

**PJN**

ISSN 1680-5194

PAKISTAN JOURNAL OF  
**NUTRITION**

**ANSI***net*

308 Lasani Town, Sargodha Road, Faisalabad - Pakistan  
Mob: +92 300 3008585, Fax: +92 41 8815544  
E-mail: [editorpjn@gmail.com](mailto:editorpjn@gmail.com)

## Nutritional and Sensory Analysis of Soya Bean and Wheat Flour Composite Cake

Rita E. Sanful<sup>1</sup>, Adiza Sadik<sup>2</sup> and Sophia Darko<sup>3</sup>

<sup>1</sup>Department of Hotel, Catering and Institutional Management, Cape Coast Polytechnic,  
P.O. Box AD 50, Cape Coast, Ghana

<sup>2</sup>Department of Hotel, Catering and Institutional Management, Tamale Polytechnic,  
P.O. Box 31, Tamale, Ghana

<sup>3</sup>Department of Hotel, Catering and Institutional Management, Accra Polytechnic,  
P.O. Box 561, Accra, Ghana

**Abstract:** The proximate and sensory analysis of the soya bean and wheat flour composite cake has been performed. This was done to determine the nutritional content and the general acceptability of the composite cake as compared to the pure wheat flour cake. The analysis revealed that the protein and fat content of the cake increased with the addition of the soya bean. Thus the composite cake is more nutritious than the pure wheat flour cake. The sensory analysis also revealed that the cake with 70% wheat flour and 30% soya beans was more acceptable than the pure wheat flour cake. However, cake with more than 30% soya beans was not generally acceptable.

**Key words:** Soya bean, wheat flour, cake

### INTRODUCTION

According to Clerk and Herbert (2000), cake is a form of food that is usually sweet and often baked. Cakes normally combine some kind of flour (normally wheat flour), a sweetening agent (sugar), fats and liquid. In Ghana cakes are normally eaten as a dessert of choice at ceremonial occasions such as weddings, anniversaries and birthdays.

According to Tull (2000) cakes produced from wheat flour alone lack adequate protein needed for growth, repair of tissues and building of cells. In addition, cake made from wheat flour is too expensive for the average person from a developing country to afford. A lot of efforts has been made and still being made to promote the use of composite flours in which flour from locally grown crops and high protein seeds replace a portion of wheat flour for use in bread production, thereby decreasing the demand for imported wheat and producing protein-enriched bread (Giami *et al.*, 2004; Olaoye *et al.*, 2006). Soy-based foods may provide additional benefits for the consumer for example due to their hypolipidemic, anticholesterolemic and counteratherogenic properties and also to their reduced allergenicity (Sipos, 1988). Consequently, soy milk based yoghurts offer a considerable appeal for a growing segment of consumers with certain dietary and health concern. In addition, soy milk yoghurt has several nutritional advantages over cow milk yoghurt such as, reduced levels of cholesterol, of saturated fat and free of lactose. Soya bean, which is possibly the richest natural food in proteins, vitamins and minerals, could therefore be a

good substitute for wheat flour in the preparation of cakes.

In this work, wheat flour-soya bean composite cakes are prepared. Nutritional and sensory analysis are made and the results presented.

### MATERIALS AND METHODS

Soybeans and wheat flour were both purchased from the Kotokuraba market in Cape Coast, Central region of Ghana. They were sent to the laboratory of the Food Research Institute, Council for Scientific and Industrial Research, for processing. The soybeans were processed into flour, using the method of IITA (1990) (Fig. 1). The process ensures effective removal of most anti-nutritional factors.

Six samples were prepared by mixing soybean flour with wheat flour in the proportions indicated in Table 1, using a Kenwood food mixer KN 201, England. The mixing was done to ensure a homogeneous mixture of the samples.

Table 1: Percentage composition of the soyabean flour-wheat flour composite cakes

Sample	Percentages of wheat flour and soya bean flour	
	Wheat flour	Soyabean flour
A	100%	0%
B	90%	10%
C	80%	20%
D	70%	30%
E	60%	40%
F	50%	50%

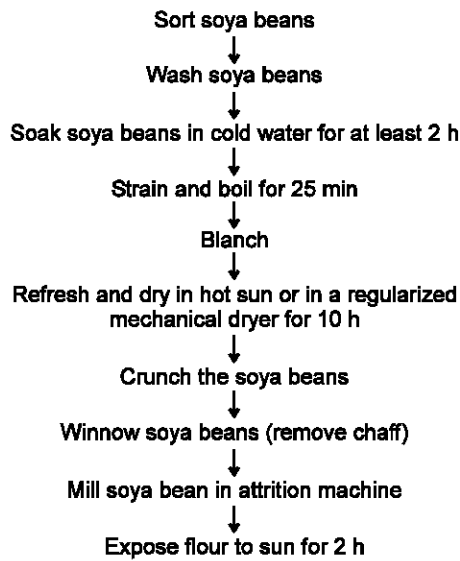


Fig. 1: Flow chart for the preparation of soya bean flour

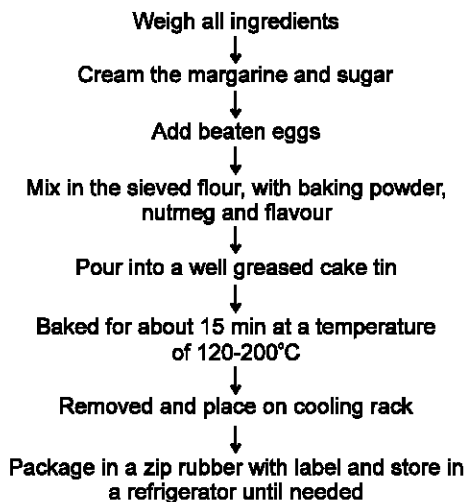


Fig. 2: Flow chart for the preparation of soyabean-wheat flour composite cakes

The flow chart in Fig. 2 demonstrates the method used in the preparation of the soya bean flour and wheat flour composite cakes.

The compositions of fat, moisture, ash, energy, protein and carbohydrate in the composite cakes were determined in the Chemistry Laboratory of the Food Research Institute using the standard AOAC methods.

Sensory analysis was performed on the cakes using a 5-point hedonic scale according to Watts *et al.* (1989) with a scaling range of 1-5 (1 = poor, 2 = fair, 3 = good, 4 = very good and 5 = excellent). A panel of 50 members was used. The Statistical Package for Social Sciences (SPSS) version II for Windows was used to analyze the data of the data of the hedonic test. Samples with significant means were separated using the Least

Significant Difference (LSD) according to Ihekoronye and Ngoddy (1985).

## RESULTS AND DISCUSSION

The results of the proximate analysis of the wheat flour-soya bean flour cake are indicated in Table 2.

It is observed from Table 2 that the moisture content of the cake reduces slightly as the amount of soya bean flour increases. Ash, which is the inorganic residue remaining after an inorganic matter has been burnt, is found to be almost constant for all the samples studied. The substitution of soya bean flour for the wheat flour is also found to increase the fat and the protein content of the cake while the amount of carbohydrate is reduced. The increase in the protein content agrees with the report of other workers (Olaoye *et al.*, 2006) and indicates that generally the substitution of soya bean flour for wheat flour in the production of cake increases the nutritional content of the cake. It is also observed from Table 2 that the values of the parameters investigated, such as fat and protein, peaked with the 30% soyabean cake sample.

Table 3 gives the organoleptic evaluation of the mean scores of the wheat flour-soya bean flour cakes.

The taste of the cake refers to the sweet sensation caused in the mouth by contact with the cake due to the sweetening agent. From the results of the organoleptic evaluation of the mean scores, sample D was ranked with the highest mean of  $4.0400 \pm 0.1369$ . In relation to the response keys of taste, it implies that sample D was ranked very good. The difference between the samples is significant. The results indicate that the taste of sample D is preferred to the other samples.

The colour of the cake expresses the level of sensation the cake produces on the eye by the rays of light due to additional colouring agent such as margarine and eggs. Even though the difference between the mean is insignificant at 1% level, sample D has a little higher mean than the other samples. Thus, the colour of sample D is preferred to the colour of the other samples. The flavour of the cake is the mingled nice sensation of smell and taste the cake produces due to the addition of flavouring substances. From the mean scores of the organoleptic evaluation, sample D ranked with  $4.2800 \pm 0.1247$  as the highest. The differences between the means of the samples are quite significant. It can therefore be concluded that sample D was preferred to the other samples in terms of flavour.

The texture of the cake refers to the smoothness, feel or appearance of the surface of the cake. From the mean scores of the organoleptic table of texture, sample D has the highest. The differences between the means of the samples are significantly different. Therefore, these results indicate that sample D is ranked as the best from the other samples in terms of texture by the panelists.

Table 2: Proximate composition of soyabean flour-wheat flour composite cakes

Sample	Parameters				
	Moisture (%)	Ash (%)	Fat (%)	Protein (%)	Carbohydrate
A	20.7	1.8	16.4	6.8	54.3
B	20.2	1.8	18.2	7.4	50.1
C	19.4	1.9	25.5	8.9	44.3
D	18.3	1.9	26.0	9.3	43.9
E	18.3	1.9	26.2	9.3	43.9
F	18.3	1.9	26.2	9.3	43.9

Table 3: Hedonic sensory mean scores of the soyabean flour-wheat flour composite cakes

Sample	Sensory quality				
	Taste	Colour	Flavour	Texture	General acceptability
A	3.4000±0.1151	3.6800±0.1323	3.7600±0.1231	4.2800±0.1311	4.5000±0.1317
B	3.1200±0.1234	3.4000±0.1400	3.0800±0.1508	3.5600±0.1516	4.0000±0.1340
C	3.2400±0.1231	3.7200±0.1247	3.3600±0.1134	3.7400±0.1334	4.1800±0.1057
D	4.0400±0.1369	4.2400±0.1473	4.2800±0.1247	4.5600±0.1075	4.8400±0.1495
E	3.0400±0.1276	3.0400±0.1713	3.2000±0.1278	3.8800±0.1166	3.6800±0.1441
F	3.3467±0.0584	3.1600±0.2274	3.4400±0.1433	3.8000±0.1457	3.9600±0.1538

The general acceptability expresses how the consumers or panelists accept the product generally. Even though the mean scores of samples A and D are quite close (with that of D being a little higher than that of A), the impression is that consumers are more inclined to accept cake from two-composite flour of 30% soyabean and 70% wheat flour than only wheat flour, since sample D is ranked as the best in terms of all the sensory parameters. The P-value ( $p < 0.05$ ) obtained from the one-way analysis of variance (F-test) indicates that the difference between the means for the samples are insignificant at 1% level. This result agrees quite well with the work of Alabi and Anuonye (2007).

**Conclusion:** The proximate analysis of the wheat flour-soyabean flour cakes indicates that the nutritional content of the cake increases as the amount of soya bean increases. It is also observed that consumers prefer the two-composite cake of 30% soyabean and 70% wheat flour than only wheat flour cake.

**REFERENCES**

Alabi, M.O. and J.C. Anuonye, 2007. Nutritional and sensory attributes of sy-supplemented cereal meals, *Nig. Food J.*, 25: 100-110.  
 Clerk, D. and E. Herbert, 2000. *Food Facts*. 4th Edn., Nelson and Son Ltd., pp: 55.

Ihekoronye, A.O. and P.O. Ngoddy, 1985. *Integrated food science and technology for the tropics*, Macmillan Publishers.  
 IITA, 1990. *Soybeans for good health: How to grow and use soybeans in Nigeria*. IITA Publications, p 23.  
 Giami, S.Y., T. Amasisi and G. Akiyor, 2004. Comparison of bread making properties of composite flour from kernels of roasted and boiled African breadfruit (*Treculia Africana decne*) seeds. *J. Mater. Res.*, 1: 16-25.  
 Olaoye, O.A., A.A. Onilude and O.A. Idowu, 2006. Quality characteristics of bread produced from composite flours of wheat, plantain and soybeans. *Afr. J. Biotechn.*, 5: 1102-1106.  
 Sipos, E.F., 1988. Edible uses of soybean protein. Presented at Soybean Utilisation Alternatives Symposium. Univ. of Minnesota, Feb. 16-18, Minneapolis, MN.  
 Tull, A., 2000. *Food and Nutrition*. 3rd Edn., University Press, pp: 32-40.  
 Watts, B.M., G.L. Yimaki, L.E. Jeffery and L.G. Ekics, 1989. *Basic sensory methods for food evaluation*. International Development Research Centre, Ottawa, Ontario, Canada, pp: 68-79.