange-Black	13.51 %

**Table 2: Preliminary phytochemical screening of *Lagerstroemia speciosa***

S.N.	Phytoconstituents	Test Name	Results of Extract
1	Alkaloids	Mayer's Test	+(ve)
		Dragendorff's Test	+(ve)
2	Carbohydrates	Molisch's Test	+(ve)
		Fehling's Test	+(ve)
3	Flavonoids	Lead acetate	+(ve)
		Shinoda Test	+(ve)
4	Proteins & Amino acids	Biuret Test	+(ve)
		Precipitation test	+(ve)
		Ninhydrin Test	+(ve)
5	Phenols	Ellagic Acid Test	+(ve)
6	Diterpenes	Copper acetate test	-(ve)
7	Saponins	Foam test	+(ve)

**Table 3: Total Phenolic Content of Methanolic extract of Leaves of *Lagerstroemia speciosa***

Sample	Total phenolic content GAE mcg/ml
Methanolic extract 100µg/ml	18.24± 0.154

**Table 4: Total Flavonoid content of Methanolic extract of Leaves of *Lagerstroemia speciosa***

Sl. No.	Extracts 100µg/ml	Flavonoid content Quercetin equivalent mcg/ml
1	Methanolic extract (100µg/ml)	28.45 ± 0.121

**CONCLUSION:**

In the current investigation, a number of bioactive chemicals were obtained, including carbohydrates, flavonoids, phenols, proteins and amino acids, and saponins. Diterpenes were not identified in the methanolic extract of *Lagerstroemia speciosa* leaves. Greater amounts of phenols and total flavonoids were obtained. This study showed that a number of formulations using the leaves of the plant *Lagerstroemia speciosa* can be utilised to treat a wide range of diseases and ailments.

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