

PROTEIN RICH MUSHROOM BREAD

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Abstract: In the modern era with fast life style bread has become essential food in the everyday diet.. Initial market survey was conducted from the selected area of the Mumbai city to understand the consumption pattern for the bread. Breads are prepared from refined wheat flour which has lower nutrient importance. However, variety of quality bread is marketed with addition of different ingredients to make bread nutritious. An attempt is made to improvise the nutrient qualities of bread. Few ingredients are modified and new protein rich mushroom bread was prepared. Newly prepared bread was analysed for the physical parameters like moisture, texture, taste and color. The microbiological status of the bread was investigated and interpreted in terms of shelf life. An optimum technical condition is recommended to synthesize the protein rich mushroom bread with improved the protein and certain mineral content.

Keyword: Protein rich , bread nutritious , physical parameters , mushroom Bread.

INTRODUCTION

Bread is regarded as a staple food in many western countries. It was considered as a supplementary food product in the Indian diet. Bread may be served in different forms at any meal of the day, eaten as a snack, and is even used as an ingredient in other culinary preparations. Bread is prepared by baking dough with different ingredients and water. It is popular around the world and is one of the world's oldest foods. The virtually infinite combinations of different flours¹, and differing proportions of ingredients, has resulted in the wide variety of types, shapes, sizes, and textures available around the world. As a basic food worldwide, bread has come to take on significance beyond mere nutrition. Nutritionist and other food authorities have recognized the nutritional importance of bread and hence are always in search of ways and means of its fortification which can make a complete wholesome food. A wide variety of additives may be used, from fruits and nuts to various fats, to chemical additives designed to improve flavor, texture, color, and shelf life².

The present study was conducted to assess the incorporation of mushroom in bread for enhancing its nutritive value. The objectives of the present study were:

- To incorporate mushrooms in bread
- To develop protein rich mushroom bread
- To carry out chemical analysis viz. moisture, ash and protein value of bread.
- To study the shelf life of bread by chemical and microbiological tests.

MATERIALS AND METHODOLOGY

Bread making: Dough was prepared by mixing Soya flour, water, yeast, salt, fat, and 25g of extra pure mushroom powder³. Other common minor ingredients emulsifiers and enzymes are mechanically mixed for about three minutes. *Saccharomyces cerevisiae*⁴ is used for leavening the bread. Following proportion was used to make

the bread. Dough was baked in oven maintain at 180°C for 20 minutes. 50g Soya flour + 50g wheat flour + 65mL of water + 1g Salt + 15g vegetable oil + 25g mushroom powder + 1g yeast

Chemical and nutrient analysis: A loaf with light brown color was weighed and used for the physical and chemical analysis and microbial inspection.. Various parameters like moisture, ash, acidity, salt, minerals and protein were determined for newly synthesized bread using official method reported in the literature⁵. Moisture was determined by Karl Fischer's method while total ash was determined by isothermal heating experiment. Total salt was determined by titrating water extract using Mohr's method. Total acidity was determined by acid-base titration. A Kjeldahl's method was used to determine total nitrogen in the form of protein. Selected minerals like Ca, Mg, Na, K, P composition were investigated either by complexometric titration or by flame photometry method. P was determined by colourimetry.

Microbiological analysis: The bread was examined for microorganism using total plate count by pour plate technique and by serial dilution method.

Sensory evaluation: The product was finally examined by composite scoring test and Hedonic test. The results of all the experiments are tabulated and discussed in the light of scientific and logical manner.

RESULTS AND DISCUSSION

Bread making was introduced into Britain by the Romans. The survey reveals that different brands of breads are available in the market and it is one of the most versatile, economical food consumed within our diet. The criteria for the selection of particular brand of breads depends on nutrient in bread and the cost involved. The study indicates that particular brand of bread is not available may be due to low market demand. However, frequency of consumption

indicates that consumers are not aware of nutritional advantages of the bread and its consumption is strongly related to the cost factor. Most of the families use bread as staple food and consume bread as a need in their diet.

Bread is a common bakery product made from refined wheat flour and has been consumed as staple food. Other bakery products like cake, pastries and biscuits contain many nutrients and minerals Bread serves as an excellent source of carbohydrate and proteins. Few fortified quality breads are the rich source of minerals like calcium and phosphorous⁶ Protein 13.23%, Fat 4.39%, Water 30.17%, Mineral matter 4.31%

The main aim of the study was to incorporate mushroom as unconventional source of nutrient in bread⁷. The experimental results on various chemical and nutritional characteristics of newly prepared breads are tabulated in table 1.

Table 1 Composition of newly prepared mushroom bread

Nutritional value per 100 g			
Energy	392 kcal	% Total ash	4.35
Sugars	0	Calcium	870 mg (8%)
Fat	9.84 g	Magnesium	58 mg (2%)
Protein	23.7 g	Phosphorus	610 mg (23%)
Vitamin A	49 µg	Potassium	529 mg (2%)
β-carotene	15 µg	Sodium	645 mg (24%)
% Water	30.54	Zinc	0.40 mg (4%)

The proportion of water to flour is the most important measurement in a bread recipe, as it affects texture and crumb the most. Hard US wheat flours absorb about 62% water, while softer wheat flours absorb about 56%. Common table breads made from these doughs result in a finely textured, light bread. Most artisan bread formulas contain anywhere from 60 to 75% water. The moisture was averaged at 30.54% which is within the recommended value for the bread. The results showed that there was marked decrease in the moisture content of bread during storage. This decrease can be probably due to climatic conditions enhancing the process of evaporation of moisture from the surface of the bread. Also the packaging material can attribute to loss of moisture to some extent.

The ash content of bread is usually in the range 1.41% to 2.46%⁵ Newly prepared bread shows 4.35% of total ash value. The increased in the ash value may be attributed to the addition of mushroom powder in bread.

Protein content of the product was found to be 23.7%. There was increase in protein content by 12% as compared with the normal formulation of bread. Most beans contain large amounts of protein. Soya protein has balanced of all eight essential amino acids in abundance which makes soya a very useful nutrient for those who wish to obtain more of their protein from non-meat sources. Soya flour is suitable for high quality bread (11.5% - 13.5% protein)⁷.

Similarly, food energy value amounts to 392Kcal as indicated by the Bomb calorimeter experiment. Gas chromatographic analysis for vitamin A and b-carotene suggest 49mg and 15mg. These vitamins are generally absent in the normal bread.

The total ash from the bread was analyzed for

Calcium, Magnesium, Phosphorus, Sodium, Potassium and Zinc content using volumetric, spectrophotometric and flame photometric method⁵. The values of these minerals indicate that newly prepared bread is rich in its mineral content. These minerals have beneficial effect on health. Higher values of all the above characteristics suggest that bread is highly nutritious and should be consumed to correct few selected health disorder.

However, in order to investigate general acceptability of the newly formulated bread sensory evaluation was carried with respect organoleptic parameters. Sensory evaluation is the study of the food product with respect to color, flavor, texture and taste of the product. Generally organoleptic characteristics of food are tested for three days. However, only two days results are shown in the table 2, because 3rd days result showed uncountable growth of mold as indicated by the selection panel after threshold test.

Table 2 Mean organoleptic evaluation of bread (N = 10)

No.	Characteristics	1 st day	2 nd day
1	Color	16	15
2	Flavor	15	11
3	Texture	15	13
4	Taste	16	13
5	Overall acceptability	16	13

Microbial status of the bread

Newly prepared protein rich mushroom bread was examined for the yeast⁹, coliform and mold count for five days & correlated with the shelf life of bread. The results are tabulated in table 3.

Table 3 Microbial investigation

% Moisture	Yeast count (22 ^o C/5days)	Mold count (22 ^o C/5days)	Coliform count (22 ^o C/5days)
30.54	1.76 X 10 ⁴ cfu/g	2.3 X10 ³ cfu/g	1 X 10 ⁴ cfu/g

The % water and microbial count indicates that shelf life of newly synthesized bread is closely related to these values and should be consumed fresh. The moisture content in the brands can be attributed to the common ingredients involved in bread making. It is documented that higher moisture content can affect the shelf life of the bread. The yeast, mold and coliform counts are very high¹⁰. The strict PFA act does not permit very high value of microbial count for bakery products. All the producers follow the rules strictly since it is the most essential parameter for any food products. A new variety of bread was developed with better protein content.

CONCLUSION

The bread is more frequently consumed as a staple food. It is evident from the chemical analysis that newly synthesized bread has better composition with respect to protein and mineral content. The increased value of protein is essential for the malnourished population. It is

recommended to investigate the product for detailed protein profile with respect to amino acid composition. In nutshell, newly prepared protein rich mushroom bread can be consumed as nutrient source. It indicates the bread has improved value of protein and rich in minerals like Calcium and phosphorus. The composition of bread is more beneficial to athletes and sports persons. The bread should be consumed fresh. Due to its added nutrient value cost might be on higher side.

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