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Sensory Characteristics and Community Acceptability of Developed Functional Soya Cookies

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ABSTRACT

Soya powder are very healthy and it is a rich source of protein (essential amino acids). The objective of the study was to develop functional soya cookies and to know the sensory acceptability of developed functional soya cookies. The present study is conducted in Food science and technology, BBAU for period of 9 months, the experimental design was conducted to prepared functional soya cookies among community people. Cookies were evaluated by 15 consumers for color, flavor, texture, and overall acceptability using a 9-point hedonic scale. The major finding of the study was (20:4), F2 formulation sample found more acceptable because of their texture, flavour, colour, appearance and overall acceptability of the cookies, which was higher than other that formulation samples in general acceptability. The study concluded that functional soya cookies are substitute of high rich protein diet in term of bakery product and suitable for all age groups.

Key words: Soyabean, Sensory evaluation, Cookies, Acceptability

Soybeans have been consumed as part of the daily diet in China and in most of the Asian countries for thousands of years due to their highly nutritious content; however, the dramatic increase in popularity and consumption in Western society is a fairly recent trend. The soybean market has expanded energetically in the past decade. This claim is based on the association between consumption of soy proteins and risk reduction of coronary heart disease (FDA 1999). Soybean (*Glycine max*) is an excellent source of protein (40-45%); hence the seeds are the richest in food value of all plant foods consumed in the world [1]. It is also rich in calcium, iron, phosphorous and most of the vitamins. It is the only source that contains all essential amino acids. The health claim requires that foods must contain at least 6.26 g of soy protein per serving in addition to being low in fat, cholesterol, and sodium (FDA 1999). Beyond heart health, proposed benefits of consumption of soy proteins, specifically isoflavones, as part of daily diet include multiple beneficial effects on atherosclerosis, menopausal symptoms, risk reduction of breast and prostate cancers, and osteoporosis [2-3]. Soybeans are considered an inexpensive source of high-quality plant protein (38% to 40%) that are abundantly rich in lysine, an essential amino acid, deficient in most cereal

grains [4-5]. For these reasons, it is advantageous to use soy powder (SP) as a protein supplement and subsequently, research is going in the mixing of soy powder with various cereal grains.

The advancement or fortification of cookies and other bakery products with other protein sources such as oilseeds and legumes has received significant attention. This is because oil seed and legume proteins are high in lysine, an essential limiting amino acid in most cereals [6]. Whole legumes contain relatively high amount of protein compared to other plant foodstuffs. Legume proteins should complement the protein in cereal grains since the chemical and nutritional characteristics of legumes make them natural complements to cereal-based diets [7]. The consumption of cereal snack foods such as biscuits, cookies, wafers and bread has become very popular in India especially among children. Among these cookies possess several attractive features including wider consumption base, relatively long shelf-life and good eating quality. Long shelf-life of biscuits makes the possibility of large-scale production and distribution. Good eating quality makes biscuits attractive for protein fortification and nutritional improvements, particularly in children feeding programmes, for the elderly and low-income groups. Enrichment of cereal-based foods with other protein sources such as oil seeds and legumes has received considerable attention [8]. Cookies are one of the most common snack foods due to their general acceptability, convenience and shelf-life. Over the years, there has been a trend to incorporate soy protein from various sources into cookie products prepared high protein cookies using wheat flour fortified with defatted soy flour and soy isolate.

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MATERIALS AND METHODS

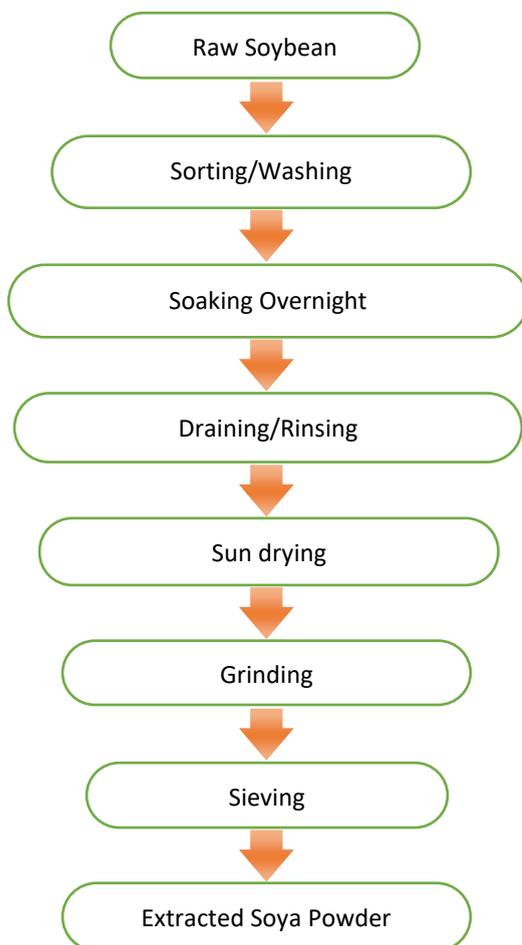
The present study was conducted at Food Science and Technology laboratory Babasaheb Bhimrao Ambedkar University, Lucknow, for the period of 9 months. The present study is an experimental design.

Sampling

The selection of the sample yellow soybeans (*Glycine max*) a small seeded variety was purchased from a local grocery store in Lucknow, Uttar Pradesh. A very small number of seeds with defects were removed from the sample.

Preparation of soy powder

Soy bean seeds were sorting and washing after then soaked in water for 10-12 hours. The soaked water was decanted and the seeds were washed with fresh water. After that Soybean should be kept to dry in the sunlight, until the moisture is completely gone (generally for two days). Then grind the dried soybeans finely in a mixer grinder and filter them in a sieve and separate the powder form. That is the method for preparing soybean powder.



Flow chart of techniques used in extraction of soy powder

Preparation of soy-based cookies

Whole wheat flour, butter, soy powder, sugar powder, baking soda, and vanilla extract were mixed and make dough uniformly by hand and set aside. Soy powder was added gradually and mixed it properly until the dough was ready. Cookies were dropped on baking sheets 5 cm apart using a round scoop (15 mL), then baked for 15 min in a

rotary oven at 180°. All cookies were cooled on a wire rack for 1 h, then packed into plastic boxes for 1 week.

Formulations

Formulation of functional cookies:

Formulations	Wheat flour (gm)	Soy powder (gm)	Powdered sugar (gm)	Butter (gm)	Baking powder (tsp.)
F ₁	200	20	150	100	2
F ₂	200	40	150	100	2
F ₃	200	60	150	100	2

Consumer acceptability and sensory evaluation

In consumer acceptability, hedonic scale used for the organoleptic evaluation and also for the acceptance of the developed product as its likely descriptive way of acceptance test which includes 9- point hedonic scale.

Because 9- point hedonic scale shows and explain consumer's degree of acceptance and satisfaction. This study was conducted on about 20 people who were exemplary of our society. The consumer had to rate prepared soy powder-based biscuits according to their taste, flavour, aroma, colour and appearance. They were given the hedonic rating card (as shown in table) which shows 9 as "like extremely" and 1 as "dislike extremely".

Rating scale / Hedonic scale	Score
Like Extremely	9
Like Very Much	8
Like Moderately	7
Like Slightly	6
Neither Like nor Dislike	5
Dislike Slightly	4
Dislike Moderately	3
Dislike Very Much	2
Dislike Extremely	1

RESULTS AND DISCUSSION

Total 15 people were randomly selected amongst the whole population from the society and were given a set of 3 different cookies samples. The samples were distributed amongst the people and were sensory evaluated on the basis of appearance, taste, texture, aroma and overall acceptance. The results are as follows:

Table 1 Sensory scores of cookies formulations on the basis of appearance

Panelist	F ₁	F ₂	F ₃
P1	8	8	7
P2	8	9	7
P3	7	8	8
P4	7	7	8
P5	8	9	9
P6	7	9	7
P7	8	8	6
P8	8	9	7
P9	9	8	7
P10	7	8	6
P11	7	9	7
P12	8	8	8
P13	9	8	7
P14	7	8	9

P15	7	9	8
Total	115	125	111
Mean	7.66	8.33	7.4
Standard deviation	0.723746	0.617213	0.910258

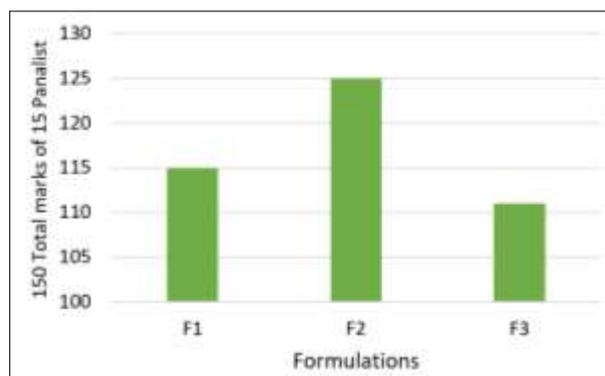


Fig 1 Graphical representation of appearance

Table 2 Sensory scores of cookies formulations on the basis of taste/flavour

Panelist	F ₁	F ₂	F ₃
P1	7	7	6
P2	6	7	7
P3	7	6	6
P4	8	8	5
P5	8	7	6
P6	6	8	7
P7	7	7	7
P8	8	8	6
P9	8	7	7
P10	7	8	8
P11	6	8	7
P12	8	6	8
P13	7	7	7
P14	6	8	6
P15	7	8	6
Total	106	110	99
Mean	7.06	7.33	6.6
Standard deviation	0.798808	0.723746	0.828078

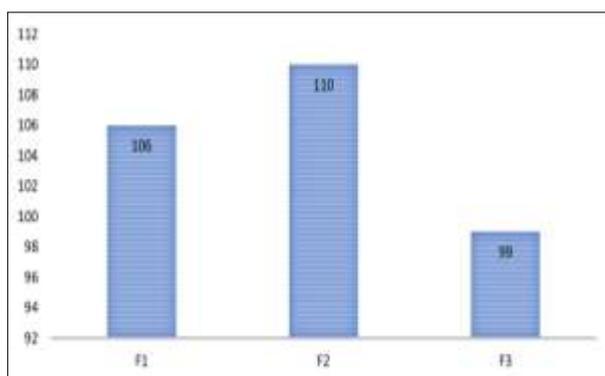


Fig 2 Graphical representation of taste

Table 3 Sensory scores of cookies formulations on the basis of texture/consistency

Panelist	F ₁	F ₂	F ₃
P1	7	8	8
P2	8	8	7
P3	7	8	7
P4	7	9	7
P5	8	9	8

P6	9	8	9
P7	7	7	8
P8	8	9	7
P9	9	9	8
P10	7	9	7
P11	8	8	6
P12	9	8	7
P13	9	9	8
P14	8	8	8
P15	7	8	7
Total	118	125	112
Mean	7.86	8.33	7.46
Standard deviation	0.833809	0.617213	0.743223

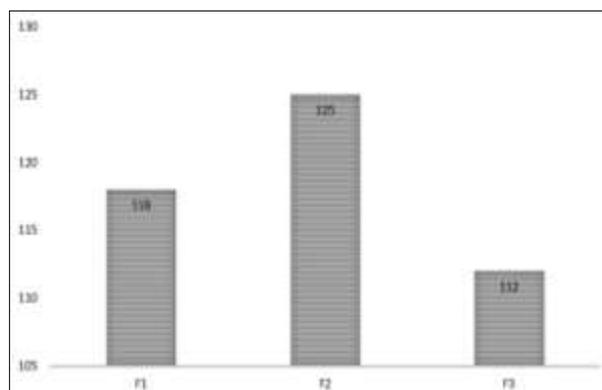


Fig 3 Graphical representation of texture

Table 5 Sensory scores of cookies formulations on the basis of aroma/smell

Panelist	F ₁	F ₂	F ₃
P1	7	7	8
P2	7	8	8
P3	8	8	8
P4	9	8	8
P5	8	9	8
P6	7	9	9
P7	7	9	9
P8	8	9	8
P9	9	9	9
P10	8	9	7
P11	7	9	8
P12	8	8	8
P13	8	9	8
P14	7	8	9
P15	9	8	8
Total	117	127	123
Mean	7.8	8.46	8.2
Standard deviation	0.77596	0.639940	0.560611

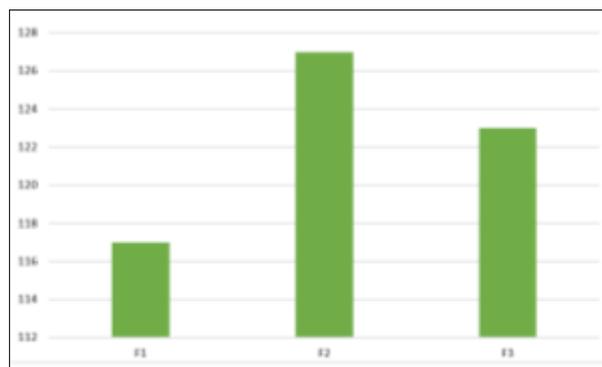


Fig 4 Graphical representation of aroma

Table 6 Sensory scores of cookies formulations on the basis of overall acceptance

Panelist	F ₁	F ₂	F ₃
P1	7	7	6
P2	7	8	7
P3	6	8	7
P4	8	6	8
P5	7	8	6
P6	9	9	7
P7	8	8	8
P8	7	8	6
P9	8	7	8
P10	7	8	7
P11	7	7	7
P12	6	7	6
P13	7	8	8
P14	7	7	7
P15	6	9	8
Total	107	115	106
Mean	7.13	7.66	7.06
Standard deviation	0.833809	0.816496	0.798808

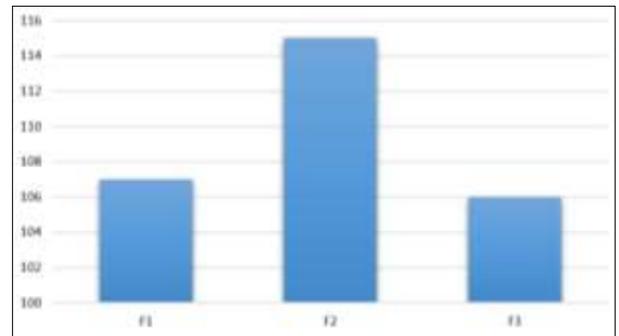


Fig 5 Graphical representation of overall acceptance

Overall calculation

The parameters on the basis of which the overall acceptance of the soy-based cookies was examined are taste or flavour, texture, colour, appearance and overall acceptance [9-11]. The calculated total, standard deviation and mean is shown in the above table. The developed product was examined on several parameters and it was found that the sample with formulations (F₂) was the most accepted sample among all. The samples don't have many variations in their colour, taste and appearance [12-14].

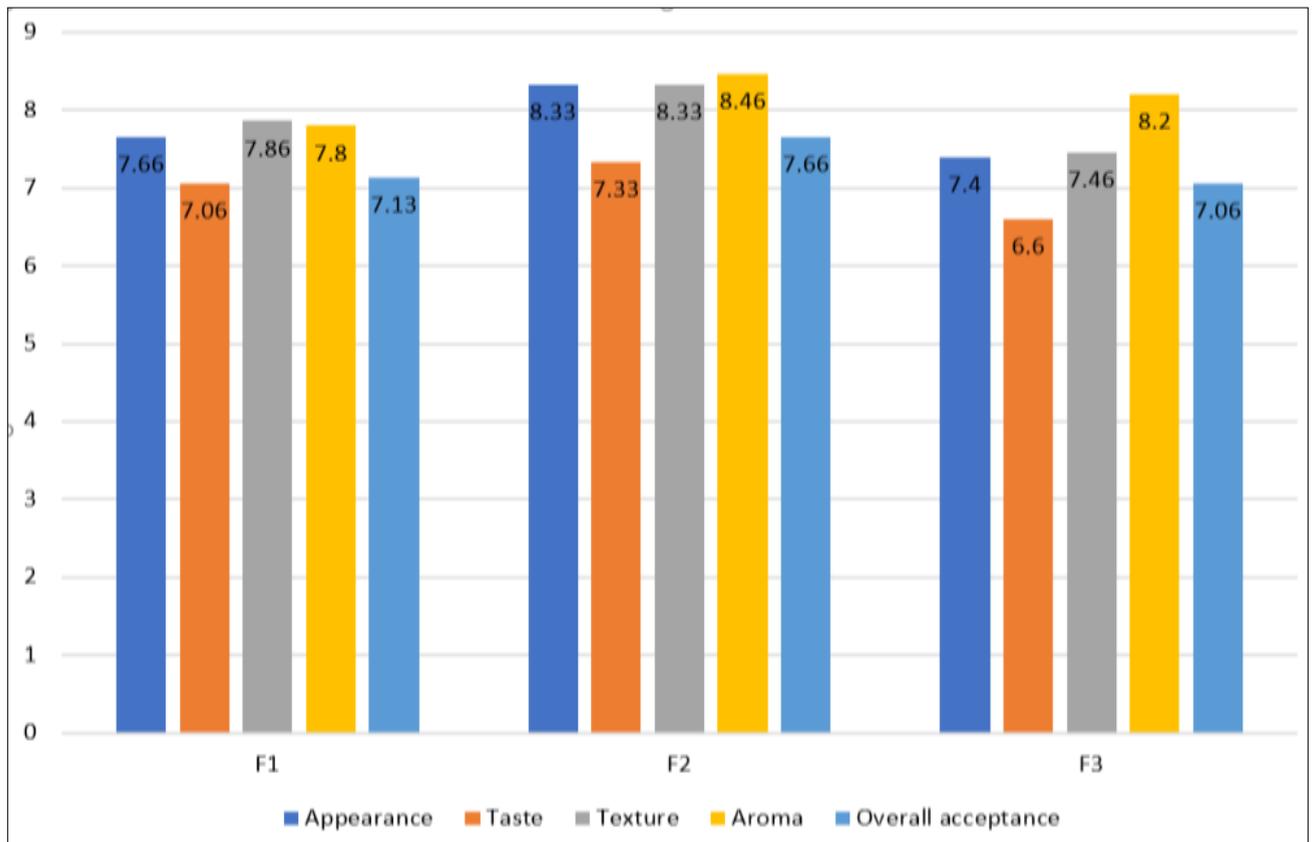


Fig 6 Graphical representation of the mean sensory scores of the cookies formulations

Table 7 Mean scores of the five sensory attributes of the cookies formulations

Attributes	F ₁	F ₂	F ₃
Appearance	7.66	8.33	7.4
Taste	7.06	7.33	6.6
Texture	7.86	8.33	7.46
Aroma	7.8	8.46	8.2
Overall acceptance	7.13	7.66	7.06
Mean	7.502	8.022	7.344

CONCLUSION

The Consumer acceptability of the developed product which is prepared by the using whole wheat flour, soy powder, sugar, butter, and baking powder was tested by using 9-point hedonic scale by the common people of the society. The prepared samples were made to get tested by total 15 consumer and they were asked to score the sample according to aroma/ smell, texture, colour, taste and overall

acceptability. Total 3 samples were prepared by different ratio of all the ingredients, there was not much variations among the all samples. But the sample F2 was found to more acceptable than other 2 samples.

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