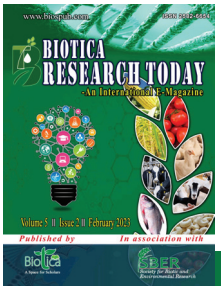
Bio. Res. Today 2023, 5(2):163-165



Biotica Research Today

e-ISSN: 2582-6654

February, 2023

Article ID: RT1237

Popular Article

Anogeissus latifolia - A Potential Dye Yielding Native Tree Species for Therapeutic Usage

S. Vennila[1*], C. Cinthia Fernandaz[2], S. Kala[3] and H.B. Roghan[4]

[1]*Dept. of Agronomy, Agricultural College and Research Institute, TNAU, Tiruvanamalai, Tamil Nadu (606 753), India*

[2]*ICAR- Krishi Vigyan Kendra, Nilgiris, TNAU, Tamil Nadu (643 101), India*

[3]*Dept. of Agricultural Research and Education, ICAR-Indian Institute of Soil and Water Conservation Research Centre, Kota, Rajasthan (324 002), India*

[4]*Dept. of Silviculture and Agroforestry, Forest College and Research Institute, TNAU, Mettupalayam, Tamil Nadu (641 301), India*

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Corresponding Author

S. Vennila

✉: vennila.s@tnau.ac.in

Conflict of interests: The author has declared that no conflict of interest exists.

How to cite this article?

Vennila *et al*., 2023. *Anogeissus latifolia* - A Potential Dye Yielding Native Tree Species for Therapeutic Usage. *Biotica Research Today* 5(2), 163-165.

Abstract

Anogeissus latifolia belongs to the family Combretaceae. It is an important multipurpose tree species found distributed in semi-evergreen and deciduous forests of different states of India. It is one of the tree species yielding gum with medicinal values. It is commonly known as gum ghatti or Axle wood tree. The plant is valuable as a fodder, fuel, timber and medicinal plant. It is one of the secondary food plants for tropical tasar silkworm. The leaves as well as the bark of the tree are used for tanning. Different parts *viz*. bark, gum and root of *A. latifolia* find medicinal importance in various indigenous systems of medicine. *A. latifolia* is one of the ingredients in several Ayurvedic formulations.

Keywords: *Anogeissus latifolia*, Dye, Gum ghatti, Therapeutic uses

Introduction

Anogeissus latifolia belonging to the family Combretaceae is an important multipurpose tree species. The tree is commonly called as axle wood or ghatti gum. It is a medium to large sized tree up to 36 m height with straight and cylindrical bole. A large tree found abundantly in the deciduous forests of India and Sri Lanka. It is one of the useful trees as medicinally important, timber, fuel, production of agriculture implements and the leaves and bark are being used for tanning. So *Anogeissus latifolia* is also one of the plants in human health management. Therefore, this article indicated ethnomedicinal uses, phytochemistry and therapeutic potential of *Anogeissus latifolia*. However, *Anogeissus latifolia* has a poor seed germination capability although natural regeneration is satisfactory and research into improved artificial regeneration methods is required which directs the future research opportunities.

Taxonomic Classification

Kingdom	: Plantae
Subkingdom	: Tracheobionta
Super division	: Spermatophyta
Division	: Magnoliophyta
Class	: Magnoliopsida
Subclass	: Rosidae
Order	: Myrtales
Family	: Combretaceae
Genus	: Anogeissus (DC.) Wall.
Species	: *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Beddome

Distribution

Anogeissus latifolia is native to India, Myanmar, Nepal and Sri Lanka, and found throughout tropical Asia. A tree of tropical and subtropical climates, it is found in deciduous or semi-evergreen forests of different states of India. It is a common element in teak forests but also occurs in the understorey of dipterocarp forests, in bamboo forests. It

Article History

RECEIVED on 31st January 2023 RECEIVED in revised form 12th February 2023 ACCEPTED in final form 15th February 2023

can be grown on dry rocky hills, ravines and bare wastelands that are too dry or otherwise unsuitable for agricultural use. It is usually associated with *Albizia lebbeck*, *Dalbergia* spp., *Grewia tiliaefolia*, *Albizia amara*, *Gyrocarpus jacquini* and *Mesua ferrea*. In India, it grows in most parts of the country except in arid areas and moist areas of North-West India. *Anogeissus latifolia* grows up to an altitude of 1200 m, with an average annual temperature of 38-45 °C and an average rainfall of 625-2250 mm. It is found on a variety of soil types but prefers deep alluvial soils. It does not tolerate water-logging.

Botany

Anogeissus latifolia known as gahtti tree, is a medium to large sized deciduous tree. Trunk is straight and cylindrical or sometimes more poorly shaped, branchless for 8 m, up to 80 cm in diameter. Bark is smooth or with scales, pale to dark gray. Branches are drooping. Its leaves are opposite or sub-opposite, variably distichous, simple, entire, exstipulate, with grayish-yellow or whitish hairs below. In India, *A. latifolia* is leafless in February-May, flowers in June-September depending on locality, and mature fruits are present in December-March. Leaf flushing begins in the dry season, reaching a peak time before the onset of rains. Flowers are small and have parts in fives. Sepals are joined together in a stalk-like tube, expanded at top into a 5-lobed cup. There are no petals. Stamens are 10, in 2 rows. A 2-winged pseudoachene, packed into a dense head. Sepal tube survives till fruiting. Fruit is ovoid-shaped, compressed, and winged with a beak. The tree blossoms and fruits from September through March.

Plant Chemicals

Anogeissus latifolia contains a wide variety of chemical compounds, which is shown by many research papers. This plant contains different type of triterpenoids like 3-β-hydroxy-28-acetyltaraxaren and β-sitosterol reported by Rahman *et al.* (2007). The bark was first examined by Reddy *et al.* (1965), who isolated (+)-leucocyanidin. Later, ellagic acids and two new glycosides of ellagic and flavellagic acids were reported by Deshpande *et al.* (1976). Leaf of this plant is rich in gallotannins reported by Reddy *et al.* (1964). The plant is rich in pharmacologically active phenolic phytoconstituent-ellagic acid. Chemically leaves, bark and heartwood yield quinic and shikmik acids; leaves contain gallotannin (90-95% of the tannins). The young leaves and shoots contain 50% tannins (dry basis). The bark contains 12-18% tannins. Heartwood contains gallic acid, ellagic acid, its derivatives, quercetinand-myricetin. The gum is mainly the calcium salt of a complex, high molecular weight polysaccharic acid (ghattic acid).

Traditional Uses

Anogeissus latifolia is an important, slow growing, multi-purpose tree that produces hardwood for a wide range of construction purposes and also a good source of fuel wood and charcoal. It also produces a gum *viz*., ghatti gum, which is used as an alternative to gum arabic. The bark and foliage are used for tanning, the leaves produce a black dye used commercially in India and it provides a host for the tussar silkworm. The plant is used traditionally as medicine to treat various human ailments and conditions such as cardiac disorder, vomiting, whooping cough, cold, diarrhea, dysentery, snake and scorpion bite, fever, skin diseases, diabetes, anemia, piles, fistula, stomach ache, sexual debility, anemia, and urinary discharge. *A. latifolia* is one of the ingredients in several Ayurvedic formulations. The stem bark of *A. latifolia* is one of the ingredients of an Ayurvedic formulation Ayaskrti. The important analgesic prototypes (Salicylic acid and morphine) were originally derived from plant sources and traditionally used as pain killers. The gum (ghatti gum) extracted from the plant is also having several therapeutic applications. The ghatti gum is used after delivery in the form of laddu to get rid of back pain and to cure damaged tissue. Different parts such as seeds and stem bark of *A. latifolia* find ethnoveterinary applications and are used to treat snake bite, insect bite, fever and other veterinary ailments. Besides, the plant is also used as fodder and in making things such as pole, door and cart axle.

Gum Ghatti

Gum ghatti (Indian gum) obtained from *A. latifolia*. It is a complex water soluble polysaccharide and the plant exudate long in use whose name is derived from the word 'ghats', which means passes, given to the gum because of its ancient mountain transportation routes. Ghatti has a bland taste and practically no odour. Trees have a greyish bark and leaves that turn red in the dry season. Exudate tears are normally less than one cm in diameter and often occur in large vermiform masses varying in colour from nearly white to dark brown from bark extractives. Generally, colour varies in relation to the age of the exudate. As with other exudate gums, incisions are customarily made in the tree bark to increase gum production. Incisions are made carefully so as not to permanently injure or kill the tree. Producing trees occur in the same geographic areas as those producing gum karaya; and gum ghatti is harvested, graded, and trans-ported in much the same way, as are most exudate gums. The best gum crops are obtained in the absence of monsoon rains; the largest harvest is in April. The world harvest of gum ghatti is relatively small and has probably not exceeded 1000 tons; comparatively small amounts of about 400 tons come to the U.S. and only several tons worldwide are used in foods. The price of grade one, the highest grade, in 1990 was \$1.30 lb^{-1} when purchased in quantity (Whistler, 1993). Gum ghatti is used in applications also served by gum arabic; it is often used in pharmaceutical preparations as an emulsifying agent. Gum ghatti is used in table syrup emulsions containing 2% butter to stabilise the emulsion; in such an application, about 0.4% ghatti is used in combination with 0.08% lecithin. It is hydrolysed to prepare pure l-arabinose on a commercial scale and used as a flavour adjunct in food products.

Dye Extraction

Natural dye extracted from leaves could be used as such for dyeing of textile materials. The dye matter has to be extracted in any one of the methods *viz*., Aqueous extraction, Solvent extraction and Fermentation method. Black dye obtained from leaves can be applied to textile substrate

with or without mordents to get a large range of shades of reasonable colorimetric. Its leaves give tannins used for tanning and dyeing. Tannins are also known antimicrobial agent.

Conclusion

A. latifolia is a deciduous tree belonging to family Combretaceae. It is rich in phytochemicals including alkaloid, Amino acids, Carbohydrates, flavones, phenols, proteins, reducing sugars, saponins, steroids, tannins and triterpenoids. It possesses various ethno-medicinal uses and also poor germination of seed. Till now, a very less research has been done on this plant. So, a need arises to focus on these trees and its precision silvicultural techniques, management for commercial exploitation and value addition.

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