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PRODUCT DEVELOPMENT: JACKOR BITES PREPARED FROM JACKFRUIT FLOUR AND JOWAR FLOUR FOR DIABETES MELLITUS PATIENTS BETWEEN THE AGE GROUP 35-45 YEARS

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Abstract: Jackfruit is a member of the Moraceae family. According to reports, the fruit has a variety of nutrients. In addition to essential micronutrients like vitamins B and C, it provides a significant amount of macronutrients including fat, protein, and carbohydrates. Jackfruit flour absorbs a considerable quantity of iron, dietary fiber, thiamine, riboflavin, and Vitamin A. It also contains anticancer, antifungal, antibacterial, anticancer, hypoglycemic, and wound-healing effects. Additional benefits of this food include it has gluten-free properties. The nutritional, sensory, and microbiological evaluation of jackfruit flour was done to make fried and baked snack items. Monitoring the effects of these two extremely strong nutrients was therefore the main objective. The finished product was a savory snack with a dark brown color, and a flaky, crunchy, crisp, and smooth texture. It also had a lot of nutritional value.

Keywords: Jackfruit flour, Diabetes, Functional food products, Minerals, Crunchy, Savoury

I. INTRODUCTION

A member of the Moraceae family is the jackfruit, Artocarpus heterophyllus. Numerous nutrients are included in the fruit. In addition to sources of vitamins B and C, it also has a good amount of fat and protein. Jackfruit flour has a considerable amount of starch, dietary fiber, iron, and vitamin A (Swami et al, 2012). The chemical composition of jackfruit varies depending on the cultivar. Compared to other tropical fruits, jackfruit flesh and seeds are higher in protein, calcium, iron, and thiamine. A study found that mature jackfruit had higher levels of vitamins and nutrients than apples, apricots, avocados, and bananas (Tiwari A.K., Vidyarthi A.S, 2010). It has been demonstrated that the jackfruit perianth and seed contain a high amount of starch by several chemical and histological studies. As the flesh ages, it gains more fiber and carbs (Rahman et al, 1995). Among the amino acids present in jackfruit are arginine, cystine, histidine, leucine, lysine, methionine, threonine, and tryptophan. 1.9 g of proteins are present in 100 grams of mature jackfruit flesh. Jackfruit has a lot of vitamin C in it. It also has very good concentrations of folic acid, niacin, B6 (pyridoxine), riboflavin, and riboflavin. It is one of the few fruits that are high in the B-complex vitamin family. According to the study, there are no obvious changes between the different fruit portions in the jackfruit's fiber content, which ranges from 0.33 to 0.40%. According to sources, the fiber concentrations of ripe and immature jackfruit are 0.8% and 2.6%, respectively. Another study found that the fleshes of various varieties of jackfruit had fiber contents that varied somewhat, from 0.50 to 0.90% (Goswami et al, 2011).

Globally, the prevalence of type 2 diabetes mellitus (DM), a chronic metabolic disorder, has been steadily increasing. People with type 2 DM are more likely to experience short-term and long-term issues, many of which cause early death. The frequency, covert onset, and delayed diagnosis of type 2 DM make patients more likely to suffer from morbidity and mortality, especially in underdeveloped countries with limited resources like Africa. Insulin insensitivity is a feature of type 2 diabetes brought about by insulin resistance, decreased insulin production, and finally failing pancreatic beta cells. As a result, the liver, muscle, and fat cells receive less glucose (Olokoba et al, 2012). Increased blood insulin levels are a defining feature of chronic hyperglycemia, generally referred to as Type 2 Diabetes Mellitus (T2DM) (hyperinsulinemia). When the blood glucose level is 100 milligrams/deciliter, the bloodstream of an average adult contains approximately 5–10 grams of glucose. Obesity and type 2 diabetes have been successfully treated with carbohydrate-restricted diets for more than a century. This achievement might easily be explained by a decrease in the amount of food intake that contributes to blood sugar and insulin levels, which leads to improvements in hyperglycemia and hyperinsulinemia (Westman,2021).

People with type 2 diabetes can include jackfruit flour in their diets because it has been found to have a low glycemic index and low glycemic load. It has been proven that jackfruit flour may easily replace wheat flour, making a low-gluten diet more feasible. Green jackfruit was studied and appraised for its nutritional and glycemic value as a rice substitute for diabetics in Kerala. The findings revealed a decline in the demand for diabetes medications during the jackfruit season (Joseph, 2019).

2. MATERIAL AND METHODS

2.1 Raw Materials

Jackfruit flour is the main component of this specific food item. The flour is extremely anti-diabetic, high in fiber, and gluten-free. Jowar flour has been included as the second key ingredient in addition to jackfruit seed flour. Since jowar flour is gluten-free, it also exhibits anti-diabetic properties. The binding of the flour is aided by rice flour. The product's protein content is increased by the addition of roasted peanuts and roasted Bengal gram. Healthy fat is provided by dry coconut. In addition to adding flavor and perfume to the product, sesame seeds also provide calcium advantages. Curry leaves enhance the product's scent and has antimicrobial and anti-fungal properties. that helps maintain the shelf life of the product.

Ingredients	Amount
Jackfruit Flour	40gm
Jowar Flour	40gm
Rice Flour	10gm
Roasted Bengal gram	20gm
Roasted Peanut	20gm
Dry coconut	10gm
Sesame seeds	10gm
Curry leaves	Few
Salt	To taste
Red chilli powder	To taste
Jeera	5gm
Baking soda	A pinch
Oil	10ml

Table 1. provides the complete ingredients list along with their amounts

2.2 PROCEDURE/FORMULATION OF THE PRODUCT

Starting with the masala. Prepare by grinding roasted peanut, Bengal gram, jeera, dry coconut, and curry leaves. Prepare the dough by mixing jackfruit seed flour, jowar flour, rice flour, prepared masala, sesame seeds, salt, and red chili powder. Heat a little oil and slowly add it to the mixture. Bind it properly. Adding water little by little as per requirement and binding the mixture in a dough. Flattening the dough with a rolling pin and cutting it into the desired shape. Heat oil in a Kadai. Add the bites and remove them immediately after it changes color. Bites are ready to be served. Storing in an air-tight container in a dry place.

Ingredient	Amount	Energy (kcal)	CHO (g)	Protein (g)	Fat (g)	Fibre (g)
Jackfruit flour	40gm	148	30	3	0.4	7
Rice flour	10gm	33	6	1	0.2	0.4
Jowar flour	40gm	133	26	4	0.8	1.4
Roasted Bengal gram	20gm	66	6.5	2.5	0.2	2.2
Roasted Peanut	20gm	100	3.4	4.8	7	2
Dry coconut	10gm	66	0.8	0.6	6	1.6
Oil	10ml	90	-	-	10	-
Sesame seeds	10g	20	-	1.5	1	1.16
Total	160g	656k	72g	18g	25g	17g

Table 2. Nutritional Value of Total Ingredients

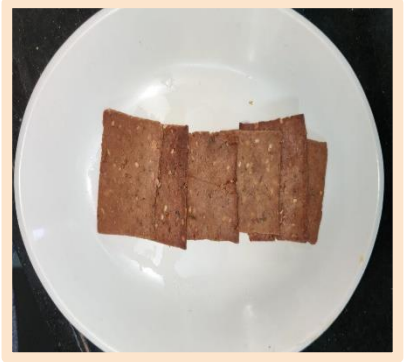
Table - 3

Ingredient	Amount	Energy (kcal)	CHO (g)	Protein (g)	Fat (g)	Fibre (g)
Jackfruit flour	15gm	55.5	11.2	1.1	0.1	2.6
Rice flour	5gm	16.5	3	0.5	0.1	0.2
Jowar flour	15gm	49.8	9.7	1.5	0.3	0.5
Roasted Bengal gram	10gm	33	3.2	1.2	0.1	1.1
Roasted Peanut	10gm	50	1.7	2.4	3.5	1
Dry coconut	5gm	33	0.4	0.3	3	0.8
Oil	5ml	45	-	-	5	-
Sesame seeds	5gm	10	-	0.7	0.5	0.5
Total	70gm	293k	29.2g	7.7g	12.6g	6.7g

Table - 3 Nutrition value per serving – Per serving size 70g

3. RESULT AND DISCUSSION

The product, "Jackor Bites" so obtained was a dark brown color, a savory snack, flaky, crunchy, crisp, and smooth in texture, along with having significant nutritional benefits. The Physicochemical properties of jackfruit seed flour have been depicted in Tables 2 and 3, indicating that it is a good source of carbohydrates, protein, and fiber content. The additional benefits of this product are gluten-free proteins, low glycemic index, and richness in bioactive compounds which makes them a suitable healthy food. Also, Jackfruit flour is rich in nutrients including carbohydrates, and proteins, as well as vital micronutrients like vitamins B and C. A significant amount of iron, dietary fiber, thiamine, riboflavin, and Vitamin A are assimilated by jackfruit flour along with phytochemicals, anti-carcinogenic, anti-diabetic, antimicrobial, antifungal, anti-inflammatory, wound healing, and hypoglycemic effects. The product as it is high in fiber thus, it lowers total blood cholesterol levels by lowering low-density lipoprotein, or "bad," cholesterol levels. Also, it helps in digestion and prevents constipation.



Jackor Bites

3.1 Sensory Evaluation

Results of Sensory evaluation of "Jackor Bites", prepared with different formulation of jackfruit flour and Jowar flour after baking and frying. Thus, it was taste-tested. The nine-point hedonic rating scale was used to create the score record card. A panel of judges assessed the samples for color, texture, flavor, mouthfeel, and general acceptability. The Sensory analysis table displays the findings of a sensory analysis of fried and baked jackfruit with jowar flour. More acceptable was determined to be the score for color, texture, taste, and mouth feel.

Attributes	9 Like extremely	8 Like very much	7 Like mode rately	6 Like slightly	5 I neither like nor dislike	4 Dislike slightly	3 Dislike modera tely	2 Dislike Moderat ely	1 Dislike extrem ely
Appearance		✓							
Flavor/taste	✓								
Aroma		✓							
Texture	✓								
Mouthfeel	✓								
Overall acceptability		✓							

Table 4. Sensory Analysis of Jackor Bites

3.2 Microbial Analysis:

All processes on Earth depend on microorganisms and their activities. All living things that are too small to be seen with the naked eye are the subject of microbiology. Algae, viruses, fungi, bacteria, archaea, and protozoa are included in this. referred to as microorganisms as a group.

Utilizing biological, biochemical, molecular, or chemical approaches for detection, and microbial analysis of food products uses these techniques. microorganism detection in a substance

The microbial analysis was performed for the product.

The procedure included:

3.21 Spread Plate Method:

In the spread plate technique, a small amount of bacteria suspended in a solution is applied over a plate using a spreader with a flat surface made of metal or glass that has been sanitized. The plate must be dry and at normal temperature, for the agar to absorb the bacteria. A countable quantity of isolated bacterial colonies uniformly spaced across a spread plate indicates success.

Advantages: Heat-sensitive microbes are not affected.

3.22 Pour Plate Method:

Pour plate techniques have been utilized widely with bacteria and fungus and will also produce isolated colonies. The initial sample is diluted many times to adequately lower the microbial population for the plating of distinct colonies. By briefly being exposed to warm agar, the majority of bacteria and fungi will not be killed. cultivate clean cultures. Fresh media might be contaminated with colonies growing on the surface or below the ground.

Advantages: Easy to undertake.

Useful for counting viable colonies

Result obtained:

Petri dish A showed TLTC (Too low to count)

Petri dish B showed 0 or negligible colonies

Shelf life:

The formulated product was stored in an air-tight container to avoid any contamination and test the shelf life. It was found that the product sustained for 1 month after which the color and texture seemed to fade away.

From the above, it can be concluded that Jackor Bites made or produced showed very low microbial growth hence it can be said that it is safe to consume and has a shelf life of 1 month without using any preservatives or additives.

4. CONCLUSION:

Traditional Indian ingredients were employed. As a healthier alternative to other crackers on the market, the product is a great snack.

Low fats are a result of the extremely low oil content. Since all of the ingredients are less expensive, it is affordable. There are no additional additives. The product is made with jackfruit seeds, chana, and peanuts. a lot of fiber and protein. Suitable for snacking on. Extremely prolonged shelf life.

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