Ann. For. Res. 67(1): 532-540, 2024
ISSN: 18448135, 20652445

DEVELOPMENT OF TRADITIONAL FOOD PRODUCT THEKUA THROUGH UNRIPE BANANA POWDER

Singh Shivani[*1], Singh Poonam[2], Singh Richa[3] & Singh Pratiksha[4],
[*1]M.Sc Food Science and Nutrition, Department of Food Nutrition and Public Health, Ethelind College of Home Science, SHUATS, Prayagraj,U.P
[2]SMS, H.Sc., KVK, Varanasi, UP
[3]Programme Assistant, KVK, Sitapur
[4]Asst Proff, College of Community Sciences, ANDUAT, Kumarganj, Ayodhaya

Corresponding Author - [*1]shivanirajput7647@gmail.com

Abstract

The present study was carried out with the objective to prepare thekua, by incorporating unripe banana powder. Product prepared without any incorpation, served as control (T0). The wheat flour 80 percent ,60 percent , 40 percent was blended with 20 percent ,40 percent ,60 percent unripe banana powder to serve as experimental treatments T1, T2 and T3..Each treatment was replicated three times .Sensary evaluation of the thekua was carried out by using by using a 9 Hedonic Scale .The data obtained during the study were analysed statistically by using analysis variance and critical difference . On the basis of finding ,it was concluded T_2(40 percent unripe banana powder and 60 percent refined flour) was the most acceptable in Taste and Flavour, Colour , Body and Texture and Overall acceptability and on the basis of acceptability it is concluded that incorporated in value added traditional food products namely "Thekua". Nutrient determination indicates that higest fibre, calcium, phosphorous, and iron content were found in $_{t3}$ T3 treatment. Cost of the last treatment of thekua 100 grm on the basis of raw ingredient was Rs Rs6-10.52.

Keywords: *Nutritional value for Thekua.*

Introduction

Banana is the common name for herbaceous plants of the genus Musa and for the fruit they produce. It is one of the oldest cultivated plants. Banana is the second largest produced fruit after citrus, contributing about (16%) of worlds total fruit production. India is largest producer of banana contributing to (27%) of world's banana production. Incidentally, production of banana in India Tamil Nadu is the leading producer of banana followed by Maharashtra. Banana is one of the most widely grown tropical fruits, cultivated over 130 countries. Four varieties of unripe bananas were purchased from the market. These were: Mzuzu (Plantains), Bukoba (Lujungira), Mshale (Pisanelitin) and Malindi (Cavendish sp.). Bananas were dried and ground into flour and analysed for moisture content, crude protein, Vitamin C, carbohydrate and mineral content (iron, calcium and phosphorus Banana is also rich in B complex (B1, B2 and B3) vitamins (Freitas and Tavares 2005). Green banana is the good source of fibers, vitamins, (Vitamin C B6, Pro-vitamin A), Minerals (potassium, phosphorus, magnesium, zinc) bioactive compound such as phenolic

compounds, and resistant starch (RS) Egbebi and Bademosi (2011) reported the chemical composition of ripe and unripe banana powder were investigated for ripe powder moisture contents 61.3%, protein 3.15% ash 6% fat 1.2% crude fiber 1.11% sugar 12.8 % carbohydrate 27.24 % indigestible and total solid 38.7g/100g . Banana powder further divided into ripe banana powder and unripe (green) banana powder depends upon the raw material used for production of powder. The advantages of unripe banana powder include the content of high total starch (73.4%), resistant starch (17.5%) and dietary fiber content (14.5%) (Juarez et al., 2006). Banana are the best solid food to introduce to infants, Potassium, Fiber, and Calcium, Magnesium, Phosphorus, Selenium , and Pantothenic acid.

Materials and Methods

The study entitled "**Development of Traditional Food Product Thekua Through Unripe Banana Powder** was carried out in the Nutrition Research Laboratory, Department of Food Nutrition and public Health, Ethelind College of Home Science, Sam Higginbottom University of Agriculture, Technology & Sciences Prayagraj Agricultural University.

- **Procurement of raw materials:** Unripe Banana was collected from local fruit shop and other ingredients were purchased from the local market of the Prayagraj.
- **Experimental site:** The study was carried out in Food Laboratory, Department of Food Nutrition and Public Health, Ethelind College of Home Science, Sam Higginbottom University of Agriculture Technology & Sciences prayagraj.
- **Preparation of Unripe banana powder**

Banana

↓

Washed

↓

Were cut into slices

↓

Blanched

↓

Spreaded on dehydrator trays

↓

Dehydrated (80^0c for 10 -12 hours)

↓

Grinded

↓

Packaged (polythene bags or air tight containers)

↓

Stored (at room temperature in dry place)

Sources: Srivastava and kumar (2009)

Treatments And Replication of Banana Peels Powder Food Products:

Unripe Banana powder was used for the development of the traditonal food products namely thekua. The whole experiment was replicated three times with treatments T_0, T_1, T_2 and T_3.

Table No 1**–Treatments and Replication of The Food Products:**

Treatment	**Products and incorporation level of Unripe Banana powder separately**	
	Wheat flour	**Unripe banana**
T_0	100	-
T_1	80	20
T_2	60	40
T_3	40	60
Replication		
Replicated	3	

Organoleptic Analysis of Developed Food Products:

Sensory evaluation of the unripe banana powder products namely ***thekua,*** done by panel of 5(five) judges selected from the faculty members of the Department of Foods Nutrition and Public Health, Ethelind College of Home Science. The judges were requested to score the products with the help of nine points hedonic scale card**. (Srilakshmi , 2007).**

Nutrient Determination of the Developed food Products:

The nutrients of the prepared products were determined by using food composition table given by **(Gopalan *et al*., 2009) and (Mohapatra *et al.,* 2010)**

- Energy
- Protein
- Fat
- Carbohydrate
- Fiber
- Phosphorus
- Calcium
- Iron

FORMULA: Nutrient/ 100g of product

$$= \frac{\text{Ingredients used (g)X Nutritive value of Ingredient}}{100}$$

Cost Calculation of the Developed Food Products:

The cost of the products was determinates on the basis of price of raw ingredients at rupees per kg.

Statistical Analysis:

The data obtained from sensory evaluation were statistically analyzed by applying two way classification and analysis of variance techniques. **(Fisher, 1995)**

RESULT AND DISCUSSION

- Organoleptic characteristic of the developed food products.
- Nutritional composition of the developed food products. Cost of the developed food products.
- The effect of incorporating unripe banana powder on various parameters of Thekua.
- The organoleptic characteristics of the developed food products.

Table 2: Average Sensory Scores of Different Parameters in Control and Treated Sample of Unripe Banana *Thekua*.

Control and treatment	Color and appearance	Body and Texture	Taste and Flavor	Overall acceptability
T_0	7.2	7.2	6.7	6.9
T_1	7.3	7.1	6.9	7.3
T_2	7.8	7.9	7. 8	8
T_3	6.5	6.6	6.5	6.5

Unripe Banana powder *thekua* (Colour & Appearance)

The data illustrated in the above pertaining to the average sensory scores of different parameters in control and treated sample of unripe *banana powder thekua,* clearly indicates that treatment T_2 had the highest score i.e. 7.8 followed by T_1 (7.3), T_0 (7.2) and T_3 (6.5), which indicates that an increase in the amount of unripe banana powder gave more appealing color and appearance and increase color and appearance acceptability of *thekua* gradually. At 40 percent of banana powder incorporation the acceptability was maximum but the acceptability of color and appearance of the *thekua* decreased when the level of unripe banana powder incorporation was increased to 60 percent.

Unripe Banana powder *thekua* (Body and Texture)

The data illustrated in table- 4.1 pertaining to the average sensory scores of different parameters in control and treated sample of unripe *banana powder thekua,* clearly indicates that treatments T_2 (7.9) had the highest score followed by T_0 (7.2), T_1 (7.1) and T_3 (6.9) which indicates than an increase in the amount of unripe banana powder also enhance body and texture of *thekua* gradually. At 40 percent of unripe banana powder incorporation the acceptability was maximum but it slightly decreased when the level of unripe banana powder incorporation was increased to 60 percent. And its shows that the incorporation of unripebanana powder in the *thekua* give more good body and texture than without it.

Unripe banana powder *thekua* (Taste and Flavor)–

The data illustrated in table- 4.1 pertaining to the average sensory scores of different parameters in control and treated sample of unripe *banana powder thekua,* clearly indicates that treatment T_2 (7,8) had the highest score followed byT_0(6.7) and T_1 (6.9)and T_3 (6.5).Which indicates that an increase in the amount of unripe banana powder also enhance taste and flavor of *thekua* gradually. At 40 percent of unripe banana powder incorporation the acceptability was maximum but it decreased when the level of unripe banana powder incorporation was increased to 60 percent. Unripe banana powder *thekua* (Over all acceptability) -

The data illustrated in table- 4.1 pertaining to the average sensory scores of different parameters in control and treated sample of unripe *banana powder thekua,* clearly indicates that treatments T_2 (8.0) had the highest score followed by T_1(7.3), T_0(6.9) andT_3 (6.5) which indicates that an increase in the amount of unripe banana powder also increase the overall acceptability of *thekua* gradually. At 40 percent of unripe banana powder incorporation the acceptability was maximum but it decreased when the level of unripe banana powder incorporation was increased to 60 percent.

Nutritional Composition of The Developed Food Products.

Table 3:- Percentage of nutrients in control and treated sample of unripe banana powder thekua per 100g.

NUTRIENTS	TREATMENTS			
	T_0	T_1	T_2	T_3
ENERGY(Kcal)	512.93	324.22	339.24	354
PROTEIN(g)	7.04	6.67	.6.30	5.92
FAT(g)	4.57	5.82	7.08	8.32
CARBOHYDRATE(g	110.91	61.29	62.58	63.86
CALCIUM(mg)	22.4	80.51	144.76	205.95
PHOSPHORUS(mg)	77.76	82.52	87.55	92.54
FIBRE(g)	0.19	5.25	10.32	15.39
IRON(mg)	1.75	1.70	1.66	1.63

shows that T_0 (512.93 Kcal) , T_3 (354 kcal) was high in content of energy followed by T_2(339.24 kcal) ,T_1(324.22 kcal) and then T_0 with (97.2 mg) ,T_1 (77.6 mg) ,was high in content of calcium followed by T_3(205.95 mg) ,T_2 (87.55 mg) and then T_1(80.51mg) T_0(77.76mg) ,was high content of phosphorus followed byT_3 (92.54mg) T_2(87.55mg) and then T_1 (82.52mg) ,T_0 (77.76mg) was high content of carbohydrate followed by T_0 (110.91 g), T_3 (63.86 g) and then T_2 (62.58 g) ,T_1 (61.29 g) was high content of fiber followed by T_3(15.39 g), T_2 (10.32 g)and then T_1(5.25g) , T_0(0.19 g) was high content of protein followed by T_0 (7.04 g) T_1 (6.67g) and thenT_2 (6.30g) T_3 (5.92g) was high content of fat followed by T_3(8.32 g), T_2(7.08 g) and then T_1 (5.82 g), T_0(4.57 g) was high content of iron followed by T_0(1.75 mg), T_1 (1.70 mg) and T_2 (1.66 g), T_3 (1.63 mg)

Table 4.:- Comparison between nutrient content of control and best treatment of thekua by using t-test.

NUTRIENTS	T_0	T_2	$T_2 - T_0$	t-value (cal.)	t(tab.)value of 5%	Result
ENERGY(Kcal)	512.93	339.24	173.69	26.05	4.30	S
PROTEIN(g)	7.04	.6.30	0.74	3.77	2.77	S
FAT(g)	4.57	7.08	-2.51	17.97	2.77	S
CARBOHYDRATE	110.91	62.58	48.33	380.96	2.78	S
CALCIUM(mg)	22.4	144.76	-122.36	13.35	2.78	S
PHOSPHORUS(mg)	77.76	87.55	-9.79	76.16	2.77	S
FIBRE(g)	0.19	10.32	-10.13	0.08	3.18	NS
IRON(mg)	1.75	1.66	0.09	6.41	2.77	S

The table shows a non – significant different between control and treatment (T_0) and best treatment on applying t – test regarding the fat carbohydrate phosphorus and fiber as the calculated value of t is found to be less than the tabulated value of t at 5%probability.

The table also shows a significant different between control (T_0) and best treatment (T_2)on applying t – test regarding the energy, protein, calcium, iron content as the calculated value of t is found to be greater than the tabulated value of t at 5% probability i.e., 2.78 which denotes that the energy,protein,calcium and iron content of T_2 is better than the control (T_0).COST OF THE DEVELOPED FOOD PRODUCTS (Rs/Kg)

Table 5: Cost of the prepared products namely *thekua* per 100g of raw ingredients.

Ingredients (g)	Actual rate/Kg (Rs)	Treatments							
		T_0		T_1		T_2		T_3	
		Quantity(g)	Cost (Rs)	Quantity (g)	Cost (Rs)	Quantity (g)	Cost (Rs)	Quantity (g)	Cost (Rs)
Wheat flour refined	28 kg	100	0	80	2.24	60	1.68	40	1.12
Banana powder	13.33kg	0	0	20	2.66	40	5.33	60	7.9
Sugar	40 kg	20	0.8	20	0.8	20	0.8	22	0.8
Oil	105 kg	5l	0.5	0.5	0.5	5	0.5	5	0.5
Cardamom	400kg	0.5	2	0.5	0.2	0.5	2	0.5	0.2
TOTAL	586.33 (kg)	100 (g)	5.4	100 (g)	6.00	100 (g)	9.47	100 (g)	10.07
Total amount (100g)			**5.4**		**6.00**		**8.49**		**10.52**

Table shows that the total cost of thekua per 100g for treatment $T_0$is Rs.5.4, T_1 is Rs. 6.00, T_2 is Rs. 8.49 and T_3 is Rs. 10.52. It is therefore concluded that the treatment T_0(unripe banana powder) has the lowest cost and T_3 (Wheat flour refined unripe Banana powder+ sugar + Oil +Cardamom) has the highest cost.

Conclusion

On the basis of finding it can be concluded that unripe banana powder it can be suitably incorporated in value added traditional food products namely *Thekua,* On the basis of sensory evaluation it was found that 40 percent of unripe banana powder was most acceptable for *thekua.*.Nutient determination indicates that higest fiber,calcium, phosphorous and iron content were found in thekua.Cost of perepared thekua Rs 6..00 to Rs 10.52 on the basis of per 100gram of raw ingredents.

Reference

- **Aparicio SA, Sayago ASG ,Vargas TA, Juscelino T ,Ascencio OTE ,*et ., al* (2007)** Slowly digestible cookies,prepared from resistance starch –rich lintnerized banana starch. *Journal of Food Composition and Analysis 20 : 175 -181 .*
- **Aurore, G., Parfait, B. andhrasmane, L.(2008)** Bananas, raw materials for making processed food products. *rends in Food Science adechnology, 1-13.*
- **Anyasi, T. A., Jideani, A. I. O., Mchau, G. R.A. (2018)** Phenolics and essential mineral profile of organic acid pretreated unripe banana flour. *Food Research International (Ottawa, Ont.), 104: 100–109*
- **Cook, N. C., Sammon, S. (1996)** Flavanoids chemistry, metabolism, cardio protective effects, and dietary sources. *Nutritional Biochemistry, 7: 66–76.*
- **Davey, M. W., Keulemans, J., Swennen, R. (2006)** Methods for the efficient quantification of fruit provitaminA