DEVELOPMENT AND FORMULATION OF HIGH FIBRE FLAT BREAD USING BANANAPEELS

Sahal TP[1*], Sweety Bharti[2], Youdhver singh[3]

Abstract

Fibre is very essential for our daily diet. It has many benefits in regulatory functions and digestive health. It also has some good effect on cholesterol and sugar levels. Fibre is very much effective in prevent dangerous diseases such as cancer, diabetes and cardio vascular diseases. So, an attempt was made to prepare high fibre flat bread using powdered peel of banana. Flour used for making flat bread is replaced by banana peel powder at a proportion of 5%, 10%, 15% and 20%. Peeled banana powder been employed to improve the amount of nutrients in various foods. polyunsaturated fatty acids, vitamins, potassium, magnesium, and protein., and amino acids are also abundant in banana peels. Banana peel flour can replace 5% to 10% of the wheat in bread to provide nutrition without detracting from flavor, color, scent, or texture. Compared to the cookies baked with the least quantity of banana peel flour, the control group and other cookies with larger concentrations of banana peel earned lower ratings for their texture and overall acceptability. Compared to the cookies baked with the least quantity of banana peel flour, the control group and other cookies with larger concentrations of banana peel earned lower ratings for their texture and overall acceptability. study for one week and found that total plate count and moisture content are at safe level after keeping at storage of one week packaged in polythene bag. These findings suggest that a low concentration substitution of banana peel for flour could improve the nutritional profile of bread without impairing its sensory qualities.

Keywords: Fibre, rheology, attributes, banana peel, antioxidant and shelf life.

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1. INTRODUCTION

Most well-known for its capacity to prevent or treat constipation, fibre is mostly found in fruits, vegetables, whole grains, and legumes. meals high in fibre, on the other hand, can aid in weight management and. reduce your chances of developing diabetes, heart disease, and several cancers. Finding enticing meals that are high in fibre is not challenging. Learn how much dietary fibre you require. How to include it in meals and snacks, as well as what foods contain it. Roughage, bulk, and dietary fibre are all terms for plant-based nutrients that your body cannot digest or absorb. (J.A. Larrauri, P. Ruperez, F. Saura-calixto).

Unlike other components that your body digests and absorbs. like lipids, proteins, and carbs, your body does not digest fibre.. Instead, before departing from your body, it virtually finishes your colon, small intestine, and stomach. Typically, depending on whether it dissolves in water, fibre is either soluble or insoluble (meaning it does not dissolve) Soluble dietary fibre. This fibre turns into a gel-like material when it dissolves in water. Soluble fibre may be found in a variety of foods, including oats, peas, beans, apples, citrus fruits, carrots, barley, and psyllium. Fiber cannot be dissolved. This type of fibre enhances material flow through. By bolstering your digestive system and raising stool volume, it helps those who have constipation or irregular stools.

There are variations in the amounts of soluble and insoluble fibre in various plant meals. Consume a wide variety of high-fiber foods to reap the most health benefits. Normalizes bowel movements. Dietary fibre bulks up and softens your stool. If your stools are big and simple to pass, constipation is less likely to happen. Fiber helps to give the stool bulk by absorbing water, which may help to settle loose, watery stools. keeps the intestines healthy. If your stools are big and simple to pass, constipation is less likely to happen. Fiber helps to give the stool bulk by absorbing water, which may help to stabilize loose, watery stools. keeps the intestines healthy. According to study, A diet high in fibre may also lower the risk of colorectal cancer. The colon ferments some fibre. Researchers are looking at how this operates. may help with colon disease prevention. lowers a person's cholesterol. Soluble fibre, found in oats, flaxseed, and oat bran, may help decrease total blood cholesterol by lowering levels of low-density lipoprotein, or "bad" cholesterol. Consuming foods high in fibre may also benefit heart health in other ways, such as lowering blood pressure and inflammation, claims research. For diabetics, fibre, especially soluble fibre, can lower blood sugar levels and help slow down sugar absorption. Additionally, type 2 diabetes risk may be decreased by a nutritious diet rich in insoluble fibre. encourages achieving a healthy weight. If you choose high-fiber meals over low-fiber ones because they are more filling, you will eat less and stay fuller for longer. As they are less "energy dense," or have fewer calories per unit of meal size, high-fiber meals also take longer to ingest. Your longevity is prolonged. Increased dietary fibre consumption, particularly from cereals, is linked to a lower risk of dying from cancer and cardiovascular disease. (Adebayo-Oyetoro AO, Ogundipe OO, Adeeko KN; 2016)

2. METHODOLOGY

2.1RAW MATERIALS REQUIRED:

Maida (all-purpose wheat flour), water, salt and banana peels were used as raw materials for my study.

2.2EQUIPMENTS REQUIRED:

To do various preparations and analysis, the following equipments were used.

- Mixer – To make flat bread dough by blending the ingredients together.
- Cooking Apparatus – To cook flat bread.
- Cabinet Dryer – to dry banana peels.
- Mixer grinder – to grind banana peel into powder.
- Hot air oven – to determine the moisture content of the product.
- Stainless steel knives, cutting board, utensils etc.
- Routine Laboratory Facilities.

2.3. PREPARATION OF FLAT BREAD:

Ingredients for the preparation of flate bread are maida, water and salt. Method of preparation of flat bread is detailed below:

Recipe:

Wheat Flour (Atta) - 500 gm

Water- 500 ml

Salt -5 gm

Figure 1 flat

Figure 2 flat bread after frying

2.4. MAKING POWDERERD BANANA PEEL:

Banana stems were removed and peels were gathered. Peels were divided into little bits. For around 20 minutes to avoid browning due to dehydration, the animal was submerged in a solution of sodium bicarbonate and potassium meta

bi sulphate (2 kg water + 1.5 gm sodium bi carbonate + 1.5 gm potassium meta bi sulphate). then dried for 72 hours in a cabinet at 75°C. It is then dried, finely powdered using a mixer grinder, and stored in airtight glass jars.

Figure 2 Banana peel powder

2.5. MAKING FLAT BREAD WITH ADDED FIBRE FROM POWDERED BANANA PEEL:

Different amounts of powdered banana peel were mixed into the flat bread dough, as shown below**.**

Table 1 Proportion of banana peel powder

SI. NO.	Sample code	Proportion of Wheat Flour	Proportion of banana peel powder
1	A	95%	5%
2	B	90%	10%
3	C	85%	15%
4	D	80%	20%

To determine which flat bread was best, they were made using the aforementioned recipes and tasted. The amount of crude fibre in the chosen flat bread recipe was examined. Samples with a high amount of fibre were sealed in polythene bags, kept at room temperature, and tested for shelf life for a week. An organoleptic analysis and moisture content measurement were done two days apart as part of the shelf-life analysis.

2.6. DETERMINATION OF CRUDE FIBRE:

2.6.1. Reagents:

- Dilute Sulphuric acid – 1.25 % (w / v), accurately prepared
- Sodium hydroxide Solution – 1.25 % (w / v), accurately prepared
- Ethanol – 95 % (v / v)

2.6.2Procedure:

- Accurately weigh the ground sample, which should be between 2 and 2.5 grammes, into a thimble before using a soxhlet extractor to extract it for roughly an hour using petroleum ether.
- To a 1-liter flask, transfer the substance in the thimble.
- 200 cc of weak sulfuric acid should be boiled in a beaker.
- Transfer all of the boiling acid to the flask holding fat-free material, then immediately attach the flask to a water-cooled reflux condenser and heat, causing the contents to start boiling within a minute.
- Rotate the flask often, being careful to prevent anything from sticking to the edges and coming into touch with the acid.
- Boiling should go on for exactly 30 minutes.
- As soon as the washings are no longer acidic to litmus paper, remove the flask, filter through a nylon bag (approximately 18 threads per centimetre), and then wash them in hot water.
- Under a reflux condenser, bring a little amount of sodium hydroxide solution to a boil.
- Transfer the filter residue into the flask containing 200 ml of sodium hydroxide solution that is boiling.
- Immediately attach the reflux condenser to the flask, then start the timer for 30 minutes of boiling.
- The flask should be taken out, and the nylon bag should be used to filter the liquid.
- Following a thorough washing with hot water, ethanol (approximately 15 ml), and three petroleum ether washes, the residue should be dried with a petroleum ether rinse.
- Fill a silicon crucible with the contents.
- In an air oven set at 105°C for three hours, dry the silica crucible and its contents.
- "Cool and weigh."
- Repeat the drying for 30 minutes, chilling, and weighing steps up until there is a discrepancy of less than 1 mg between two measurements that are taken back-to-back.
- As soon as all carbonaceous material is burned, incinerate the crucible's contents in a muffle furnace at 550°C.
- In a desiccator, liquefy the crucible, then weigh it.

Calculation:

$$\text{Crude fibre on dry basis} = \frac{(W1-W2) \times 100 \times 100}{W\,(100-M)}$$

Where,
W1 = weight of crucible + contents before ashing
W2 = weight of crucible + contents after ashing
W = Weight of sample taken for test
M = Percent Moisture content

2.7. DETERMINATION OF MOISTURE CONTENT:

Aim: To determine moisture content in the sample using hot air oven method.

Principle: A known amount of sample was evaporated in a hot air oven and the moisture content removed was determined.
Materials required: Hot air oven, electronic balance, aluminum dishes, desiccators etc

2.7.1Procedure:
• The metal dishes should be dried in a hot air oven, cooled in desiccators, and removed from the weight.
• Precisely weigh 5 g of the sample in the dish.
• Place the dish in the air oven at 105°C plus or minus 1°C for about an hour.
• Take the food out of the oven.
• In the desiccators, cool to room temperature before weighing.
• Put the dish back in the oven and bake it for an additional 30 minutes.
• Remove, let cool, then weigh.
• Repeat the process until there is no more than one milligramme of difference between two succeeding weights.

Calculation:
Moisture content, percent by weight =

$$\frac{[(W2 - W3) \times 100]}{(W2 - W1)}$$

Where,
W1 = Weight of empty dish
W2 = Weight of dish + sample before drying
W3 = weight of dish + sample after drying

2.8. ORGANOLEPTIC ANALYSIS:
In the food sector, the use of sensory evaluation panels, also known as organoleptic evaluation, is a regular and expanding practise. Our senses are used to evaluate sensory information. The product's appearance, colour, flavour, scent, taste, and texture are all examples of sensory criteria.
The prepared flate bread samples were assessed organoleptically for several quality characteristics as appearance, texture, aroma, flavour, and taste by a three-judge expert panel. The sample was graded using the scorecard that was suggested.

3. RESULT
By substituting banana peel powder for wheat flour in proportions of 5%, 10%, 15%, and 20%, flat breads were made. In order to choose the optimal formulation, the made breads were taste-tested. Fiber content of a chosen sample was examined. One week of room temperature storage of high content samples was done in polythene bags. A pre- and post-storage analysis of the moisture content and consumer acceptance was conducted.

3.1. FIBRE CONTENT OF SELECTED FORMULATION:
Table 2 percentage of fibre content

SI.NO	Sample code	Percent fibre content(on dry basis)		
		Trial 1	Trial 2	Average
1	Standard	2.25	2.25	2.25
2	C (15% peel)	4.91	4.91	4.91

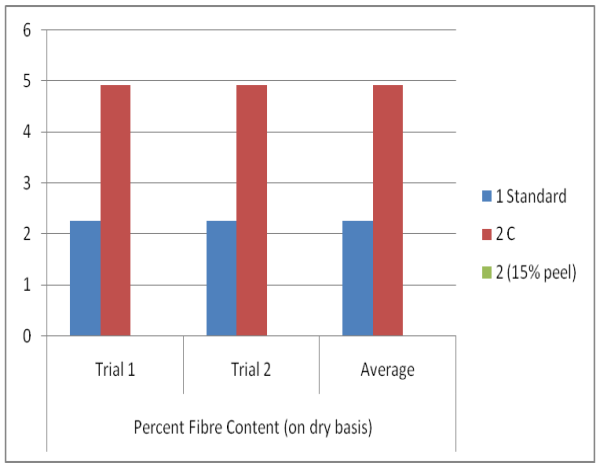

Figure 3 prcentage of fibre content

The amount of crude fibre in the chosen sample was calculated. In the table above, the outcomes are listed. In contrast to ordinary bread, which had 2.25% fibre, selected sample C, which had 15% powdered banana peel, had 4.915 dry grammes of fibre.

3.2. MOISTURE CONTENT OF SELECTED FORMULATION:
Table 3percentage of moisture content

Trial	**Moisture Content (%)**
1	22.36
2	22.36
3	22.36
Avg	**22.36**

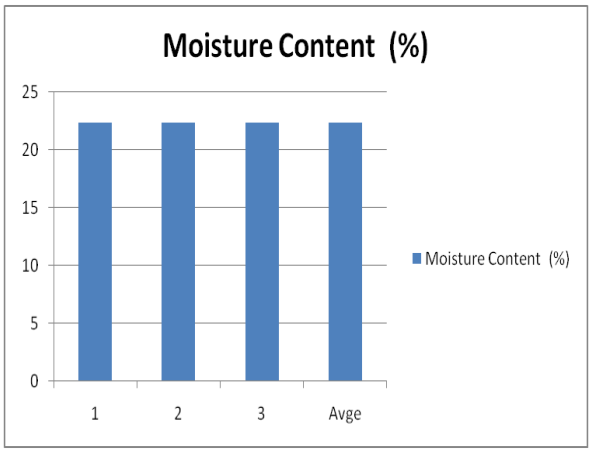

Figure 4percentage of moisture content

3.3.SENSORY EVALUATION:

Table 4 sensory evaluation

Particulars	Appearnce (5)	Textu-re (5)	Aro-ma(5)	Flavo-ur (5)	Tas-te (5)	Over-all (25/5=5)
Standard	4.5	4.5	4.0	4.0	4.5	4.3
D2	4.5	4.5	4.0	4.0	4.0	4.2

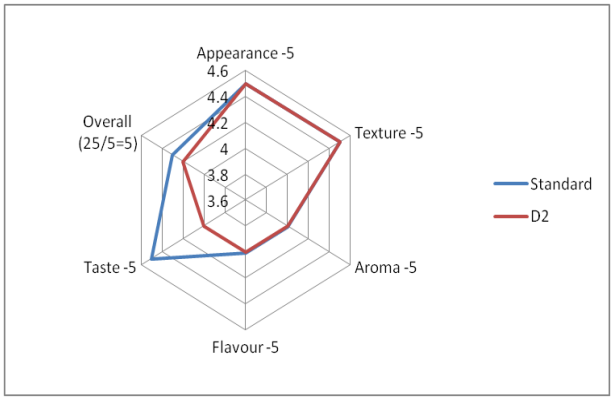

Figure 5 sensory evaluation

4. DISCUSSION

In the globe, flatbreads are the most popular type of bread. It is created with a dough that has been flattened and contains flour, water, salt, yeast, and other optional additives. Flat bread can be made using banana flour to increase fibre intake. Banana peels provide a lot of fibre and boost the nutritious value of a diet.

•High-fiber diet advantages include promoting gut health, •

•lowering cholesterol,

•controlling blood sugar,

•assisting in the maintenance of a healthy weight, and extending life.

The integration of fibres into flatbread using banana peel has been attempted in this work. Bread prepared with 5% and 10% banana peel flour was just as good and palatable as bread made with 100% wheat flour. The flavour, texture, fragrance, colour, and crumb of the bread at 10% BP were probably moderate. Additionally, compared to bread produced entirely of wheat flour, 10% BP bread had higher levels of fibre, protein, and carbohydrates. No adverse effects are brought on by the use of banana peel powder by customers of any age.To those under 50 years old, health professionals advise 30g of fibre each day.

Customers who require a diet high in fibre will benefit from this flatbread. The fruits and vegetables are very rich in fibre, according to research, and it won't have a bad impact on consumers. It helps to prevent cancer, cardiovascular diseases, other digestive ailments, and other illnesses, as well as other illnesses. because they are regarded well by customers in terms of both nutrition and organoleptics. Flat bread may be incorporated into a regular diet.

4.1. IMPORTANCES OF BANANA PEEL FOR VALUE ADDITION:

Bananas are large herbaceous blooming plants of the genus Musa that bear an edible fruit that is classed botanically as a berry. The fruit's shape, colour, and hardness vary, but it is often elongated and curved. When fully grown, its rind can be green, yellow, red, purple, or brown. It contains soft flesh that is high in starch Clusters of the fruits develop at the top of the plant and dangle there.

Musaacuminata and Musabalbisiana are two kinds of wild banana that are the source of almost all edible seedless (parthenocarpy) bananas today. Depending on their chromosomal makeup, the majority of cultivated bananas go by the scientific names Musaacuminate, Musabalbisiana, and Musa paradisiaca (for the hybrid Musaacuminata Musabalbisiana). The hybrid's old scientific name, Musasapientum, is no longer used. Native to Australia and tropical Indo-Malaya, Musa species were probably domesticated in Papua New Guinea. They are produced in 135 nations largely for their fruit, but also in smaller quantities for their fibre, wine, beer, and decorative plants.

The two countries that produced the most bananas worldwide in 2017 were India and China, who together accounted for almost 38% of the total. A ripe banana's peel, which makes up around 35% of the fruit, is typically discarded rather than eaten. On the other hand, using the peel is a fantastic way to add extra vitamins and minerals to your diet while reducing food waste. Banana peels, in actuality, in addition to being tasty, are abundant in potassium, dietary fibre, polyunsaturated fats, and vital amino acids. The benefits of fibre, in particular, have been linked to improved regularity, blood sugar management, and cardiovascular health. Meanwhile, potassium reduces the chance of kidney stones, stop bone loss, and regulate blood pressure.

According to one test-tube research, banana peels are high in antioxidants, with unripe banana peels having the greatest levels. Several studies have shown that antioxidants can reduce inflammation and guard against chronic diseases including cancer and heart disease. (Eshak NS (2016)

4.2. NUTRITIONAL PROPERTIES OF BANANA PEEL:

Around 43% of a ripe banana is made up of the skin, which is often discarded rather than eaten.

using the peel, on the other hand, is an excellent way to reduce food waste while also adding vitamins and minerals to your diet. Due to intense competition in the dietary fibre market, new products must offer additional healthy attributes beyond those of already popular products. Fiber eating helps to prevent illnesses such as diabetes, cardiovascular disease, and colon cancer. Banana peels are high in fibre and can be utilized in culinary items as functional additives. The growth of value-added food items has been fast during the last 20 years. The usage of mainly discarded fruit by-products has provided the possibility of long-term use of these edible components. Banana pulp and peel are a great source of nutritional ingredients for food fortification since they have high amounts of antioxidant activity, phenolic compounds, dietary fibres, and resistant starch as a result, portions of various bananas have been turned into flour. Due to intense competition in the dietary fibre market, new products must offer additional healthy attributes beyond those of already popular products. Fiber eating helps to minimize health issues such as. As a result, numerous academics have been interested in turning individual banana pieces into flour using various ways (microwave, spray drying, lyophilization, ultrasound, pulsed vacuum ovens, and oven drying spouted bed drier). The use of banana flour in starchy meals offers enormous potential for product development since it has a high concentration of bioactive ingredients, especially resistant starch. Even gluten-free diets do not change. This research aims to provide a concise assessment of the health advantages of banana bioactive components. It also includes a wide variety of studies carried out on the use of various banana parts and flour produced at various stages of ripeness in the food industry. (2019 AA Khoozani, J Birch, AEDA Bekhit)

4.3. NUTRITIONAL VALUE OF BANANA PEEL:

Table 5 The nutrition fact for 100 gms of banana

COMPONENT	AMOUNT IN 100g
Protein	0.92
Sludge lipid	1.44
Carbohydrates	56.00
Slack fibre	31.44
MINERAL	
Potassium	75.44
Calcium	15.20
Sodium	24.45
Iron	0.22
Maganse	76.78
Bromine	0.01
Rubium	0.98
Strontium	0.04
Zirconium	0.027
Niobium	0.09

4.4. CHEMICAL COMPOSITION OF PSEUDOSTEM AND PEDUNCLE FIBRE FROM VARIOUS BANANA PEEL POWDER:

Table 6 chemical Composition Of Pseudostem And Peduncle Fibre

Parts used for fibre extraction	Cultivars	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Pectin (%)
Pseudostem	Grand Naine	48.19	15.91	19.17	3.46
	Poovan	57.57	12.65	16.71	2.82
	Monthan	48.55	15.75	21.56	4.08
	Nendran	59.22	12.09	14.39	2.68
Peduncle	Grand Naine	48.31	13.99	19.87	3.25
	Poovan	56.24	14.89	19.17	2.62
	Monthan	49.65	15.75	20.66	3.87
	Nendran	60.41	10.20	17.56	2.06
	Mean	**53.52**	**13.90**	**18.64**	**3.1**
	CD (p=0.05)	**7.44**	**1.94**	**2.59**	**0.440**

4.5. THE EFFECT OF A BANANA'S PEEL ON THE CHARACTERISTICS OF A DIETARY FIBER CONCENTRATE MADE FROM BANANA PEEL:

The effects of four different methods for preparing banana peels on the chemical makeup and characteristics of the dietary fibre concentrate produced from banana peels. Both wet milling and hot water washing as well as wet milling and tap water washing were looked at (BDFC). The BDFC's water holding capacity (WHC) and oil holding capacity (OHC) decreased as a result of the dry milling method's significantly greater levels of fat, protein, and starch content than those obtained with wet milling (OHC). The BDFC's water holding capacity (WHC) and oil holding capacity (OHC) reduced as a result of the dry milling method's much higher levels of fat, protein, and starch content compared to those produced by wet milling. After wet milling, washing with hot water led to a larger loss of the soluble fibre fraction than washing with tap water, which resulted in lower WHC and OHC of the resulting BDFC. The BDFC had the greatest level of total and soluble dietary fibre, WHC, and OHC after wet milling and washing with tap water. (OkorieDO, EleazuCO, NwosuP; 2015).

Another study was carried out on banana and pomegranate peel flour on bread preparation. From their dried peel, pomegranate and banana peel powder was created. Due to their pharmacological applications, an effort is made to create the bread by blending the peel powder of each from 5%, 10%, and 15%. When preparing the bread wheat flour was substituted for 10%, 15%, 20%, and 30% of it with banana peel and pomegranate flour of peel in ratios of 10:10, 15:15, and 5:10, respectively. B1, B2, B3, and B4 were the

designations of the baked goods.They were analyzed using approved techniques for the determination of moisture, ash, protein, fat, crude fibre, ascorbic acid, and total polyphenols. We used a bomb calorimeter to calculate the calorific value of bread. These four test breads' physical, chemical, and sensory characteristics were compared to those of B0, a control bread made with only 100% wheat flour. The bread (B1) made by substituting 10% of the flour with 5% of each of the flours made from banana and pomegranate peel was determined to be sensory-acceptable. The aforementioned factors were examined for the B1 bread. When compared to B0 bread, the levels of protein and fat in B1 bread rise, from 6.7% to 9.4% and 6.2% to 10.12%, respectively. Additionally, bread's calorific value has grown from (183.6 Kcal to 276.1 Kcal) B1 bread had a greater phenolic and moisture content value (0.201g/GAE) and (33.74%), respectively, than B0 bread... According to the findings, B1 bread had a greater moisture content (33%) than control bread (27%), making it more antioxidant-rich and staling-resistant. The amount of dietary fibre in B1 bread is also discovered to be ten times higher than in B0 bread. According to research, 10% of the flour may be replaced to make bread that is both nutritionally and aesthetically acceptable. (S Bandal, M Talib, V Parate, 2014).

Physical and chemical properties of banana pulp and peel flour were assessed, including pH, total soluble solids (TSS), water holding capacity (WHC), and oil holding capacity (OHC), in addition to colour values L, a, and b, back extrusion force (BEF), viscosity, and other factors. at temperatures of 40, 60, and 80 °C. Data were acquired, and MANOVA, Discriminant and cluster analyses were out. All statistical tests revealed that the physical and chemical characteristics of green and ripe bananas, as well as pulp and peel-based flour, varied. Green and ripe banana flour may be distinguished by TSS and viscosity, but peel and pulp flour can be distinguished by WHC40, WHC60, and BEF. (AFM Alkarkhi, S bin Ramli, YS Yong, 2011).

According to a study, ripe bananas nevertheless have a limited shelf life of 4–7 days, making them one of the most perishable commodities. The purpose of this experiment was to assess the quality of ripe banana slices and bread made with ripe banana flour. Two varieties of ripe bananas (Gros Michel and Medium Cavendish) were cut into slices, pre-treated with 2% citric acid for two minutes, and then dried in an oven at 50°C for 72 hours to produce dry banana slices for flour. Some of the ripe banana slices that had been dried in the oven were crushed in a hammer mill and put through a 250-micron screen sieve. Ripe banana flour was used to make bread, which was then evaluated after being mixed with various ratios of 0, 10, 20, and 30% wheat flour. The sensory characteristics of the two types of bananas' bread and oven-dried ripe banana slices, including their colour, flavor, texture, and overall acceptability, were established Slices of ripe bananas that had been dried in the oven, a control sample, and the two most popular bread kinds were all subjected to proximate analysis. The dried banana slices from the oven also underwent a mineral analysis. The study's findings showed that, except from colour, there was no difference in the other sensory characteristics of the dried, ripe banana in the oven ($p>0.05$) Among the substitutes, the bread with 30% composite peel flour was the most favored. An approximate Slices from Medium Cavendish and Gros Michel's relative moisture levels were 17.20 and 20.10%, according to analyses. ash was 3.00 and 3.30%, fat was 1.0 and 0.5%, protein was 3.5 and 4.8%, fibre was 0.9%, and their carbohydrate content was 73.0 and 71.30%. Their respective energy contents were 340.70 and 303.10 kcal/100g. (J Adubofuor, I Amoah, V Batsa, 2016).

Unripe bananas (Musa paradisiacal L.) were used to make banana flour (BF), which was obtained and then chemically analyzed.With the use of BF flour, an experimental loaf of bread was created, and its chemical make-up, amount of accessible and resistant starch, and in vitro starch digestion rate were all examined Total starch (74.36%) and dietary fibre (13.52%), which were the two main components, were found in the largest amounts in BF, according to its chemical makeup. Among the overall amount of starch, accessible starch made up 56.29% and resistant starch 17.50%. In comparison to control bread, BF bread included more protein and total starch, although the latter contained more lipids. Due to BF bread's increased quantity of accessible, resistant starch and indigestible portion compared to the other breads under study, there were noticeable changes in these components. The BF bread's expected glycemic index, which was calculated using HI data and was 65.08% rather than the control bread's predicted glycemic index of 81.88%, may have a "slow carbohydrate" quality. A prospective additive for bakery goods containing slowly digesting carbs was identified by the results (BF. E Juarez-Garcia, E Agama-Acevedo, 2006).

On the bioactive ingredients and microstructural quality of chapatti, the impact of banana peel powder (BPP) was assessed. Chapatti dough made with 5, 10, 15, and 20% BPP had its stickiness, strength, knead ability, and rollability tested. Increased BPP level resulted in higher subjective scores for the knead ability and rollability of the

chapatti. With a higher level of BPP, dough stickiness increased and dough strength rose. Chapatti that had been combined with BPP had considerably greater levels of total phenolics and flavonoids than the control. (A Kurhade, S Patil, SK Sonawane,2016).

For commercial bakers, output is crucial commercially in addition to bread quality. when either 0.23% pectin or 2.5% citrus peel fibre is used in place of flour. Pectin improved water absorption by 4% when used in baking and by 2% when used in manographs. But more importantly, orange peel fibre enhanced water absorption by 7% in the manograph, 6.4% in the mix lab, and 6.5% in baking. Compared to pectin, the fibre in citrus peels strengthened dough. Loaf volume was reduced in breads with citrus peel fibre. The volume of the bread was not affected by pectin; however, the crumb grain was negatively impacted. Bread firming was unaffected by either the pectin or citrus peel fibre. By boosting water absorption, citrus peel fibre increased loaf weight, demonstrating that tiny quantities of citrus peel fibre can significantly improve bread production. (Rebecca A. Miller, 2011) .

Making gluten-free bread for celiac disease sufferers was the aim of this investigation. Banana (Musa spp.) flour was chosen in this experiment because it is a viscous substance that may replace gluten protein. Starch, sugar (sucrose), compacted yeast, water, and banana flour were used to make the gluten-free bread. Green (unripe) and yellow (ripe, 5 day) banana flours didn't produce bread with the desired height (mm) or particular volume. Black banana flour, on the other hand, which was overripe for 44 days, had good breadmaking qualities. In order to separate t The suspension of black banana flour and water was dialyzed against a sizeable volume of water to separate the nondialyzable (high-molecular-weight (HMW) and dialyzable (low-molecular-weight (LMW) fractions. Only when combined did the HMW and LMW fractions exhibit effective breadmaking abilities. The improved effects of black banana flour or the HMW/water with LMW fraction on breadmaking were lost when they were baked at 127°C for 100 minutes in an autoclave. indicating that the enzymes in black banana flour act as important components. RVA (rapid Visco analyzer) and manograph tests are employed. it was possible to determine that the flour made from black bananas had high amylase and protease activity (M Seguchi, A Tabara, K Iseki, M Takeuchi, 2014).

People who consume a lot of dietary fibre tend to have a much-decreased chance of getting certain gastrointestinal disorders, hypertension, diabetes, obesity, and coronary heart disease. Blood pressure and serum cholesterol levels are reduced when fibre consumption is increased. The glycemia and insulin sensitivity of both diabetics and non-diabetics are improved by increasing soluble fibre consumption. Weight reduction is dramatically enhanced in obese people who use fibre supplements. Numerous gastrointestinal diseases, such as gastroesophageal reflux disease, duodenal ulcers, diverticulitis, constipation, and hemorrhoids, can be helped by increasing fibre intake. The immune system seems to work better with prebiotic fibres. For both toddlers and adults, consuming enough dietary fibre has advantages. For both adults and children, consuming 14 g of dietary fibre per 1000 calories is advised. (JW Anderson, P Baird, RH Davis,2009).

This study sought to determine whether adding banana-peel flour to gluten-free cookies would improve the quantity of dietary fibre in the final product. The nutritional fibre content, lightness value, and yield of banana peel flour were assessed in relation to the impacts of several banana varieties and anti-browning pretreatment techniques. Additionally, studies were done to determine how maize flour's gelatinization condition and the amount of banana peel added to it affected the physical and chemical properties, as well as the consumer approval, of cookies. As a consequence, the yield and lightness of banana peel flour changed but not the amount of nutritional fibre, although both Type of bananas and pre-treatment technique against browning were unaffected. Because it had the maximum lightness and yield value of any banana-peel flour sample, steam-blanched kapok was selected as the ideal sample. While it was found that the ratio of banana peel to corn flour in the study of fibre incorporation to cookies had an impact on all parameters,Considering the diameter growth, spread ratio, yield, colour, hardness, and moisture content, as well as the flavor, appearance, fragrance, texture, and general acceptability of cookies. However, only the diameter growth, hardness, lightness, and consumer acceptance of cookie flavor is impacted by the maize flour's gelatinization condition. according to client preferences, the best gluten-free cookie had a corn flour to banana peel ratio of 20:80 and was baked using non-gelatinized maize flour. The amount of dietary fibre in these cookies, 3.530.26%, makes them a "source" of dietary fibre that people with celiac disease may ingest. (LB Poerwoko , 2012).

5. CONCLUSION

In this experiment, an effort has been made to create fiber-rich flat bread that contains powdered banana peels at proportions of 5%, 10%, 15%, and

20%. To choose the optimal formulation, the baked goods were subjected to sensory evaluation. The amount of fibre in a chosen sample was examined. Polythene bags were used to package and keep samples with a high amount of fibre for one week at room temperature. We examined the moisture content and customer acceptability both before and after storage. The amount of fibre in the chosen sample (Sample C) was examined. Sample C had 4.91% more fibre than standard flat bread, which had 2.25%. The conclusion is that a sudden rise in fibre content, more than double the typical one, was produced by substituting wheat flour with banana peel at a level of 15%. The product (C) of choice was wrapped in polythene bags and kept at room temperature for a week. At intervals of two days, the shelf-life quality was examined. It was discovered that the moisture content increased slightly from 21.26 to 22.51% over each storage term. The sample C has a shelf life of no more than 6 days, according to the sensory evaluation after 6 days of storage, as the sensory score fell below 4.0. The use of powdered banana peel in flatbread will much assist to boost the crude fibre content, I conclude from the aforementioned data. Also, when kept at room temperature, a product like this has a shelf life of no more than 6 days

6. REFERENCE

1. Food safety and standards (food products standards and food additives) regulations, 2011, Food safety and standards authority of India, New Delhi.
2. FSSAI Manual of methods of analysis of foods, cereal and cereal products, food safety and standards authority of India, ministry of health and family welfare, government of India, New Delhi; 2016
3. T.H. Emaga, C. Robert, S.N. Ronkart, B. Wathelet, M. Paquot, Dietary fibre component and pectin chemical features of peels during ripening in banana and plantain varieties.
4. J.A. Larrauri, P. Ruperez, F. Saura-calixto, New approaches in the preparation of high dietary fibre from fruit by-products.
5. Adebayo-Oyetoro AO, Ogundipe OO, Adeeko KN (2016) Quality assessment and consumer acceptability of bread from wheat and fermented banana flour.
6. Eshak NS (2016) Sensory evaluation and nutritional value of balady flat bread supplemented with banana peels as a natural source of dietary fiber.
7. H.M. Al-Dmoor.
8. Flat bread: ingredients and fortification. Qual. Assur. Safe. Crops Foods, 4 (2012), pp. 2-8.
9. Abbas F.M. Alkarkhi, Saifullah bin Ramli, Yong Yeoh Shin, Azhar Mat Easa Physicochemical properties of banana peel as influenced by variety and stage of ripeness: multivariate statistical analysis.
10. M.O. Ameh, D.I. Gernah, B.D. Igbabul Physico-chemical and sensory evaluation of wheat bread supplemented with stabilized undefatted rice bran.
11. Food Nutr. Sci., 4 (2013), pp. 43-48.
12. B.A. Anhwange, T.J. Ugye, T.D. Nyiaatagher Chemical composition of Musa sapientum (banana) peels.
13. Dietary Reference Intakes (DRIs), 2009. Recommended Intakes for Individuals (PDF). Food and Nutrition Board, Institute of Medicine, National Academies. retrieved 2009-06-09.
14. T.H. Emaga, R.H. Andrianaivo, B. Wathelet, J.T. Tchango, M. Paquot Effect of the stage of maturation and varieties on the chemical composition of banana and plantain peels.
15. Food Chem (2007)
16. T.H. Emaga, C.S.N. Robert, B. Ronkart, B. Wathelet, M. Paquot Dietary fibre components and pectin chemical features of peels during ripening in banana and plantain varieties.
17. Bioresour. Technol., 99 (2008), pp. 4346-4354.
18. A.L. Hegazy, M.S. Ammer, M.I. Ibrahium Production of Egyptian gluten-free bread.
19. World J. Dairy Food Sci., 4 (2) (2009), pp. 123-128.
20. Saifullah Ramli, Abbas F.M. Alkarkhi, Yeoh Sing Yong, Azhar Mat Easa Utilization of banana peel as a functional ingredient in yellow noodles.
21. A.Catharine Ross, Christine L. Taylor, Ann L. Yaktine, Heather B. Del Valle (Eds.), Committee to review dietary reference intakes for Vitamin D and calcium, Institute of Medicine, Dietary Reference Intakes for Calcium and Vitamin D (2011).
22. M. Schleibinger, A.L. Meyer, N. Afsar, A. Gyorgy Nagy, V. Dicker, J.J. Schmitt Impact of dietary fibers on moisture & crumb firmness of brown bread.
23. A.M. Sharoba, M.A. Farrag, A.M. Abd El-Salam Utilization of some fruits and vegetables waste as a source of dietary fiber and its effect on the cake making and its quality attributes.
24. P.S. Wachirasiri, S. Julakarangka, S. Wanlapa The effects of banana peel preparation on the properties of banana peel dietary fibre concentrate.
25. Bandal Suresh, Talib Mohammed, Parate Vishal Utilization of banana and pomogranate peel flour in fortification of bread.

26. Adebayo-Oyetoro AO, Ogundipe OO, Adeeko KN. Quality assessment and consumer acceptability of bread from wheat and fermented banana flour. Food Sci Nutr. 2016.
27. Agama-Acevedo E, Islas-Hernandez JJ, Osorio-Díaz P, Rendón-Villalobos R, Utrilla-Coello RG, Angulo O, Bello-Pérez LA. Pasta with unripe banana flour: physical, texture, and preference study. J Food Sci. 2009.
28. Agama-Acevedo E, Islas-Hernández JJ, Pacheco-Vargas G, Osorio-Díaz P, Bello-Pérez LA. Starch digestibility and glycemic index of cookies partially substituted with unripe banana flour LWT - Food. Sci Technol. 2012.
29. Alkarkhi AFM, Ramli SB, Yong YS, Easa AM. Comparing physicochemical properties of banana pulp and peel flours prepared from green and ripe fruits. Food Chem. 2011.
30. Aurore G, Parfait B, Fahrasmane L. Bananas, raw materials for making processed food products. Trends Food Sci Technol. 2009.
31. Bertolini AC, Bello-Pérez LA, Méndez-Montealvo G, Almeida CAS, Lajolo F. Rheological and functional properties of flours from banana pulp and peel Starke. 2010.
32. Bezerra CV, Amante ER, de Oliveira DC, Rodrigues AMC, da Silva LHM. Green banana (Musa cavendishii) flour obtained in spouted bed—effect of drying on physico-chemical, functional and morphological characteristics of the starch. Ind Crop Prod. 2013.
33. Bezerra CV, Rodrigues AMC, Amante ER, da Silva LHM. Nutritional potential of green banana flour obtained by drying in spouted bed. Rev Bras Frutic. 2013.
34. Borges AM, Pereira J, Silva Júnior A, de Lucena EMP, de Sales JC. Stability of cake pre-mixture made with 60% of green banana flour. Cienc Agrotecnol. 2010.
35. Carvalho VS, Conti-Silva AC. Cereal bars produced with banana peel flour: evaluation of acceptability and sensory profile. J Sci Food Agric. 2018.
36. Costa ALR, Gomes A, Tibolla H, Menegalli FC, Cunha RL. Cellulose nanofibers from banana peels as a pickering emulsifier: high-energy emulsification processes. Carbohydr Polym. 2018.
37. Da Mota RV, Lajolo FM, Ciacco C, Cordenunsi BR. Composition and functional properties of banana flour from different varieties. Starke. 2000.
38. Elaveniya E, Jayamuthunagai J. Functional, physicochemical and anti-oxidant properties of dehydrated banana blossom powder and its incorporation in biscuits. Int J Chemtech Res. 2014.
39. Eshak NS. Sensory evaluation and nutritional value of balady flat bread supplemented with banana peels as a natural source of dietary fiber AOAS. 2016.
40. Gomes AAB, Ferreira ME, Pimentel TC. Bread with flour obtained from green banana with its peel as partial substitute for wheat flour: physical, chemical and microbiological characteristics and acceptance. Int Food Res J. 2016.
41. González-Montelongo R, Gloria Lobo M, González M. Antioxidant activity in banana peel extracts: testing extraction conditions and related bioactive compounds. Food Chem. 2010.
42. Happi Emaga T, Robert C, Ronkart SN, Wathelet B, Paquot M. Dietary fibre components and pectin chemical features of peels during ripening in banana and plantain varieties. Bioresour Technol. 2008.
43. Haslinda WH, Cheng LH, Chong LC, Aziah AAN. Chemical composition and physicochemical properties of green banana (Musa acuminata × balbisiana Colla cv. Awak) flour. Int J Food Sci Nutr. 2009.
44. Ho LH, Abdul Aziz NA, Azahari B. Physico-chemical characteristics and sensory evaluation of wheat bread partially substituted with banana (Musa acuminata X balbisiana cv. Awak) pseudo-stem flour. Food Chem. 2013.