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## **Study of Gluten-Free Heart-Friendly Crackers**

### **Research Article**

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#### Abstract

A study was conducted to understand the acceptance of gluten-free crackers. Our aim was to standardize an innovative and preservative-free product, which was cost-effective. It was developed using raw banana flour, flaxseed, and pomegranate seeds as the main ingredients. Banana flour is rich in resistant starch, flaxseed contain essential fatty acids and antioxidants while pomegranate seeds are rich in phytochemical. The product obtained was gluten-free and can keep your heart healthy, support digestive health and may also lower the risk of cancer. The acceptability of the product was studied by conducting a sensory evaluation using a scoring test. A five-point scale was used for sensory attributes like appearance, taste, flavor, texture, after-taste, and crispiness. The other areas of focus were packaging, nutrition labeling, budgeting, and marketing.

Keywords: Gluten-free; Crackers; Phytochemical; Antioxidants; Celiac disease; Heart disease; Low-fat; Sensory evaluation; Functional foods, Healthy snack

#### Introduction

Foods are no longer considered only on terms of taste and immediate nutritional needs but also in terms of their ability to provide specific benefits avocet and beyond their nutritional value. Heart friendly crackers are a product made specifically for glutenintolerant and heart patients. There are certain ingredients used which may be beneficial for their health.

Pomegranate seed, which contains phytochemicals, which are naturally occurring, plant chemicals. Once we eat them, they can influence the chemical processes inside our bodies in helpful ways. Some of the benefits of the phytochemical that studies have found out are as follows: Aid the function of the immune system; Protect cells and DNA from damage that may lead to cancer; Reduce inflammation, Slow the growth rate of some cancer cells; Help regulate hormones (Rosewellpark.org) [1].

Another ingredient used was flaxseeds. Flaxseed is found in all kinds of today's food from cranes to frozen waffles to oatmeal. There is an increasing demand for flaxseed among consumers because of the benefit in has.

Omega-3 essential fatty acids "The good fats" have been shown

to have heart-healthy effects. Each tablespoon of ground flaxseeds contains about 1-8 grams of pant Omega-3.

Flaxseed contains 75 to 80 times more lignans than any other foods. They also contain both soluble and insoluble fiber [2]. Lignans, which are having plant estrogen and antioxidant qualities.

Research suggests that pants Omega- 3 help the cardiovascular system, through several different mechanisms, including antiinflammatory action and normalizing the heartbeats. New research claims that flaxseeds have significant role in lowering the blood pressure [2,3].

Another main ingredient of the product developed was raw banana flour. When we see the word flour, it typically means that something has been ground into flour, either from its original state or in a dried state. It is no different from green banana flour; organic raw banana flour maybe familiar if a person is always on the lookout for gluten - intolerant. Raw banana flour contains resistant starch, which may help in lowering blood sugar levels. Additionally, the resistant starch (a prebiotic) helps to form good bacteria in the gut. There are several other benefits of raw banana flour like it may improve negative effects of metabolic syndrome, promotes healthy colon, possibly aids weight loss, and could also even reduce insulin sensitivity.

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The main purpose of developing this food product was to give an alternate for the heart problems seen in the present-day lifestyle. Studies have shown that CVDs have now become that leading cause of mortality in India. A quarter of all mortality is attributed to CVDs (Dorairaj Prabhakaran.). Using Flaxseed, Raw Banana, Garlic and Pomegranate Seeds to make this product will have effective results to those patients since it helps in improving their overall health, can be cost effective, so if made in bulk also can be a snack for everyone who is looking for a healthy alternative.

#### Objectives

Objectives of this product are to study the shelf life of the product by sensory evaluation, to standardize an innovative cost-effective food product [4]. To understand the packaging, marketing, and budgeting aspect of the product, to design nutritional label.

#### Methodology

A product was finalized after deliberating and brainstorming i.e., heart friendly crackers. These crackers are a healthy snacking option along with dips. Sprouts or any other kind of toppings or even can be taken with tea or coffee.

The target group was specially heart and gluten-intolerant patients as it does not have gluten in it and can cater to everyone because it is healthy, nutritious and has a lot of health benefits.

#### Materials & Methods

Crackers were tried out with the ingredients which are listed in Table 1A. The dough of all these ingredients was prepared and kept in the oven for 20 min at 150°C without flipping them upside down until the color changes to light brown. This gave crackers a hard and crispy texture. After doing sensory evaluation of these crackers, the acceptability was not that great, so the recipe was further modified to get better taste and appearance as per the acceptability of everyone.

#### Standardization

Table 1B explains the product after standardization (30gm).

#### Preperation

Roast Flaxseeds and pomegranate Seeds, then grind it separately, after that take banana flour in a bowl and add all the ingredients (such as water, garlic, flaxseeds, pomegranate seeds, spices, and herbs). Mix all the ingredients well and form soft dough from it, then preheat

Table 1A: List of Ingredients used	to prepare Gluten Free Cracker.
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Ingredients	Amount
Banana Flour	50 gm.
Water	40 ml
Salt	1 tsp.
Chat Masala	1/2 tsp.
Cumin	1/2 tsp.
White Pepper	1 tsp.
Garlic	1/2 tsp.
Red Chilli Powder	1-1/2 tsp.
Pomegranate Seeds	2 tsp.
Flax Seeds	1/2 tsp.

the oven at 130°C. Grease the baking tray with oil, spread the dough evenly in the baking tray, and cut it into desired shape such as triangle, rectangular shape, circle or square. Remove the tray from oven and cool it for 5 min. After it cools, pack the crackers in polypropylene bags and seal it (Tables 2 & 3).

#### Sensory evaluation for shelf-life study

A shelf-life study was conducted periodically to see the acceptability till they were not edible. A semi-trained panel of 25 members was selected to periodically test the product and was scored on a 5-point scale. Criteria, which were appearance, taste, flavor, texture, after taste. Crispiness and overall acceptability, which were scored on a 5-point scale. Scale of the 1-5 points follows; 5 = Excellent, 4 = Good, 3 = Average, 2 = can do, 1 = poor (Graph 1):

The first week after the product was produced changes weren't observed in the characteristics of the heart friendly crackers. To future elaborate this: During the first week the characteristics were

Table 1B: Second Trial List of Ingredients used to prepare Gluten Free Cracker.

Ingredients	Amount	
Banana Flour	20 gm.	
Water	20 ml	
Salt	1.55 gm.	
Chat Masala	0.36 gm.	
Cumin	1.3 gm.	
White Pepper	0.36 gm.	
Garlic	1.4 gm.	
Oil	2 gm.	
Red chilli powder	2 gm.	
Pomegranate Seeds	2.6 gm.	
Flax Seeds	0.26 gm.	
Oregano	.0006 gm.	

#### Table 2: Nutritional Facts.

Energy	24 Kcal
Carbohydrates	5.16 g
Protein	.31 g
Fats	.41 g
Fiber	.8 g

Table 3: Ingredients used with Amount and Cost.

Ingredients	Amount	Cost Rs.
Banana Flour	500 gm.	200
Pomegranate seeds	100 gm.	80
Flax Seeds	100 gm.	15
Salt	500 gm.	15
White Pepper	100 gm.	70
Chat Masala	100 gm.	50
Garlic	250 gm.	20
Cumin Seeds	250 gm.	60
Oil	1 kg	110
Gas + packaging		2
Oregano	15 gm.	70
Red Chili Powder	1 kg	160
Total		852

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highly rated. The product had good appearance, taste, crispiness and overall acceptability. In the second week there were certain changes observed in the color and crispiness of the crackers. In the third week the aroma of the product enhanced the overall acceptability was found to be very good. Thus, the product had a good shelf life and can be stored for a period of one month. Shelf can be increased if the product is stored in packaging material with higher range.

#### **Nutrition Label**

Nutrition labels describes the nutrition content of a food and are intended to guide the consumer in food selection as also shown in Figure 1. Standardized serving sizes to be able to make nutritional comparisons, information about the amount per serving of nutrition such as energy, protein, fiber etc. are important for people with different health concerns. The nutrition label had the following ingredients also shown in Figure 1: Raw Banana Flour, Pomegranate Seeds, Flaxseeds, Garlic, Herbs, and Species [5-7].

#### Packaging

Packaging material used for this food product was polypropylene bags shown in Figure 2A.

Polypropylene is a thermoplastic polymer used in wide variety of applications including packaging and labeling shown in Figure 2B also, was found to be cost effective.

#### Budgeting

Budgeting makes it easier for people with incomes and expenses of all sizes with conscious decisions about eh allocation of money. The ingredients used for the product was purchased in bulk from wholesale market so that it decreases the expenses and increase the profit and total packets prepared were 20.

Actual price for 1 maker (30 gm.) was Rs.13 but including the profit it went up to Rs.15. Budgeting helped us to know how to improve upon the next product.

#### Marketing

An exhibition as well as sell was organized at Dr. BMN College. We made 20 Packets per sale. The method we followed was giving samples to taste and then making them aware of the beneficial effects on health.





Figure 2A: Packaging Material.



#### Conclusion

Thus, it can be rightly concluded that heart friendly crackers are healthy and nutritious snaking option. It is rich in antioxidant and easy to make. Even the shelf life is pretty food that everyone can consume it.

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