

## Organoleptic evaluation of soybased formulated soychakali

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■ **ABSTRACT** : Soybased food product, Soychakali was formulated in three different combinations with rice flour and soyflour 40:40, 50:50 and 40:60 ratios. All these three combinations were evaluated organoleptically. Among these combinations, high scored product was selected and chemically analyzed on the basis of their storage stability. Due to attractive colour, flavour, taste appearance and over all acceptability of soychakali prepared with composition III. *i.e.* rice flour 60 g and soyflour 40 g. scored high by organoleptically. The chemical composition like moisture, ash, crude fibre, crude protein, iron, calcium, zinc, carotene and B complex vitamins were found adequate in soychakali .

■ **KEY WORDS** : Soybean, Soyproduct, Nutritional quality

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Soybean is an important source of quality legume protein and also oilseed crop in Maharashtra. Soybean is one of the nature's wonderful nutritional gifts. It is one of the few plants that provide complete proteins with minimum saturated fat. Regular consumption of soybean helps people feel better and live longer with enhances quality of life. Soybean contains protein, carbohydrates, fat as well as vitamins and minerals including folic acid calcium, potassium and iron. Soybean protein provides all nine essential amino acids in the amount needed for human health.

Soybean also contains nutraceutical properties like isoflavones phytoestrogen soluble phosphate and potassium sulphate in which these properties are mostly used to prevent the risk of dreaded diseases like breast cancer, osteoporosis, cardiovascular diseases kidney stones, and help in beating 'menopausal blue' (Messina, 1997).

It is less expensive and hence used for formulation of high nutritious weaning, supplementary food and snack food. Most of these studies (Sahay and Kacharu, 1988; Deshpande *et al.*, 2004) recommended that soybean can be used for snack food as well as weaning food and supplementary food to combat the malnutrition and to maintain good health and good nutritional status of pre-school children. With the intention of high significance nutritive value of soybean, the most-familiar, and more popular in children, soybased product

Chakali was prepared, evaluated and analyzed chemically.

### ■ RESEARCH METHODS

Local varieties of soybean MC HS 58 and rice *i.e.* Ratanagri were procured from market. They were cleaned washed dried roasted and ground separately. The following combinations were used for the formulation of and preparation of soychakali.

#### Fomulation and prepatation :

##### **Soychakali:**

On the basis of per cent formulation of soychakali three different combinations were made with rice flour 60:40, 50:50 and 40:60. The Chakali were prepared with three combinations by use of standard method.

#### **Type of shortening agent :**

Shortening agent, refined soy oil used for frying the chakali.

#### **Frying time :**

Frying period and variation in the flame *i.e.* low, medium and high for period 2 – 4 min, 4 – 6 min. and 6 – 8 min the combination of the procedure were developed.

**Use of coloring agent :**

Chakali was prepared with the use of turmeric powder and artificial liquid yellow colour with varying amounts, 2 - 0, 4 - 0, 6 - 0 and 8 - 0 g per 100 g. prepared.

**Flavouring agent :**

Cumin seed was used as a flavouring agent with different amounts *viz.*, 05 g., 1 g., 1.5 g. and 2 g. as well as no use of flavouring agent. Per 100 g. of the product was prepared.

**Sensory evolution :**

By the use of three different combinations, soychakali was prepared and evaluation by organoleptically with the help of trained panel of judges on a nine point Hedonic scale (Amerine *et al.*, 1965)

**Chemical analysis of soy products :**

High scored Soychakali in sensory evaluation was selected for chemical analyses. Such as moisture content, total ash, major nutrient like crude protein, fat, carbohydrates, B complex vitamins, minerals such as iron, calcium, zinc and crude fibre with the use of method described in (AOAC, 1984).

**Storage seability and statical analysis :**

The organoleptical qualities of soychakali was carried out after its storage for 0 to 1 month and 1 to 2 month packed in polythene and tetra packaging materials at room temperature. The differences noticed among this were calculated by statically. The obtained data were analyzed statically at  $P < 0.05$  levels SE and CD at 5 per cent level by standard procedure (Gomez and Gomez, 1984).

**RESEARCH FINDINGS AND DISCUSSION**

The findings of the present study well as relevant discussions have been presented under following heads:

**Formulation and preparation of soychakali :**

The data regarding formulation of soychakali on the basis of different parameter such as composition soya flour, frying time, use of shortening agent, colouring agent and flavouring agent with its score for sensory evaluation are presented in Table 1 to 4. The soychakali with 40 per cent soyflour mixing with 60 per cent rice flour scored more in terms of its all organoleptic qualities for overall acceptability of this flour combination *i.e.* (40:60 soyflour : rice flour) rank high *i.e.* 7.1 as compared with 4.8 for 50:50 and 4.7 for 60:40, soyflour and rice flour combination (Table 1) .

Table 2 describes the sensory score of the product in relation to firing and type of flame used. Chakali fried on medium flame for 6 – 8 minutes was gave better organoleptic qualities to the product. Table 3 highlights the score of flavouring agent in Soychakeali preparation 2 g. of cuminseed powder per 100 g. of the product developed better aroma of soychakali. The overall acceptability of this combination was more than that of no use of flouring agent. However, overall acceptability of soychakali was more (7.6) when it was prepared with use of 2 g of turmeric powder as a colouring agent (Table 4) .

**Biochemical compositions and storage stability of soychakali:**

The data given in Table 5 and 6 reveal the storage

**Table 1: Organoleptic score of soychakali with flour combination**

Sr. No.	Proportion	Organoleptic				
		Colour	Flavour	Taste	Texture	Overall acceptability
A	Soy flour : Rice flour					
1.	60:60	4.5	4.8	4.7	4.8	4.7
2.	50:50	4.8	4.6	6.7	4.8	4.8
3.	40:60	6.7	7.3	6.9	6.9	7.1

**Table 2: Organoleptic score of soychalali and on the basis of frying time and use of flame**

Sr. No.	Flame	Frying time (mm)	Organoleptic				
			Colour	Flavour	Taste	Texture	Overall acceptability
1.	Low	2-4	4.6	4.5	4.1	4.1	4.1
		4-6	6.4	6.0	4.8	4.8	4.5
		6-8	7.4	6.2	5.4	5.9	6.0
2.	Medium	2-4	5.4	5.4	4.4	4.2	4.1
		4-6	6.2	6.2	6.4	5.2	5.0
		6-8	7.9	7.0	7.9	7.2	7.6
3.	High	2-4	4.6	6.1	6.2	6.2	4.4
		4-6	6.1	6.6	6.0	6.6	5.4
		6-8	6.0	5.4	6.4	6.0	7.0

**Table 3: Organoleptic score of soyckali on the basis of use of flavoring agent**

Sr. No.	Flavoring agent	Amount (g)	Organoleptic				Overall acceptability
			Colour	Flavour	Taste	Texture	
<b>Chakali</b>							
1.	Cumin seed	0.5	4.2	4.0	3.8	4.0	4.2
		1.0	4.8	4.6	4.6	4.6	4.8
		1.5	5.4	5.8	5.8	5.8	5.8
		2.0	6.0	7.0	7.4	7.0	7.0
2.	No use of flavoring agent	-	5.4	4.0	3.6	6.8	4.0

**Table 4: Organoleptic score of Soychakali on the basis of coloring agent**

Sr. No.	Coloring agent	Amount (g)	Organoleptic				Overall acceptability
			Colour	Flavour	Taste	Texture	
<b>Chakali</b>							
1.	Yellow artificial liquid colour	2	6.0	6.0	6.0	5.6	5.0
		4	5.4	5.2	5.0	5.2	4.8
		6	4.8	4.6	4.4	4.2	4.6
		8	3.8	4.0	4.2	4.0	4.4
2.	Turmeric powder	2	6.4	7.0	7.2	6.9	7.6
		4	3.2	3.1	3.0	3.9	3.1
		6	4.0	3.9	3.9	3.2	3.1
		8	4.0	4.1	3.1	4.6	4.0

changes in proximate, biochemical compositions and sensory qualities in soychakali kept in different packages for 1 to 2 months at room temperature. The changes in per cent of moisture and the content of B complex vitamins and  $\beta$  carotene in soychakali were noticed at significant level after two months of storage (Table 7).

The per cent of proximate compositions such as, protein was found decreased at highly significant level *i.e.* 22.12. to

21.02 in the Chakali stored upto 2 months of period. Where as the value of B complex vitamins such as vitamins B<sub>1</sub> (0.45 to 0.26 mg) vitamin B<sub>2</sub> (0.39 to 0.28 mg) and vitamin B<sub>3</sub> (1.69 to 1.27 mg) were observed reduced significantly in the soychakali. Similarly significant change was seen for  $\beta$  carotene (230.0 to 288.9)  $\mu$ g for 2 months. Non-significant effect was noticed in the changes of minerals and crude fibre contents in the soychakali after 2 months of storage. Table 6 represents that,

**Table 5 : Biochemical changes in soy production storage**

Sr. No.	Nutrient	Soychakali		t test
		Up to 1 month	1 to 2 month	
1.	Moisture %t	8.69	8.01	2.218* S
2.	Ash %	13.92	3.06	0.267*S
3.	Protein (g/100g)	22.12	21.01	3.705**S
4.	Fibre %	51.45	1.40	0.166 NS
5.	Fat %	9.99	9.09	0.60 NS
6.	Carbohydrates (g/100g)	54.57	53.07	5.007* S
7.	Iron (g/100g)	7.01	6.99	0.066 NS
8.	Zinc (mg/100g)	4.05	4.00	0.667 NS
9.	Calcium (mg/100g)	159.9	159.6	1.001NS
10.	B carotene(ug/100g)	230.0	288.9	3.672** S
11.	B <sub>1</sub> (mg/100g)	0.45	0.26	2.155** S
12.	B <sub>2</sub> (mg/100g)	0.39	0.28	1.981* S
13.	B <sub>3</sub> (mg/100g)	1.69	1.27	1.920*S

NS- Non significant \* and \*\* indicate significance of value at P=0.05 and 0.01, respectively

**Table 6 : Sensory qualities of Soychakali stored In different packages**

Sr. No	Storage parameters	Organoleptic score				
		Colour	Flavour	Taste	Texture	Over all accepted
<b>Soychakali polythene package</b>						
I.	Up to 1 month	5.2	4.8	5.0	6.0	7.0
II.	1 to 2 month	5.8	5.6	5.8	5.0	6.0
	S.E. $\pm$	0.297	0.395	0.395	0.501	0.501
	C.D. (P=0.05)	0.0978	1.301	1.301	1.650	1.650
<b>Tetra package</b>						
I.	up to 1 month	5.4	5.0	5.2	5.8	7.4
II.	1 to 2 month	4.0	5.8	4.0	6.0	7.2
	S.E. $\pm$	0.917	1.301	0.395	1.00	1.00
	C.D. (P=0.05)	3.0215	0.395	1.301	0.329	0.329

**Table 7 : Cost calculation of prepared soychakli per kg**

Sr. No.	Ingredient	Soychakali		
		Quantity (g)	Rate/unit	Cost
1.	Soy flour	400g.	30/kg	12/-
2.	Rice flour	600	16/kg	9.6/-
3.	Cumin seed	10	160/kg	1.6/-
4.	Turmeric	10	20/kg	0.2/-
5.	Soy oil	300	50/kg	15/-
6.	Salt	10	50/kg	0.08/-
	Processing cost	@ 20%	--	7.69/
	Total			46.17

soychakali stored in polythene and tetra packages for 2 months was noticed the reduced sensory qualities. As compared by packaging material, less change in sensory qualities was observed in the soychakali stored in tetra package.

#### Cost of production of soychakali :

Total cost of soychakali was calculated on pilot plant trials which is depicted in Table 7. It reveals that, for one kilogram soychakali costs around Rs. 46.17 out of this Rs. 38.48/ was incurred for raw materials and Rs. 7.69 for processing and packaging charges. Total cost of soychakali was very much less than the Chakali existed in the market.

The cost of production of soychakali is affordable. Hence, it is concluded that the soychakali prepared with this formulation is more beneficial to combat the malnutrition especially in children.

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