https://doi.org/10.33451/florafauna.v31i1pp79-85
FLORA AND FAUNA ISSN 2456 - 9364 (Online)
2025 Vol. 31 No.1 PP 79-85 ISSN 0971 - 6920 (Print)

Value Addition of *Parkia timoriana* through Food Processing Methods

***Suchitra Hijam, Shantirani Thokchom and Somita Oinam[1]**

Department of Biochemistry,
Manipur University, CANCHIPUR - 795003 (MANIPUR), INDIA
[1]Department of Biochemistry,
Manipur College, IMPHAL – 795008 (MANIPUR), INDIA
*Corresponding Author
Email: suchitrahijam@gmail.com

Received **:** 25.02.2025; ***Accepted*** : 11.04.2025

How to cite : Hijam S, Thokchom S, Oinam S. Value Addition of *Parkia timoriana* through Food Processing Methods. *Flora and Fauna* 2025. 31(1) : 79-85.

ABSTRACT

Parkia timoriana commonly known as Tree Bean and Yongchak in Manipur, is one of the tree legumes native to North East India. It is grown and cultivated in both valley and hill areas of Manipur. It can be considered as one of the natural resources of North East India. Being rich in protein and other nutrients, it can serve as good source of diet to consume. It is consumed as Eromba and Singju in Manipur. Yongchak is considered as most demanding vegetable in Manipur. The present study focuses on the value addition of Tree bean so that it is available throughout the year in many new edible forms. It can be value added by using various food processing methods such as pickling, dehydration, baking etc. Many new products of yongchak pickle, Dried instant yongchak and Protein rich yongchak cookies can be produced. These new items can be commercialized throughout the country as health benefits foods. As this tree legumes are available abundantly in most of the regions of North East India, it can be a good potential sector for the entrepreneurs in North East India.

Figures : 16 References : 14 Tables : 03
KEY WORDS : Baking, *Parkia timoriana*, Pickling, Potential sector, Value addition

Introduction

Parkia timoriana commonly known as Tree bean is a tree legume belongs to the family Fabaceae. This leguminous tree is native to lowland, tropical forests in Southeast Asia and Northeast India [2]. In Manipur and other region of the North East, it is abundantly grown and cultivated in both hill and valley areas[8]. It is locally known as Yongchak in Manipur, Zawngtah in Mizoram and Khorial in Assam. It contains varieties of nutrients which can be beneficial to health. It is rich in essential nutrients such as proteins, fat, carbohydrate, ascorbic acid and minerals. It is also good source of iron and manganese. It is preferred in diet because of low fat content, excellent source of protein, good fibre, contain zinc, iron, calcium, selenium and folate, rich in antioxidants, provides a low glycemic index may help to reduce the risk of chronic diseases *viz.* heart diseases, diabetes mellitus, obesity and cancer. In Manipur, it is considered one of the costliest vegetables in a particular season because it is a seasonal tree legume available from December till April. It is consumed in majority of the household as Singju (form of salad prepared by young yonchak, Chilli and fermented fish) and Eromba (form of Chutney prepared by mature yongchak, mashed potato, chilli and fermented fish). However, it is an underutilized food in other parts of the country and the people refuse to consume with the fear of indigestion and for its stinky smell because of the presence of antinutitional substances such as á- galactosidase, trypsin inhibitors, phenolic substances, phytate *etc.* Despite the presence of antinutritional factors, these legumes are still regarded as potential sources of protein[3].

Value addition or value added is the addition of extra value which is created over the original value of product. Value added food products are raw or pre-processed commodities whose value has been modified or enhanced to higher market value or a longer shelf life. Value addition play an importance role in developing agriculture, food processing and marketing. Value added

ACKNOWLEDGEMENTS : The authors thank their respective institutions for the help and support.

TABLE-1: Nutrient value of raw, Processed and pickle of Tree bean

Nutrients	Raw Tree bean before pickling (g)	Processed Tree bean (g)	Tree bean pickle (g)
Moisture content (%)	7.1	6.3	7 .5
Crude Protein (%)	15.6	10.35	14.87
Crude Fat (%)	7.8	6.35	7.55
Crude Fibre (%)	5.02	4.68	7.84
Ash (%)	5.66	4.04	4.04
Total Crude Carbohydrate (%)	66.39	62.6	65.7
Energy (Kcal/100g)	398.16	348.95	390.23

products provide many benefits such as profit to both the producer and consumer, minimizes the waste, increase shelf life, increase product quality and diversity and expand market season [7,10].

Even though tree bean has many health benefits and uses, it is consumed in a particular period of time and only in few forms such as fresh salad (Singju), Boiled curry (Eromba) *etc*. So, it can be value added into different new products which will have more market value, longer shelf life and able to commercialize throughout the country. Pickling is the process of preserving or extending the shelf life of food by either anaerobic fermentation in brine or immersion in vinegar. Now a days, pickle is prepared by mixing with different types of spices. Our study aims to value added the tree bean into many edible and useful forms such as pickle, dried powder, tree bean cookies and dried singju yongchak [4,14].

Materials and Methods

1. Sample collection and preparation:

Tree bean (Yongchak) was collected from the cultivator of Hiyanglam Awang Leikai, Kakching District, Manipur. There are various types of cultivar tree bean are available. Out of these, we chose the short cultivar as sample. The skin of the tree bean was scrapped out and sundried for future use. And the pod with seed was used for the value addition.

2.Value addition of Tree Bean:

a) **Preparation of Pickle**: Seed with pod was cut into small pieces, blanched for 2 minutes, salt was added and kept for overnight. Next day, it was transferred into a strainer to remove the liquid. Simultaneously all the required ingredients such as onion paste, ginger-garlic paste, spices, salt,

Fig 1: Yongchak

Fig 2: Cut pieces

Fig 3: Blanching

Fig 4: Pickle

TABLE-2: Mean score of sensory attributes

Sample code	Sensory attributes (out of 10)				
	Colour	Aroma	Taste	Texture	Overall acceptability
S1	8	7.5	8	8.2	7.5
S2	7.8	7.4	8.3	8	8
S3	7.1	6.9	7.5	7.6	7.2

oil and vinegar were weighed accurately. In a stainless-steel pan, oil was heated. Then all the ingredients were cooked in the oil. At last, the tree bean was added and cooked together for 10 minutes. It was allowed to cool down and transferred to a pickle jar, covered tightly and allowed to mature for 10 days.

Evaluation of nutritive values of Tree bean pic

Determination of proximate composition was done by the following methods:

a) Crude Protein

A known weight of the sample was transferred to 250 ml Kjeldahl flask for determination of nitrogen by Micro-kjeldahl method. Into the flask, catalyst mixture (Potassium sulphate + mercuric oxide) and concentrated H_2SO_4 were added. The mixture was boiled and digestion was continued until colour of the digest was colorless. The volume of the digest was made upto a known volume. Similarly, a blank without the sample was run. The reduced nitrogen extracted by steam distillation from a definite volume of the digest was collected in boric acid solution. The nitrogen present in the boric acid solution was estimated by titrating with 0.02 N HCl using mixed indicator (methyl red and methylene blue). The blank distillation and titration were carried out and calculation was done as below[12].

$$\text{Nitrogen/kg} = \frac{(\text{ml HCl - ml blank}) \times \text{normality} \times 14.01 \times \text{final volume}}{\text{Weight (g)} \times \quad \text{X aliquot volume}}$$

% Crude protein = Nitrogen % x 6.2

b) Crude Fibre

A weighed portion of the finely ground sample was treated with ether for removal of fat. The residue was boiled with dilute H_2SO_4 (0.255 N) and filtered through muslin cloth. The residue was washed with boiling water until washings were no longer acidic and boiled again with 0.313N NaOH and filtered through muslin cloth again and washed with boiling 1.25% H_2SO_4, water and alcohol successively. The residue was transferred to ashing dish (W1). The residue was dried at 130ºC for 2 hrs and weighed with ashing dish (W2). After ignition for 30 min at 600ºC, cool in a desiccator and weight of the ash with ashing dish was measured (W3)[12].

$$\text{\% crude fibre in ground sample} = \frac{\text{Loss in weight on ignition (W2 - W1) - (W3 - W1)}}{\text{Weight of the sample taken}}$$

c) Crude Fat

A weighed portion of the finely ground sample was transferred to a thimble. The top of the thimble was plugged with a wad of fat free cotton. Then it was placed in the extraction tube of the Soxhlet refluxing apparatus. The extraction tube was then attached to a Soxhlet flask. Approximately 75 ml of anhydrous ether was poured into the flask. The top of the extraction tube was connected to a condenser. Extraction of fat from the sample was done for at least 16 hours on a heating mantel. Ether collected from the Soxhlet flask was evaporated out and crude fat thus obtained was dried at 1000 C for 1 hr and weighed[11].

$$\text{Calculation \% Crude fat} = \frac{\text{Weight of the ether soluble material x 100}}{\text{Weight of the sample}}$$

d) Dry Ashing

A weighed portion of the sample was placed on a silica dish. It was first heated over bunsen flame. The dish was then transferred to a temperature-controlled muffle furnace. Temperature of the muffle was maintained at about 300ºC until all the carbon had ceased to glow and then temperature was raised to 420ºC. The ashing was completed by maintaining this temperature for 5 – 7 hours. The ash obtained was weighed and percent value was calculated[11].

e) Total Crude Carbohydrate

Calculation of the total crude carbohydrate content of the sample was done using the formula[9]

% total crude carbohydrate = 100 – (% crude protein + % crude fat + % crude fibre + % ash).

f) Determination of Energy Content

The energy content was determined by multiplying the percent values of crude protein, crude fat and total crude carbohydrate by the factor of 4, 9 and 4 respectively and summing up these values[10]

Formulation of nutritive value of Tree bean pickle

Formulation of nutritive value was done using literature method (Referring USDA database and Nutritive value of Indian Foods) and calculation of energy contents was done by the following reference:

1 Kcal = 4.18 KJ

1g of fat = 9Kcal

1g of Carbohydrate = 4 Kcal

1g of fiber = 2Kcal

1g of Protein = 4 Kcal

Study of Shelf life of Pickle

a) Sensory evaluation:

The Tree bean pickle was distributed to 10 staff members and 50 students of Department of Vocational Studies and Skill Development for sensorial evaluation of Pickle. The five – point Hedonic scale (for texture, color, taste and overall acceptability as: Like very much =9, like moderately = 7, neither like nor dislike = 5, dislike moderately =3 and dislike very much =1)

Sample code = 2301 (Check after 2 months)

Sample code = 2302 (Check after 4 months)

Sample code =2303 (Check after 6 months)

The mean score of performance of Tree bean pickle was calculated by given formula[13]:

$$\overline{x} = \frac{\sum x}{n}$$

Where, $\overline{x}$ = sample mean

$\sum x$ = sum of each value in the sample

n = number of value in the population

b) Microbial evaluation:

According to the study, we check only the formation of fungi because fungi is one of the microorganisms responsible for spoilage in vegetable pickles.

Fungal Staining : A clean glass slide was taken. Two drops of lactophenol cotton blue reagent was added on the clean and dry slide. A loop of the sample was transferred on the fluid through a sterile needle and press it gently so that it easily mixed with the stain. The sample was spread carefully and make a thin preparation. A coverslip was placed on the preparation by avoiding any air bubble. The excess stain was blot dried.Then it was observed under Microscope. The test was performed every month till 7th month[1].

c) Preparation of Yongchak powder: After removal of skin, the pod with seed was cut into small pieces, blanched for 2 minutes, strained out the excess liquid and sundried for one week. After properly dried it was ground into powder and pack in container. The container was stored in room temperature.

d) Preparation of Yongchak cookies: 5% of Yonchak powder was mixed with flour, fats, sugar, baking powder and baked in 180^0 C for 20 minutes. Cooled down and then packed.

e) Preparation of Dried Singju Yongchak: Pod with seed was cut into small pieces, blanched it for 1 minute, strained out the excess liquid and it was sundried for 5 days. After properly drying it was packed properly.

Results and Discussion

The Tree bean (Yongchak) used in this study was of short cultivar which was grown for some years. This short cultivar yongchak is considered one of the tastiest which is around 20 cm long and had 16 to 18 pods. It is available from the month of December to April. Value addition is the only option to make it available throughout the season.

Yongchak Pickle : Pickle was prepared using different ingredients such as onion paste, Ginger-garlic paste, spices, vinegar and oil. No chemical preservative

TABLE-3: Observance of Fungal growth developed in Tree bean pickle at different storage period.

Storage period	Fungal growth	Remarks
1 month	No growth was observed	Not spoiled
2 months	No growth was observed	Not spoiled
3 months	No growth was observed	Not spoiled
4 months	No growth was observed	Not spoiled
5 months	No growth was observed	Not spoiled
6 months	Slightly growth was observed	Slightly spoiled
7 months	Excessive growth was observed	Spoiled

was added because Vinegar and oil would serve as natural preservative. The added ingredients would help to enhance the flavour and also retain the loss nutrients from tree bean during processing [5,8].

Nutritive value of the tree bean pickle is given in the Table-1. The Table also show the comparison of raw tree bean and processed tree bean. The nutrients loss during processing was retain back when it is in the form of pickle. This is due to the addition of other ingredients during the preparation of pickle[6].

Quality and shelf life of the tree bean pickle was studied. Mean score for performance of colour, aroma, taste and overall acceptability of Tree bean pickle is given in Table-2. The test was done based on hedonic rating test.

Based on the above Table, the second sample (S2) which was 4-month-old showed good rating compared to others. However, after 6 months the score was reduced. It might be because the pickle peak time was till 6 months.

Fungal staining was performed every month, from 1st month till 7th month. The observance was given in Table-3. Storage was done under room temperature

Till 5th month there was no fungal growth. After 6 months there was a slight growth of fungus. Excessive growth was observed at 7 months. Thus, it showed that at room temperature, tree bean pickle life span was 6 months.

Yongchak Powder : Yongchak powder was prepared by grinding the sundried pieces. Blanching was required before drying because it helped to remove surface microorganisms and act as antibrowning. This powder could be commercialized for further use in various production such protein supplement capsule, as ingredient in other food production.

Yongchak Cookies : This cookie would be considered one of the health benefit diets as it was rich in protein and other nutrients. It could be prepared in many forms such as sugar free for diabetic person, with oat flour for weight management etc[7].

Fig 5: Cut pieces

Fig 6: Blanching

Fig 7: Sundrying

Fig 8: Powder

Fig 9: Dried Powder

Fig 10: Ingredients

Fig11: Baking

Fig12: Cookies

Dried Singju Yongchak : This was prepared by simply drying the blanced cut pieces of yongchak. Though this was a traditional method and use in many households to preserve it. It could be commercialized by doing proper packaging. It could serve as instant singju mix.

Conclusions:

Parkia timoriana (Tree bean or Yongchak) is one of the highly demand food legumes in Manipur and other part of North East India and has tremendous health benefits due to the presence of nutrients such as carbohydrate, protein, fats, fibre and vitamins. It is used as one of the most like ingredients of curries such as Eromba and Singju. It is utilized abundantly in the peak season. And the farmer has the good economic sources from it. But due to increase number of cultivations there is huge reduction of price in the peak season and many are at loss. In order to minimize, the losses and make it available throughout the season, we can value added the tree bean in many forms. The study shows various new products such as tree bean pickle, tree bean powder, cookies, dried singju etc. and they could be commercialized.

Thus, value addition of tree bean in various products could enhance shelf life, prevent wastage, increase avaibility throughout the season and commercialized. This sector would be a great opportunity for young entrepreneurs to startup in entire Northeast India.

Fig 13: Cut pieces

Fig 14: Blanching

Fig15: Sundrying

Fig16: Dried Yongchak

References

1. Alexopoulos CJ, Moms CW. Introductory Mycology. John Wiley and Sons.1979. 1-613.

2. Angami T, Bhagawati R, Touthang L, Makdog B, Lungmuana N, Bharti AK. Traditional uses, phytochemistry and biological activities of *Parkia timoriana* (DC) Merr an underutilized multipurpose tree bean: a review *Genet Resour Crop Evol.* 2018; **65**(2): 679- 692.

3. Devi TP, Shakuntala I, Devi G, Nonglait KKL, Singha LB, Pattanayak A, Rahman H. Antibacterial, nematicidal and nutritional properties of different parts of tree bean, Parkia roxburghii G. Don. *Asian J. Microbiol. Biotechnol. Environ. Sci*. 2007; **9**: 621-626.

4. George AH, Richard W, Lewis, Carmen RR. Variations in nutrient content of commercially canned legumes. *J of Food Sci*. 1982; **47** (1): 263-266.

5. Girdhari L, Siddapa GS. Chutney, sauce, pickle, preservation of fruits and vegetables. ICAR Publications, New Delhi. 2010.

6. Gopalan C, Rama Sastry BV, Balasubramanium SC. Revised and updated by Nrasinga Rao BS, Deosthale YG, Pant KC. Nutritive value of Indian foods. Hyderabad, India: Natl. Inst. of Nutrition, (ICMR). 2004.

7. Liener IE, Kakade ML. In Toxic Constituents of Plant Foodstuffs ed. I E Liener. Academic press, New York. 1980. 8-13.

8. Longvah T, Deosthale YG. Nutrient composition and food potential of Parkia roxburghii, a less known tree legume from northeast India. *Food chemistry*. 1998; **62**(4): 477- 481.

9. Merill AL, Watt's BK. Handbook 74 Energy Value of Foods-Basis and Derivation.1973

10. Osborne DR, Voogt P. (1978). Calculation of Caloric Value. In: "Analysis of Nutrients in Foods". Academic Press, New York. 1978. 23-34.

11. Ranganna S. Handbook of analysis and quality control for fruits and vegetable products. 5 th ed. New Delhi, Tata McGraw hill publishing company limited. 1986.112

12. Sadasivam S, Manickam A. 1996. In: Biochemical Methods, 2nd edition. New Age International (P) Ltd. Publ. and Tamil Nadu Agricultural Univ. *Coimbatore.* 1996; **2**: 204-205.

13. Srilakshmi B. Food Science, 6th Edition, New Age International Publishers. 2015. 313-320.

14. Thangjam R, Lingaraj S. In vitro regeneration and Agrobacterium tumefaciens-mediated genetic transformation of *Parkia timoriana* (DC.) Merr.: a multipurpose tree legume, *Acta Physiologiae Plantarum.* 2012; **34** :1207-1215.