

A PHARMACOGNOSTIC STUDY OF BAMBUSA VULGARIS

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ABSTRACT

This review paper discusses the versatile uses of bamboo grass plant. Bamboo is the second harvest plant after the China, making up nearly 12.5% of forest covered by Bamboo. The diversity of bamboos in the world is approximately 1400 species with 116 genera. Now there is 11.4 million hectare areas of bamboo covered in India. Out of that 129 species with 18 genera are found in India. In India there are 98 bamboo species found only in North east. in Asian countries like China, Japan, and India. Bamboo possesses high macro and micro nutrients such as protein, fiber, essential minerals and amino acids. Bamboo-derived products have high demand in the market, such as bamboo-salt, bamboo-dietary silica, bamboo-charcoal soap, bamboo-tea, Banslochan, bamboo-vinegar, and many more. These Bamboo products have been used to treat various health problems such as, obesity, inflammation, heart disease, hypertension, arteriosclerosis. The shoot of young bamboo grass can be processed into various delicious healthy foods and sometimes uses as medicines. Young bamboo shoot is usually consumed as vegetable in curry and also as pickle. properties of bamboo, one of the most important properties is the treatment of incurable diseases. The bamboos are considered phlegm, calming, cooling, resolving.

KEYWORD:- Introduction Bamboo, Morphological characteristics, Phytochemicals, Medicinal uses etc.

INTRODUCTION

Bamboo is the largest grass in the world which is related of the family Gramineae (Poaceae) with subfamily Bambusoideae. Since Ancient time Bamboo species have been used by human kind for use as a Building materials, but In China use for medicinal purposes. Botanically Bamboos is a Grass length can vary depends upon the variety or species. Some bamboos are short as 30 centimetres while giant timber bamboo can grow up to height of 4000 centimetre or 100ft. Bamboo can grow in hilly, high altitude mountain regions, plain area and in most kind of soils except desert, marsh and alkaline soils. The bamboos leaves are oval with monocot stem including the palms and large bamboos, to be columnar rather than tapering.^[1] The life of bamboos are not very long it's about only 20 years and its flower once every 7-120 years depending on the species. Out of that 129 species with 18 genera are found in India. In India there are 98 bamboo species found only in North east region like Manipur, Mizoram, Assam & Tripura etc. The name Bamboo came from kannad word (Commonly used in Karnataka state of India) "Baamboo". The bamboo a type of grass, is the fastest growing plant in the world. In India 11.4 million hectares are covered with bamboo which is second harvest plant after the china. We know that bamboo have 1250 species under the 75 genera all over in the world.^[2] Most of the bamboos are found in

forestry and it also widely spread outside forests usually farmlands, riverbanks, roadsides and rural areas. Even though it is used for housing, crafts, pulp, paper, panels, boards, veneer, flooring, roofing, fabrics and vegetable (The bamboo shoot).

Products of bamboos are using everywhere and bamboo industries are now thriving in Asia and are quickly expanding across the continents to Africa and America.^[3] Bamboo has lot of beneficial impact for alleviating many of the social and environmental problems in many countries.^[4] It has been act as natural protection of environment restoration and in the production of household handicrafts, arte facts and furniture.^[5] Bamboo charcoal produces three times as porous as wood and releases more energy and gives us huge fuel backup. Bamboo shoots are also delicious to eat and the young leaves provide feedstuff for animals^[6]. Many studies have reported that bamboo, as a forest product, has potential for use as a biofuel, along with other woody plants.^[7,8,9] Bamboo, because of the high amount of sugar, is known to be a suitable plant for a feedstock of chemical products, such as lactic acid and fuel ethanol.^[10] It can also be used as biogas.^[11]

According to the report of the World Health Organization (WHO2010), the fast-changing lifestyle

with poor choices of nutritious food and several other critical factors have increased the risk of non-communicable diseases like cardiovascular diseases, obesity, diabetes, osteoporosis, cancer, gastrointestinal diseases, and respiratory diseases. Thus, there is a significant change in the food industries due to shifting of consumer's choice from healthy foods to food that prevents nutrition-related diseases and improves the physical and mental well-being of consumers leading to the development of modern functional foods. Recent studies revealed the potential of bamboo in food sector being rich in nutrition, presence of good quantity of bioactive compounds, and several health benefits that can prevent many chronic diseases that has led to increasing interest among researcher for its application in the food industry.^[12,13,14,15,16] Bamboo is rich in mineral, but the potential in improving the content in the product is still to be explored. This chapter discusses the importance of bamboo in the food sector and its application in the food and pharmaceutical industries.^[17]

Taxonomical classification^[18,19]

Kingdom: Plantae
Phylum: Tracheophyta
Class: Magnoliopsida
Order: Rosales
Family: Graminae
Genus: Bambusa
Species: B. arundinaceae



Fig. Bambusa Vulgaris

Vernaculars

Arabic: Qasab
Persian: Nai
English: Spiny Bamboo, Thorny Bamboo
Greek: Bistaras, Qalaman, Aidqoon, Shalas
Hindi: Bans, Kantban, Bans-kapur, Bans-lochan
Urdu: Bansa
Sanskrit: Vansa, Bahupallava, Brihattrina

Phytochemicals^[20,21]

It contains cellulose and hemicellulose, 90% over its mass. On the other hand, it contains Resins, tannins, waxes in organic salts. There are some alkaline extractive materials also present. Ash, some organic component is also attached with cellulose. Lignin is another important component of it. Bamboo contains 2-6% protein, 2% deoxidized Saccharide, 0.8-6% protein and 2-4% fat. In the joint inside, siliceous substances are found in the white camphor-like crystalline appearance. Shoot contains active ingredients, that are Oxalic acid, resins, waxes, HCN, benzoic acid, reducing sugar, feruloyl arabin oxylanhexasaccharide, diferuloyl oligosaccharide, (5,5'-di--(diferul-9, 9'-dioyl)-[α-L-arabinofuranosyl-(1→3)-O-β-D-xylopyranosyl-9 (1→4) -D-xylopyranose] (taxiphyllin). Arginine, histidine, cysteine, isoleucine, lysine, leucine, methionine, threonine, phenylamine, valine, niacin, riboflavin, tyrosine, and thiamine are all found in the seeds. Protein, lysine, glutelin, methionine, choline, betaine, nuclease, proteolytic enzyme, and urease are all found in the leaves.

Morphological character^[22]

The plant of bamboo is a perennial evergreen a very tall and woody grass. The Bamboo divided in to two important parts one is Rhizomes and another are culms. The rhizome is the underground part of the stem, where is jointed stem called a culm. each culm segment begins and end with a solid joint called a node, the segment between the nodes are called internodes. From the nodes grow leaves and branches. Most of bamboo culms are hollow and cylindrical with the diameters ranging from 0.25 to 12 inches with the height of 1 feet to 120 feet.

Sr No.	Phytochemicals	Test	Inference	Observation
1	Alkaloid	Mayer's test: Extract + Mercuric Potassium Iodide + Mayer's reagent.	Cream or pale Yellow or White colour ppt obtained.	Present/Absent.
2	Glycoside	Brontrages test: 1 gm. of drug + 5-10 ml of dilute HCl, boil on water for 10 min and filter it, filtrate with CCl ₄ , add equal amount of ammonia to filtrate and shake.	Formation of pink or red colour layer on solution surface.	Present/Absent.
3	Saponin	Froth test: 20 gm. extract dissolved in 20 ml of distilled water, boil it for 5 min and filter it, take 10 ml of filtrate	Formation of Froth/Emulsion.	Present/Absent.

		and add 5 ml of distilled water and mixed it well.		
4	Flavonoid	Shinoda test: In a test tube 200gm of extract dissolved in 2 ml of methanol and heat, add few magnesium metal and few drops of con. Hydrochloric acid.	Presence of orange or red colour ppt.	Present/Absent.
5	Phenolic compounds	Lead acetate test: 100 gm. of extract in a test tube + 5 ml distilled water + 3ml 10% lead acetate solution.	Bulky white ppt forms.	Present/Absent.
6	Protiens and Amino acid	Ninhydrin test: 100 gm. extract dissolved in distilled water and filter through whatman filter paper no. 1. In a test 2ml of aqueous solution add 2ml of ninhydrin reagent	Formation of purple ppt.	Present/Absent.
7	Diterpenes	Copper acetate test: Extract dissolve in water + add few drops of copper acetate solution.	Formation of bright green colour.	Present/Absent.
8	Resins	Acetone water test: Take a extract in a test tube +few drops of acetone solution + water and shake it well.	Solution becomes turbid.	Present/Absent.
9	Phytosterols	Salkowski's Test: Extract treated with chloroform and filtered. Filtrates were treated with 2-3 drops of Conc. Sulphuric acid, mixed carefully and allowed to stand.	Appearance of golden or yellow colour.	Present/Absent.
10	Tannins	Ferric chloride test: In a test tube 2 mL of aqueous extract + 1-2 drops of 5% aqueous ferric chloride solution added.	A bluish black colour which disappears on addition of a few mL of sulphuric acid.	Present/Absent.

Active constituents^[23]

A number of studies of bamboo have yielded information about the chemical constituents, but no systematic evaluation has been carried out, so it is difficult to determine which of the identified compounds might be among the primary active constituents. It has been noted that the bamboo plant has unusually high levels of acetylcholine (Which acts as a neurotransmitter in animals and humans; its role in plants is as yet unknown), especially in some portions of the plant (e.g., upper part of the bamboo shoot). It is conceivable that compounds of similar chemical structure in bamboo may contribute to the effects of the herb and its extracts on brain function. The bamboo leaves, obtained from the common tall bamboos (species of *Phyllostachys*, rather than the small *Lophatherum*) have recently been utilized as a source of flavonoids (e.g., vitexin and orientin), used as antioxidants. The flavonoids may reduce inflammation, promote circulation, and inhibit allergy reactions.

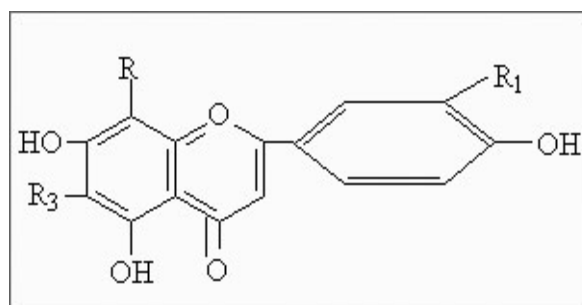


Fig. Acetylcholine.

MATERIAL AND METHODS

Collection of bamboo plant: Bamboo plant was collected from Agroforestry Research Centre, G.B. Pant University of Agriculture and Technology, Haldi. Bamboo plant was thoroughly cleaned to remove any debris. Leaves were dried in moisture free rooms whereas stem and shoot are cut into pieces and then dried and stored. After drying, various parts of bamboo were

grinded separately in a grinder and powder was stored in a tight containers.

Preparation of extract: Dried and powered form of Bamboo parts were soaked in aqueous, methanolic and ethanolic solutions for 72 hours. The solutions were filtered using muslin cloth, whatman filter paper No: 40 and then dried in rotary evaporator followed by final drying at 37°C. The dried extract was stored at 4°C until use.

Phytochemical analysis

All the extracts of Bamboo *Bambusa balcooa* were tested chemically for detection of various metabolites viz; alkaloids, terpenoids, tannins, saponins, glycosides, flavonoids, etc by using standard protocols^[24]

Uses as medicine

- ❖ From the ancient and using the traditional knowledge, pharmaceutical preparations of bamboo shoots like bamboo salt, bamboo vinegar, bamboo extracts are using to control diabetes and keep the cholesterol level within normal limit.^[25]
- ❖ Bamboos and bamboos extract has been utilized in Korea for traditional treatment to relieve hypertension, sweating and paralysis. It has been established that bamboo extract have antioxidant activities and anti-inflammatory effects.^[26,27]
- ❖ *Bambusa arundinacea* is highly reputed ayurvedic medicinal plant. Various parts of this plant such as leaf, root, shoot and seed possess antiinflammatory, antiulcer, anti-diabetic, anti-oxidant, anthelmintic and astringent activity. Various phyto-pharmacological evaluations have been reported for the important potential of the *Bambusa arundinacea*.^[28]
- ❖ The root (Burnt root) is applied to ringworm, bleeding gums and arthritis. Bark is used for skin eruptions. Leaf has a property of antileprotic and anticoagulation activities that can be used in haemoptysis.^[29]
- ❖ Seeds are acrid, laxative, said to be beneficial in strangury and urinary discharges.^[30]
- ❖ The combination of herbal product (Methanol extract of *Bambusa arundinacea*) with modern medicine (NSAIDs) will produce the best anti-inflammatory drug and will be useful for long-term treatment of chronic inflammatory conditions like rheumatoid arthritis with peptic ulcer.^[31]
- ❖ *Bambusa arundinacea* seed has shown statistically significant anti-diabetic activity as like the standard glibenclamide.^[32] Furthermore, bamboo-derived pyrolyzates have been proposed to have antimicrobial and antifungal activities^[33] and to protect neurons from oxidative stress.^[34]
- ❖ Bamboo extract pyrolyzates may have anti-apoptotic effects and can be useful as a supplement for ischemic injury treatment.^[35]
- ❖ The tender shoots of *Bambusa bambos* are reported to enhance appetite and help in digestion. Buds of *Bambusa bambos* are reported to have estrogenic activity.^[36] in rats and very soft shoots of this species are used for birth control^[37] in north Lakhimpur, Assam, India.
- ❖ It is also reported that bamboo shoots have cancer prevention properties and effective in decreasing blood pressure, cholesterol and increasing appetite.^[38]
- ❖ *Bambusa bambos* L. leaves extract possess broad spectrum antibacterial properties and can be used for the most common bacterial diseases. These promissory extracts open the possibility of new clinically effective antibacterial compounds.^[39]
- ❖ Modern research has revealed that bamboo shoots have a number of health benefits such as: improving appetite and digestion, weight loss, curing cardiovascular diseases, antioxidant activities and anti-inflammatory effects.^[40]

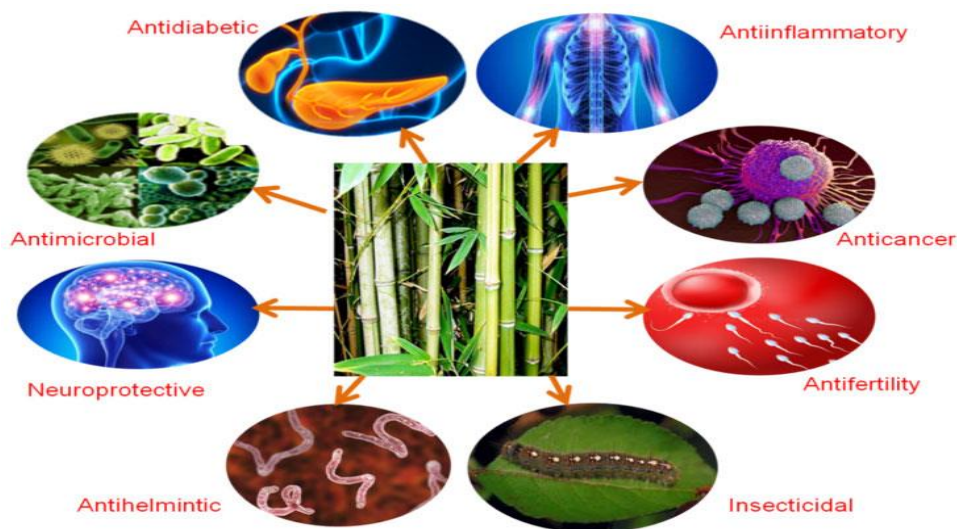


Fig. Pharmacological uses of bamboo.

CONCLUSION

The review summarized the traditional medicinal properties, phytochemical, pharmacological function and extraction technologies of bamboo leaf based on modern shreds of evidence. Bamboo plants have long been utilized to cure a variety of human ailments in various traditional treatment systems. Carbohydrates, saponins, glycosides, alkaloids, phenolics and tannins, flavonoids, phytosterols, oils, triterpenoids, and fats have all been found in this plant's phytochemistry. Bamboo plants have analgesic, antidiabetic, antipyretic, anti-inflammatory, hepatoprotective, antibacterial, antifertility, antioxidant, anti-ulcer properties in their pharmacological actions. So, apart from its use in making food and crafts, there is a need for in-depth research on Bamboo. Because of the plant's nature, more studies can be performed to uncover the plant's untapped and exploited potential.

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