

Proximate Composition of Biscuits Produced from Wheat Flour and Maize Bran Composite Flour Fortified with Carrot Extract

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Abstract

The formulated Biscuit produce in which maize bran was incorporated into wheat flour and carrot extract in the ratios 90:10, 80:20, 70:30, 60:40, 50:50 and 100% wheat as control. Carrot puree was used to fortify the formulation. The butter and sugar mixture was thorough after which wheat flour and maize bran mixed with baking powder and milk powder were rubbed in uniformly. The dough formed was shaped and baked on a greased tray at 160°C for 10 to 15 minutes. The biscuit produced was analyzed for proximate composition using standard method. The carbohydrate ranged from 62.5-48.4%, protein 23.1-8.81%, fat 21.4-19.1%, ash 1.42-0.5%, crude fiber 1.15-0.84% and moisture 6.10-5.45% the fortification of biscuit with carrot puree and maize bran improved the nutritional composition of the product.

Keywords: Wheat; Maize bran; Carrot puree; Proximate composition; Quality

Introduction

Biscuits are ready-to-eat cheap and covenant food product that is consumed among all age groups in many countries [1,2]. Biscuit belong to the flour confect many.

It is flat crisp and may be sweetened or unsweetened according to preferences. Biscuits can be made from hard dough, hard sweet dough or short or soft dough. It is produced by mixing various ingredients like wheat flour, fat sweetener and water to form dough. The dough formed unlike bread is not allowed to ferment, and then it is baked in the oven [3].

Biscuit is regarded as a form of confectionery dried to very low mixture content. According to Feyemi [4], biscuit is defined as a small thin crisp cake made from unleavened dough. Okaka describe 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 are ready to eat, cheap and convenient food product that is consumed among all age groups in many countries [1,2].

Biscuits are classified into three broad groups as spongy goods, crackers and sweet dough; based on the method used for their manufacture. Biscuits are divided into two groups, as hard and soft dough. The soft dough biscuits are rich in fat and sugar and include short cakes, short bread and melted biscuits. The dough includes Marias and morning coffee. Other types of biscuits are cream cracker, soda crackers, savory, water biscuits, digestive and short dough biscuits [5].

In many parts of Sub-sahara Africa and most especially Nigeria advancing prosperity and urbanization coupled with tremendous increase in population in recent years have led to an increase in the consumption of wheat based products especially biscuits and bread [6].

All biscuits are nutritious, contributing valuable quantities of iron, calcium, calories, fiber and some of the b-vitamin to our diet and daily food requirement. Composite flour has the added advantages of improving the nutrient value of biscuits and other bakery products especially when cereals are blended with legumes e.g. Bambara groundnut [7]. The use of plain wheat flour is common today and other

ingredient like groundnut; ground rice and corn flour are sometimes added to alter the texture [8] (Table 1).

Biscuits were enriched with carrot extract because it contains high beta carotene which has lot of health benefits. Maize bran is also added as composite due to the high fiber content of maize bran, which is good for diabetic and obsessed patient.

Carrot *Daucus carota* is a root vegetable, using orange, purple, red, white or yellow in colour with a crisp texture when fresh. It is a rich source of beta-carotene and contains other vitamin like thiamin, riboflavin vitamin B-Complex and mineral.

Virtually all the wheat used for baking in confectionery industries, especially biscuits is imported therefore campaign on the use of composite flour is being advocated. It is hoped that these indigenous crops will be revived and used as substitutes for imported one. Biscuits are high in sugar (sucrose), low fiber and high calorie, low protein which are not good for aged, diabetic and obsessed patients. It is on this view that this study was carried out to develop enriching biscuits. With protein, fiber, vitamins to make the biscuit suitable for people of all age group [1].

Materials and Methods

Procurement

The raw materials that were used for this study include white variety of maize (*Zea maize*), wheat flour and carrot which were purchased from the central market in Anyigba, Kogi State. The raw material was selected with absolute care to ensure wholesomeness, freedom from disease and defects.

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Parameters	Samples					
	100:00:00	90:10:00	80:20:00	70:30	60:40:00	50:50:00
Moisture (%)	5.80 ± 0.00 ^{ab}	6.10 ± 0.14 ^a	6.05 ± 0.07 ^a	5.50 ± 0.14 ^{bc}	6.05 ± 0.21 ^a	5.45 ± 0.07 ^c
Ash (%)	0.52 ± 0.03 ^e	0.97 ± 0.03 ^d	1.05 ± 0.00 ^c	1.42 ± 0.03 ^a	1.00 ± 0.00 ^{cd}	1.12 ± 0.07 ^b
Crude Fiber (%)	0.84 ± 0.05 ^e	0.92 ± 0.02 ^d	1.00 ± 0.00 ^c	1.15 ± 0.01 ^a	0.97 ± 0.01 ^{cd}	1.08 ± 0.02 ^a
Crude Protein (%)	8.81 ± 0.21 ^e	10.0 ± 0.33 ^d	11.7 ± 0.72 ^c	23.1 ± 0.18 ^a	17.3 ± 0.24 ^b	12.7 ± 0.60 ^e
Carbohydrate (%)	62.5 ± 0.05 ^a	61.2 ± 0.44 ^b	60.07 ± 0.21 ^f	48.4 ± 0.21 ^f	55.5 ± 0.02 ^c	58.1 ± 0.32 ^d
Crude fat (%)	21.4 ± 0.07 ^a	20.6 ± 0.0 ^d	20.2 ± 0.00 ^d	20.2 ± 0.05 ^d	19.1 ± 0.07 ^e	21.2 ± 0.00 ^c

Values are means ± standard deviations of triplicate determinations. Values on the same row having the same superscript letters are not significantly different (P>0.05) Sample Code: Wheat flour: Maize bran — 100:0; 90:10; 80:20; 70:30

Table 1: Proximate Composition of fortified biscuit samples.

Production of maize bran

The maize bran was cleaned by hand washing and sorting to remove sands and other foreign materials. The cleaned grain was soaked in water to soften the kernel for wet milling. Water was added to the milled slurry and then filtered using a sieve. The cake remaining on the sieve (i.e. the maize bran) was spread on a tray and dried. The dried bran was milled to obtain the maize bran flour.

Production of carrot extract

The carrot sticks were cleaned to remove dirt's. After which the back was peeled off using a sharp knife. The cleaned carrot was diced into small pieces and blend using a blender. Little water was added to it then filtered to obtain the carrot extract

Preparation of biscuit

Biscuit were produced according to the formulation of FIRRO. The butter and sugar were thoroughly mixed in a bowl after which wheat flour and maize bran mixed with baking powder and milk powder were rubbed in until uniform; water was then added to form dough. The dough was shaped using the head of coca-cola cover and baked on a greased tray at 160°C for 10-15 mintues.

Result and Discussion

Proximate composition

The differences in the proximate composition parameters of the biscuit samples did not follow any trend and could therefore, only be attributed to the addition effect of maize bran and carrot puree effect on the wheat flour.

The moisture content of the biscuit sample ranges from 6.10-5.454%, with the biscuit made from 50% maize bran having the least moisture content due to the high fiber content because the higher the fiber the lower the water retaining capacity of the flour, and it shows that it has a longer shelf life.

The protein content of the biscuit sample ranges from 23.1 to 9.81%, the protein content of the biscuit made from composite flour is higher than that of 100% wheat due to fortification of the composite flour. The sample showed that there is a significant difference (p>0.05) between sample with 50:50 and the other samples.

The ash content of the biscuit sample ranged from 1.42 to 0.52% with the sample 70:30 having the highest ash content. The high ash content of the biscuit shows that the sample had presence of minerals.

The crude fiber content of the biscuit ranged from 1.15 to 0.84% with sample 70:30 having the highest value. This result shows that maize bran is high in fiber.

The fat content of the biscuit ranged from 21.45 to 19.15% with 100% wheat flour having the highest fat content and sample 60:40 having the lowest. All the samples showed significant difference (p>0.05) among each other.

The carbohydrate content f the biscuit sample ranged from 62.5 to 48.4% sample 70:30 had the least carbohydrate content because that it is high in protein and sample with 100% wheat had the highest carbohydrate due to the absence of maize bran. There was significant difference (p>0.05) between the biscuit samples.

Conclusion

This work has shown that incorporation of maize bran and carrot extract into wheat flour up to 50% in biscuit production is possible without appreciable change in colour, flavour and texture. The incorporation enhanced consumer's acceptance of the product and increased its nutritional content.

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