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### To assess the sensory characteristics of bamboo rice cheese cake among college students

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#### Abstract

**Aim:** Bamboo rice is commonly considered as forest produce, since only tribal people has access to harvest of bamboo rice. Bamboo rice is uncommon in our country and in particular it is not available for general population. Hence it is considered as an exotic luxurious food product. Since Bamboo rice is packed with medicinal and nutritional benefits, it should be popularized among individuals to foster healthy eating pattern.

**Design of The Study:** Bamboo rice cheese cake was developed using bamboo rice flour, fresh cream, Maida and butter. Sensory characteristics including appearance, taste, texture, color, flavor and smell of the bamboo rice cheese cake were assessed. Five-point Hedonic scale was used to assess the sensory characteristics of the developed product and questionnaire structured into knowledge, awareness and practice was used to collect data among prospective consumers.

**Place of The Study:** This experimental research was carried out by panel of thirty college students, between 18 to 25 years of age residing in Chennai using a questionnaire.

**Results and Conclusion:** Results showed that 80% of the people habitually do not use bamboo rice in their cooking and 20% of the people use bamboo rice in their cooking. However the frequency of the consumption of bamboo rice is rare. Hence, this study was conducted to popularize exotic bamboo rice.

**Keywords:** Bamboo rice, sensory characteristic, popularize, cheese cake

#### Introduction

**Background:** The increasing demand for modern foods particularly junk foods, fried foods and pastries to face major health problems such as diabetes mellitus, obesity, hypertension, cardio vascular diseases has paved the way for the formulation of a food product that is sweet in taste, appetizing and of high nutritive value. Being a dairy product, fresh cream contains a high amount of calcium and also contains phosphorus. Phosphorus enhances the absorption of calcium which helps for the maintenance of the bone health <sup>[1]</sup>. Bamboo rice (known as Mulayari in Malayalam, Moongil rice in Tamil) is well known for its nutritional and medicinal values. Diabetic patients can use bamboo rice instead of normal rice because the Glycemic Index (GI) of bamboo rice is lesser than normal rice <sup>[2]</sup>.

Bamboo rice tree is a woody tree with a hollow stem and the leaves are slender, thin having long leaf margin. The botanical name of the bamboo tree is *Phyllostachys bambusoides*. It is commonly seen in countries like India, China, Myanmar and most of the south Asian countries. There are almost 1250 species with 70 -75 genre of bamboo trees <sup>[3]</sup>

It is said that the bamboo rice harvesting is a major source of income for the tribal communities living in the interiors of Wayanad Sanctuary in Kerala. The sanctuary makes a rich habitat to bamboo groves, where many small tribal communities still bide. Harvesting and collecting this rice is their source of income as well as their daily food intake.

#### The process of storing bamboo rice

The unpredictable flowering and thorniness of the bamboo, makes rice harvest a challenging task. To get perfect polished bamboo rice, the area around the base of each bamboo is cleaned and all the debris formed is removed. The base is then smoothed with a clay and kept to dry. Once dried, the bamboo rice is stored in the prepared surface and gathered for consumption <sup>[3]</sup>. Bamboo rice is an indigenous rice that is been harvested from the dying bamboo shoots in the forests. At the end of its life span bamboo shoots yields a flower which produces seeds, which

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is a rare, indigenous and exotic variety of bamboo rice. It has been said that tribal community residing in the forest depends on the harvesting of bamboo rice and selling the seeds as a major source of their income. Tribal community believes that regular consumption of bamboo rice makes them healthy, strong and active throughout the day [4].

**Objectives**

To popularize the nutritive value of bamboo rice among college students by assessing their knowledge, awareness and practice of the bamboo rice consumption. To develop a new product using bamboo rice and analyzing the sensory characteristics of developed product.

**Materials and Methods**

The present study was planned to obtain the general information such as socio demographic profile, knowledge, awareness, and practices of consumption of bamboo rice among college students in Chennai. Bamboo rice cheese cake was developed, standardized to assess sensory characteristics of the developed product. This study is an exploratory research in which questionnaire is prepared to collect data

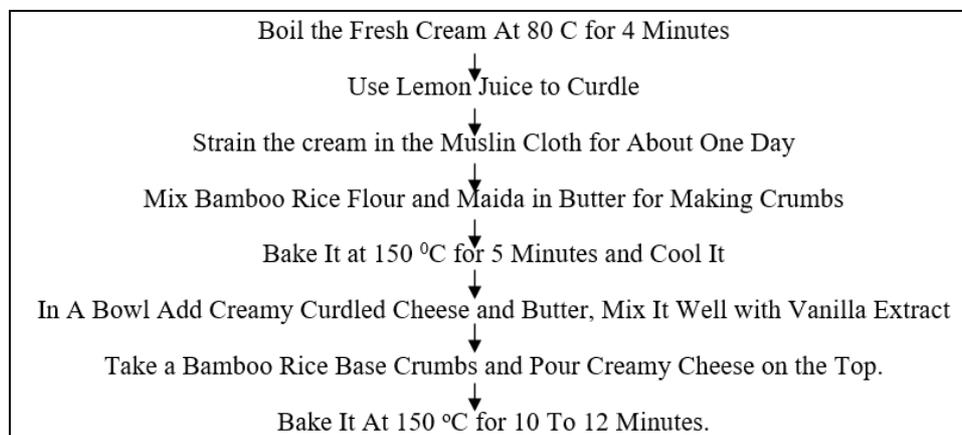
from the college students to assess their knowledge, awareness and practice of bamboo rice among them. Five point Hedonic scale were used to assess the sensory characteristics of the developed bamboo rice cheese cake.



**Fig 1, 2:** Developed Bamboo Rice Cheese Cake

**Hedonic Scale**

To develop the food product by using bamboo rice and to assess the sensory characteristics such as appearances, colour, texture, flavour, taste and smell of the food by using 5-point hedonic scale.



**Fig 3:** Flow Chart for Making Bamboo Rice Cheese Cake

**Results**

**Table 1:** Number of respondents seen bamboo rice

Student response	Number of Respondents
YES	20
NO	10

Table 1 summarizes that majority 20 people have seen the bamboo rice and 10 people have not seen bamboo rice.

**Discussion**

The present study reveals that only twenty of the respondents have seen the bamboo rice because bamboo rice is uncommon in our country since it takes years of cultivation, hence it has not gained as much importance as normal white rice even though it is packed with nutrients.

Subhadra Nayak, a resident of Panchapada village told that bamboo rice was last collected in 1979, after 40 years this rare rice variety has been harvested in Panchapada village. The bamboo forest is littered with the rice variety. It is not commonly available because it takes many years for a bamboo tree to flower and this is the reason localities use to preserve the rice as they believe it has medicinal values.

The forest department took initiative to protect the indigenous variety of rice. The forest officer added that “The forest department purchased around 80 quintals from rice collectors

for Rs 15 per kilogram. The department will use this rice to germinate bamboo trees in other areas of the state [5].

**Table 2:** Number of respondents on usage of bamboo rice

Students Response	Number of Respondents
YES	6
NO	24

Table 2 shows that majority 24 people will not use bamboo rice in cooking and only six people will use the bamboo rice in cooking.

**Discussion**

Out of thirty, only six people use bamboo rice in their cooking because over the last century the consumption pattern of the people has been changed dramatically. Present generation prefer to eat junk foods such as chat items and fast food items which are of empty calories. Hence their taste buds are tuned to the delicious Modern diet thereby urges them to give less importance to healthy and traditional food items. Most of the people prefer to eat junk foods since it is inexpensive, affordable, and convenient and also tastes good. But bamboo rice taste bitter, expensive, resembles wheat and has high medicinal value enriched with carbohydrates, fiber, protein and B vitamins. This may be one of the reason bamboo rice is not popular among the people.

**Table 3:** Number of respondents of consumption of bamboo rice regularly prevents joint pain and back pain

Student Response	Number of Respondents
YES	21
NO	9

From the table 3, we infer that twenty one respondents have the knowledge that consumption of bamboo rice regularly prevents joint pain and back pain. Nine people do not have the knowledge about the benefits of bamboo rice.

### Discussion

Bamboo rice Contains medicinal property and high nutritive value. Regular consumption of Bamboo rice controls back pain and joint pain. And also it increases the bone strength in the body. During pregnancy time eating bamboo rice helps to improve the brain development and improve cognitive function in the infants.

The fiber-rich and calorie-dense kernels of bamboo 'rice' are seeds of bamboo flowers collected by tribal people. Locally called Mulayari, it is hard to collect as the flowering pattern of bamboo is highly unpredictable and can vary from 5 years to 50 years. It has a slightly sweet wheat-like taste and can be used as a substitute for both wheat as well as rice. It helps in detoxification of body, improving reproductive health and relieving rheumatic pain [6].

**Table 4:** The bamboo rice has low Glycemic Index compared to other varieties of rice?

Student Response	Number of Respondents
True	17
False	13

Table 4 summarizes that seventeen respondents said true that it has low Glycemic index compared to other varieties of rice whereas thirteen people told that bamboo rice do not have low Glycemic index.

### Discussion

Bamboo rice has low Glycemic index and considered to be good healthier option to diabetes patients. Glycemic index of bamboo rice is 20 instead of normal rice.

Bamboo rice has very high medicinal values, ideal for people with diabetes and other ailments like Hypertension, etc. It is also noted that bamboo rice has low Glycemic index so it is suitable for diabetic patients. Wild Bamboo rice is collected from the seeds of flowered Bamboos [7].

**Table 5:** Hedonic Scale - Sensory evaluation of bamboo rice cheese cake

Hedonic scale	Very good	Good	Neither good nor poor	Poor	Very poor
Appearance	19	10	0	0	1
Colour	14	11	4	0	1
Texture	13	10	7	0	0
Flavour	14	9	4	3	0
Taste	16	5	6	0	3
Smell	12	11	3	2	2

We infer from the table 5 that, nineteen respondents felt that appearance is very good, 45 people told that colour of the product is very good, whereas 11 people told that color of the product is good.

Thirteen people felt that texture of the bamboo rice cheese cake product is very good; fourteen people told that flavor of

the bamboo rice cheese cake is very good; sixteen people felt that the taste of the product is very good. Twelve people told that the smell of the product is very good; whereas eleven people felt that the smell of the product is good.

### Hedonic scale Discussion

Fourteen respondents said that colour of the bamboo rice cheese cake is very good. No artificial colour has been added in the preparation. It is Creamy yellow in color; base is in dark brown in colour which is a distinctive colour of the bamboo rice. Bamboo rice cheese cake is based in bamboo rice crumbs with creamy cheese filling. It can also be baked as tough base cake and mould base cake. Three people said that flavour is poor because bamboo rice contain little bit of bitter taste. In bamboo rice cheese cake lemon flavour and vanilla extract has been added. Hence natural flavour is used in bamboo rice cheese cake. No artificial flavour is used to impart additional flavour in bamboo rice cheese cake which makes it healthy. Present generation attitude towards food is totally changed; they nibble towards unhealthy tasty tangy foods than healthy foods which has authentic taste. The nutrient content is high in bamboo rice cheese cake.

The 9-point hedonic scale has been used routinely in food science, the same way for 60 years. Now, with advances in technology, data from the scale are being used for more and more complex programs for statistical analysis and modeling. Traditionally, the 'words' on the 9-point hedonic scale are reassigned as 'numbers', while other '9-point hedonic scales' are purely numerical; the two are not interchangeable [8, 9].

### Conclusion

Bamboo rice is collected by tribes residing in the forest from the seeds of flowered bamboo tree. These seeds are gathered from the bamboo tree which is the tallest of the herbs of tropical rain forest. Bamboo flower only once in 40-60 years and often die after flowering. Bamboo rice is not commonly available due to the reason that it takes many years for plant to flower, which cannot be predicted. Even though it is enriched with good medicinal values it has not been used nowadays widely in our cooking so to emphasize the benefits of bamboo rice benefits; bamboo rice cheese cake was prepared, standardized and sensory characteristics were assessed using Five point Hedonic scale. Eighty percent of the people are not aware of bamboo rice because present generation's consumption pattern has been switched to fast foods, junk foods and chat items which have empty calories. Bamboo rice is packed with nutrients such as carbohydrates, vitamins, protein, and fiber and has high medicinal value hence it is used for Ayurvedic treatment. Bamboo rice is chewy when it is consumed hence it is mostly used to prepare desserts. Modern diet thereby urges them to give less importance to healthy and traditional food items. Regular consumption of Bamboo rice controls back pain and joint pain; and also it increases the bone strength in the body. Bamboo rice has low Glycemic index and considered to be good healthier option to diabetes patients. Hence this study is conducted to incorporate and to popularize the consumption of bamboo rice.

### Recommendations

- There is only very less information available about bamboo rice, hence this research can be extended by gathering information from the tribes residing in forests whose living and income is based on cultivation of bamboo rice.

- Since there is only limited recipes available in bamboo rice; new recipes should be developed by substituting the major ingredient.

#### **Limitation of the Study**

- Sample size is restricted to thirty college students because of time constraint.

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