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A SYSTEMATIC REVIEW ON TRADITIONAL MEDICINAL PLANT: *ANOGEISSUS LATIFOLIA*

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ABSTRACT: The aim of this paper is to give a systematic overview on the morphology, ethnobotanical uses, phytochemistry and pharmacological activities of *Anogeissus latifolia*. It focuses to identify the research gap and further proceed to experimental studies. It may also help out the researcher for further detailed studies. A systematic search criterion of literature was carried out by computing Google scholar, Pub med, NCBI, open access peer reviewed journals and web of science including some unpublished sources. The plant is known to possess wide range of pharmacological activities like Anthelmintic, Thrombolytic, Antiasthmatic, Anticonvulsant, Anticancer, Antidiabetic, Antibacterial, Antipyretic, Antioxidant, Antiulcer, Analgesic, Anti-inflammatory, Hepatoprotective and Wound healing activity. Limited numbers of phytoconstituents were reported like tannins, triterpenoids, ellagic acid, monosaccharides, β- sitosterol from the plant that shows biological activities with diverse ethnobotanical uses. The present review also explores the traditional medicinal uses of the tree, highlighting its role in treating various ailments and wide use of its gum in pharmaceuticals, food processing and cosmetics.

INTRODUCTION: Plants are served as major natural resources for traditional as well as modern medicinal system for treatment of different diseases from thousands of years ago. The bioactive compounds derived from different parts of plant are primarily responsible for pharmacological activities. Increasing realization of effective and safer herbal drugs leads to spurt in the use of plant based medicine across the world [1].

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The exploration, extraction and screening of biological diversity such as herbs, spices, microbes and other natural resources is the worldwide activity in recent years, that results into obtaining important chemical compounds like phenols, alkaloids, glycosides, terpenoids, flavonoids, carbohydrates, tannins, *etc*.

Anogeissus latifolia is a deciduous medium sized tree known as “Gum Ghatti” derived from word ‘Ghat’ as it produces a non- starch polysaccharide gum transported via mountain areas in ancient times [2]. It is commonly called as Dhawa, Chaal, Axle wood, Dhawra and button tree. It is native to India and Sri Lanka. Besides having timber valued, the tree possesses important medicinal properties,

particularly its bark and leaves, which are having rich bioactive components [3].

Plant Profile: *Anogeissus latifolia*

Synonyms: *Anogeissus latifolia* Wall, *Conocarpus latifolia* Roxb, *Leca macrophylla* Roxb.

Vernacular Names:

Sanskrit: Dhava

Bengali: Dhaoya

Hindi: Dhawa, Dhaora, Dhau, Chhal

Plant Taxonomy:

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Subclass: Rosidae

Order: Myrtales

Family: Combretaceae

Genus: *Anogeissus*

Species: *A. latifolia*

Distribution: The plant is distributed in India throughout the sub-Himalayan tract and outer hills from Ravi to Nepal, Bihar, Madhya Pradesh and hilly regions of Bombay, Andhra Pradesh and Madras [4]. It is also spread throughout the Shiwalik hills near Thapli village and Morni.

Botanical Description: *Anogeissus latifolia* is a deciduous tree of medium size commonly known as Ghatti from the family Combretaceae. It attains a height about 30-40 feet [5].

Leaves are about 5-7 cm long, having entire elliptical obtuse shape and rounded at both ends with shallow depression. Leaves are opposite or sub- opposite.

Its bark is smooth, grey- white, pale yellowish or pinkish brown in colour spotted all over with greenish yellow depression. Flowering and fruiting occur in the month of Sept-March. Fruits are small sized, winged and beaked with single seed and are yellowish brown or reddish brown in colour. It is having wedge- shaped seed. Flowers are minute, greenish yellow in colour, sessile with dense heads [6].

FIG. 1: *ANOGEISSUS LATIFOLIA* TREE WITH FRUITS, FLOWER AND LEAVES

Chemical Constituents:

- Isolation of 3, 3'-di-O-methyl ellagic acid-4'-β-D-Xyloside & 3,4,3'-tri-O-methylflavellagic acid-4'-β-D-glucoside from stem bark of *A. latifolia* [7].
- Isolation of tannins reported in leaves of *A. latifolia* where Gallotannin was found to be major component of phenolic fraction along with corilagin and small amount of ellagic acid [8].
- A triterpenoid namely 3-β-hydroxy-28-acetyltaraxaren and a steroid, β-sitosterol were reported to be extracted from bark of *A. latifolia* ethyl acetate extract [9].
- Four pure compounds of C- glycoside flavonoid were isolated from the plant namely Vitexin, isovitexin, isoorientin and orientin in methanol-soluble fraction of *A. latifolia* leaves.
- Along with three pure tannin compounds namely Terminalin, Punicalin and 2-o-galloylpunicalin by a series of Sephadex LH-20 columns [10].
- Gum Ghatti is reported to have monosaccharide, protein content and uronic

acid obtained by using the gradual ethanol precipitation method [11].

- The gum Ghatti is reported to contain sugars such as arabinose, galactose, mannose, xylose and glucouronic acid [12].

Ethnobotanical Uses:

- In India, gum Ghatti obtained from *A. Latifolia* is used after delivery in the form of ladder to get rid of backpain and to cure damaged tissues [13].
- *Anogeissus latifolia* is also used in gastric disorders, skin diseases, wound healing, dysentery, diarrhoea, cough, diabetes and burns [14].
- It is one of the most important medicinal plants useful in traditional system of medicine.
- In Bangladesh, it is traditionally used in snake bite and Scorpion bite treatment [15, 16].
- This plant also shows good antioxidant properties, Antidiabetic activity along with antihyperlipidemic activity [17].
- In several Ayurvedic formulations, it is used as one of the ingredients. The *A. latifolia* stem bark is used in the Ayurvedic formulation Ayaskriti, as one of the ingredient[18, 19].
- In Bilaspur, Hamirpur and Una districts of Himachal Pradesh, different parts viz. bark, flowers, fruits, roots, stems of *A. latifolia* is used in the treatment of wound, diarrhoea, diabetes [20].
- In Maharashtra, Thane district dried fruit powder of *A. latifolia* is used to relieve stomach ache [21]. The plant is traditionally used to treat various human ailments like vomiting, whooping cough, dysentery, fever, cold, piles, fistula, skin diseases, diabetes, anemia and urinary discharge as a medicine [22].

Folk and Tribal uses of *A. latifolia:*

TABLE 1: FOLK & TRIBAL USES OF DIFFERENT PARTS OF *A. LATIFOLIA*

Plant Part used	Area	Tribal Uses
Stem bark	Khammam district, Andhra Pradesh	The sap is used to relieve persistent cough [23]
Stem bark	Adilabad district Andhra Pradesh	It is used to relieve stomach-ache [24]
Gum extracts	Saputara hills, Gujarat	Used with water for lactation [25]
Gum extracts	Vizianagaram district Andhra Pradesh	Used in sciatic pain and skin problems [26]
Roots, fruit and Leaves	Guna district, Madhya Pradesh	In the treatment of wound, cancer, as an antiseptic and in burning sensation [27]
Flowers, fruits, roots Stems	Bilaspur, Hamirpur, Una, Himachal Pradesh	In the treatment of Wound, diarrhoea and Diabetes [20]
Bark	Surguja district, Chhattisgarh	In the treatment of Diabetes [28]
Stem Bark	Chitrakoot, Madhya Pradesh	In the treatment of Snake bite and Diarrhoea [29]
Stem bark	Adilabad district, Andhra Pradesh	In the treatment of Scorpion bite and Asthma [15]

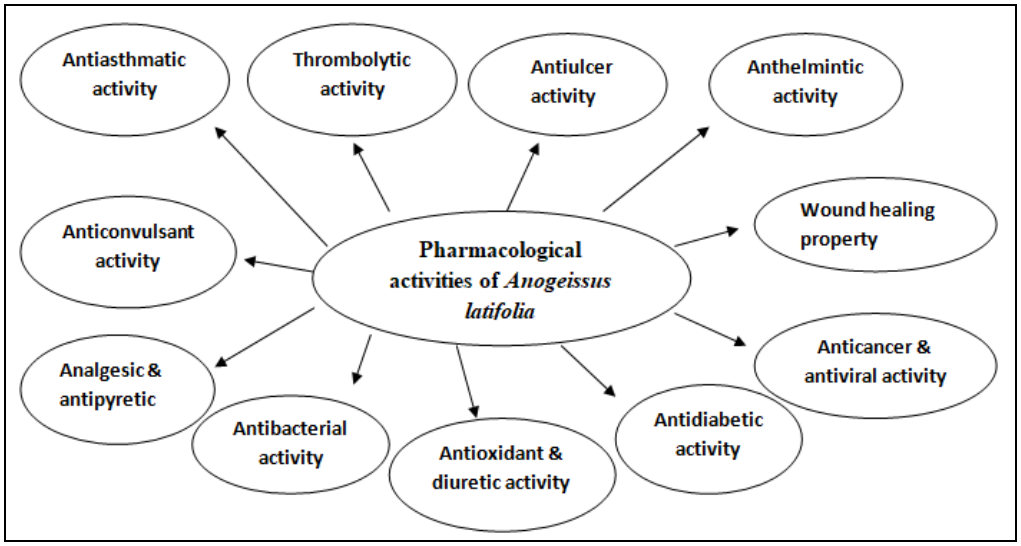

FIG. 2: VARIOUS PHARMACOLOGICAL ACTIVITIES OF *ANOGEISSUS LATIFOLIA*

Pharmacological Activities:

Anthelmintic Activity: The studies revealed that the various extracts (Pet. ether, chloroform and methanol) of *A. latifolia* bark and leaf posses Anthelmintic activity which is dose dependent against earthworms, *Pheritima posthuma*.

The extracts at five different concentrations i.e 10, 20, 30, 40 & 50mg/ml have shown moderate to significant Anthelmintic activity [30].

Thrombolytic Activity: It has been noted that as the concentration of hydromethanolic extract of *A. latifolia* increases, its thrombolytic activity increases. This activity was found to be significant at the concentration of 10mg/ml & 20mg/ml. Increase in extract concentration leads to increase in thrombolytic activity [31].

Analgesic, Anti-inflammatory & Antipyretic Activity: The ethanolic extract of *A. latifolia* stem bark exhibited good analgesic, anti-inflammatory & antipyretic effect may be due to presence of phenolic and flavonoid compounds [32]. The methanolic extract of leaves of *A. latifolia* was effective at a dose of 500mg/ kg with 53.33% paw edema inhibition showing significant anti-inflammatory activity ($P<0.001$) [33].

Wound Healing Activity: The ethanolic extract of *A. latifolia* bark has shown acceleration of wound healing process by decreasing wound surface & increasing its tensile strength [34].

Antiasthmatic Activity: The ethanolic extract of leaves of *A. latifolia* roxb. has shown Antiasthmatic activity in Histamine induced guinea pig. The result also suggests that the extract may have bronchodilator activity [35].

Anticonvulsant Activity: The ethanolic extract of *A. latifolia* stem bark with different concentration of 200, 400 and 600 mg/kg showed effective dose-dependent anticonvulsant activity against Maximal electroshock (MES) & Pentylenetetrazol (PTZ) induced seizure model. It may be due to presence of ellagic acid and other tannins [36].

Hepatoprotective Activity: The hydroalcoholic extract of bark of *Anogeissus latifolia* at concentration of 300 mg/kg have shown efficacy as hepatoprotectant in CCl4 induced liver damaged and justified the ethnobotanical use of the plant in liver diseases by analyzing Aspartate aminotransferase (AST), Alanine aminotransferase (ALT) and Alkaline phosphatase (ALP) in serum [41].

Antioxidant Activity and Diuretic Activity: The *A. latifolia* has been claimed to have strong antioxidant activity with its chemical constituents [42]. The *A. latifolia* plant extracts were studied for different free radical scavenging activities has shown antioxidant activity against DPPH and lipid Peroxidation [43]. It was also found that the *A. latifolia* leaves extract showed significant diuretic ($P<0.01$), natriuretic ($P<0.01$) and kaliuretic ($P<0.01$) effects [44].

Antiulcer activity: The *A. latifolia* bark extract possessed gastroprotective activity evidenced from ulcer inhibition induced by physical and chemical agents [45]. It was found that aqueous extract of young leaves *A. latifolia* can serve as the source of antiulcer medication with its acid neutralizing power. At a concentration of 1500 mg, the acid-neutralizing capacity was significantly reduced by the extract, coming in at 9.33 rather than 15.7 compared to the standard combination of aluminium hydroxide and magnesium hydroxide at 500mg [46].

Antidiabetic Activity: Aqueous extract of *A. latifolia* bark has shown Antidiabetic activity at 100mg/kg and 200mg/kg in STZ- NIN induced type 2 diabetic rats [47]. Methanolic extract of *A.latifolia* Wall leaves at the dose of 300mg/kg has shown Antidiabetic activity in Streptozotocin induced diabetic albino rats. A significant reduction in blood glucose level was noted with oral extract administration for 21 days [48].

The studies also found that *A. latifolia* bark was safe up to 2g/kg dose in rats. *A. latifolia* methanol extract possess significant hypoglycemic activity while petroleum ether and chloroform extract does not possess any such activity in diabetic rats [49]. The further investigation on hydro-alcoholic extract of *A.latifolia* bark at the dose of 300mg/kg has shown significant hypoglycemic activity without showing diuretic effect in alloxan induced diabetic albino rats [50].

Anti-leech Activity: Aqueous extract of *A. latifolia* dried leaves has shown a potent anti- leech action against *Piscicola geometra* infection. It has strong potential as a novel anti- leech agent that killed the leeches after 8, 40, 48, 72 and 96 hours [51].

Ayurvedic Preparations Containing *A. Latifolia*

TABLE 2: AYURVEDIC PREPARATIONS CONTAINING *A. LATIFOLIA*

Formulations	Uses
Ayaskriti	To treat skin diseases, Anemia, weight loss therapy [52]
Asanadi kashyam	Skin diseases, obesity & Diabetes [53]
Nyagrodadi choorna	Useful in the treatment of UTI's, Diabetes and Diabetic carbuncle [54, 55]

CONCLUSION: As discussed in the above review by extensive literature survey of *Anogeissus latifolia* plant belonging to family Combretaceae exhibited great ethnobotanical and pharmacological importance. Many phenolic compounds and triterpenoids have been identified. The stem, bark, roots extracts possess various ethnobotanical uses but very less research has been done on leaves. So, there is a need to carry out further studies on leaves of *A. latifolia* and isolation of bioactive compounds, their mechanism of action and clinical studies to find the greater potential of this plant in the future.

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