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Lagerstroemia speciosa – A Review

Dr. Bishnu Choudhury, MD (Ay), Ph.D.,

Medical Officer (Ay), North Eastern Institute of Ayurveda & Homoeopathy (NEIAH), Shillong, Megalaya-793018

Corresponding Author: Dr. Bishnu Choudhury

E-mail: drbishnuchoudhury@gmail.com

ABSTRACT

Herbal medicines are used traditionally throughout the world since long time. Recent data estimated that 80% of the world population till depends in herbal medicine. ***Lagerstroemia speciosa (***popularly known as Queen's Flower/ Pride of India) one of the useful medicinal plants, abundantly available in North Eastern part of India, Burma, Bangladesh, Philippines, Malaysia etc. ***Lagerstroemia speciosa*** also known as '**Ajhar**' in Assam (India) is traditionally used by the people of Assam for curing Diabetic Mellitus (Madhumeha) since long time and getting optimum benefit. In Bhavaprakash Nighantu also (Ayurvedic classic of 16 century) mentioned *Lagerstroemia speciosa* as hypoglycemic drugs. It has been used as a folk medicine among people with diabetes in Bangladesh & Philippines. It is a deciduous, tropical, flowering tree of Lythraceae family. Flowers are showy, pink to purple color. The active principles of this plant which act **as insulin like action** are **Corosolic Acid and lagerostromin**.

Keyword: *Lagerstroemia speciosa*, Herbal medicines, Ajhar.

INTRODUCTION

Scientific name – ***Lagerstroemia speciosa*** (L.) pers

Or

L***agerstroemia flos-reginae*** Retz

Family – **Lythraceae**

Vernacular name - Sanskrit – Tinish
Assamese – Ajhar
Bengali – Jarul
Hindi – Arjun , Jarul
Philippines – Banaba
English - Queen's crape myrtle, Queen's Flower,Pride of India.

Habitat – Assam, Bengal, Uttar Pradesh, Burma, Bangladesh, Philippines, Malaysia etc

BACKGROUND OF THE PLANT

- In Bhavaprakash Nighantu (Ayurvedic classic of 16th century), Chunekar mentioned *Lagerstroemia speciosa* (Tinish/Jarul) in Vatadi varga as Pramehaghna (anti-diabetes drugs).
- More over peoples of India (Assam, Uttar Pradesh), Bangladesh and Philippine also used this herb for the treatment of Diabetes mellitus.
- Folkloric use also includes diuretic and purgative action from leaf decoction.

Botanical description

It is a deciduous, tropical, flowering tree that can grow 9 – 18 m in height with widely spreading branches up to 9 – 12 m. Bark grayish or brown, thin smooth, mottled, peeling, flaking off in irregular pieces. **Leaves** 10 – 20 by 3.8 – 7.5 cm oblong or

lanceolate, or elliptic, sub-acute, glabrous, dark green lathery, base acute or rounded, main nerves 10 – 13 pairs, prominent. Leaves turn orange red colors in fall. Calyx turbinate 1.6 cm long, covered with white or ferruginous tomentum, ribbed with 12-24 prominent stout ridge, those opposite the calyx-teeth border, teeth 6-7, triangular, acute, spreading, 6 cm long, thickened at the edges. Petals 6-7 purple, 2.5 - 3.8 cm long, sub orbicular or round-ovate, clawed, much undulate and crumpled, spreading, stamens all equal, shorter than the style. Flowers are showy, pink to purple color. 5 – 7.5 cm across, in large panicles sometimes reaching 30 cm long. Flowering time – May, Fruits – Nut like. Capsules ellipsoid or sub globose, 2-3.2 by 1.6-2.5 cm, minutely apiculate. Seeds winged 1.25 – 1.45 by 6.45 mm glabrous, pale brown.

ACTIVE CONSTITUENTSZ

Leaves contain ellagic acid derivatives. A later report confirms ellagitannins, **lagerstroemin**, flosin B, and reginin A, which are all possible glucose transport enhancers. Lagertannins, beta-sitosterol, stigmasterol, campesterol, and some olefins also have been found in **L. speciosa** leaves and extracts. Lageracetal (1,1-Dibutoxybutane), 1-pentanol, ellagic acid, and **corosolic acid** (a triterpene) have been isolated from leaves. Another study reports 16 amino acids, pyrogallol tannins, and lipids also present in **L. speciosa** leaf. From the neutral fraction of hot ethanol extracts of its leaves, nonacosane, hentriacontane, tritriacontane, olefins, and esters of palmitic, daturic, stearic, arachinic, and behenic acids were identified.

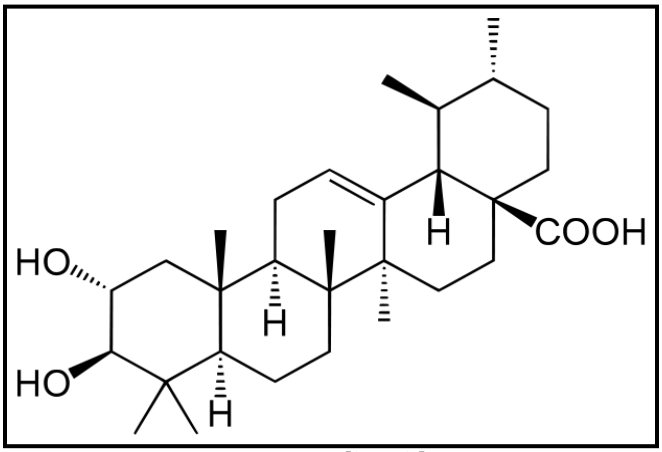
L. speciosa bark was found to contain similar constituents to its leaves. One report finds ellagic acids, beta-sitosterols, and colosolic acids from bark extracts.

L. speciosa seeds contain caprylic, lauric, myristic, palmitic, steric, arachidic, behenic, lignoceric, oleic, and linoleic acids in the oil. 9-keotoctadec-cis-11-enoic acid has been isolated from seed oil as well. Components nonanedioic acid, 12-acetyloxy-9-octadecenoic acid, and 16-methyl-heptadecandic acids present in seed extracts have been identified as having antibacterial activity. L. speciosa and related species contained ellagic acid, campesterol, stigmasterol, and beta-sitosterol in their stem parts.

Flowers contain Delphinidin-3 arabinoside, petunidine-3-arabinoside and mulvidin-3-arabinoside, gallic acid, methyl gellate and ellagic acid.

Active principles Corosolic acid, Lagerstroemin, Lagertannins

Chemical structure



Corosolic acid

It activates the transport of glucose across the cell membrane, resulting blood sugar reduction. It has inhibitory effects on post prandal hyperglycemia by inhibiting alpha-amylase and alpha-glycosidase.

Lagerstroemin

It is an ellagitannin works as insulin receptor activator by increasing tyrosine- phosphorylation of the sub-unit of insulin receptor.

Lagertannins

It stimulates glucose transport and adipocyte differentiation inhibitory activity in 3T3 – L1 cells as adipogenesis, the differentiation and proliferation of adipocytes is a major mechanism leading to weight gain and obesity.

In vitro data

Amino acids in both crude and tannin-free, spray-dried extracts isolated from its leaves constitute an insulin-like action responsible for hypoglycemic activity. Glucose uptake-inducing activity was also demonstrated in cells, by leaves extract, along with absence of adipocyte differentiation actions and effective inhibition of adipocyte differentiation (induced by insulin plus 3-isobutyl-1-methylxanthine and dexamethasone). These effects suggest this plant may be useful for treatment of hyperglycemia and obesity in type 2 diabetic patients. Ellagitannins lagerstroemin, flosin B, and reginin A increased glucose uptake of rat adipocytes in another report. Another report evaluates deterioration of this insulin-like principle from this plant, demonstrating, for example, that 20 g of old leaves or fruits dried 1 to 2 weeks had hypoglycemic activity equivalent to 6 to 7.7 units of insulin. It differs from insulin in that it is thermo stable and lowers blood sugar upon oral administration instead of by injection.

In animal study

Bioactive compounds in the leaves including lageracetal, 1-pentanol, ellagic acid, lagertannin, and corosolic acid, affect glucose transport activity in vivo. Genetically, diabetic mice fed certain Lagerstroemia speciosa preparations for a period of 5 weeks experienced hypoglycemic effect in **NIDDM**. A 1% corosolic acid preparation (Glucosol) from Lagerstroemia speciosa demonstrated significant blood glucose reduction **90** minutes after administration when given to diabetic rats vs. control animals. Its extract was also found to have beneficial effects on obese female mice, **reducing triglycerides.**

CONCLUSION

Medicinal plant constitutes an important therapeutic aid in alleviating ailments. Almost 80% of the world population is fully dependent on medicinal plants for meeting their health care needs. The herbal medicines today symbolize safety in contrast to the synthetic drugs which are regarded as unsafe to human beings and environment. Major limitation in amalgamation of herbal medicine in modern medical practices is lack of scientific and clinical data proving their efficacy and safety. There is need for conducting clinical research in herbal drugs, developing simple bioassays for biological standardization, pharmacological and toxicological evaluation, and developing various animal models for toxicity and safety evaluation. It is also important to establish the active component/s from the plant extracts.

Lagerstroemia speciosa is one of most important medicinal plants mentioned in Ayurvedic classic (Bhavaprakash Nighantu), having anti-diabetic action. In modern scientific study also is found that this plant has potent hypoglycemic effect. The active principles available in this plant are Corosolic Acid, Lagerostromin and Lagertannins**.** Corosolic acid activates the transport of glucose across the cell membrane, and alpha-glycosidase. Lagerstroemin is an ellagitannin works as insulin receptor activator by increasing tyrosine- phosphorylation of the sub-unit of insulin receptor. Lagertannins stimulates glucose transport and adipocyte differentiation inhibitory activity in 3T3 – L1 which helps in reducing weight.

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