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## A REVIEW ON POTENTIALS OF BAMBOO SEEDS FROM THE SPECIES OF *BAMBUSA BAMBOS* DRUCE

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### ABSTRACT

Bamboo seeds are commonly known as bamboo rice of species *Bambusa bambos* Druce are distinct from ordinary grasses in their perennial tree like growth habits, and flowering (seeding) only once at the end of very long vegetative growth phase followed by death of bamboo. Bamboo seeds are put into a variety of traditional medicinal uses and also an important source of food for indigenous people of Western Ghats of south India. Bamboo seeds uses are not well explored and this review provides the collection, traditional uses and scientific studies available for bamboo seeds.

**Key words**-Bamboo seed, *Bambusa bambos* Druce, Bamboo rice

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### INTRODUCTION

Bamboo is one of the fastest growing plants on earth with a reported growth rate of 250 cm in 24 hrs. *Bambusa bambos* Druce are commonly known as Indian thorny bamboo and they distinct from ordinary grasses in their perennial tree like growth habits (Fig-1) [1]. Bamboo belongs to the family of Graminae or Poaceae and seeding only once at the end of a long vegetative growth phase followed by its death. Bamboo one of the world's most useful trees, as almost every part of the Bamboo tree can be used for medication, food and industrial purpose [2]. Over 75 genera and 1250 species occur in the world. Bamboo

resources in their natural habitat have decreased considerably due to over exploitation, shifting cultivation practices, and extensive forest fires. Compared with the vast forests of bamboo found in South and Southeast Asia at the beginning of the century, there is acute scarcity now. Bamboo leaves have been used in Indian folk medicines in inflammations, laxative and piles. Leaves are used in treatment of leprosy, amenorrhoea, dysmenorrhoea, eye troubles, lumbago, osteoarthritis, psoriasis and eczema. The leaves are used as abortifacient in early pregnancies [3-6]. The stem and leaves are also used as blood purifier. Tabasheer (*Manna*) is a translucent white substance, composed mainly of silica and used as an antipyretic, aphrodisiac and antispasmodic [7-9]. Bamboo shoots are used as food in many ways and as well as folklore medicine in India.

**Vernacular names:** Sanskrit -venu, Telugu-Bongu-veduru, English -Bamboo, Hindi- Baans, Tamil - mul moongil, Malayalam - mula.

**Distribution-** Bamboo grasses are widely distributed throughout India and in tropical and subtropical areas. Indian thorny bamboo is a species of clumping bamboo native to several countries in South and East Asia. It mainly occurs throughout India, Srilanka, Malaysia, Peru and Myanmar. In India it is distributed up to an altitude of 1250 m particularly near river banks, in Central and South India and ascending up to 1100 m on the Nilgiri hills. Bamboos are some of the fastest-growing plants in the world and reported to have 1,450 species [10].

**Description-**Bamboos are distinct from ordinary grasses in their perennial tree like growth habits. It is a tall woody tree grows upto a height of 30-40 meters with thorny stems. Culms strong, cylindrical, erect, hollow, dark green- coloured, up to 30 m tall, 15-18 cm diameter, the walls very thick with a lumen; branching at all nodes, those from the lower nodes recurved and bent downward towards the ground with the upper branches arching and producing a fan like plume, the upper leafy branches bearing small spines.

Nodes slightly swollen and few lower nodes produce short aerial roots. Leaves diffuse in complements, 15-30 cm long and 8-15 mm broad, are with about 10 leaves in each complement. Leaf blades are linear and

variable in size, lanceolate, narrowed to an acuminate tip. Inflorescence an enormous panicle, branchlets spicate with loose clusters of about 5 pale spikelets; rachis variable, usually stiff, shining, smooth, striate, occasionally angular. Fruits are fusiform caryopsis, pale brown in colour and covered by three persistent glumes. Average length and width varies from 7.2-8 mm and 1.5 to 2 mm respectively. Surface is smooth, navel at one side of the fruit base, orbiculate with a protuberance at the centre. Ventral suture extends from fruit base to the apex. Flowering and fruiting occurs once in life time often during September-May [5-13].

#### **Bamboo seeds collection**

Bamboo seeds (fig-2) are commonly known as bamboo rice, a main source of food for tribal people throughout India and the overall nutritive value of these grains excel both rice and wheat. It is an important seed for tribes of community Paniya and occasionally the Kattunaikka. Bamboo flowers very rarely and at the onset of the flowering season the tribal women start preparations for the collection of seeds. Forest bamboo thrives in large populations covering wide forest expanses. Women go to the bamboo brakes before fruit-setting and clean the undergrowth and prepare a clean bed for the seeds to fall. Sometimes, the people smear cow dung on the ground below huge canopies signifying the value attached to this rare bonanza from the forests. The collection may continue for several days together and men and children join in gathering the seeds. Often the entire family stays amidst the bamboo brakes through the flowering period. The collected grains are carefully stored for future use, accentuated by the popular belief that a period of famine follows the flowering of bamboo [6, 7, 14].

#### **Chemical constituents of Bamboo seeds**

The bamboo seeds were reported to contain carbohydrates and proteins contents higher than that of rice and wheat. The seeds also contain calcium (5.0 mg %), phosphorus (18.0 mg %) iron 9.2 (mg %), vitamin B1 (0.1 mg %), Nicotinic acid (.03 mg %) riboflavin 36.3 (g %) and carotene (12.0 mg %). Seeds of this plant also contain a number of amino acids such as thiamine, riboflavin, arginine histidine, lysine, tryptophan, phenylalanine, tyrosine, methionine, cysteine, threonine, leucine, isoleucine and valiene

[14]. Our previous research on bamboo seeds results an isolation of bamboo oil and its GC-MS characterization showed many active phytoconstituents. The major compounds present in the oil is benzoic acid, 2-hydroxy-methyl ester (methyl salicylate)- 15.35%; N-hexadecanoic acid (palmitic acid) - 27.36 %; 9, 12-octadecadienoic acid (z,z) (Linoleic acid) - 38.37 %; hexadecanoic acid ethyl ester- 2.65 % and phthalic acid, ethyl isopropyl ester- 2.28 %. The total saturated fatty acids and its esters composition is estimated as 32.46 %. Whereas unsaturated fatty acids and its esters composition is 39.2 %. Other constituents present in the oil are some higher alkenes and alkanes in minor quantities. The qualitative analysis of petroleum ether and aqueous alcoholic extract of bamboo seeds showed the presence of carbohydrates, alkaloids, phenols, tannins, flavanoids and phytosterols [15].

#### Ethanobotanical uses of Bamboo seeds

The seeds when available are eaten by the poor. Bamboo seeds are used as aphrodisiac, in biliousness, in urinary discharges, astringent, emmanagogue, febrifuge and hypolipidemic. The indigenous people of South India use this bamboo seeds for fertility treatments and to reduce the lipid levels. As tribal people keep no records and these information's were collected orally from tribal medical practitioners and however bamboo seeds lack scientific evidence. The Kani tribe of Kanyakumari district of South India believes that the seeds enhance fertility. As a food Bamboo seeds are put to a variety of uses, the most common being as gruel or to make the popular steamed pancake puttu' for the preparation of which the grains have to be coarsely ground. Considered as highly nutritious and relished by every one in the family, bamboo seeds are also sought after by the non-tribal communities [7-9, 13, 14].

#### Scientific studies

Bamboo seeds lack scientific studies. It was reported that when rats fed on bamboo seeds (*Dendrocalamus hemiltonii*), they become sexually active into such an extent that each female rat give birth to as many as 800 off springs during the season of bamboo flowering 10. This phenomenon was well explained by researchers that the bamboo seeds cause changes in genetic material of chromosomes in rats [16]. Our previous

research on isolated bamboo oil support that it is a potent antioxidant and antimicrobial agent. It showed potent antioxidant activity in DPPH, ABTS and alkaline DMSO methods, Bamboo oil showed a good bacterial inhibition against *Escherichia Coli*, *Staphylococcus aureus* and *Pseudomonas aurgenosa*. The oil also showed potent antifungal activity against fungal strains of *Candida albicans*, *Candida tropicalis* and *Candida Pyrididakrusei*[15].



**Figure-1. Aerial view of *Bambusa bambos* Figure-2. Dried seeds of *Bambusa bambos***

#### CONCLUSION

The plant *Bambusa bambos* is one of the most important medicinal plant with all the parts have medicinal properties. Bamboo seeds are one of the rarely available seed that flowering of bamboo occurs at a long vegetative phase of 12 to 30 years followed by death of bamboo. It is commonly known as bamboo rice, a main source of food for tribal people and contains many active phytoconstituents. This review provides the available traditional and scientific studies of bamboo seeds. Further studies are required to prove its many potential ethanobotanical uses.

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