Drug Review
Plant medicines are used traditionally thought the world since long time. Recent data estimated that 80% of the world population till depends in herbal medicine. There are many medicinal plants known to be used in the treatment of diabetes and a number of plants have been screened positive for their anti-diabetic effect.

Over 400 medicinal plants have been reported for the treatment of diabetes, although only a small number of these have scientific and medical evaluation to assess their efficacy. The hypoglycemic effect of some herbal extracts has been confirmed in human and animal models of Type 2 diabetes mellitus. The World Health Organization Expert committee on diabetes has recommended that traditional medicinal plants to be investigated further.


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 these plant extracts.

Scientific name – Lagerstroemia speciosa (L.) pers
Or
Lagerstroemia 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 16 century), Chunekar mentioned Lagerstroemia speciosa (Tinish/Jarul) in Vatadi varga and which have hypoglycemic action.
- Lagerstroemia speciosa, known as Ajhar in Assam is traditionally used by the people Assam in Diabetes since long time and getting optimum benefit.
- Lagerstroemia speciosa has been used as a folk medicine among people with diabetes in Philippines. 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 smooths, 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.

**GunaKarma (Pharmacodynamic properties):**

- **Rasa**: Kasaya, Katu.
- **Guna**: Laghu, Ruksha.
- **Virya**: Sheeta.
- **Vipaka**: Katu.
- **Doshakarma**: Kapha-Pitta Samaka.

**CHEMISTRY**

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. "Study of Lagerstroemia speciosa (L.) Pers as a Hypoglycemic Agent"
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-heptadecadic 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:

![Chemical structure of Corosolic acid]

Corosolic acid

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Therapeutic use:

Jarul is a very controversial plant which was not mentioned by the ancient Ayurvedic literature. In the Bhabaprakash Nighantu, Chunekar mentioned in the context of Tinish. Dr. P.V. Sharma also says that Jarul is a controversial plant but is a very good antidiabetic drug. Chopra mentioned that leaves and bark has purgative properties. In Andaman fruit is used as a local application for aphthous of the mouth.

Parts use : Leaf, Bark, Fruit.
Dose : Leaf juice (30 – 50 ml)
   Leaf powder (3 – 6 gm)

MEDICAL RESEARCHES:

Mode of action:

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

Lagerstroemmin : 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.

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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 unitsof 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.
Lagerstroemia speciosa (L.) Pers (Jarul/ Ajhar)

Prepared Trial Drugs (Lagerstroemia speciosa Leaves Powder)