

Acceptability Appraisal of Cakes and Biscuits Incorporated with Soya Flour

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INTRODUCTION

- ❖ *Soyabean is one of the nature's wonderful nutritional gifts. It is considered as "Gold" obtained from soil and is thus rightly called today the "Gold Nugget of Nutrition" owing to its nutritional composition (Singh et al., 2001).*
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❖ *Soyabean is one of the few plants providing*

High quality protein

Minimum saturated fat.

❖ *In addition soyabean has a number of phytochemicals (isoflavones) which offer health benefits along with soy protein.*

Soy: Health benefits of the Miracle Bean

- ❖ *Soluble fiber in soy foods controls blood sugar.*
- ❖ *Soy food reduces menopausal symptoms and bone deterioration.*

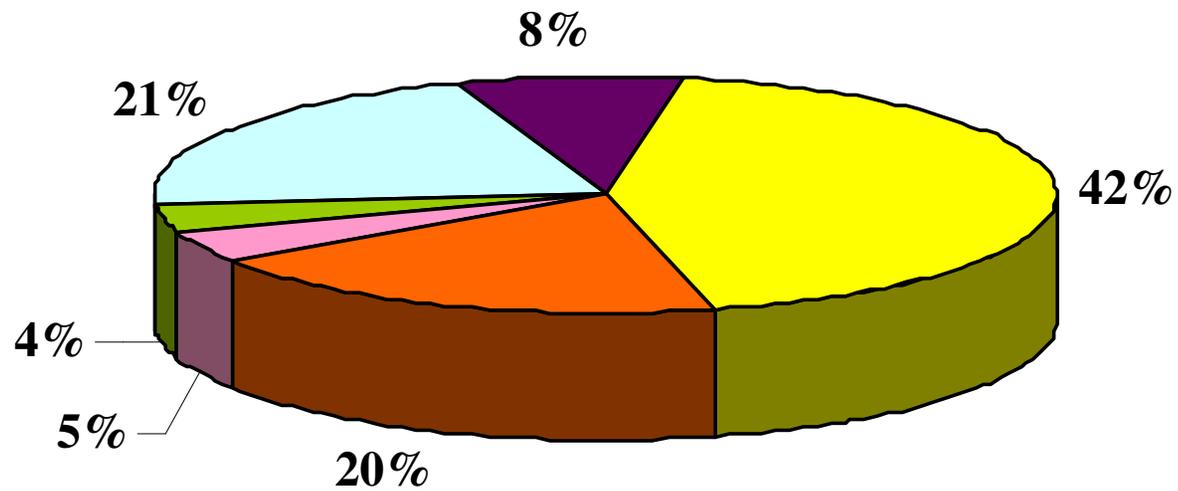
❖ *Soy food given to children daily improves mental and physical abilities, memory power and hemoglobin levels.*

❖ *Regular soy food consumption reduces the risk of many chronic diseases and delays the aging process.*

❖ *Soy food is protective against many types of cancers, especially breast and prostate cancer.*

❖ *Soy food reduces the risk of heart diseases.*

Nutritive Value per 100 gm of Soyabean



■ Protein ■ Fat ■ Minerals ■ Fiber ■ Carbohydrate ■ Moisture

❖ *Incorporation of soy protein into the diet provides a safe, economical and nutritious way to make the quality diet.*

❖ *Industry is responding with an array of soy based products for use to bring about value addition in supplementary foods.*

Soy-milk

Soy-curd

Soy-Tofu

Soy-Tempe

Bakery products.

Protein Value of Soyabean Products

<i>Soyabean Products</i>	<i>Percent Protein</i>
<i>Soyabean Concentrates</i>	<i>70</i>
<i>Soyabean Meal</i>	<i>50</i>
<i>Soyabean Flour</i>	<i>42.5</i>
<i>Soyabean Raw</i>	<i>40</i>
<i>Soyabean Cooked</i>	<i>37.2</i>

Vaidehi (1981)

❖ *In different bakery products soy can be fortified with wheat flour for both functional and nutritional reasons.*

❖ *Addition of soy flour improves the nutritional quality as it increases water absorption, helps in emulsification of fats and other ingredients.*

❖ *Major application of soy flour in bakery products is use of Lecithinated soy flour as an alternate to whole eggs which reduces the cost of raw material.*

❖ *Addition of soyabean in various products requires very little change in technology and no changes at all in process equipment.*

❖ *As consumer demand grows for low-fat healthy foods, the use of soyabean as a key ingredient can be expected to expand.*

❖ *Soy flour can be added up to 3 % without changing formulation except water. In bakery products different type of soy flour can be used based on the product.*



Soy Paneer (Tofu)



Soyabean Oil



Soya Flour



Soya Granules



Soya Cakes



Soya Biscuits

OBJECTIVES:

- ❖ To develop soya fortified baked products and to find out their acceptability among various age groups.*
- ❖ To compare the acceptability of soya incorporated cakes and biscuits among various age groups.*
- ❖ To compare the nutrient content of standard and soya fortified baked products.*

METHODOLOGY

Selection of area and Sample:

- ❖ There are varieties of soyabean cultivated in India. The soyabean were purchased from Agriculture Research Station, Kota .***
- ❖ Whole unbroken soyabean free from infestations were selected to make the full fat soya flour. The study was conducted in two phases:***

I. Standardization of cakes and biscuits:

- ❖ Different proportions of soyabean were used for standardization of baked foods and the acceptability of each product was evaluated.*
- ❖ Adjustment of quantity of soya flour was done to obtain the maximum acceptable taste.*

II. Acceptability Evaluation of developed soyabean products:

❖ *The organoleptic evaluation of all food products was done by*

Children

Adolescents

Young adults

Middle Aged groups

❖ *This helped to judge the most acceptable baked product of soybean.*

The scoring techniques used were:

Composite Scoring Test

- ❖ The rating scale is defined so that specific characteristic of a product are rated separately and the most important characteristics will account for a large part of the total score.*
- ❖ By using composite score card, various attributes like colour, odour, appearance, texture, taste and overall acceptability were evaluated.*

Composite Score Card

Name:

Product: Biscuits/Cakes

<i>Quality</i>	<i>Possible Score</i>	<i>Product</i>	
		<i>A</i>	<i>B</i>
<i>1. Taste</i>	<i>25</i>		
<i>2. Texture</i>	<i>20</i>		
<i>3. Appearance</i> <i>(Size, Shape)</i>	<i>20</i>		
<i>4. Flavour</i>	<i>20</i>		
<i>5. Colour</i>	<i>15</i>		
<i>Overall Acceptability</i>	<i>100</i>		

Comments:

Hedonic Scale

- ❖ *Hedonic Rating Scale relates to pleasurable or unpleasurable experiences. The quality in terms of sensory attributes was assessed by using 7 point and 9 point hedonic scale by various age groups.*
 - ❖ *For children facial hedonic scale and for others verbal hedonic scale was used .*
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Seven Point Verbal and Facial Hedonic Scale

<i>Verbal &</i>	<i>Facial Hedonic Scale</i>	<i>Score</i>
<i>Excellent</i>	<i>Like Extremely</i>	<i>7</i>
<i>Very Good</i>	<i>Like very Much</i>	<i>6</i>
<i>Good</i>	<i>Like Moderately</i>	<i>5</i>
<i>OK</i>	<i>Neither like Nor Dislike</i>	<i>4</i>
<i>Bad</i>	<i>Dislike Slightly</i>	<i>3</i>
<i>Very Bad</i>	<i>Dislike Very Much</i>	<i>2</i>
<i>Horrible</i>	<i>Dislike Extremely</i>	<i>1</i>

9 Point Hedonic Scale

<i>Attributes</i>	<i>Scores</i>
<i>Like Extremely</i>	<i>9</i>
<i>Like Very Much</i>	<i>8</i>
<i>Like Moderately</i>	<i>7</i>
<i>Like Slightly</i>	<i>6</i>
<i>Neither Like nor Dislike</i>	<i>5</i>
<i>Dislike Slightly</i>	<i>4</i>
<i>Dislike Moderately</i>	<i>3</i>
<i>Dislike Very Much</i>	<i>2</i>
<i>Dislike Extremely</i>	<i>1</i>

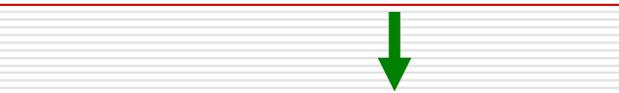
- ❖ *The scores for biscuits ranged from 7.5 - 8.2 and were most acceptable by the middle aged subjects having mean score of 8.2, followed by adolescents who had a mean score of 8.05 which ranged from liked very much to liked extremely.*
- ❖ *Children had a mean score of 7.8 and young adults had the lowest mean score of 7.55. Fifty per cent of both middle aged females and boys (6-12 years) relished biscuits having a mean acceptability score of 8.3 and 8.2 respectively.*
- ❖ *Results of sex-wise acceptability reveals that soya fortified biscuits were more acceptable by boys and females of all the age group.*

Methodology at a Glance

(i) Development of Baked Food Products Supplementing Soyabean



Cake



Biscuits

(ii) Acceptability of the developed Food Products

Children

Adolescents

Young Adults

Middle Age

(iii) Hedonic Evaluation Scale



Facial

Verbal

RESULTS AND DISCUSSION

- ❖ *The results revealed that with reference to taste, texture and flavour, standard cakes were more acceptable than soya fortified cakes (85.2, 91.5 and 89 per cent respectively.)*
- ❖ *Soya fortified cakes were more acceptable in appearance (91%) and colour (90%). The overall acceptability of standard cakes (86.5%) was higher than soya fortified cakes (80.4%).*

Table 1. Mean Acceptability Scores of Standard and Soya Fortified Cakes

Quality Attributes and Scores	Standard Cake		Soya Cake	
	Mean Score	%	Mean Score	%
Taste 25	21.3	85.2	17.8	<u>71.2</u>
Texture 20	18.3	91.5	15.2	76.0
Appearance 20	16.6	<u>83.0</u>	18.2	91.0
Flavour 20	17.8	89.0	15.7	78.5
Colour 15	12.6	84.0	13.5	90.0
Overall Acceptability	86.5		80.4	

Table 2. Mean Acceptability Scores of Standard and Soya Fortified Biscuits

Quality Attributes and Scores	Standard Biscuits		Soya Biscuits	
	Mean Score	%	Mean Score	%
Taste 25	20.6	82.4	22.9	91.6
Texture 20	16	<u>80.0</u>	17.3	86.5
Appearance 20	17.1	85.5	16.9	<u>84.5</u>
Flavour 20	16.2	81.0	18.1	90.5
Colour 15	12.2	81.3	13.1	87.3
Overall Acceptability	81 %		88.4%	

- ❖ *Soya fortified biscuits were more acceptable regarding all the quality attributes except appearance, which was higher in standard biscuits (85.5%).*
 - ❖ *The overall acceptability of soya fortified biscuits was higher (88.4%) than the standard biscuits (81%). The taste of soya fortified biscuits was most relished by the panel members.*
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Percent distribution of panel members by acceptability score of soyabean cakes

<i>Hedonic Scale</i>	<i>Age Groups</i>								
	<i>Children</i>		<i>Adolescents</i>		<i>Young Adults</i>		<i>Middle Aged</i>		
	<i>B</i>	<i>G</i>	<i>B</i>	<i>G</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	
<i>Like Extremely</i>	9	60	-	-	-	10	10	20	10
<i>Like Very Much</i>	8	40	30	10	50	50	80	60	50
<i>Like Moderately</i>	7	-	30	70	30	20	10	10	30
<i>Like Slightly</i>	6	-	30	20	20	10	-	10	-
<i>Neither Like nor Dislike</i>	5	-	10	-	-	10	-	-	10
<i>Sex wise Acceptability Scores</i>		9.0	6.8	7.8	6.3	8.3	8.0	7.9	7.5
<i>Mean Acceptability Scores</i>		7.7		6.6		7.7		7.25	

- ❖ *The results of Hedonic Test revealed that cakes were most acceptable by children and young adults having mean score of 7.7 which ranged from like moderately to like very much.*
- ❖ *Rest of the adolescents and the middle aged subjects had a mean score of 6.6 and 7.25, respectively. Boys (6-12 years) liked the soya cake extremely with a maximum acceptable score of 9.0, followed by young adult males (8.3).*
- ❖ *Results of sex-wise acceptability reveals that soya fortified cakes were more acceptable by boys and males of all the age group.*

Percent distribution of panel members by acceptability score of soyabeen Biscuits

<i>Hedonic Scale</i>	<i>Age Groups</i>								
	<i>Children</i>		<i>Adolescents</i>		<i>Young Adults</i>		<i>Middle Aged</i>		
	<i>B</i>	<i>G</i>	<i>B</i>	<i>G</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	
<i>Like Extremely</i>	9	50	-	20	10	20	30	20	50
<i>Like Very Much</i>	8	30	50	70	80	40	40	70	40
<i>Like Moderately</i>	7	10	40	10	10	10	30	10	10
<i>Like Slightly</i>	6	10	10	-	-	20	-	-	-
<i>Dislike Very Much</i>	2	-	-	-	-	10	-	-	-
<i>Sex wise Acceptability Scores</i>		8.2	7.4	8.0	8.0	6.9	8.0	8.1	8.3
<i>Mean Acceptability Scores</i>		7.8		8.05		7.55		8.2	

- ❖ *The scores for biscuits ranged from 7.5 - 8.2 and were most acceptable by the middle aged subjects having mean score of 8.2, followed by adolescents who had a mean score of 8.05 which ranged from liked very much to liked extremely.*
- ❖ *Children had a mean score of 7.8 and young adults had the lowest mean score of 7.55. Fifty per cent of both middle aged females and boys (6-12 years) relished biscuits having a mean acceptability score of 8.3 and 8.2 respectively.*
- ❖ *Results of sex-wise acceptability reveals that soya fortified biscuits were more acceptable by boys and females of all the age group.*

Protein and Energy content of Biscuits and Cakes

<i>Nutrient</i>	<i>Biscuits</i>		<i>% Increase</i>	<i>Cakes</i>		<i>% Increase</i>
	<i>Normal</i>	<i>Soya</i>		<i>Normal</i>	<i>Soya</i>	
<i>Protein (gm)</i>	3.66	7.96	<u>54</u>	3.66	7.96	<u>54</u>
<i>Energy (Kcal)</i>	597.1	608.3	<u>1.84</u>	548.6	559.8	<u>2</u>

- ❖ *The Protein content of standard and soya fortified cakes and biscuits increased to about 54 per cent.*
 - ❖ *The Energy content of Soya Biscuits was increased to 1.84 per cent.*
 - ❖ *There was 2 per cent increase in the Energy content of Soya Cakes.*
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SUMMARY AND CONCLUSION

- ❖ *The present study was conducted to develop cakes and biscuits fortified with 15 per cent soya flour*
 - ❖ *Panel of ten trained members was selected for the assessment of quality characteristics of cakes and biscuits using Composite Scoring Test.*
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❖ *Overall acceptability of soya fortified cake was 80.4 per cent which was less as compared to standard cakes (86.5%).*

❖ *Overall acceptability of soya fortified biscuit was 88.4 per cent which was higher than standard biscuits (81%).*

❖ *Cakes were most acceptable by children and young adults having mean score of 7.7 (liked moderately to like very much).*

❖ *Soya fortified biscuits were most acceptable by the middle aged subjects having mean score of 8.2, followed by adolescents who had a mean score of 8.05 (liked very much to liked extremely).*

- ❖ *In conclusion, both soya products had high acceptability values. Fifteen per cent soya fortified biscuits were found to be more acceptable than cakes.*
- ❖ *Soya fortified cakes were more acceptable by males of all the age groups.*
- ❖ *Soya fortified biscuits were more acceptable by boys and females of all the age group.*
- ❖ *The protein content of standard and soya fortified cakes and biscuits increased to about 54 per cent.*

❖ **Addition of soy flour in wheat products increases the cost but if the functionality of soy protein is considered , addition of soy flour is economical with nutrition improvement as bonus.**

❖ **Soy protein is also a cost effective way to reduce fat, increase protein , and improve the overall characteristics of various bakery products.**

THANK YOU
