

Production and Sensory Evaluation of Biscuits Using the Composite Flours of African Yam Bean and Wheat Flour

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Abstract: *Biscuits were produced from blends of African yam bean flour and wheat flour. The African yam bean was sorted, soaked, dehulled, dried, milled and sieved into fine flour and used at various ratios (proportions). The sensory evaluation was carried out by ten (10) panelists using the sensory attributes such as taste, colour, aroma and general acceptability on a nine (9) point Hedonic scale. The sample coded 202 which contained wheat and African yam bean flour 90:10 was preferred very much because of taste, colour and aroma.*

Keywords: *biscuits, African yam bean flour, wheat flour and sensory evaluation*

I. Introduction

Biscuits may be regarded as a form of confectionery dried to a very low moisture content. According to Fayemi (1981), biscuit is defined as a small thin crisp cake made from unleavened dough. Okaka (1997) described the production of biscuits as a mixture of flour and water but may contain fat, sugar and other ingredients mixed together into dough which is rested for a period and then passed between rollers to make a sheet. Biscuits may be classified either by the degree of enrichment and processing or by the method adopted in shaping them. Based on the enrichment criterion, biscuits may be produced from hand dough, soft dough or from batters (Fayemi, 1981).

The nutritional content however varies with the type of flour used. Soft wheat flour is the suitable flour for biscuit making. This is due to its content of gliadin (a prolamin) and glutamine (glutelin) which undergoes hydration in the presence of water, salt and sugar. This protein forms a visco-elastic matrix known as gluten, being responsible for the rising nature of dough or permits substantial increase in the volume of baked product of dough and its gas retention capability (Okaka, 1997).

Nigeria being one of the tropical countries cannot grow the wheat in commercial quantity due to the country's climatic condition. Only three percent of the country's total consumption of this grain can be produced locally, therefore the industry can only survive by utilization of the availability of local grain which can either partially or completely substitute wheat in the product without adversely affecting the quality of such product (Kent, 1984). Wheat production in Nigeria is limited due to climatic conditions and wheat is imported to meet local flour needs for baking. As a result of this, huge amount of foreign exchange is spent annually for wheat importation (Wilson, 1987). Efforts have been made to promote the use of composite flour in which locally grown crops with high protein values replace a portion of wheat flour thereby decreasing the demand for imported wheat (Giami et al., 2004). African yam bean (*Sphenostylis stenocarpa*) is an underutilized grain legume in Nigeria. This legume has been reported to be of importance in the management of chronic diseases like diabetes, hypertension and cardio-vascular disease because of high dietary fiber content (Enwere, 1998). It is eaten roasted, as groundnut or boiled and blended with ingredients like oil, pepper and salt. It is consumed in different forms such as snacks, delicacy, main meal etc. It can be used for the fortification of other foods.

II. Materials and Methods

The African yam bean, wheat and all other ingredients such as baking powder, egg, milk, fat, sugar and flavours were purchased from Ose market in Onitsha North Local Government Area of Anambra State, Nigeria.

The African yam bean seeds were sorted, soaked in cold water for 12hr to loosen the seed coats. The seeds were rasped between palms and the loosened taste was removed by floating in water. The dehulled seeds were sundried and ground into fine flour and sieved using a sieve size of 0.4mm.

Formulation of composite flour

The wheat flour and the African yam bean flour were blended in the ratios of 100:0, 90:10; 80:20; 70:30; 60:40 and 50:50. The blends were thoroughly mixed using a mixer. The composite flour obtained were then stored separately in tightly covered containers under dry conditions for later use.

Biscuit production

The ingredients used includes margarine, sugar, eggs, milk powder, baking powder, vanilla flavour, nutmeg, milk flavour and composite flour.

The margarine and the sugar were mixed in a bowl and creamed until the mixture becomes light and fluffy. One whole egg and milk powder were added to the cream while mixing , after 20 minutes of mixing , composite flour, baking powder, salt and nutmeg were slowly introduced into the mixture and the dough obtained was rolled on a flat rolling board, sprinkled with flour to a uniform thickness using wooden rolling pin. Biscuit cutter was used to cut the dough into fine shapes which were places on well greased baking trays. It was baked in an oven at 150⁰C for 20 minutes until they are pale brown in colour.

III. Sensory evaluation

The samples were evaluated by 10 semi-trained panelists randomly selected from the students of Federal Polytechnic Oko, Anambra State, Nigeria. Quality attributes such as aroma, taste, colour and general acceptability of the products were scored on a 9 (nine) Hedonic scale. The panelists were instructed to rinse their mouth with water after every sample and not to make comment during evaluation to prevent influencing other panelist. The raw scores were assembled and statistically analyzed.

IV. Results and discussion

The sensory evaluation scores of biscuit produced from different blends of wheat flour and African yam bean flour.

Table 1: Mean scores of the biscuit samples

Samples	aroma	taste	colour	general acceptability
201	5.9 ±1.60	7.6 ±0.70	7.7±0.82	7.1±1.60
202	8.4 ±0.84	8.9±0.32	8.6± 0.70	9.0±0.00
203	6.7 ±1.10	7.4±1.08	7.4± 1.00	7.7± 1.00
204	5.4 ±2.01	5.1±1.52	6.6 ± 1.27	6.3±1.25
205	5.4 ±1.43	5.6 ±2.01	6.8± 0.92	6.6±1.17
206	6.3 ±1.34	6.4±1.58	5.9± 0.74	6.9±1.88

Sample 201= 100% wheat: 0% AYB; sample 202= 90% wheat: 10% AYB

Sample 203= 80% wheat : 20% AYB; sample 204= 70% wheat: 30% AYB

Sample 205= 60% wheat: 40% AYB; sample 206= 50% wheat : 50% AYB

V. Discussion

The result shows that in aroma, sample with the code 202(90% wheat and 10% AYB) was preferred. The sample was rated the best by the panelist in terms of taste and aroma this may be attributed to the ratio of the wheat and the African yam bean flours.

VI. Conclusion

The result showed that the use of wheat flour and African yam bean flour can be used to produce biscuit. Its positive result was that the biscuit produced had firmer and fine texture with more translucent appearance.

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