

Product Formulation through Incorporation of Multigrain Flour to Traditional Snack “Sakkaravaratti Upperi”

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Abstract: *Banana is a monocotyledonous, perennial herb within the order zingiberales, and the family musaceae. The musaceae is divided into two genera musa and ensete. Musaceae one of the most important fruit crops of the world. Cavendish or dessert banana are most commonly eaten fresh though they may be fried or mashed and chilled in pieces. Nendran is popular variety in kerala where it is relished as a fruit as well as used for processing. It is acuminata balbaisiana hybrids. Karpuravalli is occasionally seeded depending on the seasonal variability. Its ash coated golden yellow and sweet fruits have good keeping quality. Whole wheat is a rich of dietary fibre, which makes it perfect for your gut health. Multigrain flour is rich in iron, calcium, vitamins, minerals and some nutrients. In upperi incorporation of multigrain flour is one of the best sources of calcium and iron. its low glycemic index and abundance of polyphenols. sorghum (jowar) is a gluten free alternative for wheat sorghum. this study investigated the formulation and acceptability of “sakkaravaratti upperi” incorporated with multigrain flour under 2 variations such as nendran banana and karpuravalli banana. Among the 2 variation variation 1 was acceptable more. The cost and nutrient content of the sakkaravaratti upperi was calculated. it can be concluded that multigrain flour incorporated sakkaravaratti upperi can be prepared with good sensory and nutritional quality and also cost effective.*

Keywords: Formulation through Incorporation of Multigrain Flour.

I. INTRODUCTION

Banana is a monocotyledonous, perennial herb within the order Zingiberales, and the family Musaceae. The Musaceae is divided into two genera Musa and Ensete. Musaceae one of the most important fruit crops of the world. The banana is grown in the tropics and though it is most widely consumed in those regions it is valued worldwide for its flavor, nutritional value and availability throughout the year. Musa consists of about 40 species and is distributed through India, New Guinea, Australia and Southeast Asia (Simmonds 1962). The Musa genus is grouped into four sections. Eumusa, Callimusa, Rhodochlamys and Australimusa. Eumusa are most widespread and contain the greater number of species and a form for it includes the entire edible seedless banana. Almost all cultivars of the edible banana are now classified under two species M. acuminata (AA) and M. balbisiana (BB), both belonging to Eumusa section. According to Simmonds (1962) most cultivated banana were derived from hybridization between two diploid species M. acuminata and M. balbisiana. Musa acuminata surpasses Musa balbisiana in variability and in diversity of species and the least nine species have been described (ssp. malaccensis, ssp. microcarpa, ssp. burmannica, ssp. burmannicoide, ssp. stamea, ssp. banksii, ssp. errans, ssp. zebrina and ssp. truncate (De Langhe, 1969) whereas Musa balbisiana is less diverse with no subspecies recognized. Most of edible types that are derived from these species are triploid, although diploid (AB) and tetraploid (ABBB) cultivars are also known.

Cavendish or dessert banana are most commonly eaten fresh though they may be fried or mashed and chilled in pies or pudding they may also be used to flavor muffins, cakes, or breads. Cooking varieties or plantains are starchy rather than sweet are grown extensively as a staple food source in tropical regions; they are cooked when ripe or immature a ripe fruit contains as much as 22 percent of carbohydrate and is high in dietary fiber, potassium, manganese and vitamins B6 and C.

The ripe fruit is laxative when eaten early in the morning an excellent food for those anemic persons, having general weakness, jaundice, nervous breakdown, obesity, weak digestion and vitamin deficiency. Decoction of the unripe fruit is good for diarrhea and scurvy. The juice of the plant is taken to cure hemorrhages, cholera, epilepsy and hysteria. An extract of the trunk's juice can be used to massage scalp to promote healthy growth of hair and preventing hair loss. The pounded inflorescence "puso" is used as poultice for skin ulcers and wounds. The flowers are taken as an infusion in normal doses for painful menstruation. The fresh flower can be cooked and eaten to treat diabetes. It is also good for the weak heart. Eating ripe bananas can prevent constipation, colitis, and heartburn. For bladder infection eat 3 to 4 bananas a day. Traditional foods play an important role in ensuring food security and hold a tremendous potential in combating malnutrition to a significant extent. It is essential that the knowledge of their production is not lost.

With the above insights, an effort has been taken to product formulation through incorporation of multigrain flour to traditional snack "sakkaravaratti upperi"

- To develop multigrain flour sakkaravaratti upperi
- To standardized the sakkaravaratti upperi using sensory characteristics
- To determined the yield and cost of standardized product
- To determined the quality of standardized product

II. REVIEW OF THE LITERATURE

The review of literature pertaining to the present study entitled "Product Formulation through Incorporation of Multigrain Flour to Traditional Snack "Sakkaravaratti Upperi" is discussed under the following heads.

1. Significance of Nendran banana (AAB)
2. Significance of Karpuravalli banana (ABB)
3. Significance of Jaggery
4. Significance of multigrain flour

2.1 Significance of Nendran banana (AAB)

It is popular variety in Kerala where it is relished as a fruit as well as used for processing. It is Acuminata balbaisiana hybrids (AAB). Commercial cultivation of Nendran has picked up rapidly in Tamil nadu in the recent past. Nendran is known to display considerable diversity in plant stature, pseudo stem color, presence or absence of male axis, bunch size etc.. Bunch has 5 – 6 hands weighing about 12 – 15 kg. Fruits have a distance neck with thick green skin turning buff yellow on ripening.

Fruits remain as starchy even on ripening. The variety is grown for both fruit and vegetable purpose. The long and thick with good keeping quality make Nendran widely acceptable among consumers. At international level the variety is known as plantain. Its s also used for the preparation of banana chips (Sheng *et.al.*, 2011). Nendran is highly susceptible to banana Bract Mosaic virus (BBMV), nematodes and bores.

2.2 Significance of Karpuravalli (ABB)

It is popular variety grown for table purpose in medium rich soils. It is Acuminata balbaisiana hybrids (ABB Genome) its commercial cultivation is spread over in central and southern district of Tamil nadu and Kerala. In Bihar, cultivation is in patches under the name "Kanthali ". Karpuravalli is a tall, robust plant well suited to marginal lands and soils, produced under low input conditions. It is also the sweetest among Indian banana.

Karpuravalli is occasionally seeded depending on the seasonal variability. Its ash coated golden yellow and sweet fruits have good keeping quality. Karpuravalli is highly susceptible to wilt diseases tolerant to leaf spot disease and well suited for drought, salt affected areas and for low input conditions (Kanchana *et.al.*, 2005). the average bunch weight is 15 – 20 kg the variety is also known as Vellapalayankondan, Kudumbavazhai etc..

2.3 Significance of Jaggery

Jaggery is unrefined natural sugar that is produced without adding any chemicals. More than 70% of the total world Jaggery production is done in India. Jaggery is popularly known as the "medicinal sugar" and is nutritionally comparable

with honey .it has been used as a sweetener in ayurvedic medicine for 3000 years. Indian Ayurvedic medicine considers Jaggery to be beneficial in treating throat and lung infection.

The mineral content of Jaggery includes calcium, phosphorous, magnesium, potassium and iron and traces of zinc and copper. The vitamin content includes folic acid and B – Complex vitamin. Thus other than that is a good source of energy it also prevents rheumatic afflictions ; prevents disorder of bile ; helps in reliving fatigue; relaxation of muscles , nerves and blood vessels , maintain blood pressure and reduce water retention , increases hemoglobin level and prevents anemia.

As the major producer of Jaggery the country has recognized as one of the leading traders and exporters of Jaggery to the world. India exported 3,41,155.53 MT of Jaggery and confectionary products to the world for the worth of Rs.1,633.22 crores / 227.90 USD millions during the year 2019 – 2020.

2.4 Significance of Multigrain Flour

A. Whole Wheat

It is one of the primary multigrain ingredients. Whole wheat is a rich of dietary fibre, which makes it perfect for your gut health. An observational study in the American journal of clinical nutrition suggests that whole wheat like other whole grains can help prevent certain forms of cancer.

B. Oats

Oats are a nutrition powerhouse with the presence of mineral such as manganese, phosphorous, magnesium, copper, iron and zinc. It is also rich in vitamins B1 and B5. The presence of antioxidants such as avenanthramides, help in blood pressure regulation

C. Maize

Maize flour is readily available in the Indian markets. It is loaded with dietary fibre, vitamin B, omega – 6 fatty acids, plant based proteins, and antioxidant (zeaxanthin and lutein).this flour can help promote eye health and prevent serious condition like a diverticular diseases

D. Ragi

The ancient grain is one of the best sources of calcium and iron .its low glycemic index and abundance of polyphenols make it the perfect meal for people with diabetes plus, essential amino acids like lysine and methionine ensure that you have younger looking skin always.

E. Jowar (Sorghum)

Sorghum popularly known in India as jowar is a cereal grain which is found mostly in tropical and subtropical climates. Sorghum has been a part of the human diet for more than 5000 years with its uses being traced through several civilizations across the world.

It is often referred to as the fifth most important cereal crop grown in the world , with its benefits being recognized far and wide .Apart from being a healthy cereal and sorghum (Jowar) is a gluten free alternative for wheat sorghum is also used for animal fodder.

III. METHODOLOGY

The research design pertaining to the study entitled “Product Formulation through Incorporation of Multigrain Flour to Traditional Snack “Sakkaravaratti Upperi” has been discussed under the following headings.

1. Selection of ingredients for preparation multigrain incorporated of traditional snack
2. Preparations of multigrain flour incorporated to traditional snack
3. Yield calculation of multigrain flour incorporated to traditional snack
4. Sensory evaluation of multigrain flour incorporated to traditional
5. Cost calculation of multigrain flour incorporated to traditional snack
6. Calculation of nutritive value of multigrain flour incorporated to traditional snack

3.1 Selection of Ingredients for Preparation Multigrain Incorporated of Traditional Snack

A commercial available multi grain such as (whole wheat, oats, maize, ragi, jowar) was procured from local market. Jaggery, cumin powder and cardamom powder and oil were procured from local market. The Nendran banana and Karpuravalli banana high rich in potassium, vitamin C and fair amount of fiber These ingredients have been purchased from local fruit shop “Pazhamudri Nilayam” in the city

Table 1: Ingredients selected for of multigrain flour incorporated traditional snack

S. No	Ingredients
1	Nendran raw banana
2	Karpuravalli raw banana
3	Jaggery
4	Multigrain flour (whole wheat , oats , maize , ragi , jowar)
5	Cardamom powder
6	Cumin powder
7	Water

3.2 Preparation of Multigrain Flour Incorporated to Traditional Snack

Table 2: Multigrain flour incorporated to traditional snack

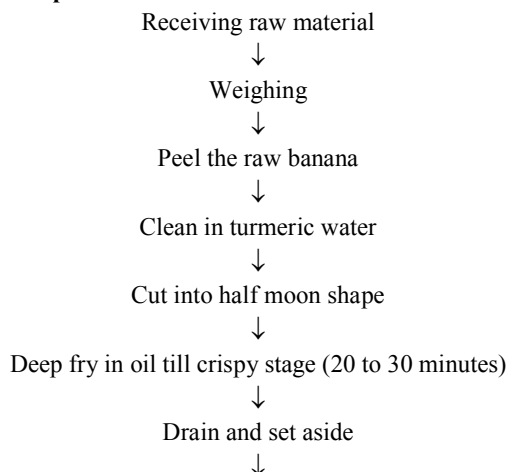
Ingredient	Control	Variation I	Variation II
Raw banana (g)	125	125	125
Jaggery (g)	50	50	50
Multigrain flour (g)	-	55	55
Cumin powder (g)	5	5	5
Cardamom powder (g)	5	5	5
Water (ml)	30	30	30

Oil for deep frying

3.2.1 Multigrain Flour Incorporated to Traditional Snack

In the variation I and variation II, as per incorporation tabulated in Table II, Peel the raw banana, and clean in turmeric water cut into half moon shape. Deep fry in medium heat the oil till super crispy. It will take around 20 to 30 minutes to get it crispy. Drain and set aside. Take Jaggery and water in sauce pan and boil till liquid and strain it after that boil till it gets syrup. Add raw bananas pieces and coat it well. Cook it in the syrup till the banana is coated well after add cumin and cardamom powder coated it well. At end of the stage add the multigrain flour and mix well. Stir till gets coated all the banana pieces. All to cool completely and store it in airtight container

Preparation of Multigrain Flour Incorporated to Traditional Snack



Take Jaggery and water boil till liquid stage in sauce pan
↓
Strain it
↓
Boil the strain liquid till it gets syrup
↓
Add raw banana pieces and coated it well
↓
After well coated the raw banana add cumin and cardamom powder
↓
At end add multigrain flour and coated it one time
↓
Let's cool
↓
Store it in an airtight container

Figure 1: Preparation of traditional snack of Sakkaravaratti upperi



PLATE – I: CONTROL SAMPLE



PLATE – II: VARIATION A



PLATE –III: VARIATION B

3.3 Yield calculation of multigrain flour incorporated to traditional snack

The yield of the developed products were calculated using the following formula

$$\text{Yield\%} = \frac{\text{Weight of the formulated product}}{\text{Weight of the raw ingredients used for incorporation of the product}} \times 100$$

3.4 Sensory Evaluation of Multigrain Flour Incorporated to Traditional Snack

Sensory evaluation can be defined as a scientific discipline that applies principles of experimental design and statistical analysis to the use of human senses (sight, smell, taste, touch and hearing) for the purpose of evaluating consumer products.

The incorporation of multigrain flour to traditional snack “Sakkaravaratti Upperi” has been evaluated for its acceptability by 10 point hedonic scale with a panel 10 members by administering a score card consisting of ten sensory characteristics like ,color and appearance ,taste, flavor, texture and overall acceptability. The scores obtained from the sensory evaluation were used to calculated mean and standard deviation and the most acceptable product was determined.

3.5 Cost Calculation of Multigrain Flour Incorporated to Traditional Snack

Cost calculation is made to find the price of the product for selling this may helps to know the loss and profit .cost of the prepared multigrain flour incorporated to traditional snack has been calculated using a standard price list from local market where the ingredients were procured operating cost, packaging material and profit.

3.6 Calculation of Nutritive Value of Multigrain Flour Incorporated to Traditional Snack

The Nutritive Analysis of the selected multigrain flour incorporated to traditional snack was calculated approximately by using ICMR /NIN. The nutrients like energy, carbohydrate, protein, fat, Vitamin – C, fibre and potassium was calculated

IV. RESULT AND DISCUSSION

The research pertaining to the study entitled “Product Formulation through Incorporated of Multigrain Flour to Traditional Snack is discussed under the following headings.

1. Yield calculation of multigrain flour incorporated to traditional snack
2. Mean score of sensory evaluation of multigrain flour incorporated to traditional snack
3. Nutrient content of multigrain flour incorporated to traditional snack
4. Cost calculation of multigrain flour incorporated to traditional snack

4.1 Yield calculation of multigrain flour incorporated to traditional snack

The yield of the multigrain flour incorporated to traditional snack

Table 3: Yield Percentage

S.No	Variation	Weight of the product (g)	Weight of the raw material(g)	Total yield Percentage (%)
1	Control	250	270	93
2	Variation A	260	270	96
3	Variation B	240	270	88

The yield percentage of multigrain flour incorporated to traditional snack Control 66%, Variation A 78% and Variation B 85%

4.2 Mean score of sensory evaluation of multigrain flour incorporated to traditional snack

The mean and standard deviation of sensory evaluation of multigrain flour incorporated to traditional snack Variation A

Table 4: Sensory evaluation of multigrain flour incorporated to traditional snack

S.no	Criteria	Control	Variation A	Variation B
1	Colour and appearance	8.3	8.7	8.2
2	Consistency	8.1	8.1	8.1
3	Flavour	8.1	8.3	8.2
4	Taste	8.1	8.2	8.2
5	Over all acceptable	8.1	8.3	8.1

The data in the table indicates the variation 1 is highly acceptable in all sensory qualities. The proportion of the ingredients used in variation 1 is presented in the above table and chart.

Colour and Appearance

The score for the colour and appearance of the Multigrain flour incorporated to traditional snack was made with control sample, variation A, and variation B. The Multigrain flour incorporated to traditional snack made with variation A had attracting colour and appearance then Control & variation B

Texture

The texture of the Multigrain flour incorporated to traditional snack was made with control sample, variation A, and variation B. The texture of the variation had excellent consistency.

Taste

The taste of the Multigrain flour incorporated to traditional snack was made with control sample, variation A, and variation B. The taste of the variation A and B was Very good.

Flavour

The score for flavor of Multigrain flour incorporated to traditional snack was made with control sample, variation A, and variation B. The flavor of variations A is good.

Overall Acceptability

The overall acceptability Multigrain flour incorporated to traditional snack was made with control sample, variation A, and variation B. The overall acceptability is high for variation A as it had high score for its sensory characteristics.

4.3 Nutrient Content of Multigrain Flour Incorporated to Traditional Snack

The nutrient content of multigrain flour incorporated to traditional snack was calculated in table V

Table 5: Nutritive value of multigrain flour incorporated to traditional snack

Nutrient	Value	Calculated and estimated
Energy (Kcal)	940.1	Calculated
Protein(g)	27.5	Calculated
Carbohydrate(g)	227	Calculated
Fat(g)	7.3	Calculated
Fibre(g)	11.7	Calculated
Potassium(mg)	73.5	Calculated

The nutritive value was calculated from ICMR/NIN, Dietary Guidelines for Indian, (2011)

4.4 Cost calculation of multigrain flour incorporated to traditional snack

The cost of each raw material was calculated by using standard price where the raw material was procured. The cost was calculated according to quantity used in production of products. The cost calculation of multigrain flour incorporated to traditional snack.

Table 6: Cost of multigrain flour incorporated to traditional snack

Ingredients	Rate/kg	Variation A	
		Qty	Rs
Banana	12	125	10
Jaggery	15	50	3
Multigrain flour	20	55	2.8
		Total	42

V. SUMMARY AND CONCLUSION

Banana is one of the most commonly grown fruit crop of the country. In India, approximately 5 lakhs tones of banana trunk are discarded as waste every year, after harvesting. Instead, banana fibers can be extracted from those trunks. Employment and income to millions of people engaged in its growing and trade can be generated. India produces about 26.217 of Banana from an area of 0.709. Major producing states are Tamil Nadu, Maharashtra, Karnataka, Gujarat, Andhra Pradesh, Assam and Madhya Pradesh. After the consumption of the fruit the plant is cut and thrown on the roadside. This biomass is of great importance, as banana pseudo stem is the basic raw material required for extraction of banana fibers and Gujarat (locale of the study) has sufficient availability of the same to the need. The main aim of the study is multigrain flour incorporated to traditional snack with two variations .the sensory evaluation like colour and appearance, consistency, taste, flavor and over all acceptability was collected to incorporated traditional snack. The yield, nutritive value and cost were calculated for the multigrain incorporated to traditional snack

VI. CONCLUSION

The multigrain flour incorporated to traditional snack sakkaravaratti upperi was developed and the nutritive value, cost and yield were calculated. In the current situation of world Childerns, Youngster, Adults, Old age people are taking more snack items especially Children and youngster. They are like to intake varieties and different snack items. Due to the change in lifestyle and dual income consumers may prefer products like bakery products, ready to eat , instant mixes and many more .in order to enrich the nutritive value to the traditional snack incorporated multigrain flour to banana is rich in protein, fibre, potassium can be met as per the recommended dietary allowance. The banana are easily available fruit which are high protein, potassium by which the product can be enriched with nutrients, hence the healthy status of the people can be increased

Finding of the study include

- The best product from sensory evaluation = Variation A (Raw Nendran banana)
- The yield of the variation A was 96%
- The energy in the selected variation A is 333 kcal
- The carbohydrate in the selected variation A is 114 g
- The Fat in the selected variation A is 5g
- The protein in the selected variation A is 7.3 g
- The potassium in the selected variation A is 577 mg
- The approximate cost of the selected multigrain flour Incorporated to traditional snack was Rs 42/-

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