Bamboo Shoot: A Traditional Indian Superfood from Northeast

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ABSTRACT

Bamboo shoot is a vital constituent of conventional delicacies of a few components of the Indian states, especially in North-Eastern vicinity and is surprisingly appreciated for its dietary and fitness advantages because of the presence of numerous bio-lively compounds. In many Asian countries, bamboo shoots are green and are harvested as a country wide crop. Sprouts are a classic ingredient in Chinese and other Asian cuisines, but are the result of newly grown buds from mature bamboo plants and also bamboo shoots have less fat content and calories, are easy to grow and harvest, and high in fibre and potassium. This article provides insight into bamboo shoot-based food and utilisation patterns, its standard characteristics and cost-enhancing opportunities, as well as future goals in terms of nutrition and international food safety.

Keywords: *Bamboo, Bamboo shoots, Traditional food, Therapeutic values, Nutritional values, North East Region.*

1. Introduction

Bamboo Shoots are the newly sprouted canes that shape simply beneath the soil, and feature a crisp texture. Bamboo grows from rhizomes, which can be underground stems sporting the genetic fabric vital for growth and proposing growth nodes which can be sprouting factors at the stem. Bamboo has been used historically with the aid of using tribal for many years all around the world (Choudhury *et al.*, 2012).

Bamboo belongs to the grass own circle of relatives Poaceae. The long, immediate stems of this massive grass can develop as much as a hundred toes tall relying on the species. Bamboo in milder climates is commonly much less than half of the size, however tropical bamboo can develop to dizzying heights. Stems are jointed and hollow, frequently densely growing. Of the 1575 recognised species of bamboo, simplest 110 have fit to be eaten shoots, even though a few are categorised as fit to be eaten, which should be cautiously organised and boiled earlier than consumption.

For food uses, edible bamboo leaves and sprouts have been considered from time immemorial. Many articles had advertised the antioxidant, antibacterial, and other effects of various bamboo leaf extracts and ingredients. It is mainly due to the phenolic constituent of bamboo leaves such as homobitexin, tricine and phenolic acid (Choudhury *et al.*, 2012).

Raw bamboo shoots contain a cyanogenic glycoside, a plant impurity that is also found in cassava. Contamination should be destroyed by thorough cooking. Therefore, cook clean bamboo shoots before using them in any other way. Contamination is also destroyed during the canning process (Nirmala *et al.*, 2018).

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2. Nutrient Composition

"Simple is sustainable" No complicated algorithms are needed when it comes to food and happiness. Eat less, make healthier choices, and live more lives. Bamboo shoots are one of the easiest means of nutrient absorption as it has great demand for their therapeutic and nutritional value. Bamboo shoots are rich in nutrients like carbohydrates, proteins, amino acids, many significant minerals and vitamins, so they are very likely to be used as important health foods. Freshly collected bamboo shoots have a decent quantity of vitamin B1, retinol, pyridoxine, and tocopherol (Chauhan *et al.*, 2016). The table below shows the nutrient composition of bamboo shoots (Visuphaka K., 1985).

3. Health Benefits of Bamboo Shoot

These are an essential part of many known dishes, and have a great deal of health benefits.

- Tyrosine promotes the biochemical metabolism of the human body because it's the main component of the adrenal gland, which is a precursor of adrenaline required for the body's active metabolic activity. It also helps in the functioning of thyroid gland and pituitary gland, that are required in the production and regulation of the hormones in the body.
- The presence of a lot of fibre and phytosterols in the bamboo shoots lessen the amount of fat and cholesterol in the blood.
- The dietary fibre contains a number of health benefits; it controls blood pressure, hypertension and obesity. It also protects human body from coronary diseases and potential carcinogens (Nirmala Chongtham*et al.*, 2021)
- The high dietary fibres and low fat in bamboo shoot helps in reducing the thickening of arteries; maintaining the blood pressure.

Table 1: Nutrient composition of Bamboo Shoot

S. No.	Compound	Structure
1.	Amino acid	Bamboo shoots contain a large number of amino acids. In bamboo shoots, many amino acids are found in which 8 are essential for the human body. However, the number of amino acids in fermented and canned shoots is less as compared to the freshly collected juvenile shoots.
2.	Proteins	Bamboo shoots have quality protein contentranging from 1.49g/100g to 4.04g/100g fresh weight.
3.	Minerals	Bamboo shoots contains many types of mineral elements, i.e., cobalt (Co), copper (Cu), chromium (Cr), manganese (Mn), zinc (Zn), magnesium (Mg), nickel (Ni), lysine, germaclinium and other nutritious phytoconstituents.
4.	Carbohydrate	Carbohydrate content is high in bamboo shoots and its content in edible shoots of *Bambusa nutans, Bambusa vulgaris, Dendrocalamusstrictus,* and *Dendrocalamus asper* was found at 3.3%, 3.4%, 0.6%, and 2.9%, respectively.
5.	Fat	Bamboo shoots are known to contain very little fat, and because of their low content, they are ideal candidates for a healthy diet for people with diabetes and cardiovascular disease.
6.	Fibre	Bamboo shoots have a good source of dietary fibre like NDF, ADF, lignin etc.
7.	Phytosterol	Phytosterols are extensively found in fresh and fermented bamboo shoots
8.	Phenol	There are around 8 phenolic acids found in bamboo shoots of *Phyllostachys pubescens* of which protocatechuic acid, p-hydroxybenzoic acid, and syringic acid were found to be most abundant.

Table 2: Ways of Consuming Bamboo Shoot

Type	Content	Product
Fermented bamboo shoot	Fermented bamboo shoots are eaten by various ethnic communities as one of the most popular traditional foods. Fermented shoots have a long shelf life, and also enhances food safety by utilizing the natural microbial flora and its antibacterial compounds (Nongdam P. and Tikendra L., 2014)	
Fresh bamboo shoot	Indigenous peoples of north-eastern India use fresh shoots as one of their popular foods. Fresh bamboo shoots are boiled before use to destroy any toxins present. They have a taste somewhat similar to water chestnuts with a very mild taste. Slightly earthy, woody and slightly fruity (Thakur K, 2016)	
Bamboo shoots pickle	Bamboo shoots can be used as pickles and can be stored in salt water for many years. If necessary, remove the pickled bamboo shoots from salt water and use them for cooking. Pickles tend to soften over time, but still remain tough.	
Dried bamboo shoots	Dried bamboo shoots aren't hard, however alternatively rubbery. Dried bamboo shoots are satisfactory sweet that's no longer observed in clean or canned bamboo.	

- Karbi Anglong tribes of India uses bamboo shoots to control early stages of cancer.
- Phytosterol inhibit cell invasion, growth of cancer cells, metastasis and the production of carcinogens (George *et al.*, 1982).
- Bamboo shoots are used by local Bodow, Tadau, Mosan, and Tiwa tribes to treat irregular menstrual cycles, postpartum bleeding, infertility problems, relieve labour, and induce puberty in young women.

4. Bamboo-based Traditional Foods from North-East India

In north-eastern India, about sixteen kinds of bamboo can be safely eaten (Meric*et al.*, 2006) and a number of the vital safe to eat bamboo species are *Arundinaria callosa*, *Bambusa nutans*, *Bambusa pallida*, *Bambusa polymorpha*, *Bambusatulda*, etc. The bamboo shoots are a prime food of a lot of famous conventional cuisines and the locals ate up both sparkling or fermented bamboo shoots.

In Arunachal Pradesh, young bamboo shoots are boiled and chopped and used as green in the preparation of a common recipe called Kupe (Anupam *et al.*, 2001). Shoots obtained from *Bambusabalcooa*, *Bambusa nutans*, and *Dendrocalamusstrictus* are almost non-acidic and should be steamed or boiled for proper treatment. That is, it occasionally converts water until the bitterness is gone.

In states like Meghalaya, Mizoram, and Sikkim, the sparkling younger shoots are eaten up both boiled with different green leafy vegetables or fried with different non-vegetable components (Singha *et al.*, 2008). The bamboo shoots in fermented shape are eaten up as one in every favored conventional ingredient. Some of the vital fermented bamboo shoot merchandise acquainted with locals are soibum, soidon, soijim, bastangapani, and so forth.

In Manipur, Soibum is one of the most famous fermented ingredients commonly to be had in nearly all neighbourhood vegetable markets. It is made from gentle shoots of *endrocalamushamiltonii*, *endrocalamusgigangteus*, *Bambusatulda*, *Bambusabalcooa*, and *Bambusa pallid* and is broadly utilized in guidance of unique delicacies.

The greater famous kwatha or noney technique makes use of historically designed chambers coated with Colocasia leaves or plastic bags and filled with sliced bamboo shoots. While the Andro kind includes using a large earthen pot stuffed in part with minced bamboo shoots. The liquid component isn't eliminated because the fermentation lasts for 6–8 months.

A less complicated technique used in Bishenpur is located in a massive plastic bath which incorporates shredded shoots with sufficient water to deluge them; they are then stored in cardio circumstance for fifteen days earlier than being eliminated and packed in plastic bags for three months. The liquid remnants may be again and again used as starter in lifestyle for the following spherical of soibum manufacturing because it reduces the fermentation technique by 6-7 days. Tangkhul tribes utilized a neighborhood bamboo range referred to as nathan to supply dried shoots which seem like strips with wrapped appearances.

The Barman network of Tripura prepares a conventional dish referred to as godhak that is made through blending fermented bamboo shoots in conjunction with, dried fishes, garlic and seasonings (Bhatt *et al.*, 2003).

Sikkim and Darjeeling people make fermented products called Mesuand. Nagaland people use juice extracted from fermented bamboo shoots as a fundamental constituent.

5. Global Importance of Bamboo Shoot

People from different international locations change bamboo with different names because of its very convenient property. The Chinese called bamboo “people's friends”, the Vietnamese called it “my brother”, and the Indians called it “green gold” (Visuphaka, 1985).

Bamboo shoots being a periodic plant, with extravagant involvement at some purpose of the year, especially in China, Canada, Bhutan, Japan, Thailand, Nepal, Australia, USA and India, there ‘a wish to expand the bamboo shoots’ capability for continuous and irreplaceable use, even during off-seasons (Debangana, 2012). Bamboo shoots make up a $50 billion industry in Taiwan, which consumes 80,000 tonnes annually (Nongdam and Tikendra, 2014).

It is traditional for Indonesians to slice bamboo shoots thinly and cook them using coconut milk and spices to create gulairebung, as well as deep-fry veggies wrapped bamboo shoots (Thakur *et al.*, 2016).

Philippine's people consumed bamboo shoots in many forms using soy sauce, prawns, brown sugar etc. (Jeyaram, 2009). In Mga Pilipino delicacies, the bamboo shoots are prepared with milk and chillies,and also with stew beans and fish. Bamboo shoots are also pickled as atchara and typical candy pickles (Ricohermoso*et al.*, 2015). Thai people call bamboo shoots as no mai and it's going to be utilised in stir-fries, soups comprehensive of tom kha kai, curries inclusive of kaeng tai pla, additionally to salads comprehensive of sup no-mai.

Bamboo shoots are stirred fried or can be added in beef chop to create the Vietnamese delicacies. Bamboo shoots noodles with duck meat are also a well-known sidh in Vietnam.

In Asian nations like Myanmar, bamboo shoots are known as 'myahait'. It is used in preparing soup. The soup is prepared in the following ways, firstly the bamboo shoots are collected from a bamboo grove. The bamboo shoots are then let to boil so as they may be prepared with curry powder, rice powder.

6. Future Perspective

Bamboo harvesting has been conducted for thousands of years in many tropical nations and is now considered a lucrative crop, mainly in north-eastern India. This location has a lot of edible bamboo. Bamboo shoots that have been steamed, pickled, or fermented are regarded as delicacies. In many developing nations (including India), a huge population has been deprived of protein due to a widespread shortage as well as outrageous charges for legumes (Chongtham*et al.*, 2011).

Bamboo shoots are not only a poor food, but they can also be a favourite of city slickers. Bamboo shoots, according to the literature, include necessary minerals, vitamins, fibre, and their low-fat content helps control blood sugar cholesterol. They may also be readily incorporated into a variety of cuisines at home. These findings could be beneficial to promote the cultivation of bamboo, such as herbs/medicinal plants in coconut palms and vegetable fields, and as a result, integration into agricultural and horticultural activities may be possible.

The following factors must be taken into account when growing bamboo shoots as a staple meal. Topmost, we need to carefully balance the bamboo shoots harvest with the protection of the forest. Second, even the cultivation of edible bamboo shoots with low levels of cyanoglycosides should be emphasised in terms of food safety, detection and detoxification of cyanoglycosides. Third, the underlying mechanisms of traditional use of bamboo shoots in community medicine are worth further investigation (Debanganaet *al.*, 2012).

7. Conclusion

India, the second largest producer of bamboo shoots after China, does not seem to make significant use of its food potential. This may be primarily due to a lack of awareness of the edible

Table 3: Commercially important edible bamboo consumed in varied countries

S.No.	Country	Species of bamboo shoots consumed
1.	Australia	*Bambusaoldhamii, Dendrocalamus asper, D. brandisii, D. latiflorus*
2.	Bhutan	*Dendrocalamus giganteus, D. hamiltoniivar.edulis, D. hookeri*
3.	China	*Bambusaoldhamii, Dendrocalamus asper, D. brandisii, D. latiflorus*
4.	Japan	*Bambusaoldhamii, Dendrocalamus asper, Phyllostachys edulis*
5.	Korea	*Phyllostachypubescens, P. nigra, P. heterocycle*
6.	Taiwan	*Bambusa edulis, B. multiplex, B. oldhamii, B. pallida,*
7.	USA	*Phyllostachys dulcis, P. edulis, P. bambusoides, P. pubescens*

properties of the shoots. Consumption of soft shoots is mainly limited to north-eastern states and some southern peninsulas such as Kerala, Karnataka.

Bamboo shoots have a gigantic ability of getting used as crucial fitness meals as they've excessive content material of beneficial proteins, amino acids, carbohydrates, and lots of crucial minerals and nutrients and really low fat. Bamboo shoots are eaten up predominantly in Asiatic international locations wherein they shape an indispensable part of numerous conventional cuisines of the region. The usefulness of bamboo shoots as fitness meals isn't in large part acknowledged via means of the overall public because of lack of awareness of their excessive dietary values. There is an extra necessity to create attention to the various humans approximately their dietary fitness advantages in order that they're broadly accepted. Bamboos occupy a totally massive function in normal lifestyles of indigenous humans of Northeast India because of their huge application as conventional meals, residence creation substances, and uncooked substances for manufacturing of beneficial home and different handicraft products.

The sparkling or fermented bamboo shoots shape an essential part of some of ethnic dishes. But shoots ought to be well processed as they comprise excessive stages of poisonous cyanogenic glycosides. Using stepped forward shoot processing techniques primarily based totally on medical methods in preference to crude and unhygienic ones will now no longer handiest lessen poisonous cyanogenic compounds however additionally maintain dietary values. The vicinity being the most important manufacturer of bamboo in India has a vivid prospect for the bamboo shoot enterprise however currently bamboo shoot manufacturing is predominantly for enjoyable the nearby needs.

Only a few are active in this area, so we would like to expand our bamboo processing and packaging equipment. More effective advertising technology needs to be developed. It generates most of the revenue through the use of bamboo shoot products. It is available to many strong and potential customers at home and abroad. The orderly status of the nearby bamboo shoot company not only contributes to the social and financial improvement of the region, but can even bring significant income to the country.

8. References

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