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A comprehensive review on *spondias pinnata*

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REVIEW ARTICLE

ABSTRACT

Spondias pinnata (Linn. f.) Kurz. Family: Anacandiaceae Flowers are small and in panicles. Fruit is rounded, yellow, a one-seeded drupe, with a finely flavored, edible pulp. Wide spread in India. Spondias pinnata is a well known plant indigenous to south East Asian countries. The plant has been used intensively in many traditional herbal medicines across the globe. This plant has been known to possess antimicrobial, anti-diabetic, ulcer-protective, anti-cancerous, anti-diarrhoeal, anthelmintic, cytotoxic and hepatoprotective activity.

It owes its different pharmacological activities to the wide range of phytoconstituents that are present in the plant. The plant is found to contain sterols, flavonoids, polysaccharides and gums. β-amyrin, oleanolic acid and amino acids glycine, cystine, serine, alanine and leucine, daucosterol, cycloartanone 24-methylene and lignoceric acid, ellagitannins, galloylgeranin, lignoseric acid and β –carotein are the other constituents that are found to be present in the plant.

KEYWORDS: Spondias pinnata,Anacandeacae,Antidiabetic,Hepatoprotective,

Flavonoid,Amino acid.

PLANT PROFILE

Common names:

English	Hog plum
Hindi	Amara, Ambodha
Punjabi	Ambara
Sanskrit	Amrata
Urdu	Jangali Aam



Figure 1 ***pondias pinnata.***

Description

Leaf anatomy: The leaves are duciduous or evergreen, estipulate & usually alternate (opposite in *Bouea*, *Blepharocarya*). Most taxa have imparipinnate leaves (rarely paripinnate, bipinnate in *Spondias bipinnata*), usually with opposite leaflets (rarely alternate in e.g. *Pseudospondias*, *Sorindeia*, *Thyrsodium*), while others have trifoliolate leaves (e.g. *Rhus*, *Searsia*, *Toxicodendron*) or unifoliolate leaves (e.g. *Anacardium*, *Lithrea*). The unifoliolate leaves are rarely palmate (*Campylopetalum*). Leaf margins can be entire, dentate, serrate or crenate, prominently revolute (e.g. *Anacardium*) or rarely spinose (e.g. *Comocladia*). Primary leaf venation is pinnate, rarely palmate (e.g.*Campylopetalum*). Secondary venation is most commonly eucamptodromous, brochidodromous, craspedodromous, semi craspedodromous or cladodromous and rarely exmedially reticulodromous (e.g. *Rhus thouarsii*) [1]. An intramarginal vein is rarely present (e.g. *Spondias*). Resin canals are found in Anacardiaceae leaves and reproductive structures. Resin canals run parallel to the phloem in leaf petioles and in major lamina veins, and are absent only in the most minor veins. They are also associated with the phloem of every vascular undle in the reproductive structures of most genera [2].

Fruit: The fruits are drupes or samaras and all appear to be derived from a fundamentally drupaceous fruit type. They are most often 1-locular, but incompletely 2- , 3- , 4- and 5- locular fruits are not rare. The pericarp is multilayered and well differentiated within the family. The exocarp varies in thickness and can have a lignified outer epidermis (Some *Anacardioideae*) or subepidermal sclereids (*Pentaspadon*). In some taxa (e.g. *Lithrea*, *Toxicodendron*), the exocarp is brittle and chartaceous and separates from the mesocarp at maturity[3]. The mesocarp is usually fleshy and resinous, can be waxy or oily, and is often pulpy and edible (e.g. *Mangifera*, *Spondias*), dry (e.g. *Schinopsis*, *Pachycormus*) and sometimes contains dermatitis causing liquid in usually black resin canals of varying thickness (e.g. *Anacardium*, *Mangifera*, *Gluta*). In *Melanochyla* both mesocarp and endocarp contains black resin [4].

Seeds: Seeds are generally ellipsoid, ovoid, falcate, lenticular or reniform. They vary in size from 2mm to more than 10cm. Species of *Spondias pinnata* have labyrinth seeds in which the seed coat deeply encroaches on the endosperm and embryo. The seed coat is usually

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Undifferentiated and/or reduced, while the chalaza is well developed and forms the greater part of the seed coats. The embryo of Anacardiaceae is oily, curved or straight with two expanded cotyledons [5].

Flower: Wild Mango is a deciduous tree, 10-15 m tall, with yellowish brown, smooth branches. Leaf stalks are 10-15 cm long. Leaves are 30-40 cm long, compound with 5-11 opposite leaflets. Leaflets are stalked, ovate-oblong to elliptic-oblong, 7-12 cm long, 4-5 cm wide, papery. Leaf base is wedge- shaped to rounded, often oblique, margin toothed or entire, with a tapering tip. Tiny flowers are borne in panicles at the end of branches, 25-35 cm long [6]. Flowers are stalkless, white. Sepals are triangular, about 0.5 mm. Petals are ovate-oblong, about 2.5 × 1.5 mm, pointed. Fruit is ellipsoid to elliptic-ovoid, yellowish orange at maturity, 3.5-5 × 2.5-3.5 cm. Inner part of endocarp is woody and grooved, outer part is fibrous. Mature fruit is usually with 2 or 3 seeds. Flowering March-April [7].



Fig.2 *Spondias pinnata* Flower

Chemical Constituents:

Phytochemical studies have yielded flavonoids, tannins, saponins and terpenoids. Essential oil from the pulp yielded carboxylic acids and esters, alcohols, aromatic hydrocarbons. Fruits yield ß-amyrin, oeanolic acid, glycine, cystine, serine, alanine, and leucine. Aerial parts

yield lignoceric acid, ß-sitosterol and its glucoside [9].

Other uses The flowers are sour and used in curry as a flavoring and also eaten raw as well as the local people make chutney, jam and pickle [10].

Pharmacological Review

Mondal et al., (2009) evaluated for hypoglycemic activity on adult Wistar albino rats at dose levels of 300 mg/kg p.o. each using normoglycaemic, glucose loaded and alloxan induced for 14 days. Glibenclamide (2.5 mg/kg) was used as reference standard for activity comparison. Among the tested extracts, the methanol extract was found to produce promising results that is comparable to that of the reference standard glibenclamide. The preliminary phytochemical examination of the methanol extract revealed presence of flavonoids, tannins, saponins and terpenoids. The present work justifies the use of the bark in the folklore treatment in diabetes.

Hazra et al., (2013) evaluated the hepatoprotective activity of *Spondias pinnata* with 70% methanol extract *spondias pinnata* (SPME) on iron overload induced liver injury. Iron overload was induced by intraperitoneal administration of iron-dextran into mice. Results were demonstrated the hepatoprotective efficiency of SPME in iron intoxicated mice, hence possibly useful as iron chelating drug for iron overload diseases.

Ghate et al., (2013) investigated on *Spondias pinnata* bark on human lung and breast carcinoma with 70 % methanolic extract of *Spondias pinnata* bark (SPME) in promoting apoptosis in human lung adenocarcinoma cell line (A549) and human breast adenocarcinoma cell line (MCF-7).

Panda et al., (2012) Studied antibacterial activity using agar well diffusion (concentration 100mg⁄ml) against eight phathogenic bacteria responsible for diarrheal diseases.

Chalise et al., (2010) Studied for the antioxidant activity and total polyphenol content (TPC), which results to beneficial health effects due to their antioxidant activity and TPC.

Mondal et al., (2009) Studied diuretic and laxative activity of different bark extracts of *Spondias pinnata* in wistar albino rat. The chloroform and methanol extracts produced significant diuretic and laxative activity.

Hazra. et al., (2008) Evaluated antioxidant activities of spondias pinnata stem bark extract which provided evidence that 70% methanol extract of *spondias pinnata* stem bark is a potential source of natural antioxidant.

Phytochemical review

Tandon et al., (1976) studied the chemical constituents of *Spondias pinnata*. Aerial parts of the plant was reported to contain 24-methylene-cycloartanone, stigma-4en-3-one, β-sitosterol, lignoceric acid and β-sitosterol β-D-glucoside.

Muhammad A et al.,(2010) evaluated Pharmacognostic Investigation and Authentication of Potentially Utilized Fruit *Spondias mangifera* (willd),and incinerated drug was tested for the presence of various inorganic elements such as Potassium, Calcium, Magnesium, Aluminium, Iron, Phosphorus, Iodine and Sulphur which have good neutraceuticals potentiality

Muhammad A et al., (2009) investigated pharmacognostic studies and evalulation of total phenolic contents of trunk bark of spondias mangifera wild,due to the presence of phenolic compounds the species is recommended as potential anti inflammatory, immunomodulatory, mast cells, stabilizing, blood pressure and cholesterol lowering natural resource.

Joysree D et al.,(2011) studied Chloroform and Ethanol Extract of *Spondias Pinnata* and its Different Pharmacological activity Like- Antioxidant, Cytotoxic, Antibacterial Potential and Phytochemical Screening through In-Vitro Method. Based on the results of the present study, it can be suggested that the *spondias pinnata* possess good to moderate antioxidant, cytotoxic and antibacterial potential.

Gauri S et al., (2011) Preliminary evaluation of nutraceutical and therapeutic potential of raw *Spondias pinnata* K., an exotic fruit of India. The current study explains the nutritional as well as medicinal utility of the fruit which is a rich source of minerals and antioxidants such as phenols and flavonoids.

Mohammad S et al., 2014 biological investigations of the leaf extract of *spondias pinnata.* Spondias pinnata were assessed for thrombolytic activity.

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