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Preparation of Flaxseed Airfried Kurkure

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ABSTRACT: This research aimed to develop a healthier alternative to traditional deep-fried kurkure by integrating flaxseed and employing air-frying techniques. Flaxseed, renowned for its rich nutritional profile, including omega-3 fatty acids and fiber, was incorporated into the kurkure formulation to enhance its nutritional value. Air-frying, a healthier cooking method that minimizes oil absorption and the formation of harmful compounds, was employed to prepare the kurkure.

Firstly we had developed a product that is flaxseed air-fried kurkure and after that we gave done its all sensory evaluation and also we have examine the sensories.

After that we have taken one sample by which it's analysis we're taken part in future basis After that promiximate analysis were done and also its physical analysis also been noticed and observed successfully.

The developed flaxseed air-fried kurkure was subjected to comprehensive evaluation, encompassing sensory analysis, nutritional profiling, and consumer acceptability testing. The sensory evaluation revealed that the air-fried kurkure exhibited comparable sensory attributes to the traditional deep-fried version, indicating that the healthier cooking method did not compromise taste or texture. Nutritional analysis demonstrated a significant reduction in fat content while simultaneously increasing the fiber and omega-3 fatty acid content of the air-fried kurkure. This aligns with the expected benefits of incorporating flaxseed and utilizing air-frying.

Consumer acceptability tests were conducted to assess the overall appeal of the flaxseed air-fried kurkure. The results indicated positive feedback regarding the taste, texture, and overall liking of the product.

This study provides valuable insights into the development of healthier snack food options. By combining the nutritional benefits of flaxseed with the advantages of air-frying, this research offers a promising approach to producing a more nutritious and appealing snack alternative.

I. INTRODUCTION

In an era where health consciousness is on the rise, consumers are increasingly seeking healthier alternatives to traditional snacks. One such snack that has gained popularity is kurkure, a crispy and flavorful Indian snack. However, traditional kurkure is often high in unhealthy fats and additives. This research delves into the development of a healthier version of kurkure, incorporating the nutritional benefits of flaxseed and the convenience of air frying. Flaxseed, a nutritional powerhouse, is rich in omega-3 fatty acids, fiber, and lignans. These nutrients have been linked to various health benefits, including reduced risk of heart disease, improved digestion, and lower cholesterol levels. By incorporating flaxseed into the kurkure recipe, we aim to create a snack that not only satisfies cravings but also promotes overall well-being.

Air frying, a healthier cooking method, utilizes hot air circulation to cook food with minimal oil. This technique significantly reduces the amount of fat and calories compared to traditional deep frying. By air frying the flaxseed kurkure, we can further enhance its nutritional profile while maintaining its crispy texture and delicious flavor.

This research will explore the formulation and optimization of flaxseed air-fried kurkure. We will investigate various factors such as the proportion of flaxseed flour, the optimal air frying temperature and time, and the ideal seasoning blend to achieve the desired taste and texture. Sensory evaluation will be conducted to assess the product's acceptability

among consumers. Additionally, nutritional analysis will be performed to determine the macronutrient and micronutrient content of the final product.

By developing a healthier and more nutritious version of kurkure, we aim to contribute to the growing demand for healthier snack options. This research has the potential to provide a valuable contribution to the food industry by offering a novel and appealing snack that aligns with contemporary health trends.

Flaxseed, a tiny, golden seed, has been revered for centuries for its remarkable nutritional profile and potential health benefits. This unassuming seed, often overlooked, is a powerhouse of essential nutrients, including omega-3 fatty acids, dietary fiber, lignans, and protein. As global health consciousness grows, flaxseed has emerged as a superfood, garnering attention for its potential to support various aspects of well-being.

This report delves into the multifaceted world of flaxseed, exploring its historical significance, nutritional composition, and a wide range of health benefits. We will examine the scientific evidence supporting the claims associated with flaxseed consumption, including its potential to reduce the risk of heart disease, lower cholesterol levels, manage diabetes, and promote digestive health. Additionally, we will discuss the role of flaxseed in weight management, hormonal balance, and skin health.

By the end of this report, readers will have a comprehensive understanding of the nutritional value and potential health benefits of flaxseed. We will also explore practical tips for incorporating flaxseed into daily diets, addressing common concerns and misconceptions. As we journey through the pages of this report, we will uncover the hidden potential of this golden seed and its ability to contribute to a healthier and more vibrant life.

II. HEALTH BENEFIT OF FLAXSEED: A Golden Seed, A Wealth of Health: The Benefits of Flaxseed

Flaxseed, a tiny, golden seed, has been revered for centuries for its remarkable nutritional profile and potential health benefits. This unassuming seed is a powerhouse of essential nutrients, including omega-3 fatty acids, dietary fiber, lignans, and protein. As global health consciousness grows, flaxseed has emerged as a superfood, garnering attention for its potential to support various aspects of wellbeing.

Heart Health:

Omega-3 Fatty Acids: Flaxseed is an excellent source of alpha-linolenic acid (ALA), a plant-based omega-3 fatty acid. These fatty acids can help reduce triglycerides, lower blood pressure, and decrease the risk of heart disease.

Fiber: The soluble fiber in flaxseed helps lower cholesterol levels, particularly LDL ("bad") cholesterol, further reducing the risk of heart disease.

Digestive Health:

Fiber: Flaxseed is a rich source of both soluble and insoluble fiber. Soluble fiber can help lower cholesterol and regulate blood sugar, while insoluble fiber promotes regular bowel movements and prevents constipation.

Cancer Prevention:

Lignans: Flaxseed is a significant source of lignans, plant compounds with estrogen-like properties. Some studies suggest that lignans may help reduce the risk of hormone-related cancers, such as breast and prostate cancer. They may also help protect against colon cancer.

Hormonal Balance:

Lignans: The lignans in flaxseed can help balance hormones, especially in women. They may alleviate menopausal symptoms like hot flashes and night sweats. They may also help regulate menstrual cycles and reduce the risk of endometrial cancer.

Blood Sugar Control:

Fiber: The fiber in flaxseed slows down the absorption of sugar into the bloodstream, helping to stabilize blood sugar levels. This can be particularly beneficial for people with diabetes. It may also help prevent type 2 diabetes.

Weight Management:

Fiber: The fiber in flaxseed can help you feel fuller for longer, reducing appetite and promoting weight loss. It can also help regulate appetite hormones and improve satiety.

Skin Health:

Omega-3 Fatty Acids: The omega-3 fatty acids in flaxseed can help improve skin health by reducing inflammation and promoting a healthy complexion. They may also help reduce the risk of skin cancer.

Other Potential Benefits:

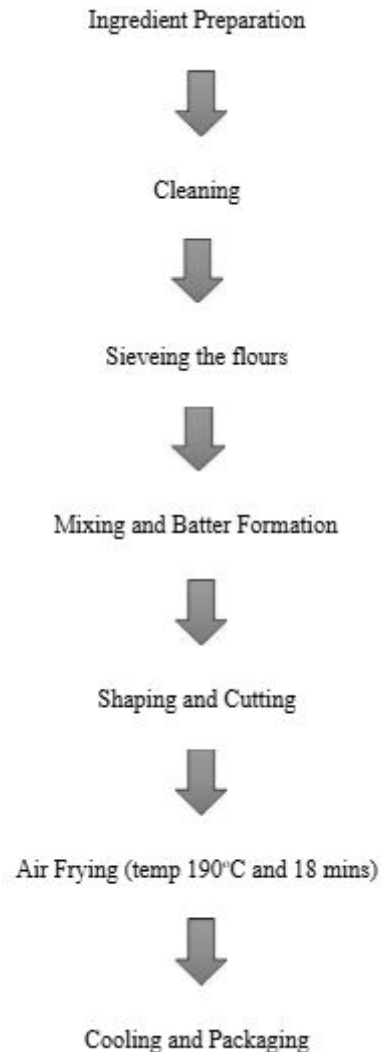
Antioxidant Properties: Flaxseed contains antioxidants that can help protect cells from damage caused by free radicals.

Reduced Inflammation: The omega-3 fatty acids and lignans in flaxseed have anti-inflammatory properties that may help reduce inflammation throughout the body.

Improved Brain Health: Some studies suggest that the omega-3 fatty acids in flaxseed may help improve cognitive function and reduce the risk of neurodegenerative diseases, such as Alzheimer's disease.

III. MATERIALS AND METHODS

MATERIAL	WEIGHT
Corn Flour	35g
Rice Flour	10g
Flaxseed Flour	3g
Besan	3g
Water	140ml
Salt	0.88g

3.0) FLOWSHEET OF FLAXSEED KURKURE**Preparation of flaxseed kurkure:****Mix Dry Ingredients:**

a large bowl, combine corn flour, rice flour, flaxseed flour, besan, and salt. Mix well to ensure even distribution.

Add Water Gradually:

Slowly add water to the dry mixture, stirring continuously.

The batter should be thick but pourable. Adjust the water quantity as needed. Knead the Dough: Knead the dough for 5-7 minutes until smooth and elastic. Roll Out the Dough:

On a lightly floured surface, roll out the dough to a thickness of about 1/8 inch Cut into Shapes:

Use a knife or a pizza cutter to cut the rolled-out dough into desired shapes, such as squares, rectangles, or diamonds.

Air Fry:Preheat your air fryer to 180°C (350°F). Lightly grease the air fryer basket with oil.

Place the cut pieces in a single layer in the basket, ensuring they don't overlap.

Air fry for 8-10 minutes, or until golden brown and crispy. Flip the pieces halfway through cooking for even browning

Cool and Serve:

Remove the air-fried kurkure from the air fryer and let them cool completely on a wire rack. Once cooled, store them in an airtight container.

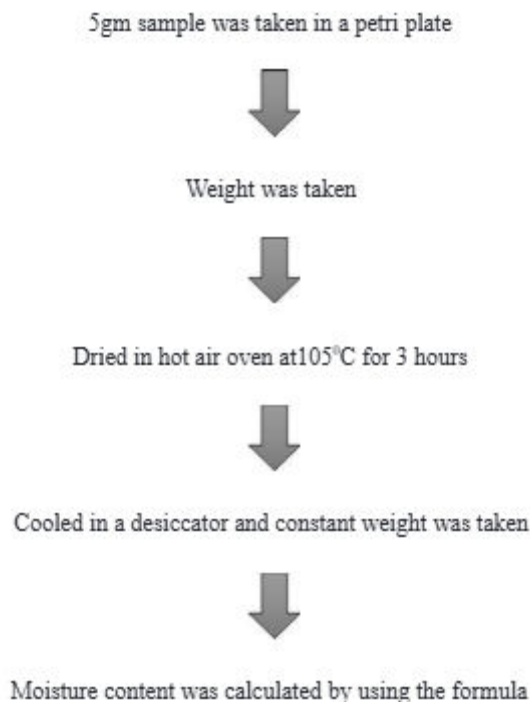
IV. RESULT AND DISCUSSION**PROXIMATE ANALYSIS:****Moisture Content:**

From above sample we have taken 3 Sensory evaluation for analysis purpose.

5gm of the sample of flaxseed Kurkure was taken in petri plate and the weight was measured, the petri plates with samples are placed in hot-air oven for drying that with at temperature 105 degree Celsius after three hours the sample was taken out and cooled in desiccator weight was taken and again place in the hot air oven to retrieve the sample and rewed after half an hour until the constant weight was obtained for last three readings.

Initial wt. of sample + petri plate – final wt. of sample + petri plate × 100
wt. of sample

Estimation of Moisture Content (of 3 samples were examine)

**3.0) Ash Content:**

Total Ash value: 5g of flaxseed Kurkure of 3 samples was taken to burn the sample after charring the crucible and was placed in a muffle furnace for ignition at 550 °C for 4 hours. The crucibles was taken outside and cooled in a desiccator. The sample was ignited again after every half an hour until a constant weight was obtained accepted by the difference of

$$\text{Ash\%} = \frac{\text{Weight of Ash}}{\text{Weight of sample}} \times 100$$

4.1 Estimation of Fat

5 gm sample was weighed and packed in a thimble the prepared thimble was weighed to cross- check the weight of the sample. The thimble was then enclosed in a big cellulose thimble and then it was placed in a Soxhlet extraction tube, 250 ml, of petroleum ether, was added to the Soxhlet extraction tube containing the sample. The heating mantle was turned on and the temperature was set at 60°C. Petroleum ether gets evaporated and condensed and falls over the sample drop by drop and the speed of dropping should be 150 drops per minute.

When clear color petroleum ether was seen in Soxhlet after 6- 12 hours, the assembly was turned off. The round bottom flask containing the solvent was separated from the assembly to recover the solvent. The solvent was recollected by using the downward distillation unit for the next use and the round bottom flask holding the extracted fat sample was dried in a hot air oven at 105 °C until all the solvent was removed after drying the RBF was cooled in a desiccator and the weight was taken until the last three successive reading shows the difference less than 0.001 gm. A 5-gram sample underwent initial weighing and was then enclosed within a thimble.

Subsequently, the thimble, now containing the sample, underwent an additional weighing to verify the sample's weight. The thimble, housing the sample, was then inserted into a larger cellulose thimble. This combined setup was carefully positioned within a Soxhlet extraction tube. To facilitate the extraction process, 250 ml of petroleum ether was introduced into the Soxhlet extraction tube containing the sample. Upon activating the heating mantle and setting the temperature to 60°C, the petroleum ether underwent a cycle of evaporation, condensation, and dripping over the sample at a controlled rate of 150 drops per minute. Once the petroleum ether, now visibly clear, was observed in the Soxhlet after 6-12 hours, the entire assembly was deactivated. The round bottom flask, holding the solvent, was then separated from the apparatus to recover the solvent. The reclaimed solvent underwent further processing using a downward distillation unit for subsequent use.

Meanwhile, the round bottom flask containing the extracted fat sample underwent a drying process in a hot air oven set at 105°C until all the solvent was completely removed.

Following drying, the round bottom flask was cooled in a desiccators, and its weight was measured until three successive readings showed a difference of less than 0.001 grams.

Percent fat was calculated as under:



Estimation of Carbohydrate:

The percent carbohydrates were calculated by subtracting the sum of moisture, protein, fat, ash and fiber from 100.

$$\% \text{ CHO} = 100 - (\% \text{ Moisture} + \% \text{ Protein} + \% \text{ Fiber} + \% \text{ Fat} + \% \text{ Ash})$$

$$\text{Carbohydrates}\% = 60.052\%$$

Estimation of Crude Fiber

The fat free sample obtained from the fat extraction test was used to calculate the crude fiber content. Initial Wt = 5gm

The sample was boiled in 200ml of 1.25% H_2SO_4 for 30 +. 1 min and filtered with dothman filter paper and washed with hot distilled water 6-8 times to remove all the traces of the acid from the sample.

Sample was then recollected and boiled with 200ml of 1.25% NaOH for 30 +. 1 min. after cooling it was filtered with whatman filter paper and again wash with lukewarm distilled water 2-3 times to remove NaOH from the sample.

After washing with distilled water, the sample was washed once with 10% HCl wash with ethanol

2 times.

3 times petroleum ether (ethanol)

After washing the remaining residues were collected in a previously weighed crucible, and it was then dried in a preheated hot air oven at a temperature 105°C for 3 hours.

The crucible was cooled in a desiccator after cooling the weight was noted. Then the crucible was placed in preheated muffle furnaces 550°C until ash obtained.

The crucible was cooled in a desiccator and the weight was measured.

4.2 Estimation of Protein

The protein content of the samples was determined utilizing the Kjeldahl method. Initially, 2 grams of the sample underwent digestion with 5 grams of a digestion mixture, comprising 10 parts potassium sulfate and 1 part copper sulfate, along with 20 ml of concentrated sulfuric acid. This digestion process continued in a Kjeldahl flask until the contents achieved a state of being carbon-free. The resulting digested sample was then adjusted to a final volume of 100 ml. A 10 ml aliquot of the digested sample was subjected to distillation with 20 ml of 30 percent sodium hydroxide. The liberated ammonia from this process was collected in a solution containing 20 ml of 2 percent boric acid, enriched with 2-3 drops of a mixed indicator. This indicator was a combination of 0.1% methyl red and 0.1% bromo-cresol green, dissolved in 95 percent ethyl alcohol, with a ratio of 1:5, respectively.



Figure 13. a



13.b

The entrapped ammonia was subsequently titrated against 0.1N hydrochloric acid. The nitrogen content in the sample was then calculated using the following expression:

$$\text{Protein \%} = 30.46\%$$

4.3 Proximate analysis result of flaxseed kurkure

Factors/ parameters(%)	Result
Moisture content	3.65%
Ash Content	3.04%
Crude Fat	1.197%
Crude Fiber	1g
Protein	30.46g
Carbohydrate	60.63g

Table11: Proximate analysis result table.

4.4 Moisture Content:

Moisture content of **flaxseed kurkure** was found to be **3.65%** in proximate analysis.

4.5 Total Ash:

Ash content of **flaxseed kurkure** was found to be **3.04%** in proximate analysis.

4.6 Fat:

The crude fat content of **flaxseed kurkure** was calculated as **1.97%**

4.7 Fiber:

The crude fiber content of **flaxseed kurkure** was calculated as **1%**

4.8 Protein Content:

The Protein content of **flaxseed kurkure** was calculated as **30.46%**

4.9 Carbohydrates:

The Carbohydrates content of **flaxseed kurkure** was calculated as **60.63%**

4.10 Shelf Life Study:

According to our research by doing sensory analysis we observe that the **flaxseed kurkure** has a shelf life of **4 to 5** months at room temperature after 5 months we observe some changes in taste, texture, aroma and flavour
So we observe that it's better to use before 5 month

4.11 SENSORY ANALYSIS GRAPH OF PREPARED PRODUCT

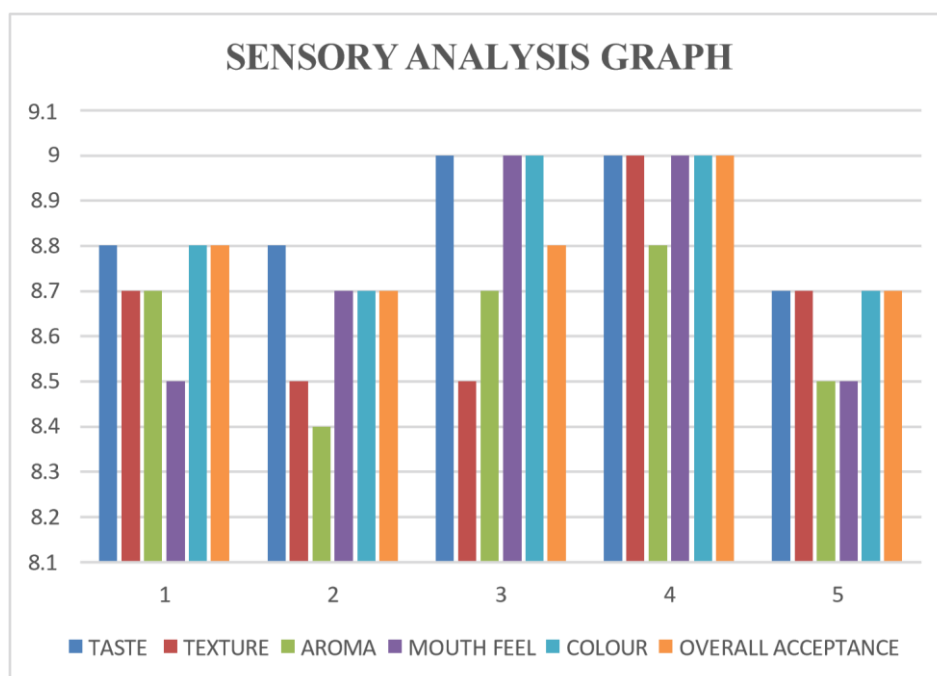


Figure 15: Sensory analysis graph of flaxseed Kurkure.

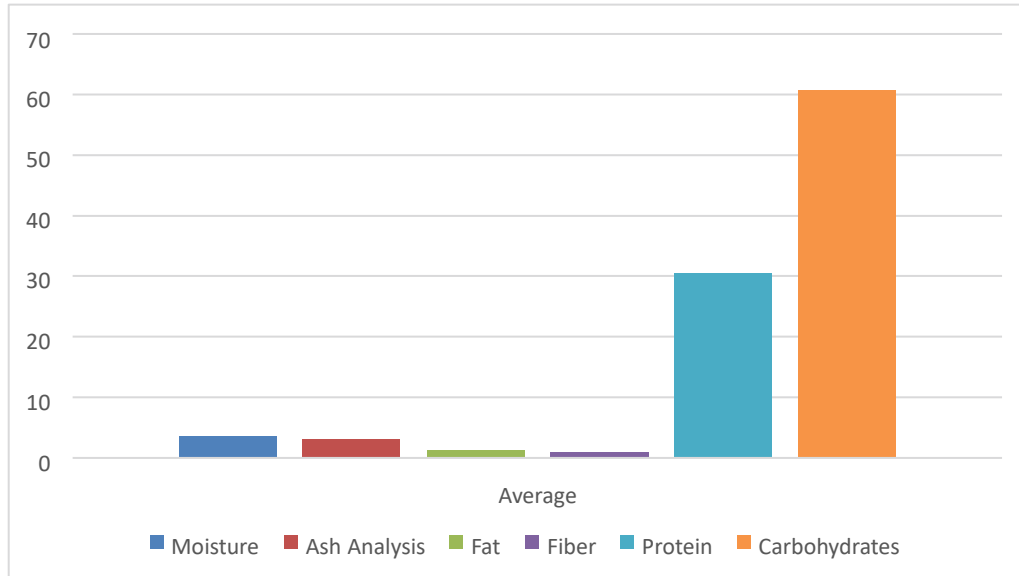


Figure 16. Content Analysis Graph

FINAL PRODUCTS:



V. CONCLUSION

Flaxseed Kurkure isn't just a snack; it's a delightful fusion of tradition and health, a symphony of flavors and nutrients. By seamlessly blending the beloved Kurkure with the nutritional powerhouse of flaxseeds, this recipe redefines the concept of indulgent snacking. It's a testament to the fact that healthy can be incredibly delicious. Every bite offers a burst of crunchy texture, bold flavors, and a dose of essential nutrients like omega-3 fatty acids, fiber, and antioxidants. This recipe is more than just a snack; it's a celebration of wholesome indulgence. It's a perfect companion for those seeking a guilt-free treat, a healthier alternative for kids, and a delightful surprise for health-conscious adults. So, let's embrace the goodness of Flaxseed Kurkure, a snack that not only satisfies cravings but also nourishes the body and soul. Think of Flaxseed Kurkure as a culinary masterpiece that marries the best of both worlds: the irresistible crunch and flavor of traditional Kurkure with the incredible health benefits of flaxseeds. It's a snack that not only satisfies your taste buds but also fuels your body with essential nutrients. Imagine enjoying a snack that's not only delicious but also supports your overall well-being. Flaxseed Kurkure is that snack. It's a guilt-free indulgence that you can feel good about eating, knowing that you're nourishing your body while satisfying your cravings. Flaxseed Kurkure isn't just a snack; it's a delightful fusion of tradition and health, a symphony of flavors and nutrients. By seamlessly blending the beloved Kurkure with the nutritional powerhouse of flaxseeds, this recipe redefines the concept of indulgent snacking.

It's a testament to the fact that healthy can be incredibly delicious. Every bite offers a burst of crunchy texture, bold flavors, and a dose of essential nutrients like omega-3 fatty acids, fiber, and antioxidants. This recipe is more than just a snack; it's a celebration of wholesome indulgence. It's a perfect companion for those seeking a guilt-free treat, a healthier alternative for kids, and a delightful surprise for health-conscious adults.

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