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THE INFLUENCE OF MALTED SORGHUM ON THE PRODUCTION AND THE ACCEPTABILITY OF COMPOSITE BREAD

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ABSTRACT

Malted sorghum-wheat composite bread was investigated in this research work. The bread samples produced were subjected to proximate composition and sensory evaluation tests using standard methods with 100% wheat bread as control. The moisture contents for all the bread sample ranged from 18.37% - 20.75%, protein 12.48% - 14.32%, fat 4.20% - 5.80%, fibre, 4.20% - 4.99%, ash, 0.95% - 2.43% and carbohydrate, 55.86% - 58.52% respectively. The sensory evaluation test showed marked preference for wheat bread in term of colour, aroma, taste, texture and overall acceptability by the panellists.

Keywords: Malted sorghum, wheat, composite bread, acceptability

INTRODUCTION

Bread is ready to eat, cheap and convenient food product that is consumed among all age groups in many countries (Hussein, Lating and Pearsoin, 2006). Composite flour is a mixture of different flours from cereals, legumes or root crops that is created to satisfy specific functional characteristics and nutritional composition. Botanically, the cereal seed grains or kernel is covered by fibrous outer layer (brown seed coat) to protect the grains from attack by insects. This protection is quite effective if there are no cracks on the surface (AACC, 2000).

Wheat is not actually a seed but rather a true fruit. The wheat grain has three parts; bran is the outer layer of the kernel and is high in fibre and nutrients (Mohammed, 1995 and Anglani, 1998). The germ is the embryo of the kernel and when sprouted, it reproduces new wheat plants. The endosperm makes up most of the kernel and is the food reserve for the germ. The endosperm is extracted during milling process to make common white flour(AACC,2000)

Sorghum bicolor L.Monech is the fifth important cereal crop after wheat, rice, maize and barley in terms of production (FAO, 2005). The nutritional composition of sorghum indicates that it's the principal sources of energy, protein, carbohydrate, vitamin and minerals including the trace element, particularly iron (Fe) and zin (Zn) except calcium (Ca). Sorghum grain contained minerals such as phosphorus (P), potassium (K) and magnesium (mg) in varying qualities (Sullins, Rooney and Riggs,1995).

Considerable efforts have been focused on the use of composite flour for bread and baked products in many wheat importing countries (Badi, Elfaki and Perten 2001). However, the present work is to investigate the influence of the malted sorghum on the production of acceptable composite bread as well as evaluating the quality characteristics of composite bread produced from different ratios of malted sorghums.

MATERIALS AND METHOD

The sorghum grains (Sorghum bicolorL. Monech) locally called 'Oka baba' were purchased from Sayedero, a local market in Ilaro metropolis, Yewa South local government area of Ogun State, Nigeria. Golden wheat flour was purchased from reputable store also in Ilaro and was transported to the laboratories of Department of Food Technology, Federal Polytechnic, Ilaro.

Preparation of Malted Sorghum

The sorghum grains (2kg) were sorted to remove stones, dirt's and other extraneous materials. The sorted, cleaned grains were thoroughly washed and steeped in water for 12 hours so as to attain a 42-26% moisture level. The hydrated grains were then spread on a jute sac which had been previously sterilized by boiling for 30minutes and the grains were allowed to germinate

(sprout) for 4 days. Non- sprouted grains were discarded and sprouted ones were oven dried at 60°C in a cabinet dryer to moisture of 10-12%. The withered rootless grains were gently brushed off and the malted grains were dry milled, sieved and packaged in air tight container for further analyses.

Composite Flour Blends Formulations

Malted sorghum- wheat composite flour were prepared by blending malted sorghum flour with wheat flour at varying proportions: 100:0, 90:10, 80:20, 70:30, 60:40 (%) respectively. The flour blends were separately packaged in a sealed polyethylene bags and kept in a dry cool place for bread production. Wheat flour (100) was used as control.

Production of Bread

The bread samples were produced using straight dough method as described by Ceserani, Kinton and Foskett (1995) and reported by Onoja, Akubo, Njoku, Atama, Onyishi, Ekeh, Eyo and Ejere (2014). The recipe of the dough's includes 200g of wheat-sorghum flour, 125ml of water, 5g of baker's yeast, 10g of fat, 5g of sugar and 2g of salt. Each was appropriately weighed into a mixing bowl. The content of the bowl was thoroughly mixed for about 155 minute to obtain a smooth consistency, the allowed to ferment (primary proofing) for 2 hours. The fermented dough was then kneaded using a kneading machine with stainless surface for 20 minutes until a fine-silky structure is obtained. Cutting and molding of the dough was carried out, followed by panning. Secondary proofing was allowed to take place for another 2 hours at relative humidity of 80-90%. Baking was carried out at oven temperature of 230°C for 25 minutes. The baked bread was then allowed to cool down, packaged in 0.2mm thick polyethylene bags and stirred at ambientcondition (29±1°C) for subsequent analysis.

RESULT AND DISCUSSION

Table 1: Proximate analysis of malted sorghum-wheat bread

SAMPLES	MOISTURE (%)	PROTEIN (%)	FAT (%)	CRUDE FIBRE (%)	ASH (%)	CHO (%)	ENERGY k(cal)
100:0	[illegible]	11.48±0.24	4.20±1.34	4.99±2.36	2.43±0.94	58.52±4.64	317.82
90:10	19.29±1.88	11.96±0.07	4.34±2.46	4.86±0.36	2.32±0.91	57.25±3.00	315.90
80:20	19.52±1.85	12.60±0.25	4.56±2.09	4.80±2.82	1.32±0.74	57.19±5.59	320.24
70:30	20.36±1.29	13.68±0.14	4.68±1.40	4.78±1.54	1.97±0.74	56.37±3.65	322.34
60:40	20.75±0.89	14.32±0.09	5.80±2.88	4.20±2.82	0.95±0.68	55.86±2.27	332.88

Values represent means of triplicates. Values with the same superscript are notsignificantly different at $p \leq 0.05$.

KEY:100% = Wheat flour; 90:10 = wheat: Malted sorghum flour; 80:20 = wheat: Malted sorghum flour; 70:30 = wheat: Malted sorghum flour; 60:40 = wheat: Malted sorghum flour; CHO = Carbohydrate

Table 2: Sensory evaluation of malted sorghum-wheat bread

SAMPLES	COLOUR	AROMA	TASTE	TEXTURE	OVER. ACC
100:0	7.40	7.70	7.90	6.90	7.80
90:10	6.70	7.20	6.80	6.20	6.40
80:20	6.10	6.50	6.50	6.10	6.40
70:30	5.80	5.70	5.70	5.70	6.00
60:40	5.60	5.10	5.00	5.20	5.80

Values represent means of triplicates. Values with the same superscript are notsignificantly different at $p \leq 0.05$.

KEY:

100% = Wheat flour; 90:10 = wheat: Malted sorghum flour; 80:20 = wheat: Malted sorghum flour; 70:30 = wheat: Malted sorghum flour; 60:40 = wheat: Malted sorghum flour

Table 1, showed the result of the proximate analysis of malted sorghum-wheat bread. The result revealed moisture contents of 18.37%, 19.29%, 19.52%,20.36% and 20.75%for 100% wheat bread,90:10, 80:20, 70:30 and 60:40 malted sorghum-wheat bread respectively. Lowest moisture content was observed in 100% wheat bread while 60.40% malted sorghum-wheat bread had the highest moisture content. Low moisture content generally in foods has a positive effect on the food product (shelf life) whereby highest moisture content

contributes to the promotion of the growth of microorganisms which causes spoilage (Mohammed, 2000).

The protein contents for all the bread samples ranges from 11.48%- 14.32%. This showed an increasing order due to the addition of malted sorghum flour. It could be observed that 100% wheat bread had the lowest amount of protein (11.48%) while bread made from 60:40% malted sorghum wheat had highest protein content of 14.32%.

The fat content in all the fortified bread samples, including the 100% wheat bread showed a similar trend like the protein content. It ranges from 4.20-5.80% for the bread samples. What accounts for this observation is probably due to the fact that samples in which fortified with malted sorghum flour requires more fat (margarine) during kneading operation in order to get dough of smooth consistency in addition to pleasant flavour and acceptable taste for the bread samples.

The ash content ranges from 0.95%-2.43% for the bread samples including the 100% wheat bread. It is observed that bread samples produced from 100% wheat has the highest ash content with 60:40% malted sorghum-wheat having lowest ash content. Wheat as a cereal crops are known to be very rich in minerals such as Ca, P and K, hence as the malted sorghum substitution was increasing in the flour blends, the ash content was decreasing. According to Rooney and Serna-Saldivar, 1991, ash content is an indication of mineral water soluble or acid soluble in the sample.

Crude fibre contents of 4.99%, 4.86%, 4.80%, 4.78% and 4.20% for all the bread samples. It is observed that as the malted sorghum flour substitution increases in the flour blends, there was a corresponding decrease in the crude fibre contents. The carbohydrate contents in the bread samples ranged from 55.86%-58.52% cereal crops generally are known to be rich in carbohydrates. However, the carbohydrate contents decreases as the level of substitution with malted sorghum flour increases.

The result of sensory properties of a bread sample shows in Table 2. It is generally observed that there are differences in all attributes evaluated, 100% wheat bread rated highest in colour, aroma, taste, texture and overall acceptability while 60.40% malted sorghum-wheat bread ratio is the lowest. Closely followed by the 100% wheat bread is 90.10% malted sorghum-wheat bread.

CONCLUSION

The nutritional contents of composite bread produced in this research work is richer than wheat bread in terms of the indices evaluated, i.e, moisture, protein, fat, ash, fibre, and carbohydrate contents. The incorporation of malted sorghum will no doubt help to reduce over dependence on wheat flour for bread production. However, panellists showed marked preference for wheat bread in colour, aroma taste, texture and overall acceptability indicating that consumers still have affinity for 100% wheat bread.

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