

**SUPPLEMENTATION OF EGYPTIAN
BREAD WITH SOYBEAN FLOUR
1. EFFECT OF SUPPLEMENTATION
ON THE QUALITY AND ACCEPTABILITY**

By

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ABSTRACT

Analysis for both wheat flour and soybean flour was made. Egyptian bread was made with different combinations of wheat and soybean flour = 100 : 0,95 : 5, 90 : 10, 85 : 15 : 80 : 20, and 75 : 25%. The bread was scored for aroma, crust and crumb color, texture, flavor, and overall acceptability by Egyptian judges. Bread made with 20% soybean flour had the highest mean score for crust color (5.88), texture (5.53), and overall acceptability (5.96). Bread made with 25% soybean flour had the least mean score for both aroma (5.26), crumb color (5.34), and flavor (5.9). It had a characteristic aroma and flavor but not bad. Concerning overall acceptability it is amazing to recognize that both bread made with 20% and 25% soybean flour had the highest scores (5.96 and 5.73 respectively) and more acceptable than bread made with 0% soybean flour which had the least mean score (4.73) for acceptability. Bread made with 5% soybean flour had the highest mean score for aroma and flavor.

INTRODUCTION

Grains supply over 50% of all human energy in the world, in some countries they provide 70% of the total food intake (6). For instance most of the protein in the Middle Eastern diets comes from cereals and pulses (4). In many diets, cereals make a greater contribution than any other food groups to both energy and protein content. About two-thirds of the available protein comes from wheat in the form of bread. The bread consumed in Egypt is called Eish-Ballady and is made with 80-85% extraction wheat flour, starter (yeast), salt, and water without addition of fat.

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In general the lysine, threonine, sulfur containing amino acids and tryptophan content of cereals are low, where as legumes are a good source of lysine, but limited in the sulfur-containing amino acids (2). So it is practical to attempt to improve the nutritive value of cereal proteins by incorporating in the diet of other foods which supply the deficient amino acids (5). In comparing wheat to the Food and Agriculture Organization reference pattern, Howe (4) found that lysine was the most deficient amino acid and tryptophan the next. Yang et al. (8) proved that the nutritive value of wheat flour improved by lysine supplementation up to a level of 0.20 or 0.25%. Soybean protein is rich in essential amino acids, especially, lysine. Thus a combination of wheat and soybean should give protein of higher biological value than wheat or soybean alone.

In Egypt, the price of food plays an important role in the type of food consumed, and animal proteins are beyond the economic means of many people. So it is important to develop food mixtures high in protein by using local inexpensive foods, acceptable to the population. Acceptability of Egyptian bread made from wheat flour supplemented with soybean flour was investigated.

MATERIAL AND METHODS

Wheat flour 72% extraction was used, Soybean flour was supplied by the ADM Milling Company, Kansas City - Mo. Different combinations of wheat flour and soybean flour were analyzed for protein ($N \times 6.25$).

Egyptian bread was prepared from the following combinations wheat and soybean flour : 100 : 0, 95 : 5, 90 : 10, 85 : 15, 80 : 20, and 75 : 25.

Ingredients were 200 gm. flour, 8 gm. starter, 3 gm. salt and 180 ml. water at 37°C. The starter was made by dissolving 25 gm. pressed yeast in 100 ml. water at 37°C and adding 100 gm. of flour. It was covered and left at room temperature for one day before use. Method for making the bread was as Follows :

1. Place flour in a dough mixer.
2. Mix starter, and water, add to flour.
3. Mix for 1 min. at first speed and for 3 min - at second speed.
4. Transfer dough from mixer bowl to shallow pan.

5. Ferment dough for 3 hr. at 37°C in an incubator.
6. Cut dough into two loaves weighing 150 gm each and place on 15 gm. of shorts on a cookie sheet.
7. Dust with flour and make it flat by patting with fingers.
8. Leave for 3 min. at room-temperature.
9. Bake at 500°F for 10 min.

Two loaves of bread from the different combinations of wheat flour and soybean flour were baked on each of 20 days. The bread was scored for aroma, crust color, crumb color, texture, flavor, and over all acceptability, by Egyptian judges. The score card was based on a scale of 1 (very poor), 2 (poor), 3 (fair), 4 (fairly good), 5 (good), 6 (very good), and 7 (Excellent).

RESULTS AND DISCUSSION

Protein Content :

Protein content, as analyzed for wheat flour, soybean flour and for wheat-soybean flour combinations is given in Table 1.

TABLE 1

Protein Content of Wheat Flour, Soybean Flour, and Wheat Soybean Flour Combinations.

Different Combinations	Protein Content *
100% wheat flour	11.23%
100% Soybean flour	43.11%
5% Soybean flour	
95% Wheat flour	12.61%
10% Soybean flour	
90% Wheat flour	14.20%
15% Soybean flour	
85% Wheat flour	15.82%
20% Soybean flour	
80% Wheat flour	17.41%
25% Soybean flour	
75% Wheat flour	19.23%

* N x 6.25 for both wheat flour and soybean flour

The protein content of wheat flour was 11.23% which is in between of 9.9 to 14.0% protein content of hard wheat flour given by Griswold (3) and in the range of 12% given in Agriculture Handbook No. 8 (7) — The protein content of soybean flour was 43.11% which is in the range of 43.4 to 47.0% given in Agriculture Handbook No. 8 (7).

Organoleptic Evaluation :

The mean scores for aroma, crust and crumb color, texture, flavor, and over-all acceptability of the bread are presented in Table 2.

It was found that bread made with 20% soybean flour had the highest mean scores for crust color, texture, and over-all acceptability. Bread made with 25% soybean flour had the least mean scores for both aroma, crumb color and flavor. Crumb color became darker with each increase in percentage of soybean flour. It has a characteristic aroma and flavor but not bad. It is interesting to find that both bread made with 20% and 25% soybean flour had the highest mean scores for over-all acceptability and more acceptable than bread made with 0% soybean flour. However, texture and over-all acceptability scores reached their maximum with bread made with 20% soybean flour, then decreased as more soybean flour was added.

In conclusion, supplementing wheat flour with 20% soybean flour produced an acceptable bread in spite of the decrease in score for crumb color with increasing percentage of soybean flour.

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TABLE 2

Mean Scores For Aroma, Crust and Crumb Color, Texture, Flavor, and Overall Acceptability of Egyptian Bread Made With Wheat Flour and Soybean Flour.

Bread	Aroma	Crust color	Crumb color	Texture	Flavor	acceptab Over-all Itity
100% Wheat flour						
0% Soybean flour	5.69	4.80	5.88	4.84	5.42	4.73
95% Wheat flour						
5% Soybean flour	5.92	5.23	5.80	5.19	5.76	5.19
90% Wheat flour						
10% Soybean flour	5.84	5.46	5.61	5.27	5.57	5.57
85% Wheat flour						
15% Soybean flour	5.76	5.80	5.20	5.23	5.42	5.69
80% Wheat flour						
20% Soybean flour	5.61	5.88	5.46	5.53	5.46	5.69
75% Wheat flour						
25% Soybean flour	5.26	5.61	5.34	5.30	5.19	5.73

* Range 1 (very poor) to 7 (Excellent).