



P-ISSN: 2349-8528

E-ISSN: 2321-4902

www.chemijournal.com

IJCS 2020; 8(3): 1587-1589

© 2020 IJCS

Received: 27-03-2020

Accepted: 29-04-2020

Pallavi Kumari

Department of Food and Nutrition (Community Science),
Dr. RPCAU, Pusa, Samastipur,
Bihar, India

Usha Singh

Department of Food and Nutrition (Community Science),
Dr. RPCAU, Pusa, Samastipur,
Bihar, India

Gitanjali

Department of Food and Nutrition (Community Science),
Dr. RPCAU, Pusa, Samastipur,
Bihar, India

Organoleptic, physico-chemical and nutritional evaluation of salty biscuit supplemented with quality protein maize flour

Pallavi Kumari, Usha Singh and Gitanjali

DOI: <https://doi.org/10.22271/chemi.2020.v8.i3v.9420>

Abstract

Bakery products are popular in all over world and the production has risen by many folds due to their low cost, varied taste and textured profiles with attractive package and longer shelf-life to suit easy marketing. For evaluating the organoleptic, physico-chemical and nutritional properties, salty biscuit was developed from QPM in combination with other ingredients used in bakery. The appearance was observed to be 8.80 ± 0.48 whereas it was 8.76 ± 0.43 for colour, 8.70 ± 0.53 for flavour, 8.80 ± 0.48 for taste and 8.76 ± 0.43 for texture. The overall acceptability of the salty biscuit was near to excellent i.e. 8.80 ± 0.40 . For ascertaining physico-chemical quality, weight, volume and density of baked salty biscuit was determined. Acceptability testing of the product was determined by the score given for sensory characteristics such as appearance, colour, flavour, taste, texture and overall acceptability. The weight, volume and density of QPM salty biscuit was found to be 14.05 ± 0.78 g, 10.00 cc and 1.75 ± 0.09 g/cc. For evaluating nutritional quality of salty biscuit data on proximate composition was recorded. The moisture content of salty biscuit was 1.95 ± 0.02 per cent and ash content was 1.37 ± 0.01 per cent. The fat content of product was 5.18 ± 0.02 per cent. The percentage of fibre, protein and carbohydrate was 0.92 ± 0.02 , 2.29 ± 0.07 and 88.19 ± 0.07 respectively. The Calcium and iron content were 4.00 ± 1.00 and 0.98 ± 0.05 mg per 100 g. The sugar and starch content of salty biscuit were 2.71 ± 0.02 and 61.81 ± 0.54 per cent.

Keywords: Bakery products, Bun, Salty biscuit, QPM, Physico-chemical properties.

Introduction

The demand for processed food is increasing rapidly with increasing urbanization and for fulfilling consumer's demand, a number of processed products are being developing day by day. Food habits and dietary habits of population in different regions of the world have been determined mainly by the availability of local foods and their local practices. Man has evolved his habitual dietary pattern to maintain good health, perhaps after a good deal of trial and error. Nutrition science by its remarkable achievement has created an awareness of the importance of food to the well-being of people. Today more people can be satisfactorily nourished and enjoy healthful living. The nutritional well-being and health of all people are vital prerequisites for the development of societies. A wide variety of food grains are produced in India due to its different agro-climatic condition. Cereal grains are the main staple food like wheat, rice and a number of coarse grains which are now termed as nutriceals like Maize, Sorghum, Bajra, Ragi, Barley etc. Wheat is one of the popular cereals that supply the basic nutritional and energy requirements of the population and is widely used for product development in various industries including bakery industry. However the protein quality of wheat is poor. Lysine is the first limiting essential amino acid in wheat flour; threonine and tryptophan are also in lower amounts. The quality of a product with a big portion of wheat constituents can be improved by supplementation with suitable proteinaceous nutriceal such as Quality Protein Maize (QPM). The use of QPM in the diet improves overall protein quality of cereal rich in essential amino acid lysine and tryptophan. With rapid growth and changing eating habits of people, bakery products have gained popularity among masses consumption in view of its low price and high nutrient value. The bakery industry has achieved third position in generating revenue among the processed food sector. With increasing urbanisation, the demand of processed foods, bakery products particularly biscuits command wide popularity in rural areas

Corresponding Author:

Pallavi Kumari

Department of Food and Nutrition (Community Science),
Dr. RPCAU, Pusa, Samastipur,
Bihar, India

As well as urban areas among all age groups (Agarwal, 1990). This is due to longer shelf-life, prepared in local bakeries, easy marketing, low cost, varied taste and texture. Encouraging trends in consumption of bakery products by population of lower and middle income groups indicate vast scope for consideration of nutritional enrichment of bakery products. In developing countries, proper nutrition to the preschool children is of paramount importance to overcome the severe effect of protein malnutrition and they must be provided with nutritious supplementary foods at low cost. Accordingly, considerable interest has developed in protein rich biscuits which are convenient, inexpensive and ready-to-eat. Considering all these points in mind including the cost of the product, it was decided to develop and evaluate the value added bakery products from QPM by using improved processing methods.

Materials and methods

Procurement and Processing of raw materials

QPM grains were procured in one lot from the farmer of Bhagwatpur village of Samastipur district who has cultivating the grains under close supervision of maize scientists of Dr. RPCAU, Pusa. Other food ingredients such as refined flour, refined oil, vanaspati, sugar, salt, milk powder, yeast, baking powder, vanilla powder etc. were procured from local market in one lot. The QPM grains had undergone different processing operations such as cleaning, washing, then the QPM grains were soaked for 5 minutes in double amount of 1% lime water by weight and then heat treatment was given for 30 minutes at 85°C and left overnight. Next day, the grains were washed for 4 times very carefully so that lime and bran of grains would be removed. Grains were then dried in sunlight by spreading them on a clean cloth after that grinding, sieving and packaging were done.

Development of Salt Biscuit from Quality Protein Maize

At first refined flour and QPM flour were mixed properly by continuous sieving in required amount. The ingredients like refined oil, vanaspati, salt, sugar powder, baking powder, vanilla powder, saltu, milk powder and water were kept together in a utensil and mixed properly with the help of palm till the ingredients become light. Now the value added flour was added to it and smooth dough was made into ball and flattened with the help of roller. The rolled dough was cut into desired shapes by using biscuit shapener and baked at 160° C for 15 minutes.

Determination of acceptability of value added bakery products from QPM

Sensory Evaluation

Sensory or organoleptic quality or evaluation is a combination of different senses of perception which come into play for choosing and eating a food. Therefore, the sensory qualities were evaluated by the panel of judges selected for ensuring acceptability of products. Acceptability testing of salty biscuit was determined by the score given for sensory characteristics such as appearance, colour, flavour, taste, texture and overall acceptability. Salty biscuit was developed from refined flour and QPM flour and in different proportion such as 90:10, 80:20, 70:30, 60:40 and 50:50. After the laboratory trials for the acceptability of the developed product, field testing was conducted to assess their market potential. When the product developed from these combination were evaluated organoleptically. The score for overall acceptability ranged between 8.00-9.00 out of 9 points of hedonic rating scale.

Determination of physic-chemical parameters

Weight, volume and density of baked products were determined. Weight of products were measured with the help of precision balance. Volume determined by displacement method by using kerosene oil. After calculating weight and volume of developed products, density was obtained by using the following formula;

$$\text{Density (g/ml)} = \frac{m}{0.8 \times V}$$

Determination of nutritional composition

Moisture content was determined by Hot Air Oven method of AOAC (1975). The ash, fat and crude fibre content were analysed by using the standard procedure and techniques followed by AOAC (1975). The crude protein content was analysed by micro-kjeldhal method (NIN, 1983). Total carbohydrate was obtained by subtracting the sum of moisture, ash, fat, crude fibre and crude protein from 100. Sugar and starch content were estimated by the method of Mahadevan and Sridhar (1986) using anthrone reagent (10-keto, 9, 10- dihydroanthracene). The calcium content was determined by Titrimetric method and the iron content was determined by Wong's method.

Statistical analysis

The nutritional analysis were statistically analysed for mean and standard deviation.

Results and discussions

The product developed from refined flour and maize flour in the ratio of 70:30 was found most acceptable. The data obtained from organoleptic evaluation of QPM salty biscuit has been presented in Table 1. The appearance was observed to be 8.80 ± 0.48 whereas it was 8.76 ± 0.43 for colour, 8.70 ± 0.53 for flavour, 8.80 ± 0.48 for taste and 8.76 ± 0.43 for texture. The overall acceptability of the salty biscuit was near to excellent i.e. 8.80 ± 0.40 . Obviously, the product will get good space in Indian diet if it is made available to the people. Quality assessment of salty biscuit was also carried out by analyzing physic-chemical qualities. Physico-chemical quality of value added salty biscuit was assessed were weight, volume and density. The data obtained has been presented in Table 2. The weight of value added salty biscuit was found to be 14.05 ± 0.78 g, volume of the product was 10.00 cc and the density was 1.75 ± 0.09 g/cc. Proximate composition, mineral content as well as sugar and starch content of value added salty biscuit was assessed to ascertain the nutritional quality of salty biscuit. It was found that salty biscuit contains 1.95 ± 0.02 per cent moisture. The ash content which determines the total minerals composition of the product was observed to be 1.37 ± 0.01 per cent whereas that of fibre 0.92 ± 0.02 . The protein contain of value added salty biscuits was observed to be 2.29 ± 0.07 per cent and the percentage of total carbohydrate was 88.19 ± 0.07 (Table 3). It was revealed that value added salty biscuit provides 4.00 ± 1.00 mg calcium and 0.98 ± 0.05 mg of iron per 100 g of the product (Table 4). Sugar content of salty biscuits was 2.71 ± 0.02 per cent whereas the starch content was 61.81 ± 0.54 per cent (Table 5).

Unit cost of the product

The unit cost of QPM sweet biscuit was calculated by the total expenditure on material and operational cost which involved 15% of total cost. The unit cost of the product was

calculated as per 100g and found to be Rs 8 which was cheap as compared to the market price. So the baked products can be used in various nutritional programmes to improve the nutritional status.

Table 1: Organoleptic quality of value added salty biscuit

Sensory characteristics	Score
Appearance	8.80 ± 0.48
Colour	8.76 ± 0.43
Flavour	8.70 ± 0.53
Taste	8.80 ± 0.48
Texture	8.76 ± 0.43
Overall acceptability	8.80 ± 0.40

Mean ± S.D.

Table 2: Physico-chemical quality of value added salty biscuit

Parameters	Observations
Weight (g)	14.05 ± 0.78
Volume (cc)	10.00
Density (g/cc)	1.75 ± 0.09

Mean ± S.D.

Table 3: Proximate composition of value added salty biscuit

Parameters	g/100g
Moisture	1.95 ± 0.02
Ash	1.37 ± 0.01
Fat	5.18 ± 0.02
Fibre	0.92 ± 0.02
Protein	2.29 ± 0.07
Total carbohydrate	88.19 ± 0.07

Mean ± S.D.

Table 4: Calcium and iron content of value added salty biscuit

Parameters	mg/100g
Calcium	4.00 ± 1.00
Iron	0.98 ± 0.05

Mean ± S.D.

Table 5: Sugar and starch content of value added salty biscuit

Parameters	g/100g
Sugar	2.71 ± 0.02
Starch	61.81 ± 0.54

Mean ± S.D.

References

1. AOAC. *Official Methods of Analysis of the Association of Official Analytical Chemists*. 12th Ed. Washington D.C, 1975.
2. Agarwal SR. Prospects for small scale biscuit industry in the nineties. *Indian Food Ind.* 1990; 9(3):19-21.
3. Hooda S, Jood S. Organoleptic and nutritional evaluation of wheat biscuits supplemented with untreated and treated fenugreek flour. *Food Chem.* 2005; 90:427-435.
4. Jhonson ML, Curl T. *Standard method of biochemical analysis*, Kalyani Publishers, New Delhi, 1973, 62-65.
5. Mahadevan, Sridhar R. *Methods in physiological pathology*. Shirakami publication, Madras. 1986, 146-147.
6. Maize Production Technologies, march Directorate of Maize Research (ICAR), 2011.
7. Manay NS, Sadaksharswami M. Food facts and principles. New Age International (p) Limited, New Delhi, 1995, 246.

8. Mepba HD, Eboh L, Nwaojigwa SU. Chemical composition, functional and baking properties of wheat-plantain composite flours. *AJFAND.* 2007; 7:1-22.
9. National Institute of Nutrition. *A manual of Laboratory Techniques*. Indian Council of Medical Research, Hyderabad, 1983, 20.
10. Patel MM, Rao VG. Influence of untreated, heat treated and germinated black gram flours on biscuit making quality of wheat flour. *J Food Sci. Technol.* 1996; 33(1):53-56.
11. Patel MM. Studies on the effect of blackgram (*Phaseolus mungo*) on rheological and baking characteristics of wheat flour. Ph. D. Thesis, University of Mysore. Mysore, India, 1992.
12. Shankaran G. Role of moisture, temperature and humidity during storage of Food grains. Third international Food convention. 20-23 October 2000. (ed. Gopal., G., Seth, p. and Rathore, J.s.). Central Food Technology Research Institute. Mysore, 2000, 11-16.
13. Singh AP, Bhattacharya M. Development of dynamic modulus and cell opening of dough during baking. *Journal of Texture Studies.* 2005; 36:44-56.