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NUTRITIONAL ASSESSMENT OF VALUE-ADDED PRODUCT DOSA FROM UNRIPE BANANA POWDER

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Abstract
The present study was carried out with the objective to prepare Dosa, by incorporating unripe banana powder. Product prepared without any incorpation, served as control (T0). The Semolina 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 DOSA 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 that in Dosa, treatment T_2(40 percent unripe banana powder and 60 percent wheat flour) was most acceptable in Taste and Flavour, Colour , Body and Texture and Overall acceptability. on the basis of acceptability it is concluded that incorporated in value added Dosa. Nutrient determination indicates that higest fibre, calcium, phosphorous, and iron content were found in Dosa followed by per 100 gram.Cost of the dosa was Rs 7.03-10.03

Keywords: *Nutritional value, Value Added Product cost caluculation, flavonoid, Banana Powder*

Introduction
Banana are also an excellent source of vitamins including: A- aids in healthy teeth, bones,soft tissue,and more B6 – aids the bodys immune system, promotess brain health, heart health and more C – aids in healing ,growth of tissue ,ligaments, and more D-helps the body to absorb calcium. Anemia high in iron, banana can stimulated the production of hemoglobin in the blood and so help in case of anemia. An unripe banana 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. Protection from ulcers & Heartburn remedy Bananas have long been recognized for their antacid effects that protect against stomach ulcers and ulcer damage. A flavonoid in the banana, leucocyanidin, has been found to significantly increase the thickness of the mucous membrane layer of the stomach. Since bananas help to neutralize acidity, they are also a great way to get rid of heartburn. Banana powder used as a

substitute for fresh banana in making traditional cakes or their premixes as well as in the processing of banana snacks, crackers or crisps due to presence of sugar and starch. Banana powder further divided into ripe banana powder and unripe (green) banana powder depends upon the raw material used for production of powder.

Materials and Methods

The study entitled "**NUTRITIONAL ASSESSMENT OF VALUE ADDED PRODUCT DOSA FROM 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 Unpeel Powder Food Products:

Unripe Banana powder was used for the development of the value added dosa.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 Value Added Dosa:

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

Organoleptic Analysis of Value Added Dosa:
Sensory evaluation of the unripe banana powder products namely ***dosa,*** 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 Value Added Dosa:
The nutrients of the prepared product 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 Value Added Dosa: 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 value added dosa.
- Nutritional composition of the value added dosa. Cost of the developed food product.
- Organoleptic characteristics of the Developed Value Added Dosa
- Effect of Incorporation of Unripe Banana Powder on Different Parameter of Dosa.
-

Table 2: Average sensory scores of different parameters in control and treated sample of unripe banana *DOSA*.

Control and treatment	Color and appearance	Body and Texture	Taste and Flavor	Overall acceptability
T_0	7.3	7.4	7.4	6.6
T_1	7.5	6.9	7.5	7.6
T_2	7.8	7.9	7.8	7.7
T_3	6.5	6.8	6.9	6.5
C.D	0.6	0.6	0.7	0.6

Unripe Banana powder *dosa* (Colour & Appearance)

The data illustrated in the above pertaining table 4.3 to the average sensory scores of different parameters in control and treated sample of unripe *banana powder dosa,* clearly indicates that treatment T_2 had the highest score i.e. 7.8 followed by T_1 (7.5), T_0 (7.3) 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 *dosa* gradually. At 40 percent of banana powder incorporation the acceptability was maximum but the acceptability of color and appearance of the *dosa* decreased when the level of unripe banana powder incorporation was increased to 60 percent.

Unripe Banana powder *dosa* (Body and Texture)

The data illustrated in table- 4.3 pertaining to the average sensory scores of different parameters

in control and treated sample of unripe *banana powder dosa,* clearly indicates that treatments T_2 (7.9) had the highest score followed by T_0 (7.4), T_1 (6.9) and T_3 (6.8) which indicates that an increase in the amount of unripe banana powder also enhance body and texture of *dosa* 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 unripe banana powder in the *dosa* give more good body and texture than without it.

Unripe Banana powder *dosa* (Taste and Flavor) –
The data illustrated in table- 4.3 pertaining to the average sensory scores of different parameters in control and treated sample of unripe *banana powder dosa,* clearly indicates that treatment T_2 (7,8) had the highest score followed by T_1(7.5) and T_0 (7.4) and T_3 (6.8). Which indicates that an increase in the amount of unripe banana powder also enhance taste and flavor of *dosa* 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 *dosa* (Overall acceptability)-
The data illustrated in table- 4.3 pertaining to the average sensory scores of different parameters in control and treated sample of unripe *banana powder dosa,* clearly indicates that treatments T_2 (7.7) had the highest score followed by T_1 (7.6), T_0 (6.6) and T_3 (6.5) which indicates that an increase in the amount of unripe banana powder also increase the overall acceptability of *dosa* 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 VALUE ADDED DOSA

Table 3- Percentage of nutrients in control and treated sample of unripe banana powder *Dosa p*er 100g.

NUTRIENTS	TREATMENTS			
	T_0	T_1	T_2	T_3
ENERGY(Kcal)	278.25	295.23	308.02	322.61
PROTEIN(g)	8.41	8.11	7.82	7.44
FAT(g)	0.65	2.15	3.18	4.45
CARBOHYDRATE(g)	59.69	60.86	62.03	63.2
CALCIUM(mg)	13.92	79.10	144..22	209.37
PHOSPHORUS(mg)	84.64	92.06	99.48	106.91

FIBRE(g)	0.22	5.24	10.32	15.41
IRON(mg)	1.84	1.55	1.64	1.76

Table number 4.6. shows that T_3 (322.61Kcal) , T_2 (308.02kcal) was high in content of energy followed by T_1(295.23kcal) ,T_0(278.25 kcal) and then T_3 with (106.91 mg) ,T_2 (99.48 mg) ,was high in content of phosphorus followed by T_1 (92.06mg) ,T_0 (84.64 mg) and then T_3 (63.2 g) T_2 (62.03 g) ,was high content of carbohydrate followed by T_1 (60.86 g) T_0 (59.69 g) and then T_3 (209.37 mg) ,T_2 (144.22 mg) was high content of calcium followed by T_1 (79.10mg) ,T_0 (13.92 mg) and then T_0 (8.41 g) ,T_1 (8.11 g) was high content of protein followed by T_2 (7.82 g) ,T_3 (7.44 g) and then T_3 (15.41 g) , T_2 (10.32g) was high content of fiber followed by T_1 (5.24 g) T_0 (0.22 g) and then T_3 (4.45 g) T_2(3.18 g) was high content of fat followed by T_1(2.15 g) ,T_0(0.65 g) and then T_0 (1.84 mg) ,T_2(1.76 mg) was high content of iron followed by T_2(1. 65 mg) ,T_1 (1.55 mg).

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

NUTRIENTS	**T_0**	**T_2**	**$T_2 - T_0$**	**t- value (cal.)**	**T (tab.) value of 5%**	**Result**
ENERGY(Kcal)	278.25	308.02	-29.77	2.56	2.77	NS
PROTEIN(g)	8.41	7.82	0.59	7.83	2.78	S
FAT(g)	0.65	3.18	-2.53	11.05	2.78	S
CARBOHYDRATE(g)	59.69	62.03	-2.34	108.73	4.30	S
CALCIUM(mg)	13.92	144..22	-130.3	42.52	5.18	S
PHOSPHORUS(mg)	84.64	99.48	-48.84	-345.13	3.18	NS
FIBER(g)	0.22	10.32	-10.1	358.26	2.77	S
IRON(mg)	1.84	1.64	0.2	2.72	2.77	NS

The table 4.6.1 shows a non – significant different between control and treatment (T_0) and best treatment on applying t – test regarding the calcium 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, fat iron content as the calculated value of t is found to be greater than the tabulated value of t at 5% probability i.e., 2.77 which denotes that the energy,

protein calcium and iron content of T_2 is better than the control (T_0).

Table 5. Cost of the prepared products namely *dosa* 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)**
Semolina	28kg	100	0	80	2.24	60	1.68	40	1.12
Banana powder	13.33kG	0	0	20	2.66	40	5.33	60	7.99
Wheat refined flour	28kg	25	0.7	25	0.7	25	0.7	25	0.7
Salt	22kg	0.5	0.01	0.8	1.1	0.5	0.01	0.8	0.01
Garlic	120kg	0.5	0.6	0.8	0.09	0.5	0.06	0.8	0.09
Ginger	80kg	0.5	0.04	0.8	0.04	0.5	0.04	0.8	0.06
Green chili	60kg	0.5	0.2	0.8	0.04	0.5	0.03	0.8	0.04
Turmeric	280kg	0.5	0.14	0.6	0.16	0.5	0.14	0.8	0.02
TOTAL	238.33	100 gm	4.62	100 (g)	7.03	100 (g)	7.99	100 (g)	10.03
Total amount (100g)			**4.62**		**7.03**		**7.99**		**10.03**

Table shows that the total cost of dosa per 100g for treatment T_0 is 4.62 Rs., T_1 is Rs. 7.03, T_2 is Rs. 7.99 and T_3 is Rs. 10.03. It is therefore concluded that the treatment T_0 (Unripe banana powder) has the lowest cost and T_3 (Unripe Banana powder+ semolina+rice raw milled+gram) 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 *Dosa*, On the basis of sensory evaluation it was found that 40 percent of unripe banana powder was most acceptable for *dosa.* Nutrient determination indicates that highest treatment T_3 had fibre, calcium, phosphorous, and iron content were found in *Dosa*. Cost of the prepared *dosa* Rs 7.03 to 10.6 on the basis of per 100gram of raw ingredent.

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