

# Effect of Composite Flour on Quality and Nutritional Properties of Bread

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**Abstract:** Malnutrition in related to protein deficiency is widespread in the developing nations, but even more so in the developing regions of the world. It can affect all age groups, especially young children and women. Micronutrient malnutrition has many adverse effects on human health, not all of which are clinically evident. Even moderate levels of deficiency can have serious detrimental effects on human body functioning and behavior. In the wealthier countries, higher incomes, greater access to a wider variety of micronutrient-rich and fortified foods, and better health services, are all factors that contribute to the lowering the risk and prevalence of Protein-Energy Malnutrition (PEM). Soybean is one of the chief sources of nutritional components like proteins with potential functionality and bio-availability; also fermented soy products have high nutritional quality with elevated anti nutritional compounds. Present study has been planned based on the protein rich soya flour, where bread was fortified and developed to mitigate the protein energy malnutrition (PEM). In this study defatted soy flour was incorporated into the bread and standardized the protein rich product with the semi trained sensory panel members.

**Keywords:** Protein Energy Malnutrition (PEM), Soy flour, Bread, Fortification.

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## 1. INTRODUCTION

Protein Energy Malnutrition is one of the most devastating problems worldwide and is inextricably linked with poverty. Each individual requires a minimum amount of nutritious food to keep them healthy. When this minimum requirement is not met the human body becomes weak and susceptible to infection. Therefore, to recover from this problem it is very important to supplement the diet with protein and energy rich content (7). Soybean contains all the three essential macronutrients required for good nutrition which serves as an excellent complement to lysine-limited cereal protein. It is the cheapest legume having nutraceutical properties (5). The use of soybean products in the feed and food industry has been increasing steadily. The world soybean production is currently 219.8 million metric tons out of which India produced 9.3 million metric tons constituting about 4% of the total world production(4). The unique chemical composition of soybean seed, which includes the number of nutraceutical compounds such as isoflavons, tocopherol, and lecithin besides 20 % oil and 40 % protein, has made it one of the most valuable agronomic crops in the world(3). The food derived from soybeans generally provides the health benefits and is a cheaper source of high-quality protein. The Soybean has potential to eliminate Protein Energy Malnutrition prevailing in poor sections of society in the country (2). The most important soybean derived products are the traditional soy foods, which include Soya milk, Soya flour, Soya curd, soya sprouts, soya sauce and Tofu (Soya Paneer) (1). Besides its nutritive quality, functional properties of Soy Protein have opened avenues for producing new products and improving the quality of existing standard food products. Hence it becomes necessary to promote its popularity and utility in developing countries like India to meet the ever growing Protein Energy Malnutrition.

India has a large market for the bakery products. It has become an important industry in India and is growing rapidly (5). The main bakery products are bread, biscuits, cakes, pastries and other milk and dairy products. Nowadays, bakery food products, especially bread is becoming very popular in rural as well as urban areas among all the age groups due to its

several attractive features, including wider consumption, low cost among other processed foods, varied taste, easy availability and good eating quality(6). It is the most consumable wheat based bakery product. Being a convenience of bread intake and considering the wider health benefits of soy, the investigators aimed to develop the bread by formulation of composite flour with soy, all purpose flour and milk powder to enrich its nutrient content towards mitigate Protein Energy Malnutrition.

## 2. MATERIALS AND METHODS

The basic concept behind the development of soy bread is to enhance the Protein and Energy by formulating composite flour to enrich the quality of bread.

### Procurement of raw materials:

Good quality Refined flour, Defatted soy flour, Skim milk powder, Sugar, Butter, Dry yeast, Vegetable oil and Baking Powder were procured from the local super market, Tirupati to formulate and standardize the product.

### Processing of Bread:

Standard procedure was adopted to prepare the bread (8). The yeast was poured into luke warm water by addition of sugar and allowed to ferment till froth arise on the top of the water denoting that the yeast cells get activated for leavening action. The dry ingredients like flours, sugar and salt were sieved together for the uniform blending. The yeast mixture was added to the blended dry ingredients gradually and made into dough by beating on the surface until it gets smooth texture. The prepared dough was kept aside for half an hour for rising. Cream the fat into the dough and knead again. Then allow it to stand for half an hour in the dry proofer or in the warm place (27.7<sup>0</sup>C). Punched, divided and scaled the dough into balls. Later these balls were transferred into greased bread tins. Rolling the mould could be done either by machine or hand. The bread tin was kept in wet proofer (35<sup>0</sup>C) or under wet cloth about one hour. During this period yeast fermentation was continued and the incorporated air while processing allowed the rolled breads to rise by volume. Then it was baked in baking oven at a temperature of 205<sup>0</sup>C (400 F) for a period of 30 minutes.

The baked bread was taken from the oven and allowed to cool to the room temperature. Then the cooled bread was taken out from the bread tin and made in to even slices.

**Table 1: Formulation of Composite Flour to Develop the Bread**

S. No	Ingredients	Trials			
		Reference	Trial-1	Trial-2	Trial-3
1	All Purpose flour (g)	100	50	70	70
2	Soy Flour (g)	-	50	30	20
3	Skim Milk Powder (g)	10	-	-	10
4	Sugar (g)	25	25	25	25
5	Yeast (g)	5	5	5	5
6	Salt (g)	3	3	3	3
7	Baking powder (g)	5	5	5	5

The table 1 shows that the composition of ingredients in different trails. In the reference sample soy flour was not included.100g of all purpose flour, 10g of milk powder was added. Remaining ingredients were added in the same quantity in all trials. During the trial-1 there was no inclusion of milk powder but both all purpose and defatted soy flour were added in equal proportions i.e.50:50.The ratio of flours in trial-2 was 70:30 respectively .In trial-3 the proportion of flours were 70:20 ratio along with milk powder.

### Sensory evaluation:

Sensory evaluation is a scientific discipline used to evoke measure, analyze and interpret reactions to those characteristics of foods and materials as they are perceived by the senses of sight, smell, taste, touch and hearing. Sensory evaluation involves the measurement and evaluation of the sensory properties of foods and other materials. Sensory evaluation also involves the analysis and the interpretation of the responses by the sensory professional.

The breads were subjected to organoleptic evaluation in each trial with selected panel members. The product was standardized based on the sensory scores of the formulated breads. Trial-3 got highest score among all trials including with reference sample. Hence this formula was standardized in terms of ingredients and procedure.

### 3. RESULTS AND DISCUSSION

Value addition was done to the regular bread by incorporating the functional and health ingredients i.e. defatted soy flour and milk powder to enrich protein and energy content.

**Table 2: Composition of the standardized product**

S.No	Ingredients	Quantity(g)
1	All Purpose Flour	70
2	Soya Flour	20
3	Milk Powder	10
4	Sugar	25
5	Yeast	5
6	salt	3
7	Baking Powder	5

The table 2 shows the ingredients composition in the standardized soy bread. Various trials were carried out in the laboratory which has given in the methodology in table 1. Based on the sensory scores of the panel members the product was standardized. It was found that the trial-3 got highest score among all the trials against the reference sample. Thus the third trial was standardized in the formulation of soy bread.

**Table 3: Quantitative parameters of the bread**

S.No	Parameters	Quantity
1	Initial weight(g)	350
2	Net weight of the bread(g)	280
3	Net weight of bread percent (%)	80
4	No. of loafs	2
5	Each loaf weight(g)	160
6	No of slices	28
7	Average weight of each slice	10
8	No. of servings	7

The above table indicated that the percent yield of the product from the dough was 80%. Initial dough weight was 350g which yielded 280g of baked bread provided with two loafs. Each weighed around 160g which could be served for 7 members at the rate of 4 slices for each member.

**Table 4: Organoleptic evaluation of bread developed with composite flour**

S.No	Trials	Sensory Attributes											
		Appearane		Color		Taste		Texture		Odour		Overall Acceptability	
		W	A.G	W	A.G	W	A.G	W	A.G	W	A.G	W	A.G
1	Reference	4.5	4.7	4.4	4.5	4.4	4.5	4.6	4.4	4.3	4.2	4.4	4.5
2	Trial-1	2.9	3.1	2.4	2.6	2.4	2.1	2.2	2.0	2.3	2.5	2.4	2.5
3	Trial-2	3.9	3.8	3.3	3.1	3.1	3.7	3.1	2.3	3.1	3.3	3.5	3.4
4	Trial-3	4.7	4.4	4.6	4.5	4.7	4.8	4.4	4.3	4.2	4.2	4.5	4.5

**Note:** W-Women, A.G-Adolescent Girls

The table 4 represents the mean scores of sensory evaluation of soy bread. In the reference sample defatted soy flour was not added and the figures indicated that the sample was well accepted by the both groups. Among all the trials, trial-1 got least score in all sensory attributes. In this 50g of defatted soy flour was added. This imparted dull surface. In trial-2 the defatted soy flour was decreased to 30g and considerably all purpose flour was increased to 70g. This trial got better score compared to trial-1 but lesser than both reference and trial-3. The trial-3 was prepared with 10g of defatted soy flour along with milk powder. It got highest score in all sensory attributes. Hence this trial was taken as standardized formulae.

**Table 5: Nutrient composition of bread developed with composite flour**

S.No	Nutrients	Quantity
1	Protein (g)	15.078
2	Fat(g)	10.9
3	Carbohydrates(g)	63.3
4	Energy (K.Cal)	411
5	Calcium(mg)	152.9
6	Iron(mg)	3.1
7	Phosphorous(mg)	241.6

The table 5 shows the nutrient composition of standardized bread. The major nutrients such as Energy (411K.Cal), Carbohydrates (63.3g) Protein (15.078g), Fat(10.9g) and minor nutrients like Calcium(152.9mg), Iron(3.1mg) Phosphorous(241.6mg) were calculated. Formulation of bread with composite flour was found to be nutritionally superior to whole wheat bread. Addition of defatted soy flour was substantially increased the protein and mineral content. Defatted soy flour has high mineral content particularly Calcium and Phosphorus. Therefore, breads with composite flour had better nutritional quality than the regular wheat flour breads.

#### 4. CONCLUSION

The utilization of soybean for food uses in India is meagre and it needs work in terms of blending with other foods to make taste acceptable. The high-quality soybean protein should be included in daily diet of Indian masses to mitigate the widespread energy-protein malnutrition. The Government of India as well as private sector should take aggressive approach to increase the food use of soybean in the country. Addition of soy flour can improve quality and nutritional properties of wheat bread. The results of this study showed that adding 20g of soy flour to the bread formulation, improved bread quality, sensory characteristics, and nutritional properties of bread. Therefore, in order to prevent Protein Energy Malnutrition complications, such as growth failure and weight loss, through a healthy diet, consumption value added soy bread containing defatted soy flour and milk powder could be beneficial. Hence it becomes necessary to promote its popularity and utility in developing countries like India to meet the ever growing protein deficiency.

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