International Journal of Food Science and Nutrition
ISSN: 2455-4898; Impact Factor: RJIF 5.14
Received: 06-01-2019; Accepted: 09-02-2019
www.foodsciencejournal.com
Volume 4; Issue 2; March 2019; Page No. 30-33

Preparation of banana bread to utilize the over ripe banana

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Abstract
The utilization of over ripe banana in the form of banana bread was investigated. Banana bread was prepared with different variations of wheat flour & over ripe banana, i.e., 80:20, 70:30, 60:40 and 50:50. The physico-chemical and sensory parameters were evaluated for consumer acceptability by using a 9-point hedonic scale. On the other hand, chemical properties of the banana bread were tested, such as protein content by Folin Lowry method, fat content by Soxhlet method, carbohydrate content by DNS method and moisture content by hot air oven method. Moisture content in banana bread were decreased from 52.45%, 52.30%, 52.20% and 51.74% respectively. So the sample B having ratio 70:30 of wheat flour contain 5g/100g protein, 9.7g/100g carbohydrate and 2g/100g fat with good flavour, taste, texture, colour and appearance showing the health benefits of increasing the appetite of body and because of its nutritional value, incorporation was highly acceptable while the other samples were also acceptable.

Keywords: banana bread, wheat flour, over ripe banana, folin Lowry method, soxhlet method

Introduction
Bread is a staple food prepared from dough of flour and water, usually by baking. Throughout recorded history it has been popular around the world and is one of the oldest artificial foods, having been of importance since the dawn of agriculture. Bananas were originally found in South East Asia, mainly in India. Banana crop is heavy feeder of nutrients. Its roots spread superficially and absorb large amount of nutrients from the soil. Proper management of nutrients in banana crops lead to higher yield. The essential nutrients are supplied through different fertilizers combination which varies with variety and climate conditions. Banana is rich in potassium and fiber. The banana increases the appetite of body. They may have to prevent asthma, cancer, high blood pressure, diabetes and digestive problem. It is a high fiber foods are said to be good for the heart.

Banana bread first became a standard feature of American cook books with the popularization of baking soda and baking powder in the 1930's. It appeared in Pillsbury's 1933 Balanced Recipes cook book, and later gained more acceptances with the release of the original Chiquita Banana's Recipe Book in 1950. National Banana Bread day of America is 23rd February. Bananas appeared in the US in the 1870's and it took a while for them to appear as ingredient items for deserts. The modern banana bread recipe began being published in cook books around the 1930s and its popularity was greatly helped by the introduction of baking powder on the market. Wheat flour is a powder made from the grinding of wheat used for human consumption. Wheat varieties are called "soft" or "weak" if gluten content is low, and are called "hard" or "strong" if they have high gluten content. Hard flour, or bread flour, is high in gluten, with 12% to 14% gluten content, and its dough has elastic toughness that holds its shape well once baked. Soft flour is comparatively low in gluten and thus results in a loaf with a finer, crumbly texture. The quality and acceptability of cookies produced from the flour blends using cookies prepared from wheat flour as control. Acceptability of the produced cookies and chemical properties of the flour blends were determined. Response Surface Methodology was used to develop the mixing ratio and also model the protein and crude fibre responses (Rachael and Margaret, 2016) [12].

The feasibility of partially replacing wheat flour with plantain flour in bread and biscuit making were investigated. Matured plantains (Musa paradisiacal) were pulped, blanched, dehydrated and pulverized. The wheat flour (WF) was substituted by plantain four at levels of 5, 10, 20 and 30% and 0, 50, 60, 70, 80 90 and 100% for bread and biscuit making, respectively (Mepba *et al.*, 2015) In case of health oriented products such as sugar free, low calorie and gluten free products is increasing. One such trend is to use gluten free flour content in food products to overcome health problems such as Autism, Celiac disease (Chronic diarrhoea, abdominal bloating and pain, chronic constipation) among others. Combination of flours, amount of corn flour was increased as rice flour decreased fat, ash, and protein content showed an increase on increasing the corn flour amount (Tiwari and Shukla, 2015) [16].

The banana of three advanced stages of maturity were analysed for their physicochemical and mechanical properties. Fruits were treated with 500 ppm ether solution and kept for ripening under controlled conditions at 20±1°C and maturity stages were selected on the basis of standard color chart (Tapre and Jain (2015) [14].The banana powder (BP) was added to hard red spring wheat (HRSW) flour intended for yeast-leavened bread formulation. Five different formulations containing 10%, 15%, 20%, 25%, and 30% BP were prepared with varying amounts of base flour, while vital gluten was maintained at 25% in all blends (Singh *et al.* 2011).

The objective of this work is to examine the factors, which influence the safety and quality characteristics of bread made from frozen dough. The main aim of preparation of banana bread is to utilise the over ripe banana in form of banana bread which increases the appetite of body, because of the

fried, baked or dried banana. The cooked banana reduces the chances of cough and cold as compare to the raw banana. Banana bread helps to stabilize blood sugar level as well as cholesterol level. Also it improves the digestive health.

Materials and Methodology

The details of material and methods used during the course of the project are as follows:

Collection of Ingredients

- **Ripe Banana** - Ripe banana of local variety was purchased (40 rupees per dozen) from the local market of Bhilai.
- **Wheat Flour** - Wheat flour was purchased from Rajesh Super Market, Sector 10, and Bhilai.
- **Instant Yeast** - Instant yeast manufactured by Deccan Fresh Baker Yeast was procured (80 rupees per 500gm) from Rajan Bakery, Sector 6, and Bhilai.
- **Sugar -**The powdered sugar was purchased (40 rupees per kg) from Rajesh Super Market, Sector 10, and Bhilai.
- **Salt -** The common salt under the brand name of "Tata Salt" was purchased (19 rupees per kg) from Rajesh Super Market, Sector 10, and Bhilai.
- **Bread Improver -** Bread improver under the brand name CCDS Bread Improver was procured (60 rupees for 50gm) from Rajan Bakery, Sector 6, and Bhilai.
- **Refined Oil -** Refined oil under the brand name of "Fortune" was purchased (93 rupees per kg) from Rajesh Super Market, Sector 10, and Bhilai.
- **Preservative -** Calcium propionate under the brand name "Romoban" was procured (150 rupees per kg.
- Equipments Used Following equipments were used in research laboratory are: sieve, furnace, electronic weigh machine, mixer, colorimeter, glassware.

Bread Making Process

Bread was prepared using flour, sugar, salt, water, yeast along with fats and emulsifier were mixed together to form a dough. The dough was kneaded till clean up stage and allowed to ferment for two and a half hours. Then the dough was divided into dough ball, moulded placed in furnace at 350-400°C for 30-40 minutes.

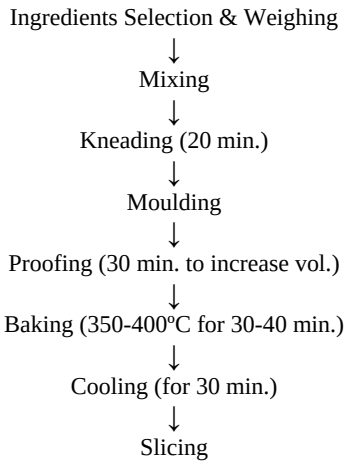

Fig 1: Bread making flow process

Chemical analysis

Hot air oven method for moisture content (By AOAC, 1997)

Moisture per cent was determined by hot air oven method in this method a clean empty porcelain dish was weighed. 2–4gm of the mixed sample of banana bread was weighed in the dish. It was heated on water bath until it dries. It was heated in a steam for 2 hr. at 105-110°C. Then it was cooled in the desiccators and weighed.

The Folin-Lowry method of protein

Protein reacts with the Folin-Ciocalteu reagent to give coloured complexes. The colour so formed is due to the reaction of alkaline copper with the protein as in the burettes and the reduction of phosphor molybdate by tyrosine and tryptophan present in the protein. The intensity of colour depends on the amount of the aromatic ammonia acids present and will thus vary for different protein.

Soxhlet method for fat content

Determination of fats involves a partial drying of a weighed sample prior to a soxhlet extraction. The extracted fat is weighed and the fat content calculated. It is important that sand be incorporated with the sample before drying. The purpose of the sand is to create a greater surface area, necessary to remove moisture and prevent entrapment of fat. Accurately weighed extraction flask containing a few glass beads or boiling chips (carborundum), and then approximately 85 ml of petroleum ether was added. The sample contained in the thimble was extracted from with petroleum ether for at least 80 cycles in a minimum of 4 hours in a Soxhlet extraction apparatus. Upon completion of the extraction, the unit was separated and poured off the ether (and thimble) from the extractor into a large filter (to collect the thimbles) positioned on a container (such as a gallon bottle). Repeated until most of the ether is removed and the flask has very little ether left. The Soxhlet unit was removed and a flask was placed on a steam bath to evaporate the remaining petroleum ether. The flask was swirled initially to avoid boil-over. Flask and its contents were dried in a mechanical convection oven at 100-102°C for time required to obtain constant weight and cooled to room temperature.

DNS method of Carbohydrate test

Several reagents have been employed which assay sugars by using their reducing properties. One such compound is 3,5-dinitrosalicylic acid (DNS) which in alkaline solution is reduced to 3-amino -5-nitrosalicylic acid. The chemistry of the reaction is complicated since standard curves do not always go through the origin and different sugars give different colour yields. The method is therefore not suitable for the determination of a complex mixture of reducing sugars.

Physical analysis

Length (L): The length was measured in mm by digital Vernier caliper.

Width (B): The width was measured in mm by digital Vernier caliper.

Thickness (T): The thickness was measured in mm by digital Vernier caliper.

Sensory Analysis

The judgment was made by rating product on a 9 point hedonic scale corresponding descriptive term ranging from 9 "Like extremely" to "Dislike extremely".

9- Like extremely	4- Dislike slightly
8- Like very much	3- Dislike moderately

7- Like moderately
6- Like slightly
5- Neither like nor dislike
2- Dislike very much
1- Dislike extremely

Results and Discussion

The present study was based to evolve effect of flour on quality of banana bread. The results obtained from the analysis are presented under the following headings:

1. Chemical analysis of banana bread.
2. Physical analysis of banana bread.
3. Sensory evaluation of banana bread.

Chemical analysis of banana bread

Table 1: Chemical analysis of banana bread samples

S. No.	Parameters	Treatments	
		A (%)	B (%)
1.	Moisture	52.30	52.20
2.	Protein	8	5
3.	Carbohydrate	4.8	9.7
4.	Fat	3	2

Moisture analysis

From the data regarding moisture percentage in banana bread sample of different treatments, it was observed that treatment sample A (52.30g/100g) had maximum moisture percentage followed by sample B (52.20g/100g). The treatment can be rated as sample A > sample B.

Protein analysis

From the data regarding protein percentage in banana bread sample of different treatments, it was observed that treatment sample A (8g/100g) had maximum protein value followed by sample B (5g/100g). The treatment can be rated as sample A > sample B.

Fat analysis

From the data regarding fat percentage in banana bread sample of different treatments, it was observed that treatment sample A (3g/100g) had maximum protein value followed by sample B (2g/100g). The treatment can be rated as sample A > sample B.

Carbohydrate analysis

From the data regarding carbohydrate percentage in Banana Bread sample of different treatments, it was observed that treatment had sample B (9.7g/100g) maximum carbohydrate value followed by sample A (4.8g/100g). The treatment can be rated as sample B>sample A.

Physical analysis of banana bread

Physical analysis of banana bread samples are given in table 2.

Table 2: Physical analysis of banana bread samples

Sample	Length (cm)	Width (cm)	Thickness (cm)	Volume (cm^3)	Density (g/cm^3)
A	15	5	7.5	562.5	2.55
B	15	5	8	600	2.41

Sensory evaluation of banana bread

Table 3: Sensory evaluation of banana bread samples

S. No.	Parameters	Treatments	
		A	B
1.	Colour	8	9
2.	Taste	8	8
3.	Flavour	7	9
4.	Texture	7	8
5.	Appearance	8	8
6.	Overall acceptability	7	8

Color in banana bread: The highest mean color score recorded in banana bread sample B (9) followed by sample a (8). The treatments can be rated as sample A < sample B.

Taste in banana bread: The highest mean taste score recorded in banana bread and sample B (8) followed by sample A (8). The treatments can be rated as sample a same as sample B.

Flavor in banana bread: The highest mean flavor score recorded in banana bread sample B (9) followed by sample a (7). The treatments can be rated as sample A < sample B.

Appearance in banana bread: The highest mean appearance score recorded in banana bread sample B (8) followed by sample a (8). The treatments can be rated as sample A same as sample B.

Texture in banana bread: The highest mean texture score recorded in banana bread sample B (8) followed by sample a (7). The treatments can be rated as sample A < sample B.

Overall acceptability in banana bread: The highest mean overall acceptability score recorded in banana bread sample B (8) followed by sample a (7). The treatments can be rated as sample A < sample B.

Fig 2: Prepared Banana Bread

Conclusions

1. The banana bread was successfully developed by considering the physio-chemical and sensory evaluation.

2. From the analysis of physico-chemical properties and sensory analysis evaluation, the sample B was found better than other sample with physical value 15 cm length, 5 cm width & 8 cm thickness, chemical value 5 g/100g protein, 9.7 g/100g carbohydrate & 2 g/100g fat and sensory value on hedonic scale having color (9), taste (8), flavor (9), texture (8), and appearance (8) & overall acceptability (8).

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