



Evaluation of nutritional quality of developed functional bread fortified with Mushroom and dates.

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Abstract

Bread may be described as a fermented confectionary product produced mainly from wheat flour, water, yeast and salt by a series of process involving mixing, kneading, proofing, shaping and baking (Dewettinck et al., 2008). The objectives of this study was to evaluate the nutritional composition of functional bread fortified with Mushroom and Dates and compare to normal white bread, and to see how much protein and iron will be improved to and enhanced in the daily diet and help who are anemic and protein energy malnutrition. The functional bread is developed by taking wheat flour and different percentages (5%,10%,15%) of mushroom and dates and are mixed and fermented with baker's yeast and then baked 30-40 minutes in oven at 200 C° of different samples and functional bread developed. The sensory evaluation was done by panelist of 5 members, and they most accepted sample containing 10% mushroom powder and 10% dry dates chips and that sample by nutritional analysis was done in laboratory, in this the amount of Protein and Iron was increased, and moisture content decreased. The developed functional bread naturally fortified with button mushroom (*Agaricus bisporus*) and dried dates mejdool variety chips, after development the nutrient quantity of bread is increased – Protein value from 7.30 gm to 10.94gm, Iron from 1.1mg/100 gm to 2.2 mg/100 gm. And all the other nutrient contents also enhanced. One important factor moisture percentage decreased from 39% to 19%, so shelf life of bread increased from the normal white bread. The functional bread is valuable in terms of nutritional quality as well as texture is good and shelf life also improved.

Keywords: Fortification, functional bread, mushroom, dates, PEM-malnutrition, iron deficiency.

1. Introduction

Bread is regarded as a staple food all over the country and world. It was considered as supplementary food product in Indian diet. Bread may be served in different form at any meal of the day, eaten as a snacks and even use in other preparation. As a basic food worldwide, bread has come to take on significance beyond mere nutrition. Bread may be described as a fermented confectionary product produced mainly from wheat flour, water, yeast and salt by a series of process involving mixing, kneading, proofing, shaping and baking (Dewettinck et al., 2008). The consumption of bread and other baked goods such as biscuits, doughnuts and cakes produced from wheat flour is very popular, but the low protein content of wheat flour,

which is the most vital ingredient used for the production of different kinds of baked goods has been major concern in its utilization (Young, 2001). Bread is one of the most widely consumed food product in the world and bread making technology is probably one of the oldest technology known (Selomulyo and Zhou, 2007). It is an important staple food for many countries. The product is basically made of hard wheat flour, yeast, fat, sugar, salt and water (Badifu et al., 2005). It is a cereal product that is naturally low in protein and nutritionally not a balanced diet because it is low in lysine, an essential amino acid (Gianni et al., 2003). Since bread is an important food that is generally accepted, they could be an excellent and convenient food item for protein fortification to improve

thenutritional well being/health of the people and in nutritional programs which will enhance reduction in protein malnutrition that is prevalent in developing countries. Fortification of wheat flour with high protein materials from plant sources to increase the protein and improve the essential amino acid balance of the resultant baked product such as bread has been recognized; (Rosales-Juarez *et al.*, 2008; Mepba *et al.*, 2009; Agu *et al.*, 2010).

Mushrooms are of excellent food value as they provide a full protein food containing all the twenty one amino acids besides containing useful amount of fats, vitamins and minerals. Mushroom protein being easily digestible (70-90%) is considered superior to vegetable proteins. Two essential amino acids lysine and tryptophan are enormously present in mushrooms which are not found in cereals. Being low in caloric value (300 – 390 Kcal/100 g dry wt), low fat and high protein, they are considered as ‘delight of diabetic patients’. Folic acid and Vitamin B-12 which are normally absent in vegetarian foods are present in mushrooms (3 g fresh mushroom can supply 1 micro g vitamin B12, recommended for daily uptake).

Indian diet is primarily based on cereals (wheat, rice and maize), which is deficient in protein. Currently common populace also considers mushroom as a quality food due to its health benefits. Mushroom is considered to be a complete, health food and suitable for all age groups, child to aged people. as for the value of protein is concern, the high amount of protein are present in all varieties but in **Button Mushrooms** (*Agaricus bisporus*) the value is highest among all, so this variety is most valuable in terms fortification for protein enhancement. Button Mushrooms (*Agaricus bisporus*) is the most popular mushroom variety grown and consumed the world over.

In India, fresh dates are called Khajoor while dried dates are called Chhuhara. Dry or soft dates are eaten out-of-hand, or may be seeded and stuffed, or chopped and used in a great variety of ways: on cereal, in pudding, bread, cakes, cookies, ice cream, or candy bars. The pitting may be done in factories either by crushing and sieving the fruits or, with more sophistication, by piercing the seed out, leaving the fruit whole. Dates are a good source of various vitamins and minerals. Its a good source of energy, sugar and fiber. Essential minerals such as calcium, iron, phosphorus, sodium, potassium, magnesium and zinc are found in dates. Dates have a high mineral content, which is beneficial for many different health conditions, but their impressive levels of iron make them a perfect

dietary supplement for people suffering from anemia. The high level of iron balances out the inherent lack of iron in anemic patients, increasing energy and strength, while decreasing feelings of fatigue and sluggishness Dates are an excellent source of iron, carry 0.90 mg/100 g of fruits (about 11% of RDI). Iron, being a component of hemoglobin inside the red blood cells, determines the oxygen-carrying capacity of the blood. Further, they are an excellent sources of potassium. 100 g contains 696 mg or 16% of daily-recommended levels of this electrolyte.

Nutritional deficiency leads to Protein-Energy Malnutrition in majority of children (between 1-5 years) world wide. Specially in rural and slum areas. Poverty, lack of knowledge are leading factor to cause kwashiorkor and marasmus are very popular protein deficiency disease, which destroy their life and even death. In developing countries every second pregnant and about 40% of preschool children are estimated to be anaemic, and major health consequence include poor pregnancy outcome, impaired physical and cognitive development, increased risk of morbidity and reduced work productivity in adults. (WHO) Iron deficiency is the most common and widespread nutritional disorder in the world. As well as affecting a large number of children and women in developing countries, it is the only nutrient deficiency which is also significantly prevalent in industrialized Countries. The numbers are staggering: 2 billion people – over 30% of the world’s population – are anaemic, many due to iron deficiency, and in resource-poor areas, this is frequently exacerbated by infectious diseases.. About a third of deaths in children are believed to be a have contributed to about 1.5 million India is among the countries with highest prevalence of anemia in the world. As India is a population billionaire, the country accounts for the largest number of anaemic persons in the world. Foods or food components may provide health and wellness benefits these foods, also known as “functional foods,” are thought to provide benefits beyond basic nutrition and may play a role in reducing or minimizing the risk of certain diseases and other health conditions. Examples of these foods include fruits and vegetables, whole grains, fortified foods and beverages and some dietary supplement. Fortification of food with micronutrients is a valid technology for reducing micronutrient malnutrition as part of a food-based approach when and where existing food supplies and limited access fail to

provide adequate levels of the respective nutrients in the diet.

2. Material and method

For bread development first taking raw button mushroom were purchased and chopped into slices and treated with 3% salt and 0.01 citric acid at 100C⁰ for 3 minutes, then it was put into tray for blanched mushroom for draining after that put into dehydrator for drying (Temperature- 50 C⁰, humidity 70% at start), drying for 10 hours at 50C⁰ dried mushroom (remaining humidity 20%) after that grinding of dried mushroom into grinder (PHILIPHS grinder) was done and in last button mushroom Powder was obtained and ready for mixing. The

next step to make dry dates chips, for that dried dates were collected from the local market and treated and then chopped into chips of even sizes. After preparing these ingredients the refined wheat flour was taken and dough preparation was carried out and during dough development mushroom powder and dried dates chips were incorporated into it in different percentages for bread making. 300gm plain wheat flour, 20 gm fresh yeast, 100 ml Luke warm milk, 100ml Luke warm water, 50 gm powdered sugar, 50 ml refined oil, 1 tea spoon salt for every sample and different concentrations of mushroom powder (5%, 10%, 15%, 20%) and dry dates chips (5%, 10%, 15%, 20%) of the wheat refined flour was taken.

Treatments details in samples-

Table 1 : The treatment details and sample preparation for different bread preparation was as follows:

Treatments	Sample Preparations	Ratio of Ingredients
T1	Flour with 5% Mushroom powder and 5% Dates	90: 5:5
T2	Flour with 10% Mushroom powder and 10% Dates	80:10:10
T3	Flour with 15% Mushroom powder and 15% Dates	70:15:15

Three breads samples were produced which were denoted as (T1 5% mushroom powder and 5% dates chips of wheat flour, T2 with 10% mushroom powder, 10% dates chips in flour and T3 with 15% mushroom powder and 15% dates chips). The process was done by first Sieve the flour and make well in the centre, Put the yeast in the centre then sprinkle over one tea spoon salt and powdered sugar, mix the amount of mushroom and dates chips with different treatments (5%, 10%, 15%), it was then leave for 15 minutes, then smooth dough were put in different containers according to treatments, After 15 minutes sugar was added and knead with milk and Luke warm water, and knead to a very soft dough by punches given to them, after punching the dough were placed in warm place

for 30 minutes, after 30 minutes dough were again punched and again keep in warm place for 30 minutes then taken out and punches given again in last smooth dough were put in a bread tin (loaf tin and keep in warm place for 10-15 minutes Preheat the oven at 200 C⁰ for 5 minutes, then baked for 30-40 minutes at 200C⁰, after this prepared bread were taken out from oven resulting functional bread.

3. Result and discussion

Nutritional value of the developed functional bread are assessed in the Food Analysis Laboratory with different specific equipments for each nutritional parameters like protein, iron, carbohydrate, Total energy, fat, moisture content.

Table 2 : Functional bread nutritional value

Nutritional value	Functional natural fortified bread
	Result
Protein, %	10.94
Iron, mg/100g	2.2

Total Energy K.cal /100g	319.0
Carbohydrate,%	68.07
Fat, %	1.29
Total Minerals,%	2.3
Moisture,%	19.40

Source : RFRAC, Lucknow.

From the laboratory analysis of bread the nutritional value of bread like protein, iron, minerals, fat, moisture, energy and carbohydrate were found, the amount of protein is 10.94 gm per 100gm of sample, Iron content was 2.2 mg/100gm of sample of bread Carbohydrate 68.07 gm. Total energy is 319.0 kcal. Moisture content was found 19.40%. From the obtained result it was concluded that all the desired nutritive value which were taken in the study to enhance the value of bread, were increased a well as all the other factors like taste, color, appearance and shelf life of

the bread were also improved when compared to commonly found white wheat bread.

In present study the comparison was done between white bread and studied sample of bread to see the effect of fortification of major ingredients like button mushroom and dates chips on the nutritional value of developed functional bread. By comparative graph we can see the difference of values side by side from different samples, and how much fluctuations are present in two or more different samples, and it clearly represents the values accordingly.

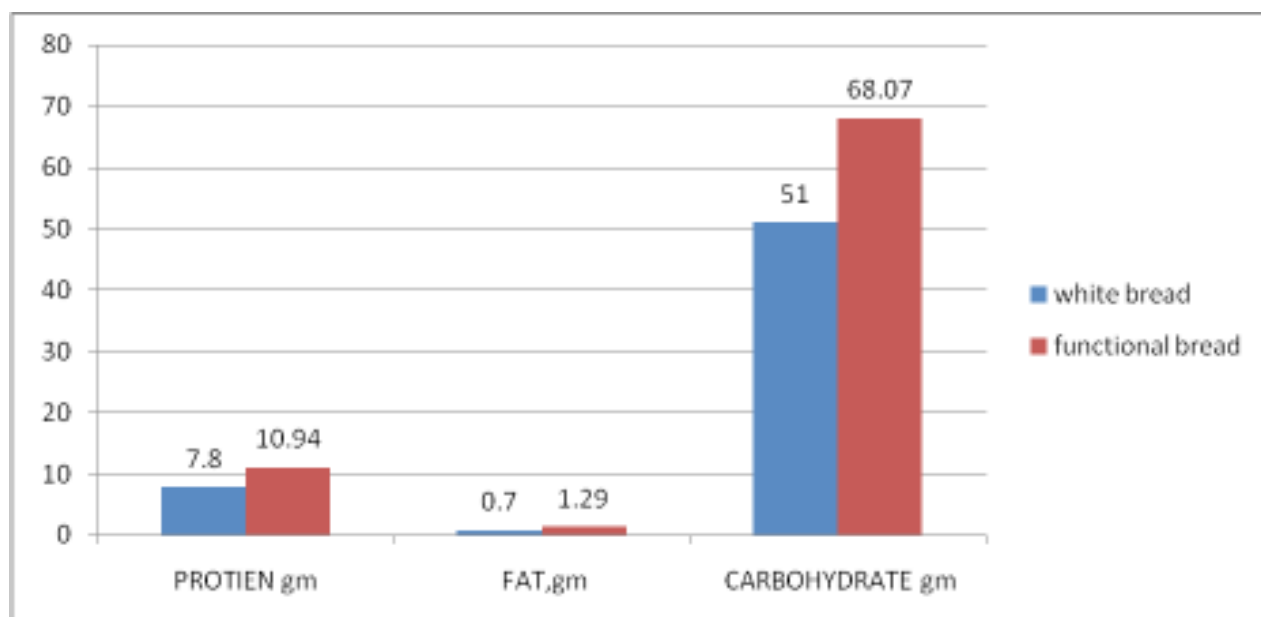


Fig : Comparative graphical representation of white wheat bread and functional bread

From above graph the nutrient contents are present in comparing way, from two different samples The protein content in functional bread is 10.94 gm in

compare to white bread which contains 7.8 gm of protein. Carbohydrate in functional bread is 68.07gm and in white bread 51.10gm.

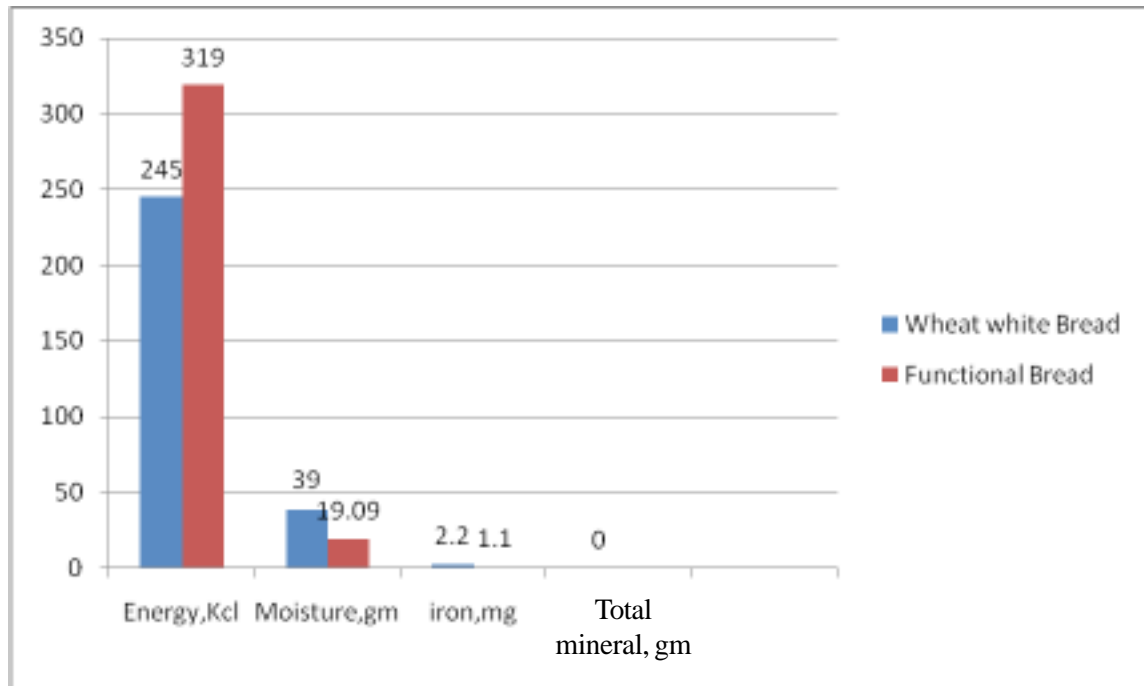


Fig : Comparative graphical representation of white wheat bread and functional bread

From above graph the nutrient contents are present in comparing way, from two different samples. The Iron content in functional bread is 2.2 mg in compare to white bread which contains 1.1mg iron. Energy in functional bread is 319 kcal and in white bread 245 Kcal.

Moisture content in functional bread is 19.09% and in white bread 39.0%. From the above two graphical representation it is concluded that the amount of protein and iron has increased in the functional bread, and other values also increased in functional bread, but moisture% is less in functional bread. So the result is better from white wheat bread in all aspects in terms of nutrition and shelf life.

4. Conclusion

Nutritive value of functional bread increased in terms of protein and iron has increased in the prepared functional bread when it is assessed in the laboratory, these nutrient were the major area on which study was done and to enhance the bread protein and iron content .Other components also increased but the one factor, moisture content was decreased in functional bread which is a good for shelf life of the bread. When compared to normal white bread in terms of nutrition and other physicochemical factors the studied functional fortified bread was much improved, and will enhance the nutrition value of protein and iron in the diet.

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