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DEVELOPMENT OF A NUTRITIOUS LOW FAT FINGER MILLET CHAKLI

¹SAKSHI KOLHE, ²SWETA MISHRA ³SHITAL GIRI

^{1,2}Ajenkya D.Y Patil University, Pune, Maharashtra, India

ABSTRACT

Finger millet is one of the most oldest millet in India and belongs to a period of thousand years in the past. Amongst all the cereals and millet that is available today, finger millet holds the highest content of Calcium, Potassium, high dietary fiber, mineral, sulfur and amino acids, as compared to white rice which is the main staple food of India. Millet contains calcium 344mg and potassium 224mg per 100gms.

As chakli being a traditional savory food product, it is recognized to be low in protein and mineral and because of frying the fat content also gets increased. As a result we produced a chakli which was fat fried (traditional method) and also in oven which was a baked product. Multiple samples of chakli were prepared using the two base ingredients that was ragi flour and Bengal gram flour. After preparation of this two chakli samples it was observed that the fat content differed in the fat fried and oven baked sample. The oil intake of the chakli was reduced and the protein content was increased in the baked version of the chakli. Ragi flour can be incorporated to Bengal gram flour to formulate Calcium, iron, protein rich chakli. The main objective of this research is to prepare nutrition rich chakli using ragi. Calcium deficiency leads to bone and teeth disorders, iron deficiency, which can be overcome by introducing finger millet (ragi) in daily diet.

Keywords- chakli, oil uptake, oven baked, mineral content, protein content, incorporated, deficiency.

1.INTRODUCTION

Baked products are liked by a large number of people because it is available anywhere anytime, suitable of being ready to eat and having more of a shelf life. Baked products have low moisture content and therefore there is a less chance of its microbial spoilage and henceforth there is a largescale production and distribution of the same.

Large number of population today prefers snack type foods because it being easy to carry light weight and can be considered a quick snack food. These snack food items can be carried anywhere and anytime. Nowadays because of the heavy and hectic lifestyle people prefer this snack food to avoid hunger. Traditional chakli is produced by using two flour combinations of chickpea and Bengal gram, added with flavorings and spices. It is formed in spiral form using a traditional chakli maker. The combination of these various ingredients, it has a characteristic aroma that originates using bengal gram or chickpea flour and flavor full spices. Because this delicacy is originated in India, people here like it with a strong spicy flavor.

Finger millet is also known as ragi , nachni or nagli ,which is one of the most important millets in India and

abroad. It is commonly grown in India and a traditional food of the south Indians. Indians consume cereals as their staple food which provides them 70-80% of the energy, but the consumption of millets is low compared to rice. Due to hectic schedules, unhealthy eating habits, no exercise in daily routine people nowadays are facing various disorders like diabetes mellitus, hypertension, cholesterol, high blood pressure, cancer, obesity. Therefore they are opting foods like oats which are high in fiber, phytochemicals, hypocholesterolemia and anticancer properties. But due to less favorable growing condition in India the oats that are consumed are of imported quality therefore are higher in prices.

There are so many different millets like ragi which have the same health benefits and are cheaper as compared to oats, there is ignorance of nutritional content.

Finger millet has various health benefits for infants, elderly people, and pregnant women as it is significantly high depositing calcium. The reports also show that consumption of finger millet helps the lactating mothers to produce more breast milk.

The food that is fried is always of a low quality combining with off

flavors. Hence the eating of foods which are made in overused fats or oil is itself a process of self-limiting. Therefore, the hazards due to over eating of fried food or fats are the main problems which are seen in deep fried foods. Cardiovascular disease, obesity, and diabetes are major health complications when there is high dietary fat intake. In spite of all the health concerns related to fat intake, fried products still remain popular. Hence more

2. HEALTH BENEFITS

Finger Millets is rich in magnesium and it not only helps in reducing severe asthma and migraine but also helps in reducing diabetes, heart related diseases, high blood pressure and atherosclerosis. Finger Millets are rich in phosphorus and phosphorus is beneficial mineral which produces energy, that is crucial component of ATP. 1cup of cooked millet provides 27% of daily value of phosphorus. Magnesium present in finger millets helps to relax the blood vessels, improves the blood flow and hence maintains the blood pressure. Hence it protects from cardiovascular diseases. The lignin present in millets gets converted into mammalian lignans with the help of healthy gut micro flora in the body which also protects from breast cancer. Finger Millets also prevent the gallstones, as it contains insoluble fiber and studies show that insoluble fiber reduces the risk of gallstone by 17%. Finger Millets also helps in improving the insulin response thus

importance given to find out find out new methods of reducing the fat content, reduce the oil uptake while frying. Therefore, oven baking is an alternative method to overcome all the disadvantages of deep frying.

The main objective of this study is to enhance the shelf life by modifying the traditional method and incorporating nutritious ingredients and to replace the traditional deep fried method with baking.

maintaining the blood glucose level. Finger Millets help in supplementing calcium to the body as it provides 344mg/100g. Women who have reached the menopause and facing issues like obesity, high blood pressure, high cholesterol can be benefited by consuming finger millets 6 times a week. It is also preventing premature death.

3. MATERIALS AND METHOD

3.1. INGREDIENTS

Finger millet flour, bengal gram flour, turmeric, asafetida, salt, red chili powder, sesame seeds, caraway seeds, soyabean oil for frying obtained from local market in Pune, water.

3.2. PACKAGING MATERIAL

LDPE (low density polyethene) is used for successful packaging material for the

chakli.



3.3. EQUIPMENTS USED

Equipment such as Chakli maker, hot air oven, thermometer of the temperature analysis, weighing scale were used.

3.4. CHEMICALS

Chemicals which are of Food Grade is to be used from MIT college laboratory.

For Protein Estimation

1. Kjeldahl catalyst: Mix 9 part of potassium sulphate and 1 part copper sulphate
2. Sulphuric Acid
3. 40% NaOH Solution
4. 0.2 N HCl Solution
5. 4% H₃Bo₃
6. Indicator Solution : Mix 100 ml of 0.1% methyl red (in 95% ethanol) with 200 ml of 0.2% bromocresol green (in 95% ethanol)

For Fat Estimation

1. Petroleum ether

For Carbohydrate Estimation

1. Boiling water bath.
2. Conc. H₂SO₄
3. 0.2% (w/v) anthrone solution

3.5. METHODOLOGY

The finger millet chakli is prepared by replacing the traditional flour with finger millet flour and Bengal gram flour. Beginning with the weighing of ingredients as mentioned in table no. 1, dry roast all the dry ingredients on a low flame, until the aroma is released, then mix all the dry ingredients, mix the finger millet flour as mentioned in table no. 1, with turmeric, salt, asafetida, caraway seeds, sesame seeds. Add warm oil of measurement 0.011g at the temperature of 134 °C and warm water at the temperature of 41°C (water as require to form the dough).

Form a dough of smooth consistency. let the dough rest for 15 mins. Place the formed dough in a oil greased mechanical hand chakli press, and form the spiral chakli as required.

Heat the oil for about 184 °C for 10 minutes and then add the formed chakli in the hot oil. Fry the for approximately 5-7 minutes. Remove from the oil place it on a paper towel, let it cool and place the chakli in LDPE packaging material.

Now preheat the oven for 10mins at 175°C, place the chakli on the oven tray and bake them for 35 mins. Remove the chakli, let them cool

and place the LDPE packaging material.





FIG-1. PREPATION OF FINGER MILLET CHAKLI

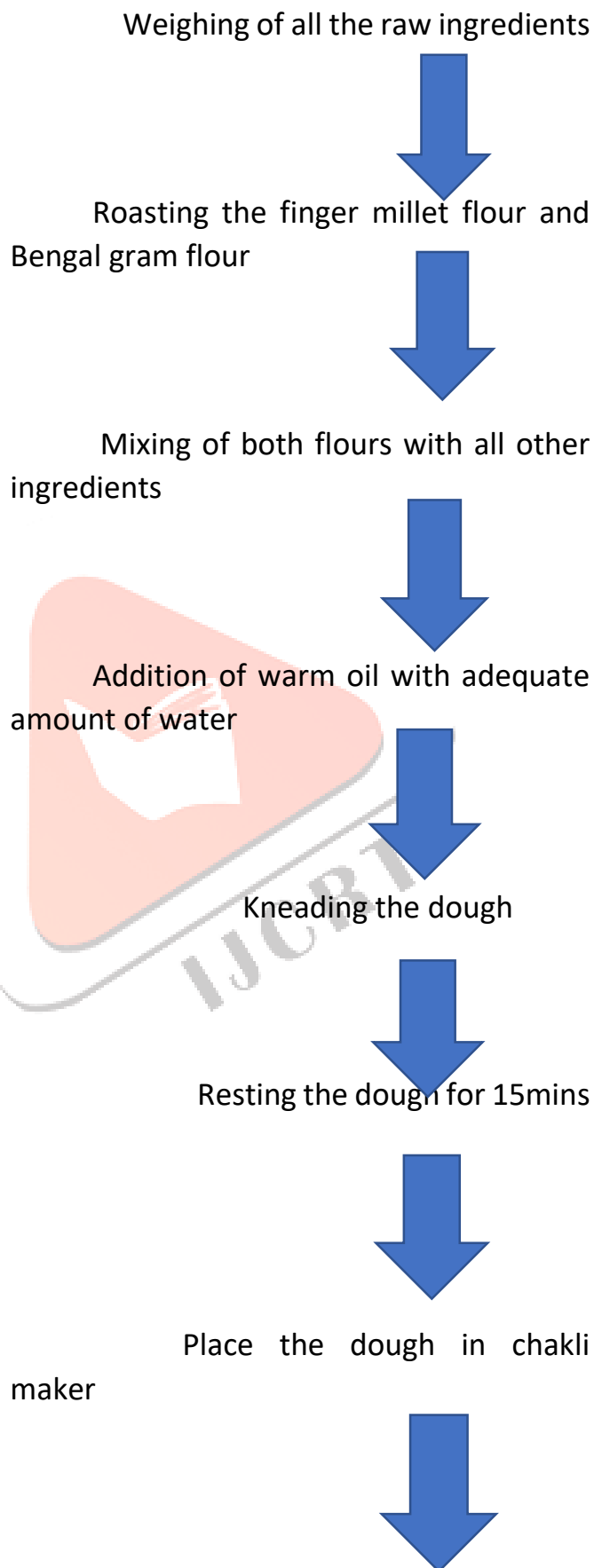
TABLE NO.1

INGREDIENTS	QUANTITY
Finger millet flour	200g
Bengal gram flour	100g
Turmeric	0.005g
Asafoetida	0.005g
Salt	0.004g
Red chilli powder	0.005g
Sesame seeds	0.008g
Caraway seeds	0.003g
Soyabean oil	1/2ltr
Water	As required

4.PROCESSING PARAMETER FOR THE CHAKLI

TABLE NO. 2

PROCESSING PARAMETER	VALUE
Initial temperature of oil	135 °C
Final temperature for frying	185 °C
Time taken for frying	4-7 mins
Resting time of the dough	10mins



Deep fry the chakli for 5-7 mins/ bake them for 35 mins



5. CHEMICAL ANALYSIS

5.1 Determination of moisture

The moisture content was determined by oven drying method. 0.052g of sample was broken into pieces (crushed), dried in the oven for 107 °C to a constant weight. The sample was cooled in the desiccator, weighed again and the loss in weight was recorded as moisture content (18).

$$\text{Moisture (\%)} = \frac{W1 - W2}{W1} \times 100$$

Where,

W1= initial weight before drying

W2= final weight after drying



5.2 Determination of protein content

The protein content is to be determined by the method of micro kjeldahl (19).

$$\text{NITROGEN (\%)} = \frac{\text{Sample titre} - \text{Blank titre} \times \text{Normality of HCL} \times 14 \times 100}{\text{Weight of sample} \times 1000}$$

$$\text{PROTIEN CONTENT (\%)} = \text{Nitrogen\%} \times 6.25$$

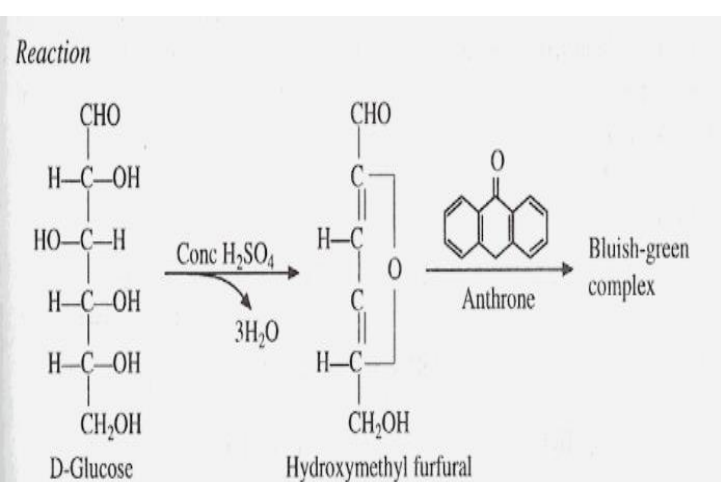
5.3. Determination of fat

Fat is to be estimated by method of Soxhlet apparatus (19).

$$\text{Fat (\%)} = \frac{\text{weight of fat}}{\text{weight of sample}} \times 100$$

5.4. Determination of carbohydrate

Total carbohydrate is to be estimated by Anthrone method (19).



6. ECONOMIC FESEABILTY OF FINGER MILLET CHAKLI

TABLE NO.3

Ingredients	Rate (Rs/kg)	Quantity (g)	Cost (Rs)
1.Finger millet	48	750	36
2. Bengal gram flour	100	250	25
3. oil	90	1/2lt	45
4. salt, chili powder, turmeric,	--	--	20
5. Fuel and packaging	20	--	20
6.miscellaniou s	10	--	10
7. cost/kg (chakli)	-	1kg	

The cost estimation of production of the chakli was done using the method of standard calculation. And considering all the costs beginning from raw material, processing, packaging, from table no 3 the total production cost of 1kg product costs Rs.156.

7. RESULTS

The approximate values after the chemical analysis of the chakli is represented in table no. 4.

The values which were obtained through the analysis showed that the moisture content of the baked chakli is 9.6%. The building blocks of body tissue, Protein was estimated to be 7.9g/100g.

The very important components of the diet carbohydrates and fats which are the major source of energy was estimated to be 54g/100g and 25g/100g respectively. This chakli is also a very rich source of dietary fiber which is required to the human body for the cleaning of the digestive track.

TABLE NO.4

Moisture content	9.6%
Protein	7.9g/100g
Carbohydrates	54g/100g
Fats	25g/100g

The value is an average of 4 samples.

8. DISCUSSION

The above experiment convinces that the basic, simple and traditional chakli preparation can be changed slightly by replacing the raw ingredients which are nutrient rich. The process of frying can be replaced by oven baking which reduces the fat content in the food product. From this

experiment the main objective of protein, mineral enrichment and reducing the fat was achieved. The traditional chakli is made with rice flour. Finger millet chakli is produced by incorporating Bengal gram flour and these were more nutrient rich as compared to the traditional one. The baked sample was having high nutritive values with high protein, mineral content as compared with deep fried sample. These chakli samples can be stored for 3 months without any quality deterioration.

9. CONCLUSION

The project work was undertaken to standardize the production of baked Finger millet chakli which was prepared using finger millet flour and bengal gram flour as the base ingredients and these flours were acceptable as compared to the traditional recipe which included rice flour, chickpea flour. The color of the chakli appeared to be in a dark brown color, but the taste, and the flavor of the ingredients added were and the texture appeared to be very acceptable as compared to the fried sample. Therefore, it can be concluded that the baked Finger millet chakli was evidently more satisfactorily acceptable.

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