

INDIAN BAMBOO OVERVIEW WITH SPECIAL REFERENCE TO *BAMBUSA BAMBOS*

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ABSTRACT:

The genus *Bambusa* used in folk medication for antiquity in Africa, China, India, and different regions of the world. In recent eons, numerous research focused on the ethnobotanical, phytochemical, and pharmacological segments of *Bambusa bambos*. The crude extracts and purified biologically active constituents of *Bambusa bambos* contained a varied array of pharmacological properties, including antioxidative, anti-inflammatory, antibacterial, antifungal, antimalarial, antineoplastic, anti-hyperglycemic, aborticidal, and cytotoxic actions. From *Bambusa bambos*, alkaloids, flavonoids, phenolics, terpenoids, and additional substances all being identified and entitled. Due to its exceptional therapeutic properties and low toxicity, *Bambusa bambos*. have a substantial global market, which has drawn growing attention from academics. Although bamboo has a wide range of potential, additional study inputs are necessary for outcomes that can be relied upon.

KEYWORDS: *Bambusa bambos*, ethanobotany, ethanopharmacology, phytoconstituents, pharmacological activities.

INTRODUCTION

Nature consistently provides illustrative proof of its healing abilities. It is a comprehensive repository of treatments to treat every aspect of humanity. Over a thousand years, drug knowledge has accumulated, providing the most efficient means of assuring healthcare¹⁻³. Herbal remedies have established their value and significance in the healthcare systems currently in use around the world. Reliant on the portion used, such as leaves, flowers, fruits, barks, roots, and seeds, which comprehend distinct purposeful ingredients, a plant will demonstrate a variety of biological activities^{4,5}.

The all-time available online encyclopedia of information; Wikipedia defines *B. bambos*, as a perennial, giant, woody grasses, also known as the gigantic thorny bamboo, Indian thorny bamboo, spiny bamboo, or thorny bamboo, mostly indigenous to southern Asia (India, Bangladesh, Sri Lanka, and Indochina).

Additionally, it got enfranchised in Seychelles, the Philippines, Java, Malaysia, Maluku, Central

America, and the West Indies ⁶. The plants are tall, bright-green coloured spiny grasses. It develops in thickets made up of several densely branching, closely spaced culms ⁶. The enormous potential of bamboo as a plant medicine has been demonstrated through different research studies. There are numerous references to bamboo's medicinal benefits in conventional medical systems like Ayurveda, Chinese medicine, and Unani ^{4,7,8}. Several bamboo species, used since ancient times, have therapeutic potential, according to several scientific investigations ^{4,9}.

Scientific classification ⁶

Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Monocots
Clade:	Commelinids
Order:	Poales
Family:	Poaceae
Genus:	Bambusa
Species:	<i>bambos</i>

Common names of bamboo in India's diverse region^{3,10}

English:	Bamboo, Bamboo manna, Giant Thorny Bamboo
Hindi:	Bans-lochana, Banskapur, Vanoo, Banz
Gujarati:	Toncor, Wans, Vanskapur, Vas-numitha
Bengoli:	Bans-Kapur, Baans, Baansh, Baroowa Bans
Sanskrit:	Vanshalochana, Venulavanam
Arab:	Tabashir
Marthi:	Bansa, Baambii, Bansamitha
Tamil:	Munga-luppa, Mullumangila, Mulmunkil, Mungil
Telugu:	Veduruppu, Mulkas Veduru, Mullu Veduru
Maliyalam:	Moleuppa
Kannad:	Bidaruppu, Tavakshira

Botanical Description

The plant grows as long woody grasses with thorny stems and countless tufted on a strong rootstock. It curves at the top as it develops to a height of 30 to 40 meters. Shoots are bare, fortified at the nodes with 2-4 stout recurved bristles. Nodes have prominent appearance, while the internodes are approx. 45cm in length. The culms grow from 15cm up to 18cm across.⁽¹¹⁻¹⁴⁾ Leaves are generally linear or lanceolate in shape with scabrous margin, silicate base and narrow midrib. The tip of leaves is stiffed, glabrous or puberulous beneath. Leaves are 17.5-20.5 × 2-2.5 in dimensions, with sheath over leaf culminating on a profuse callus and a short spikey auricle. The plant bear panicles in form of inflorescence in large number all over the stem. It also bears oblong caryopsis of 5-8mm long, slightly grooved towards one side. The plant bear flowers and fruits only once in their lifespan, frequently in September to May.^{11,13,14}

Geographical Distribution in India

In terms of bamboo genetic resources, India comes in second place, just behind China.^{15,16} There are numerous reports on the diversity of this species in India. According to Bahadur and Jain (1983), there are 113 species of bamboo,¹⁷ however other reports place the numeral species anywhere between 102 by Ohrnberger and group in 2002¹⁸ to 136 by Sharma *et al.* in 1980¹⁹. Bamboo plantations cover 9.57 million acres in India, or around 12.8% of nation's total forest area¹⁹. According to a number of specialists, human activities have a significant impact on bamboo's dispersion²⁰. Gamble *et al.*²¹ did note, however, that rainfall is correlated with bamboo distribution in India. In a different report, Varmah and Bahadur²² linked the preferred distribution of several bamboo species to the various agroclimatic regions of India.

Bambusa bambos permits effective growth in almost all major tropical, subtropical and dry tropical regions of India^{15,23}. Species such as *arundinacea* and *thamnocalamus* are found in the alpine zone, but *phyllostachys* and these two taxa are found in the temperate region as well^{15,23}.

Ethanobotanical aspect of Indian bamboo

"Ethanobotany" refers to the study of the connection between society and floras, particularly how plants are used by diverse beliefs for various purposes. In the case of Indian bamboo, ethno-botanical studies have shown that bamboo plays a significant role in the lives of people in India. Certain species of bamboo shoots are edible and are a part of many regional cuisines in India. They are often used in curries, soups, and stir-fry dishes. Bamboo shoots are known for their crunchy texture and unique flavor. In traditional medicine systems like Ayurveda, different sections of the bamboo plant used for their medicinal

applications. For example, bamboo leaves are used to treat various ailments, including respiratory disorders and infections. Bamboo extracts are also used in some traditional medicines.

The women of tribal community residing around Salen in Tamil Nadu used bamboo leaves as an abortifacient in early conception²⁴. They preferred preparing decoction from leaf bud for smooth discharge of menstrual blood. The preparation was believed to provide them relief from pain in dysmenorrhea¹¹. Another tribe named kani tribe from Kanyakumari district of Kerala opted using seeds of *Bambusa bambus* to increase fertility²⁵. People preferred drinking decoction of plant after delivery of child as a laxative and for quick and smooth expulsion of placenta²⁶. To treat bruising and reduce swelling, Kanyakumari's traditional healers spread over a creamy stuff prepared from complete plant, turmeric, and *Areca catechu*²⁷. The paste prepared from *B. bambos* seeds were castoff by tribal to cure rheumatism²⁸. It's important to note that the uses of bamboo can vary significantly from one region to another in India, as well as among different communities and ethnic groups. Furthermore, modern technology and sustainable practices are being incorporated into bamboo cultivation and utilization to promote its economic and ecological benefits while preserving traditional knowledge and practices.

Ethanopharmacology of Indian bamboo

Ethnopharmacology is the study of the traditional knowledge and uses of plants by indigenous cultures for medicinal purposes. While *B. bambos* doesn't have an extensive history of medicinal use compared to some other species of this plants, it has found applications in traditional medicine systems in India. **Table 1** explains the medicinal importance of different morphological parts of this species in traditional system of medicine. In traditional Ayurvedic medicine, the tender shoots of *B. bambos* are used for their anti-inflammatory properties. They are sometimes used to treat inflammatory conditions and joint pain. Some traditional remedies in India use parts of this plant, such as the leaves or shoots, to help reduce fever (antipyretic). Their shoots are believed to have digestive properties and are sometimes used to alleviate digestive issues. Bamboo species, including *B. bambos*, have been investigated for their antioxidant potential. Antioxidants protect cells from injury instigated by free radicals and may have several health aids. Bamboo extracts, comprising those particularly from this species, have been studied for their potential in promoting bone health. They are rich in silica, which is important for bone health and may help in conditions like osteoporosis. In some traditional beauty practices in India, bamboo extracts are used for hair and skin care. Bamboo silica is believed to strengthen hair and nails and improve skin texture as well. In certain regions, bamboo leaves, along with other herbs, have been used in

traditional remedies for respiratory conditions like coughs and asthma. Bamboo extracts, particularly the resin, have been used traditionally for wound healing due to their purported antimicrobial properties.

It's important to note that while there is traditional knowledge about the potential medicinal properties of *B. bambos*, scientific research into its pharmacological effects is ongoing. Many of these traditional uses are based on anecdotal evidence, and more rigorous scientific studies are needed to confirm their efficacy and safety. As with any herbal remedy, it's important to refer with a healthcare practitioner afore using *B. bambos* or any plant-based product for medicinal purposes, especially if you have underlying health conditions or are taking medications.

Table 1. The Medicinal Application of *B. bambos*

Sr.No.	Morphological parts of <i>B. bambos</i>	Medicinal importance [overview, therapeutic]
1.	Entire plant	Astringent, laxative, anti-inflammatory, diuretic
2.	Shoots	Dislodgement of worms and helminths from gut and ulcer wounds
3.	Leaves	Leprosy, amenorrhoea, dysmenorrhoea, eye troubles and eye infection, lumbago, haemorrhoids, hematemesis, febrifuge
4.	Leaves (in form of Juice)	Strengthening the cartilage in osteoarthritis and osteoporosis, maintain the integrity of the bones, arterial walls, skin, teeth, gums, hair and nail, skin infection (eczema and psoriasis)
5.	Stem and leaves (together) Roots (paste or ash)	Blood purifier Skin disorders, ringworm infection, rabies, dermatoses, bleeding gums, joint pain
6.	Bark	Cure for eruption of acne
7.	Fruits	Fat metabolism and obesity
8.	Silicates of <i>Bambusa</i>	Create body's structural matrix for forming and repairing connective tissues

Phytochemical constituents

Approximately 90% of bulk mass of *B. bambos* is made up of cellulose and hemicellulose. However, it also contains waxes, tannins, and organic salts. Additionally, some alkaline extractive constituents are present. Ash and another organic substance are joined to the cellulose. Another crucial component of it is lignin. Around 0.8-6% protein, 2% deoxidized saccharide, 2-4% fat, and 2-6% protein are all existing in bamboo.⁽¹⁾ The protein concentration is comparatively higher in theirs leaves compared to stem.⁽²⁹⁾

The different phytoconstituents present in diverse portions of the plant is enlisted in **Table 2 and Fig.1**. The siliceous secretion called bamboo resin can be discovered in the stem internodes of several kinds of bamboo.⁽²⁹⁾ The secretion appears somewhat like white or transparent bluish-white camphor-like crystals, a mild stickiness to palate, with a sweet flavor.⁽¹¹⁾ Dual components, stigmast-5,22-die-3 β and stigmast-5en-3 β -ol- β -D-glucopyranoside, which are promising candidates for the hypoglycemic effects, were discovered during the plant's phytochemical examination. Additionally, two well-known substances, α -amyirin acetate and urs-12-en-3 β -ol- β -D-glucopyranoside, were sequestered from this plant.⁽¹¹⁾ Another significant class of chemical found in the aerial sections of *B. bambos* is betaine.⁽²⁹⁾ The aqueous extract of mature *B. bambos* leaves included six phenolic acids, such as chlorogenic acid, ferulic acid, coumeric acid, protocatechuic acid, vanillic acid, and coffeic acid. Possible action of the allelopathic (weedicial) potency is exhibited by phenolic acids²⁹.

Table 2. The chemically active constituents present in different morphological parts of *B. bambos*

Sr. No.	Plant part	Active constituents (Phytoconstituents)
1.	Shoots	Oxalic acid, Silica (Silicon Dioxide) Flavonoids Polysaccharides: reducing sugar, diferuloylarabinoxylanhexasaccharide, diferuloyl oligosaccharide, (5,5'-di-diferul-9,9'-dioyl)-[α -L-arabinofuranosyl-(1 \rightarrow 3)-O- β -D-xylopyranosyl-9-(1 \rightarrow 4)-D-xylopyranose] (taxiphyllin) Minerals (e.g., calcium, potassium) Vitamins (e.g., vitamin A and vitamin C) Dietary Fiber
2.	Leaves	Resins, waxes, hydrogen cyanide (HCN), benzoic acid Amino Acids: glutelin, lysine, methionine, betain, choline Proteolytic enzymes, nuclease and urease Minerals (e.g., calcium, potassium) Ethanollic extract: 17,20,20-tri dimethyl-20 α -isopranyloleanate and eicosan-1,20-dioic acid Phenolic acids in aqueous leaf extract: chlorogenic acid, ferulic acid, coumeric acid, protocatechuic acid, vanillinic acid, caffeic acid
3.	Resin (sap)	Flavonoids, terpenoids, alkaloids, phenolic compounds, Tannins, resin acids, essential oils
4.	Seeds	Amino acids: arginine, cysteine, histidine, isoleucine, lysine, methionine, phenylamine, threonine, valine, tyrosine Vitamins: niacin, riboflavin, thiamine
5.	Roots	Cynogenetic glycoside (taxiphyllin)

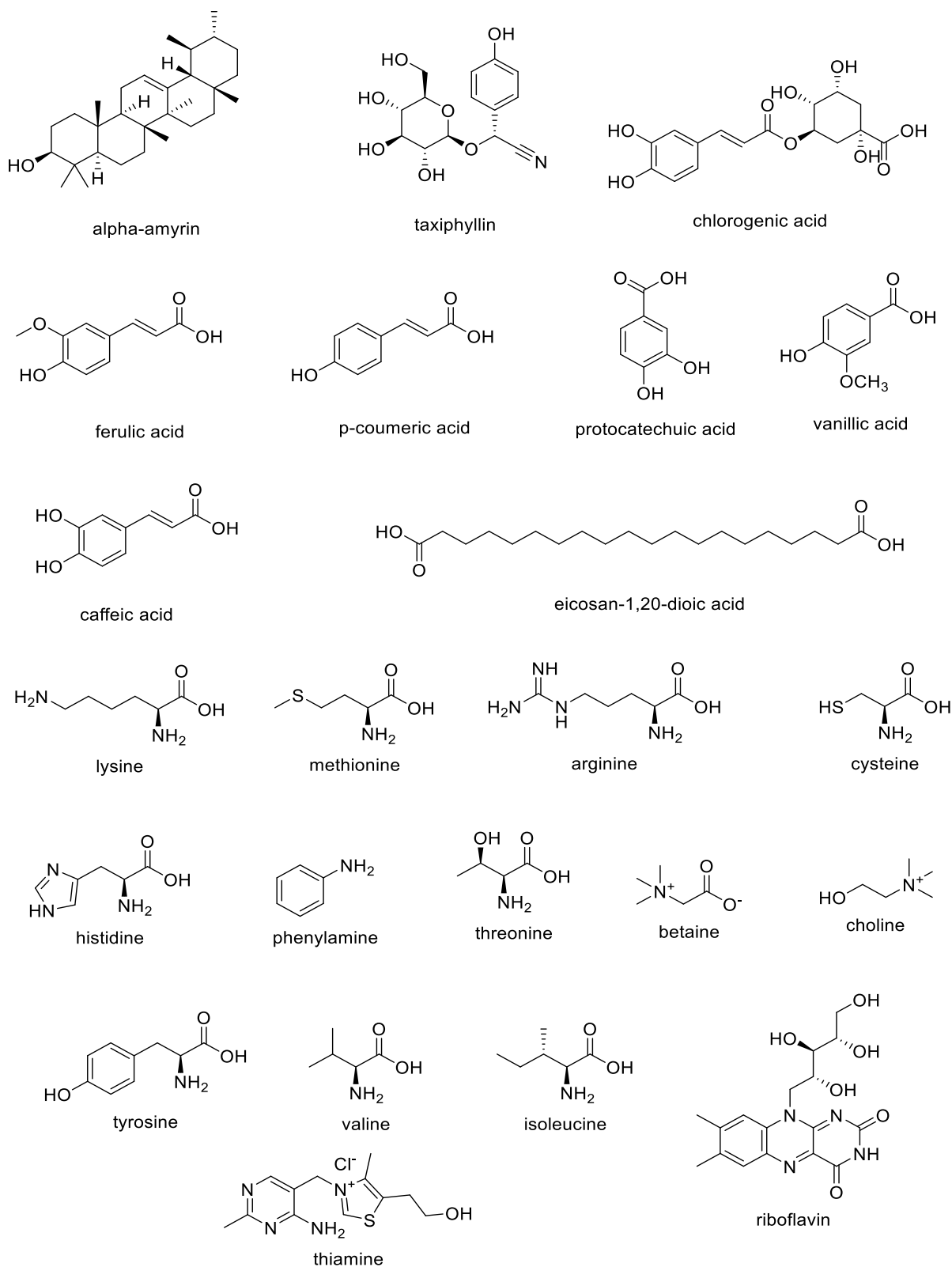


Fig.1. Chemical structures of active constituents isolated from *B. bambos*

Pharmacological activities of *B. bambos*

The **anthelmintic** activity of the plant's roots extracted in ethanol against *Pheritima posthuma* was studied. The investigation includes measuring the duration of worm paralysis and death at various extract dose levels (10, 20 and 50 mg/ml). A dose-dependent anthelmintic condition of the extract was seen. When compared to the standards piperazine citrate (15 mg/ml) and albendazole (10 mg/ml), the action was comparable^{11,30}. The presence of α -amyrin is responsible for the anthelmintic action³¹.

Male rat fertility was decreased by a *B. bambos* tender shoots ethanol extract (BASE)¹¹. The fertility ratio dropped to 15% for control rats subsequent receiving BASE for 7 days at 300 mg/kg dose per day, then to 23% following a 7-day retrieval period. Particularly after 4 days of therapy, fewer cohabiting females were successfully inseminated. Eight days after BASE removal, the full resumption of mating behavior was visible. Spermatozoa obtained from the cauda epididymis were less motile and contained fewer spermatozoa than those from the caput and cauda epididymis. Significantly reduced testicular, epididymal, vas deferens, and prostate weights observed. The serum protein along with pyruvate/oxaloacetate transaminase action profiles revealed about extract as largely non-toxic³².

An authorized critique in the National Formulary of Unani Medicine (NFUM) describes the polyherbal Unani composition known as Suffof-e-SuzakQawi^{11,33}. It is said to have **diuretic and anti-gonorrheal** effects. Healthy rats receiving an aqueous suspension of the preparation at dosage of 500, 750, and 1000 mg/kg demonstrated an upsurge in urine outflow and sodium excretion that was as good as reference furosemide^{11,34}.

Glucosinates, thiocyanates, and cyanogenic glucosides are present in *B. bambos* shoots¹¹. *B. bambos* shoot extract demonstrated in vitro **anti-thyroid action** by inhibiting thyroid peroxidase (TPO), which iodide then turned around³⁵.

The antibacterial activity of water-phase extract of bamboo shavings (WEBS)¹¹ through supercritical CO₂ method extraction was appraised. It employed agar disc diffusion assay in nutritive agar and CzapekDox agar medium counter to a variety of food abided and food putrefied microbes. The WEBS demonstrated concentration-dependent antimicrobial activity against *S. aureus*, *B. subtilis*, *E. coli*, *A. niger*, *P. citrinium*, and *S. cerevisiae*³⁶. The α -amyrin and phenolic compounds in the plant is what causes the **antibacterial** activity, according to the research¹¹.

Due to their capacity to decrease blood vessel permeability and raise capillary resistance, flavonoids serve as **vasoactive and vaso-protective** agents¹¹. Treatment for blood capillaries problems uses

flavonoids. The clinical studies exhibit flavonoid treatment increases capillary resistance. Flavonoids found in *B. bambos* may help protect vessels and have venotonic effects³⁷.

The Ministry of Health of the People's Republic of China recently certified the anti-oxidative property of bamboo (AOB) leaflets as an innovative type of natural anti-oxidant, and utilized in numerous food systems³⁸. To assess AOB's safety, a number of **acute and subchronic toxicological** studies were conducted. The results showed that in both rats and mice, its maximum tolerated dosage (MTD) was larger than 10 g/kg of body weight, which is practically non-toxic. None of the mutagenicity tests revealed any evidence of mutagenicity. Rats were given 1.43, 2.87, and 4.30 g/kg per day for 90 days, but none noteworthy changes in their histopathology, clinical conditions, or chemistry were noticed. 4.30 g/kg per day³⁹ is the no-observed adverse effect threshold (NOAEL). These findings suggest that AOB is safe to use as a food additive⁴⁰.

Utilizing an animal model of arthritis caused by Complete Freund's adjuvant (CFA), researchers looked at the plant's **anti-arthritic** effectiveness in the treatment of rheumatoid arthritis (RA).⁽¹¹⁾ Analyzing many indicators of bone deterioration, such as histological and radiological evaluation of the joints, allowed researchers to better understand how methanol extract affected arthritis. Rheumatoid factor, paw volume, spleen histology and erythrocyte sedimentation rate (ESR) were among some parameters measured. At dose levels of 100, 200, and 300 mg/kg in a dose-reliant fashion, the methanol extract significantly reduced bone erosion, spleen expansion, and rheumatoid factor, but less so than the standard treatment (Dexamethasone 5 mg/kg i.p.)⁴¹.

Rats that had been given alloxan to cause diabetes were used to investigate the **anti-diabetic** effects of an aqueous ethanol extract of *B. bambos* seeds. The outcomes showed that in rats with alloxan-induced diabetes, an aqueous ethanol extract significantly reduced blood glucose levels and provided considerable protection. It was comparable to the reference standard glibenclamide for its anti-diabetic action⁴². Doses of 200 and 400 mg/kg p.o., ethanolic extract of roots effectively lowered blood sugar intensity in healthy and alloxan-induced diabetic rats. The extract's hypoglycaemic action got discovered to be dose-dependent and equivalent to reference drug glibenclamide⁴³. Administered orally by normal rats with 500 mg/kg dose and intravenously to streptozocin-induced diabetic rats at dose of 60 mg/kg, aqueous extract of leaves exhibited hypoglycaemic activity. The hypoglycaemic impact was equivalent to that of glibenclamide (0.9 mg/kg)⁴⁴. The α -amyrin⁴⁵, Stigmast-5, 22-dien-3-ol, and Stigmast-5-en-3-ol--D-glucopyranoside are responsible for anti-diabetic effect¹¹.

Adult male rats were given an ethanolic extraction of tender shoots of *B. bambos* at a 300 mg/kg dose per rat each day upto 7 days in order to access the epididymis structure and functional activities¹¹. Spermatozoa count and sperm motility were shown to be considerably lower in the caput and caudal portions of epididymal part, respectively. Cytologically, an increase of intertubularstroma along with a decrease in both segments' epithelium and stereocilia height and caudal lumen diameter noticed. Both epididymal segments were observed to have lower epididymal weights, acid phosphatase, and total lactate dehydrogenase activity. Though protein concentration in caudal segment got rised up. The anatomical and functional integrity of the epididymis was reported to be compromised by extract therapy^{11,46}.

On isolated human and rat uterus, the uterine activity of the fresh juice of the leaves examined. Its **ecbolic activity** was found to be mild at doses of 1–10 mg/ml^{11,47}.

At a dose of 80 mg/kg, mice receiving an aqueous extract of the leaves were shown to have lower mean rectal temperatures, which reverted to normal 24 hours post administration. The aqueous extract of *B. bambos* leaves may thought of a possible **anti-pyretic** agent⁴⁸.

The methanol extract of leaves with **anti-inflammatory** property⁽¹¹⁾ was investigated in carrageenan- and immunologically-persuaded paw edema, as well as its **anti-ulcer** activity in albino rats. Comparing to usual medications, the activity was discovered to be significant. The most effective anti-inflammatory activity was shown when methanol extract and phenylbutazone (NSAID) in combination was administered, with least toxicity and no ulcerogenic activity. Thus, the finest anti-inflammatory drug will be created by combining herbal product, such as the methanolic extract of *B. bambos*, with a contemporary drug (NSAID), and it seems helpful for the long-lasting management of chronic inflammatory illnesses⁴⁹. The α -amyrin and phenolic compounds is responsible for the anti-inflammatory effect.

The phenolic substances found in *B. bambos*, like phenolic acids, flavonoids, and tannins, help the plant's **antioxidant** capacity⁵⁰⁻⁵⁴. Flavonoids' ability to chelate iron and their capacity to scavenge age-related free radicals combine to produce their antioxidant action. Reactive oxygen species (ROS) and organic hydroperoxide are not formed in vivo as a result of flavonoids' ability to inhibit oxidases like lipooxygenase, cyclooxygenase, and xanthine oxidase. Additionally, flavonoids block enzymes that are indirectly involved in oxidative reactions. These processes are what give flavonoids their anti-aging, photoprotective, and hair color-preserving properties⁵⁵.

Different researcher groups briefed the medicinal significance of *B. bambos* in their reports, which is summarized in **Table 3**.

Table 3. The pharmacological activities of *B. bambos* reported by different researcher groups.

Sr.No.	Parts of plant used	Diseases or ailments	Preparations or administration	References
1.	Leaves	Pimple onto eyelid	Rub the leaves onto the pimple	Mahomoodally, 2014 ⁵⁶
2.	Leaves	Constipation, bilharzia	Powder; oral Bolus; oral	Neamsuvan <i>et al.</i> , 2016 ⁵⁷
3.	Stems; Leaves; Roots; Sprouts; Barks	Laxative, leukoderma, inflammation, strangury, cough, cold, consumption, asthma, emmenagogue, bleeding disorder	-	Rudra <i>et al.</i> , 2021 ⁵⁸
4.	Seeds	Rheumatism	Paste; Topical	Silambarasan and Ayyanar, 2015 ⁵⁹
5.	Young stems Young shoots Leaf buds Tender shoots	Leprosy, lipoma Dislodgement of worms, ulcer Discharge of menses indigestion	Decoction; Potion; Oral Poultice of young shoots is used Decoction Curry from tender shoots.	Srisawat <i>et al.</i> , 2016 ⁶⁰
6.	Grains	All diseases	Rice prepared from the grains of Bamboo whose stem is infested by Sigare (<i>Dendrophthoe falcata</i>) is taken internally for relief from all diseases (believed as Sanjeevani).	Udayan <i>et al.</i> , 2005 ⁶¹

7.	Roots	Anthelmintic action	Ethanol extract at different dose level of 10, 20 and 50mg/ml	Kumar <i>et al.</i> , 2012 ³⁰
8.	Tender shoots	Antifertility	Ethanol extract (BASE) at a dose of 300mg/kg per day for 7 days	Vanithakumari <i>et al.</i> , 1989 ³²
9.	-	Anti-gonorrhoeal and diuretic properties	Aqueous suspension at dose of 500, 750 and 1000mg/kg given to healthy rats	Krishna <i>et al.</i> , 2006 ³³
10.	Shoots	Anti-thyroid activity	-	Amar <i>et al.</i> , 2004 ³⁵
11.	Plant sap	Antibacterial activity	Water-phase extract of bamboo shaving (WEBS) in different agar media	Joyce <i>et al.</i> , 2011 ³⁶
12.	-	Vasoprotective & venotonic	Oral	Spingoli, 2008 ³⁷
13.	Leaves	Acute and chronic toxicity on antioxidant property	Doses 1.43, 2.87 and 4.30g/kg per day for 90 days	Baiyi <i>et al.</i> , 2005 ³⁸
14.	-	Anti-rheumatic	Methanol extract at dose level of 100, 200 and 300mg/kg	Rathod <i>et al.</i> , 2012 ⁴¹
15.	Seeds, roots, leaves	Antidiabetic	Aqueous ethanol extract of seeds in alloxan induced diabetic rats, ethanol extract of roots at dose of 200mg/kg p.o. in normal rats while 400mg/kg p.o. in alloxan induced diabetic rats, oral dose of 500mg/kg of leaves aqueous extract to normal rats and 60mg/kg i.v. to streptozocin induced diabetic rats	Sudeepkumar <i>et al.</i> , 2012 ⁴² Joshi <i>et al.</i> , 2009 ⁴³ Flavia <i>et al.</i> , 2012 ⁴⁴ Narender <i>et al.</i> , 2009 ⁴⁵
16.	Shoots	Anatomical change in rat's reproductive organ	Ethanol extract at dose of 300mg/kg per rat per day for 7 days	Manonavagi <i>et al.</i> , 1989 ⁴⁶
17.	Leaves	Ecbolic activity	Fresh juice 1-10mg/ml	Satyawati <i>et al.</i> , 1976 ⁴⁷
18.	Leaves	Anti-pyretic	Aqueous extract at dose of 80mg/kg	Kundu <i>et al.</i> , 2011 ⁴⁸

19.	Leaves	Anti-inflammatory & antiulcer	Methanol extract + phenylbutazone	Michel et al., 2005 ⁴⁹
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CONCLUSION

The connotation of *B. bambos* as a therapeutic drug with varied pharmacological spectra has been clarified in this review. The various ethnomedicinal and pharmacological characteristics of *B. bambos* are due to a range of phytochemical elements that they possess. Additional research into the available data is necessary in order to create novel clinical therapies from *B. bambos*. This review presents a wonderful opportunity for future research because it compiles essential data on numerous facets of this therapeutic plant.

CONFLICT OF INTEREST:

The authors have no conflicts of interest regarding this investigation.

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