

A REVIEW ON BAMBUSA ARUDINACEAMehakpreet Kaur*¹, Sonia Singla², Navpreet Kaur³, Anuja Chopra⁴ and Divneet Kaur⁵¹Research Scholar, G.H.G Khalsa College of Pharmacy, Gurusar Sadhar Ludhiana, Punjab.^{2,4,5}Associate Professor, G.H.G Khalsa College of Pharmacy, Gurusar Sadhar Ludhiana, Punjab.³Assistant Professor, G.H.G Khalsa College of Pharmacy, Gurusar Sadhar Ludhiana, Punjab.***Corresponding Author: Mehakpreet Kaur**

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ABSTRACT

Bamboo is the colloquial name for the highly regarded ayurvedic medicinal tree *Bambusa arudinacea* that belongs to family poaceae. The plant's leaves, roots, shoots, and seeds, among other parts, have anti-inflammatory, anti-diabetic, anthelmintic, anti-ulcer, antioxidant, and astringent properties. Seeds of the plant are acrid, laxative and said to be beneficial in strangury and urinary discharge. The likelihood of a natural medication not being available increases with its effectiveness. The natural medication is easily falsified with poor grade ingredients to satisfy the rising demand Pharmacognostical methods of standardising the plants have been used in the current work to assure the use of true and authentic material in herbal compositions. The characteristics of *Bambusa arudinacea* seeds at the macroscopic, microscopic, and powder microscopic levels have been studied. All these pharmacognostical studies can be used as a diagnostic tool for the correct identification.

KEYWORDS: Bambusa arudinacea, scientific classification, ethnopharmacological uses, pharmacological uses formulations.

**INTRODUCTION**

It is a perennial, enormous, woody grass in the order monocotyledon's group angiosperms is bamboo. One minor subfamily, Centothecoideae, and five big subfamilies, Arundinoideae, Pooideae, Chloridodeae, Panicoideae, and Bambusoideae, can be found within the grass family Poaceae (or Gramineae). Bamboos are categorised in the subfamily Bambusoideae, despite their name.^[1] There are about 10 genera and 1450 species.^[2] In earlier times bamboo was greatly used in ayurveda and unani systems the benefitory effect of the drug is proved as an ancient medicine it is uses for treating cold and cough. It is also reported that it has antidiabetic, antiulcer antimicrobial, antifertility anti-arthritic activity and many other pharmacological activities.

Scientific Classification

Kingdom: Plantae (unranked): Angiosperms (unranked)
Monocots (unranked): commendalins
Family: Poaceae
Subfamily: Bambusiadeae
Supertribe: Bambusiadeae

One of the world's most valuable plant resources is bamboo. *Bambusa arudinacea* (retz), an elegant spiny bamboo found all over India, is a member of the poaceae family. It only blooms once in a lifetime (30–40 years), usually between September and May. It has linear leaves, enormous panicles of flowers, and occasionally the entire culm. Oblong, 5-8mm long, grooved on one side, caryopsis (grain). A kani Tribes in the Kanyakumari district consumed the seeds and have the belief that they increase fertility. Traditional uses for bambusa included using its leaves, shoots, seeds, and roots as laxatives,

astringents, and diuretics. The *B. arudinaceae* extract demonstrated anti-inflammatory, antiulcer, antifertility, antimicrobial, and hypo glycaemic properties by showing activities.^[3-6] *Bambusa arudinacea* alcoholic seed extract has shown to include flavonoids, tannins, phenols, quinines, sterols, carbohydrates, and amino acids.^[7]

Botanical Description

Plant- Thorny

Stems-Many stems are seen

Rootstock: crested

Height: approx. 30meter

Culms: 15-18 cm. across

Nodes: striking, stems are up to 45 cm. long.

Shoots: plain, armed at the nodes with 2-4 stout recurved spines

Leaves: 17.4 - 20.5 X 2 - 2.6 cm, narrow and parallel shape, and tips are stiffed.

The margin is rough and narrow midrib.

Panicles: efflorescence and may occupy the whole stem.

Caryopsis: 5-8 mm long and oblong, grooved on one side

Flowering and fruiting: Once in a lifetime.^[8]

Distribution

IT IS Found in moist areas of India at an altitude of 1250 m near the river sides in south india it extends up to 1100 m it is also being cultivated in north west india and Bengal region. It is also cultivated in Sri Lanka, Peru And Myanmar. It can also be found in Arunachal Pradesh, Karnataka, Orissa, Maharashtra, Gujarat, Himachal Pradesh, Madhya Pradesh, Assam, Manipur, Karnataka, Uttar Pradesh and Rajasthan. Few Other Species of Bamboo can be found extensively in North East India.

Macroscopic Characterisation

Bamboo is generally characterised by woody stems which are generally pointed which arise from the rhizomes. The Macroscopic Characteristics of bamboo include woody and pointed stems, commonly called culms which start from the underground woody jointed rhizomes culms are generally round & smooth. Diameter of the plant ranges from few mm to 30cm. The hardness of the culm depends upon the number of fiber bundles & the manner of their scattering. The outer shell thickness & the silica deposits in outer cortical layer also contribute in hardness of culm. green color indicates freshness of the culm. Rhizomes are the pachymorph type have woody nature, slightly arched upturned sharply at the tip in manner of a walking stick handle, which become thick & broad at the that bear the culms & narrow at the end which is called neck and it is joined with rhizomes.

Active Constituents

Bamboo plant has high concentration of Acetylcholine that results in neurotransmitter property. Other components include Cholin, betain, hydrate of silicic acid and nuclease, urease with, proteolytic enzyme, glycoside, alkaloid, Vitamin C, Flavonoids, Hydrocyanic

acids, Glutelin protein and Benzoic acid are energetic components.^[11-13] The silicious substance which is located close to the joint to the interior have a white camphor like crystalline appearance, which is sticky to the tongue and candy in taste.^[14] Shoot have materials like Oxalic acid, lowering sugar, resins, waxes, HCN, benzoic acid, , di feruloyl oligosaccharide, (5, 5'-di--(diferul-9, 9'-dioyl)-[α -L-arabino furanosyl- (1 \rightarrow 3)- O- β -D-xylopyranosyl-9 (1 \rightarrow 4) -D-xylo pyranose] (taxiphyllin).^[15] Seed constitute of arginine, cysteine, histidine, isoleucine, leucine, lysine, methionine, phenylamine, threonine, valine, tyrosine, niacin, riboflavin, thiamine Leaves mainly have Protein, gluteline, and lysine, methionine, betain, cholin, with proteolytic enzyme, nuclease, urease.^[16]

Ethnopharmacological Uses

In people *bambusa arudinacea* are arboreous grasses known to mankind since a long time and is utilized as a food and shelter by native people.^[17] It is used in various application such as making traditional and musical instruments, boat rafts, construction, furnitures and flooring, fencing and fodder for cattles, utensils for cooking, and in management of waste water.^[18] *Bambusa arudinacea* is employed for the treatment of the many inflammatory disorders.^[19] The plant stem and leaves are acidic and used as a laxative, in blood diseases, kapha, inflammation, piles and gall disorders.^[20] It is additionally utilized in constringent and excretory organ disorders in ayurveda the extract of leaves bud is employed in catamenial discharge, leaves infusion for eye wash and used internally for bronchitis, sexually transmitted disease and fever. The seeds are mainly utilised for liver diseases and urinary discharges. The root ointment serves as treatment for liver cirrhosis and tumors. The leaves are emmenagogues and are used for sciatica, fibrositis, stomach and liver diseases, pulmonary bronchitis and gonorrhoea. The flower juices are used for deafness and earache. the bark is used as a treatment for skin rashes. Manna is a sweet, pungent tonic used in blood disorders, lung diseases such as asthma, bronchitis and tuberculosis. Besides this, it's additionally used for fever, hemo protein deficient anaemia, liver disease and leprosy. Tabasheer (dried bamboo sap) containing 97% silica is employed as a tonic for cough and asthma. The leaves of this plant are utilized by social group ladies in madras for abortion of a toddler by change of state it two occasions on a daily basis in kanya kumari kani tribes, the seeds of this plant increase the fertility and so it's in giant demands for the development of fertility during this space. The leaf juice is employed for osteoarthritis, pathology for creating the animal tissue and bones strong, for strengthening blood vessel walls, teeth and nails and reduces disease of the skin and dermatitis. Ancient practitioner's uses 2-3 cups of *b. arudinacea* retz. leaf simmering thrice daily for months to treat dm.^[20]

Pharmacological Uses

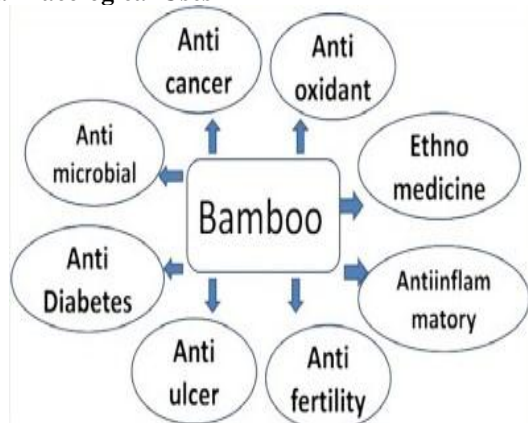


Fig. Pharmacological properties.

Anti-inflammatory activity

The antiinflammatory result of the wood alcohol extract of the leaves of *B. arundinacea* against carrageenin-induced furthermore as immunologically elicited paw and also its antiulcer activity in anomaly rats are studied dropsy and located to be vital in comparison to the quality drugs.

The mix of methanol extract and anti-inflammatory drug (Non-Steroidal medication Agent, NSAIA) has been studied and found to be the foremost potent anti-inflammatory activity through an experiment with least toxic (no ulcerogenic) activity. Thus, the combination of flavorer product (methanol extract of *B. arundinacea*) with trendy medicine (NSAIAs) can manufacture the best medicine and can be helpful for long term treatment of chronic inflammatory conditions like arthritic inflammatory disease with organic process ulcer.^[21]

Antimicrobial effect

B. arundinacea could be a potential supply to get new and effective compound to treat microorganism and flora infections. *B. arundinacea* has been found to possess antimicrobial activity against variety of bacterial and fungal strains. 2,6 dimethoxy-p-benzoquinone isolated from bamboo extract inhibits the expansion of *Candida albicans*, *Trichophyton inter digitale*, fungus genus *gypseum*, *Penicillium*, *Chrysogenum* *Staphylococcus aureus*, *eubacterium subtilis*, and *P. aeruginosa*.

The hexane, solvent and hydroethanolic extract of this plant seeds have shown important antimicrobial impact against varied microorganisms. Jayarambabu *et al.* according the antimicrobial activity of ZnO nanoparticles using *Bambusa arundinacea* extract by Agar disc diffusion technique against *S. aureus* and *B. subtilis* the synthesized ZnO nanoparticles showed increased zone of inhibition of 14, 16, seventeen, nineteen millimetre and 12, 14, 15, 17 mm against *S. aureus* and *B. subtilis*, respectively. The ZnO NPs interaction between *S. aureus* and *B. Subtilis* was

studied by SEM to watch the morphology changes of microorganism and underneath ZnO NPs treatment.

Normal *S. aureus* and *B. subtilis* exhibit a spherical and rod shape with a smooth surface, but bacteria treated with ZnO NP showed irregular morphology and broken bacterial cell walls, indicating the interaction of bacteria and ZnO NPs, leading to the destruction of bacterial cells.^[22]

Antidiabetic activity

Aqueous ethanolic solvent extracts of *B. arundinacea* seed have been examined for anti-diabetic interest the use of alloxan induced diabetic rats and as compared with widespread. The end result showed that aqueous ethanolic extracts had proven significant safety and most discount in blood glucose changed into found in alloxan diabetic rats. The consequences of this complete have a look at display that *B. arundinacea* seed proven statistically significant Anti-diabetic interest in contrast to the widespread glibenclamide.^[23]

Analgesics Activity

Methanolic extract of the aerial part of *Bambusa vulgaris* at doses of 50mg, 100mg, 200mg, and 400 mg per kg reduced writhing in Swiss albino model mice induced by acetic acid by 25.9 percent, 29.6 percent, 37.0 percent, and 44.4 percent, respectively, compared to 40.7 percent and 51.9 percent reductions obtained with 200mg and 400 mg per kg of the standard analgesic drug, aspirin. In general, the studies show that the aerial component of this plant has significant analgesic potential, which could be due to the presence of saponins and alkaloids in the extract.^[24]

Antifertility activity

An ethanolic extract of *B. arundinacea* soft shoots (BASE) brought about a discount in fertility of male rats. After management of three hundred mg/kg in keeping with day of BASE for 7 days, the fertility index reduced to 15% for manipulate rats and to 23% after a 7-day recuperation period, respectively. The quantity of cohabited ladies being efficaciously inseminated become decreased specially after four day of treatment. Complete recuperation of mating conduct become glaring eight days after BASE withdrawal.

The range of spermatozoa within the caput and cauda epididymis have been decreased concomitant with a lower within the motility of spermatozoa amassed from the cauda epididymis. The serum profile of protein and oxaloacetic/pyruvic transaminase hobby display the extract to be surprisingly nase hobby display the extract to be surprisingly non-toxic.^[25]

Insecticidal Activity

B. arundinacea has been said to own insecticidal property. The younger shoots comprise 0.03% hydrogen cyanide, benzene carboxylic acid and cyanogenic glucosides viz. taxiphyllin that are said to be deadly on

mosquito larvae. Bamboo shoots can resist insects, laterites, pH and hemp for that reason they've antiseptic and antilarval properties.^[26]

Anti-Arthritic Activity

Anti-arthritic pastime of *B. arundinacea* in treatment of rheumatoid Arthritis (RA) by use of CFA-brought on arthritis animal version turned into investigation. The impact of *B. arundinacea* methanolic extract at the arthritis turned into study via means of analyzing diverse markers of Bone erosion like histological, radiological evaluation of the joints. For assessment of anti arthritic pastime different parameters analyzed are Paw volume, Arthritic index, Rheumatoid Factor [RF], Erythrocyte Sedimentation Rate (ESR) and Spleen histopathology.^[27]

The powdered leaves are used for warm extraction by the use of methanol as solvent. The anti-arthritic interest of the dry extracts was achieved the use of lady rats of approximately 2 hundred to 250 gms. The methanolic extract of *B. arundinacea* significantly (dose dependent) reduced the bone erosion, spleen enlargement & rheumatoid element etc. at a dose (one hundred mg/kg, 2 hundred mg/kg, three hundred mg/kg) as compared to the manage organization however much less as compared to Standard drug (Dexamethasone 5mg/kg I.P).^[28]

Vessels protection and Venotonic Activities

Flavonoids are vein energetic and vessel-shielding markers due to the fact they lessen the permeability and growth the resistance of blood capillaries. Flavonoids are used with inside the remedy of blood vessel issues along with varices, persistent venous insufficiency, low capillary resistance etc. Oral management of flavonoids has been determined to successfully enhance the capillary resistance in animal models.^[29]

Antiulcer activity

Oral management of a hot-water extract (Folin) of bamboo grass (*Sasa albo marginata*) extensively decreased the occurrence of water immersion and restricted strain, ethanol brought on and indomethacin brought on gastric ulcers in rats.^[30] These researchers evaluated the antiulcer impact of bamboo grass in rats via way of means of Histological exam of the Folin handled gastric mucosa of the rats which confirmed that the microscopic blood clots overlaid the superficial epithelium, which additionally maintained the mobile integrity of gastric mucosa, particularly towards strain ulcer. Folin suppressed the prevalence of hyperaemia and a decline of acid mucopolysaccharides withinside the ethanol prompted ulcer and changed into visible to suppress the launch of histamine from rat mast cells, and stabilize erythrocytes and boost up their agglutination below acidic conditions. Their effects suggested that a microscopic haemostatic impact of Folin bolstered with the aid of using a membrane-stabilizing impact may be answerable for the prevention of the gastric lesions.^[31]

Miscellaneous

Bamboo is utilized in Chinese medication for treating infections and healing. It is a low-calorie supply of potassium. It is acknowledged for its candy flavor and as an amazing supply of vitamins and protein. Bamboo is the primary meal of the Giant Panda; it makes up 99% of the Panda's diet. Soft bamboo shoots, stems, and leaves are the essential meals supply of the Giant Panda of China. When bamboo is heated at terribly high temperature in associate degree unventilated vessel, it becomes charcoal, that is employed like different charcoal products, as a fuel component, a deodorizer, or an absorbent. The vapor that comes off the heated bamboo is condensed to supply a liquid called bamboo vinegar. Bamboo vinegar has been produced in Japan (wherein it's far referred to as chikusaku-eki) for decades and is used medicinally to deal with eczema, atopic dermatitis, and different pores and skin diseases; it's far maximum commonly carried out via way of means of including to water used for bathing. Bamboo vinegar is identified as an anti-inflammatory and anti-fungal. Pickled bamboo, used as a condiment, may also be made from the pith of the young shoots. In addition, bamboo is frequently used for utensils used for cooking within many cultures. In modern times, some believe that bamboo tools are an eco-friendly alternative to other manufactured utensils. In Ayurveda, the Indian device of conventional medicine, the silicious concretion located withinside the culms of the bamboo stem is referred to as banslochan. It is thought as tabashir or tabashir in Unani-Tibb the Indo-Persian device of medicine. In English it's far referred to as "bamboo manna". This concretion is stated to be a tonic for the respiration diseases.

In addition, the fiber of bamboo has been wont to create paper in China since early times. A prime quality hand-made paper continues to be made in tiny quantities. Coarse bamboo paper is still used to make spirit cash in many Chinese communities. Bamboo's natural hollow type makes it a plain selection for several instruments, significantly wind and percussion. There are various varieties of bamboo flute made everywhere the world, resembling the dizi, xiao, shakuhachi, palendag, jinghu, angklung.^[32]

Important Formulations

Sitopaladi churna, Talisadi churna Genuine Bamboo-manna is difficult to procure. *Curcuma angustifolia* is in use as a substitute. Its original name, Tabashiri, was equated in due course the Tabasheer of Unani medicines^[30]. Possible Combinations: *B. arundinacea* + *Piper longum* + *Cinnamomum camphora* (curing lung disease). Recommended dose: The recommended dose is between 0.5% and 5.0%.^[33]

CONCLUSIONS

The bamboo has been found with various pharmacological activities with different phytochemicals in various parts of the plant. The traditional uses of the

plant need to be conserved with their studies to use extensively in the treatment of various diseases. It has been found in moist areas of India, and some parts of south and north east India. Bamboo has been used since long in curing variety of diseases carbohydrates, aldehydes, flavonoids all have been found in sufficient quantity to cure the diseases. Bamboo also has antifertility, anti venomic, antimicrobial, anti-diabetic, anti-arthritic antioxidant activities.

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