

Effect of Wheat Flour Substitution with Soya Protein Product on Quality Properties of
Bread and Cake

Dhilal Mehdi Abdul Kadir

ABSTRACT

Bread is considered the most important food to human beings since the beginning of life and will continue so. It is the master of table for most people, the title of their strength and their security insurance. And although the bread meets an important part of human daily requirements of nutrients, its proteins are characterized by low content of the essential amino acid, lysine. This necessitates the enhancement of bread nutritive value with food protein sources, and since the cost of animal protein sources is high and the problem of food shortage and malnutrition is evident in the world, the studies have given an attention to the enhancement of bread with plant protein sources particularly soy proteins.

From this stand point of view, the present study tended to investigate the effect of wheat flour substitution with 3,6,9,12 and 15% of soy protein product on chemical composition and rheological properties of dough used in making bread and cake as well as considering their quality and sensory properties. The important results demonstrated by this study were as follows:

- 1- Protein and ash contents increased significantly as substitution percentage increased; the increase ranged between 8.20-41.60% and 19.7-102.6% for protein and ash, respectively.

- 2- Fat and carbohydrate contents decreased as substitution percentage increased; the decrease being 1.52-6.57% and 1.32-6.75% for fat and carbohydrate, respectively.
- 3- Wet gluten on 14% moisture basis and dry gluten contents decreased as substitution percentage increased; the decrease ranged between 6.2-30.8% and 6.4-30.0% for wet and dry glutes, respectively.
- 4- Falling number decreased as substitution percentage increased; it amounted to 510 sec. for 0% substitution treatment against 453 sec. for 15% substitution treatment.
- 5- Results of farinograph test have shown that water absorption percentage on 14% moisture basis increased and amounted to 67.3% for 15% substitution treatment against 62.2% for 0% substitution treatment. Arrival time also increased so that it took 4.0 min. for 9,12 and 15% substitution treatments against 1.25 min. for 0% substitution treatment.
- 6- Dough development time increased being 6.5 min. for 9,12 and 15% substitution treatments against 3.5 min. for 0% substitution treatment. However, dough stability time decreased so that it look 11.0 min. for 0% substitution treatment against 7.0 min. for 12 and 15% substitution treatments.
- 7- Degree of dough softening increased and amounted to 70 Brabender units for 9,12 and 15% substitution treatments against 40 B.U. for 0% substitution treatment.
- 8- Total fermentation time of dough reduced as substitution percentage increased; the range of reduction being 5.55-27.77%.
- 9- Laboratory bread volume decreased as substitution percentage increased; the decrease being 2.86-14.29%. Bread leavening also decreased; the decrease ranged between 2.61-13.40%.

- 10- Sensory evaluation of laboratory bread showed that 3,6 and 9% substitution treatments gained the consumer acceptance in the overall sensory properties. Results, however, didn't show any significant difference in crumb color between 0% and 3% substitution treatments.
- 11- Laboratory bread substituted up to 12% remained edible for human consumption when stored at room temperature for 48 hours. However, bread of 15% substitution treatment remained edible for human consumption when stored at the room temperature for 24 hours only.
- 12- Shortened cake volume reduced as substitution percentage increased; the reduction being 1.76-10.21%. Sensory evaluation of cake, however, didn't show any significant difference between the studied treatments in the overall sensory properties.